



REDUCING
HOUSING
INEQUALITIES

National reports on the regulatory system of environmental and energy policies

ReHousIn Deliverable 3.2

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The ReHousIn project aims to spark innovative policy solutions towards inclusionary and quality housing. To achieve this, it investigates the complex relationship between green transition initiatives and housing inequalities in European urban and rural contexts, and develops innovative policy recommendations for better and context-sensitive integration between environmentally sustainable interventions and socially inclusive housing.

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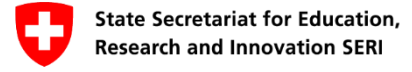


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INTRODUCTION

D3.2 examines the economic mechanisms, norms, and institutional and contextual factors that shape the Energy and Environmental Policies (EEPs) in nine selected countries from 1990: Austria, France, Hungary, Italy, Norway, Poland, Spain, Switzerland and the United Kingdom (Figure 1). The main objective is to provide a national assessment of EEPs regulatory systems in the nine countries, with a focus on housing retrofitting, nature-based solutions, and densification policies. A policy analysis approach is adopted, relying on different methods for data collection: a) the collection of grey and scientific literature, acts, regulations and policy assessments; b) interviewing 8-10 key-policy actors in the participants' countries, including policy makers, public agencies, NGOs; c) policy lab 1 organized in each country with the participation on national and local policy makers, NGOs, civil society and activist groups and academics and other experts in housing and environmental policies.

Each national report follows a common outline, organized into seven sections. The first two sections provide an executive summary and an introduction and methodology. The third section outlines the general governance systems of the selected country. The subsequent three sections focus respectively on housing retrofitting, nature-based solutions, and densification policies in the national context. Each policy area is investigated through key transversal aspects including the emergence of the issue and related policy decisions, the implementation process, the size and role of the market, the multilevel governance framework, and achievements, assessments, and challenges. The final section provides an overall synthesis and discussion of changes in EEPs at the national level along with possible relations and trade-offs between EEPs and housing inequalities. Deliverable D3.2. presents the main elements of the three sections respectively devoted to housing retrofitting, nature-based solutions, and densification policies in the national context.



Figure 1. Overview on the nine selected countries. Source: ReHousIn website.

As a common reference for the nine countries, a note is prepared on the analysis and assessment of the EU regulatory system affecting EEPs, particularly in relation to the Green Deal. Below are some hypotheses and transversal issues that guided the elaboration of a common analysis grid and the subsequent comparison of national contexts and may be refined throughout the writing and review process:

- Over the past decades, the commodification of housing—characterised by increased extractive pressure on rent—has played a significant role, albeit with important variations, across different countries. A central research question is to understand when and why Energy Efficiency Policies (EEPs) reduce or exacerbate the perpetuation or growth of inequalities, and through which social mechanisms. EEPs may contribute to inequality when they fail to consider the structural impacts of housing commodification due to factors such as ideological stances, austerity measures, prioritization of sustainability, or the inherent autonomy and inertia of policy instruments. In these scenarios, market dynamics and price mechanisms become the primary drivers of social outcomes.
- In countries with a marginal level of public rental and low level of market rental housing (Central Europe) commodification processes are less relevant (the housing stock is practically commodified). In a super-ownership environment, in addition to the low dynamics of implementing EEPs the housing inequality outcomes appear slowly as well in a moderated form.
- The EU regulation has often been a decisive tool in shaping some policy areas, particularly the energy environment. However, several countries have anticipated certain engagements and policy areas. The resulting policy cartography is varied and contributes to the double process of uploading and downloading of policy regulation. Still, the role of the EU seems crucial in setting agenda, financment and goals.
- Market-led interventions are all but negligible but hindered by major barriers. However, some have affected countries' legislation through the action of intermediaries, lobbies and parties with sectional and sometimes general effects. Still, market inspired legislation fails to address low-income households.
- Additional hypotheses concern the rise of frictions among stakeholders, conflicts and controversies in the implementation of EEPs, particularly the lack of coordination between sectoral policies. Who are the main actors in creating and implementing retrofitting policies, and how their interests converge or diverge?
- In some cases, corrective public policies may have successfully mitigated inequalities or produced fewer unequal outcomes. If such cases exist, examining the policy tools and social mechanisms that enabled these corrections is crucial. Typically, these interventions align with conventional strategies addressing housing market failures—a field that has been in decline—including public housing provision, rent control, and socially oriented subsidies.
- Increasingly, however, local experiments and voluntary organizations have attempted to address EEPs through fragmented approaches that reflect the political contexts of many countries. These local initiatives often embody innovative elements or serve as exemplary models, potentially paving the way for broader policy adoption and generalization (this primarily pertains WP5, though the outcomes will be assessed as they unfold).

Key comparative criteria for national reports that will be crucial in developing D3.3 include:

- The impact of the privatization process on housing inequalities as influenced by EEPs.
- The balance between market and institutional forces, policy tools, and the distribution of benefits.
- The role, autonomy and effectiveness of local authorities in addressing housing inequalities shaped by EEPs.
- Contradictions, lack of coordination, and conflicts among various actors, levels of governance and sectoral policies.
- The spatial impact of these processes across different territorial scales: local, regional, and subnational.
- Identification of corrective, innovative, or experimental measures that can reduce housing inequalities.

COUNTRIES' SUMMARIES

Austria

Austria's governance system is characterised by a strong federal structure. The national government sets strategic goals, transposes EU directives, and manages key funding programmes. Federal states hold legislative power over housing subsidies, building standards, spatial planning, and nature conservation. Hence, at the federal state level, territorial differences exist in the design and formulation of housing, retrofitting, nature-based solutions and densification. Municipalities, though institutionally weaker, play a critical role in land-use regulation and the delivery of densification and greening projects. Retrofitting has evolved from a technical focus to a climate and energy-cost strategy with mostly financial incentives, but implementation is hindered by governance fragmentation and legal barriers in multi-owner buildings. NBS policies have broadened to include urban cooling and health, but implementation varies widely, with smaller municipalities facing capacity issues and limited social-environmental coordination. Densification has become a key urban policy, yet land protection efforts lack cohesion, and smaller municipalities depend heavily on market-driven growth. Overall, for Austria, where incentives remain the primary policy tool, governance fragmentation, challenges to vertical coordination, and limited regulatory integration hinder policy coherence and equity.

France

Housing retrofitting has mainly on incentive-based tools and, recently, direct subsidies have prioritized owner-occupiers. Social housing has received limited funding, despite specific envelopes. Although local authorities have progressively gained competencies, their role remains mainly focused on support and coordination within a vertically structured governance system. The institutionalisation of NBSs is relatively recent, still lacks a common reference, and is generally integrated into broader biodiversity strategies. The absence of shared regulations and targeted funding makes local implementation particularly complex and uneven. Despite growing traction at national and international level, NBSs face considerable challenges on the ground. Densification policies emerged in the 2000s alongside urban regeneration strategies and efforts to counter urban sprawl. More recently, the focus shifted towards zero land artificialization and the preservation of open and agricultural areas. Densification policies are still applied unevenly, facing national-local tensions and influenced by local political will. Overall, implementation of ecological transition policies remains challenging, hindered by political instability, budgetary constraints, and global crises. Recent regulations have also triggered forms of backlash or resistance.

Hungary

The housing inequality consequences of green policies are rarely discussed and recognised in the Hungarian political and scientific discourses. There are several reasons behind, like the low level of implementation of green policies (e.g. large-scale energy efficient housing

renovation interventions were completed in the 2000s and hardly continued since then, densification is not considered a green policy and is not consistently implemented, nature-based solutions aim to increase the popularity of urban spaces on rather small scales more than their ecological functions). Also the fact, that private ownership in the housing sector is around 97% and the local municipalities have limited roles, funds and capacities due to the centralisation process since 2010, housing impacts of green policies are governed by market forces. This fact leads to patchwork interventions in the urban structures and slows down the social mobility processes.

Italy

The report presents Italy's policy and governance framework for the ecological transition, as analysed within the framework of the ReHousIn project, focusing on housing retrofit, nature-based solutions (NBS), and urban regeneration. As regards housing retrofit, incentive-based policies – primarily tax deductions since the late 1990s and recent investments linked to the NRRP – have driven renovations but primarily benefited owner-occupied and higher-income households, with limited impact on the public housing stock. To address this gap, targeted funding was later introduced by the national government through the National Complementary Plan (PNC), first and foremost through the *Sicuro, Verde, Sociale* programme. NBS have gained traction within national and regional strategic documents in recent years, however, their implementation remains fragmented and is only marginally integrated with housing policies. Urban densification is rarely addressed explicitly in the Italian policy discourse, while urban regeneration (*rigenerazione urbana*) has emerged as a key policy field over the past two decades, with regional and national programmes (such as, most recently, the PINQuA) supporting housing retrofit and the regeneration of neighbourhoods more widely. A further strand of regeneration, which typically involves densification, occurs through large-scale, market-led redevelopment, usually involving brownfield sites and negotiated planning instruments, while plot-level densification occurs via standard planning tools.

Norway

Energy retrofitting has progressed slowly despite growing political attention since the mid-2000s. National action plans and financial schemes (e.g., Enova and Husbanken) support improvements in energy efficiency, but without legal mandates or targeted subsidies. This limits access for low-income groups and tenants, reinforcing socioeconomic disparities and exposure to energy poverty. NBS entered national policy frameworks around 2009 and gained momentum through the 2018 and 2024 planning guidelines. While increasingly visible in urban planning, NBS implementation varies widely across municipalities and lacks safeguards against green gentrification, particularly in high-value urban areas. Densification, formalized in national planning law in the 1980s, has become central to urban development strategies. However, its implementation is largely market-driven and seldom includes affordability provisions, often exacerbating exclusion in central locations. The report highlights persistent governance fragmentation and weak policy coordination as key barriers to equitable environmental transitions.

Poland

Poland's Environmental and Energy Policies have evolved significantly, driven by EU directives, environmental concerns, and energy security needs. Since 2016, regulatory reforms, including the Energy Efficiency Act and the Clean Air Programme, have aimed to reduce emissions and improve energy performance, particularly in the residential sector. While EU funding and national subsidies support retrofitting efforts, regional disparities, limited local capacity, and fragmented governance hinder effective implementation. Urban areas face rising retrofit costs, and worsening affordability, while rural areas often lack access to support programs. Improving local governance, enhancing coordination between national and local actors, and targeting vulnerable populations are essential to achieving inclusive, efficient, and equitable housing outcomes across Poland. Finally, the report explores densification strategies aimed at curbing urban sprawl, improving infrastructure use, and promoting sustainable city growth. It emphasizes the need for stronger coordination, simplified procedures, and integrated planning to accelerate progress toward national and EU climate goals.

Spain

Retrofitting initiatives, strongly shaped by the EU's Energy Performance of Buildings and Energy Efficiency Directives, have improved energy efficiency and reduced emissions through instruments such as the Technical Building Code and PREE subsidies. However, implementation has been uneven across regions, with mounting evidence of gentrification and broader affordability concerns. Spain's NBS policies, grounded in Law 33/2015 and the National Strategy for Green Infrastructure, have supported ambitious municipal projects in Barcelona, Vitoria-Gasteiz, and Valencia, often financed by EU funds. While these initiatives enhance biodiversity, climate resilience, and public health, they also risk green gentrification and disproportionately benefit middle- and higher-income groups. Densification strategies, embedded in the Urban Planning Law, Climate Change and Energy Transition Law, and Urban Agenda 2030, have promoted compact city models and transit-oriented development as prerequisites for many new residential developments. Despite environmental gains, affordability challenges and displacement pressures persist. The study highlights the strengths of Spain's multilevel governance and EU funding alignment but underscores persistent and growing socio-economic inequalities. More equitable financing mechanisms, improved governance coordination, and stronger protections for vulnerable residents are essential to ensure that the green transition advances both environmental and social justice.

Switzerland

Switzerland is committed to the 1992 Climate Change Convention, the Kyoto Protocol and the Paris Agreement. It passed the CO2 Act in 2000, which sanctions a 10% reduction of emissions by 2010. A CO2 levy on fossil fuels was introduced in 2008. Since 2010 the Buildings Programme provides financial incentives for energy refurbishments. These contribute to the loss of affordable rental housing as improvement costs can be passed on to tenants. NBS related policies are integrated in those focusing on biodiversity conservation, climate change adaptation, and river restoration. In 2012 the Federal Council released a first

Climate Change Adaptation Strategy to promote green infrastructure, open spaces, green and shaded areas to mitigate heatwave impacts, river restoration, and prevention of soil sealing. Municipalities were tasked with implementing climate change adaptation and mitigation measures, with limited funding from the federal government. Accordingly, only few cities are currently implementing NBS, while smaller towns often lack clear strategies. Since 2014 Densification is a key policy goal and legally binding since 2014, but implementation remains slow as significant authority is given to local governments. In cities and tourist regions a combination of restrictive building zones and low interest rates has sparked a construction boom that caused a hike of land and housing prices.

The United Kingdom

In the UK the government's main approach is using legislation and public funding to stimulate private market solutions for the delivery of green initiatives. This approach can produce trade-offs for equity and public benefit. Retrofitting efforts face slow progress as the national Government prioritises small-scale demand-side schemes to stimulate supply, with limited results. Meanwhile the limited public investment, inconsistent delivery and narrow eligibility criteria that characterise these schemes perpetuate existing inequalities, often excluding those most in need. Private and non-profit developers are now mandated to provide NBS through biodiversity net gain legislation, requiring a 10% biodiversity improvement for all new housing development. By linking NBS provision to developer viability, NBS is viewed as a cost and an asset. When used to enhance property values, it channels benefits into the most expensive areas. Equally, developers may seek to offset additional costs by negotiating down planning contributions for affordable homes. Densification in the UK has consistently depended on transferring public land to the private sector, and cross-subsidising affordable housing with private housing provision. This ultimately leads to a net decline in social homes.

NATIONAL REPORT ON THE REGULATORY SYSTEM OF EEPs in AUSTRIA

1 Executive Summary

This report analyses Austria's regulatory and institutional frameworks for environmental and energy policies (EEPs) in the domains of housing retrofitting, nature-based solutions (NBS), and densification. It investigates how these policies are governed across Austria's multi-level federal system, how they have developed and what are the most important actors and policy tools. Furthermore, environmental outcomes, as well as how they intersect with housing policy and social equity concerns form this analysis.

Austria's governance system is characterised by a strong federal structure. The national government sets strategic goals, transposes EU directives, and manages key funding programmes (e.g., NEKP, Energy Efficiency Act). Federal states hold legislative power over housing subsidies, building standards, spatial planning, and nature conservation. Hence, at the federal state level, territorial differences exist in the design and formulation of housing, retrofitting, nature-based solutions and densification. Municipalities, though institutionally weaker, play a critical role in land-use regulation and the delivery of densification and greening projects.

Retrofitting has evolved from a technical efficiency focus to a broader strategy of climate mitigation and energy cost reduction, driven by EU directives, national decarbonisation goals, and recent energy price shocks. Policies mostly rely on market-based instruments, with multiple subsidy programmes supporting energy-efficient renovations and heating system transitions. However, renovation rates remain far below climate neutrality targets, largely due to legal constraints in multi-owner buildings and governance fragmentation. Although financial incentives (especially focussed on owner-occupiers of single-family houses and multi-unit-building owners) dominate, implementation remains fragmented. Even though recent initiatives address energy poverty and support vulnerable households, substantial gaps remain in the rental sector.

NBS policy has expanded beyond biodiversity protection to include climate adaptation, urban cooling, and public health. The latest National Adaptation Strategy (adopted in April 2024) reflects this broadened scope. Nonetheless, implementation is uneven: while larger cities like Vienna leverage zoning tools and building code reforms, smaller municipalities struggle with limited capacity and funding. Coordination gaps between environmental and social planning persist, and concerns over displacement due to greening are currently acknowledged as limited.

Densification has transitioned from an anti-sprawl environmental measure to a core urban strategy aimed at improving land-use efficiency and housing supply. Densification is pursued to reduce land consumption and improve infrastructure efficiency. However, national land protection efforts have faltered due to political resistance at the federal states level. While

zoning for affordable housing in form of new, compact developments has been implemented in large cities, other municipalities are more reliant on market-driven development.

Across all three domains, however, governance fragmentation, challenges to vertical coordination, and limited regulatory integration hinder policy coherence and equity. Financial incentives remain the primary policy tool, with legal instruments and planning mandates underused. The report highlights key trade-offs between climate goals and housing affordability, particularly for renters and low-income households.

2 Introduction and methodology

This national report investigates actors and policy instruments used in environmental and energy policies (EEPs) within the multi-level governance setting of Austria. As with the other national reports of the ReHousIn project, the study focuses on the governance of three key policy areas: housing retrofitting, nature-based solutions (NBS), and urban densification and examines how these policy areas relate to (social) housing policies and housing inequalities. Given Austria's federal state design, we highlighted Vienna's special role as both a municipality and a federal state in our analysis by adding a small section to the assessment of each policy area.

Methodologically, the report builds primarily upon an extensive desk research that includes the collection of legal texts, national policy documents in the form of strategic plans or coalition agreements. Key national-level sources include the National Energy and Climate Plan (NEKP), the Environmental Subsidy Act, the Energy Efficiency Act (EEffG), the national Climate Adaptation Strategy and the Austrian Spatial Development Strategy. Additional documents are public reports, evaluations, and grey literature from relevant institutions and academic literature.

The documents were reviewed and screened by following the themes given by the guidelines of the WP lead. For all three policy areas, these broad themes were: a) policy cycle: emergence of the issue and policy decisions and how these evolved in response to European Union directives, b) the implementation process, c) size and role of the market, d) the multi-level governance process, and e) achievements, assessments, and challenges. A key aim of the document review and screening was to identify policy objectives, institutional actors, including the use of policy instruments, and governance processes cutting across levels. Documents were classified according to policy area (housing retrofitting, Nature-based Solutions, and densification) and level of governance. In a federalist country like Austria, a multi-level governance approach is important and structured the analysis. Along these classifications, documents were screened for policy instruments (e.g., regulatory, financial, informational) and policy goals, with particular attention to the actors governing and/or to be governed at different levels. Attention has also been paid to how the distributed responsibilities across the EU, federal, Länder, and municipal levels, their vertical coordination and horizontal integration shape the relationships between (social) housing – or more generally housing affordability – objectives and environmental objectives.

Based on this initial review and screening, a national policy lab was conducted as part of the ReHousIn project on 25 April 2025. The policy lab hosted 16 participants with representatives of social and private housing providers, representatives of tenant support services, representatives from national ministries (housing, social affairs, environment), representatives from regional administrations and independent experts. The Lab was designed to bring together stakeholders from national, regional, and municipal authorities, alongside actors from the public, limited-profit, and private housing sectors, civil society organisations, and academia. Efforts were made to ensure a diverse mix of expertise and institutional perspectives relevant to housing and climate policy. Discussions focused on how the tension between climate measures and housing affordability is perceived across different governance levels, what challenges exist in aligning environmental and social goals at different policy tiers, but also across cities and municipalities of varying sizes, and what measures are currently being discussed or implemented to bridge these objectives.

In addition to insights gained from the policy lab and extensive desk research, a series of interviews was conducted. While the data obtained from the first two tasks provided a sufficient and in-depth understanding of the actors and policy instruments used in EEPs at the national level and within Vienna's multi-level governance process, a gap was identified at the small- to mid-sized municipal level. This is especially crucial, since municipalities play a crucial role in local implementation, especially in land-use, zoning and densification. For this reason, the interviews focused specifically on questions related to EEPs at this local level and their interlinkages with the EU and national levels. A total of five interviews were conducted in June and July 2025. The interviewees ranged from politicians of small- to mid-sized municipalities (in their role as local zoning authorities) to administrative personnel from these municipalities, as well as representatives from regional management.¹

It should be noted that this analysis found an increasing policy convergence between greening and densification. As the report demonstrates across sections, nature-based solutions and densification are not only co-located in urban policy agendas but are often addressed through shared planning instruments and objectives, such as reducing land take, mitigating urban heat, and increasing liveability. Highlighting this interdependency is crucial for understanding current environmental policy in Austria and should be considered a cross-cutting theme throughout the report.

While the report aims to provide a comprehensive account of Austria's regulatory and institutional landscape up until early 2025, the analysis does not capture policy shifts associated with the formation of Austria's new government, which has operated since March 2025. After the 2019 coalition of the Austrian People's Party and the Green Party, the new coalition comprised the Austrian People's Party (ÖVP), the Austrian Social-Democratic Party (SPÖ) and the NEOS (The New Austria and Liberal Forum), which saw some restructuring in the administration. Most importantly, after an era where the Green Party concentrated climate policy efforts in one ministry, climate-related agendas are situated with the Federal Ministry of

¹ List of interviews conducted: Interview #1 politician of small/mid-sized municipality, 24.6.2025, Gmunden (duration 0:30); Interview #2 administrative personnel of small/mid-sized municipality, 24.6.2025, Gmunden (duration 1:07); Interview #3 administrative personnel of regional management, 15.7.2025, Linz (duration 1:02); Interview #4 administrative personnel of small/mid-sized municipality, 15.7.2025, Gmunden (duration 0:57); Interview #5 politician personnel of small/mid-sized municipality, 15.7.2025, Gmunden (duration 0:55).

Agriculture and Forestry, Climate and Environmental Protection, Regions and Water Management under the lead of the Austrian People's Party.

Facing an ongoing economic recession (since about 2023²) and a potential Excessive Deficit Procedure through the Commission following a general government deficit of 4.7% of the GDP in 2024, the new government has already initiated budget cuts for 2025 and 2026. While these cuts are widespread, many of them will affect climate mitigation and adaptation policies, such as cuts in the renovation wave program amongst others³.

Thus, while the report captures the policy landscape at the time of writing, certain aspects—such as ongoing subsidy reforms or new planning requirements—may change in the short term. In addition, the availability and detail of documents, but also in policies, vary significantly by federal state and municipality, limiting consistent comparisons across Austria. In parts, smaller municipalities and some Länder lack public evaluations or implementation reports, especially regarding NBS and densification measures.

3 General governance system

Austria's governance system is shaped by its formal federal republic state structure, which comprises three levels: national (federal), 9 federal states (Länder), and about 2,100 municipalities. Regulated constitutionally, the federalist principle of Austria divides responsibilities between the national and the federal states (Art. 10-15 B-VG)⁴. The divided responsibilities also entail distributed and shared legislative and executive powers with a complex fiscal revenue-sharing mechanism. While the federation retains exclusive authority/responsibility over areas such as taxation, defence, and foreign affairs, the Länder hold autonomous legislative power in fields not explicitly reserved for the nation (Art. 15, the so-called residual competence). Formally, the federal states have seldom legislation over building regulations, housing promotion (subsidies), matters of spatial and regional planning and development, conservation of nature and landscape protection, amongst others. Given that Austria's nine federal states hold substantial autonomy, especially in housing, spatial planning, and nature conservation, makes them pivotal actors in implementing national strategies and adapting them to regional contexts. Municipalities are responsible for providing local services of general interest, which include municipal infrastructure like primary education, roads, water supply, waste disposal, and leisure and cultural facilities. Based on Austria's social housing tradition, municipalities also provide municipal housing.

Despite the division of power and responsibilities, Austria's federalist system is characterised by a complex financial revenue-sharing mechanism. While most fiscal revenue, including income and value-added tax, is collected at the national level, it is then re-distributed through a complex revenue-sharing mechanism to federal states and municipalities, which the latter find difficult to influence. Because only very limited taxation authority lies with subnational governments, their fiscal autonomy is restricted, which reinforces and highlights federal

² <https://www.wifo.ac.at/en/news/austria-is-in-its-third-year-of-recession/>

³ <https://www.derstandard.at/story/3000000268893/wo-spart-die-regierung-wo-gibt-sie-mehr-geld-aus-die-wichtigsten-bereiche-im-ueberblick>

⁴ <https://www.parlament.gv.at/en/explore/political-system/the-federal-state-of-austria/index.html>

control. The federal government can shape federal state policies through indirect financial levers, despite the possibility of influencing regional law through framework legislation. In sum, this often blurs the lines between shared and exclusive competences. This extends to municipalities, which are typically regarded as junior partners in Austria's governance system, both institutionally and financially, with constrained influence compared to Länder and the federation.

This multi-level governance configuration results in the need for coordination of regulatory and financial policies across all policy levels in the formulation and implementation of housing and environmental policies in the domains of retrofitting, nature-based solutions (NBS), and urban densification. Despite established coordination mechanisms like Article 15a agreements, federalism hinders rather than enables efficient climate mitigation policy in Austria, while there is tentative evidence that the current governance set-up might not be so hindering in adaptation policies (Brad et al. 2023, Steurer et al. 2020, Steuer and Clar 2017). Climate policy, therefore, is rather fragmented and incremental. According to the report of Brad et al. (2023), this fragmentation is rooted in conflicting interests between the federal government and federal states, but also territorial disparities in capacity and resources. Especially in smaller municipalities, capacities and resources are limited. Furthermore, the climate policy landscape in Austria relies heavily on “soft” instruments such as voluntary measures, market-based tools, and advisory services, rather than effective legislative policies and binding planning instruments (Brad et al., 2025).

The following provides a short summary of the governance system for housing and three selected energy and environmental policies, housing retrofits, nature-based solutions and densification – including a summary table below (Table AT1).

Housing. In housing, the national government regulates core frameworks like the Condominium Act, Tenancy Law, and the Limited-Profit Housing Act, of which the latter plays a critical role in Austria's affordable housing system. However, direct competencies in housing subsidies were fully transferred to the federal states in 1989 (Friesenecker and Litschauer 2022). The 2017 fiscal equalisation reform converted housing subsidy taxes into a pure federal state levy, based on half a per cent of the wage bill paid by employers and employees (Amann et al. 2023). The earmarking of these funds, which was already abolished in the 2000s, is not part of the federal state levy either. Federal states can use these revenues for whatever purposes. Hence, the federal states legislate and administer housing subsidies for newly built subsidised housing (often provided by limited-profit housing associations), but usually also include subsidies for supporting retrofitting and housing allowances. Each federal state has its own Housing Subsidy Act or equivalent, setting out subsidy criteria and technical requirements, including energy efficiency. Federal states, therefore, became crucial actors in housing provision. Federal states are also responsible for framework legislation in spatial planning, for instance, introducing zoning categories for subsidised housing. Municipalities, as the most localised governance level, are responsible for spatial development plans, zoning regulations, and building permits. Their actions have direct implications for all three environmental policy areas.

Retrofitting. At the national level, the federal government is primarily responsible for setting strategic policy frameworks, passing federal legislation, and allocating financial resources.

Several federal ministries develop national strategies and funding instruments, such as the National Energy and Climate Plan (NEKP), the Environmental Subsidy Act, and the Energy Efficiency Act (EEffG). Federal law also transposes EU directives, such as the Energy Performance of Buildings Directive (EPBD), into national regulatory frameworks. Recently, the national level has developed numerous financial schemes like the “Sanierungsoffensive” which provides subsidies for thermal renovations; “Raus aus Öl und Gas” that promotes the replacement of fossil fuel heating systems; and “Sauber Heizen für Alle” which targets low-income households. However, as noted above, budget cuts with the new government might impact these programs substantially. These publicly funded financial tools, which operate through market mechanisms by incentivizing private investments in renovation and heating system upgrades, are complemented by information-based tools, like klima:aktiv, a consulting and good-practice network.

Federal states, on the contrary, are responsible for applying EU energy efficiency regulations in building codes and defining the conditions under which subsidies are granted. Nonetheless, through Article 15a agreements of the Federal Constitutional Law, the national level continues to shape minimum environmental standards and coordinates with federal states on energy efficiency. The OIB (Austrian Institute of Construction Engineering) coordinates technical standards, but implementation depends on each state's legal frameworks and budget priorities. The ambition and stringency of implementation vary widely across states. For example, Vienna, Lower Austria, Salzburg and Tyrol have more demanding standards in their subsidy schemes (aligned with or exceeding OIB-Guideline 6), while other federal states might not. Municipalities influence outcomes through local enforcement of building codes, and – often in bigger municipalities and cities – provide district heating networks, and technical advisory services necessary for the decarbonisation of heating systems.

Nature-based Solutions. The federal role regarding Nature-based Solutions (NBS) is less regulatory and more strategic and supportive. The Austrian National Adaptation Strategy (NAS) serves as the main policy document, though it is non-binding. Federal ministries support implementation through stakeholder dialogues (e.g., KLAR! regions), knowledge production through research funding, and the administration of EU-financed funds such as the Biodiversity Fund.

The federal states are the legislative authorities for spatial planning and nature conservation. Hence, they have to translate the goals of the National Adaptation Strategy into their own adaptation plans and conservation laws. For instance, states like Vienna have integrated adaptation and NBS objectives into urban development plans and zoning regulations. Funding for NBS projects often originates at the federal state level, municipal level or comes from a combination of state, municipal, and EU sources. Municipalities are the principal implementers. They are responsible for maintaining green and open spaces, regulating tree planting, and adapting local infrastructure. Zoning plans can include specific mandates for façade greening, permeable surfaces, or minimum green space quotas. Especially, bigger cities like Vienna and Linz have recently updated their zoning and building codes to mandate greener buildings and integrate sponge city principles.

Densification. As with NBS, in the densification policy area, the federal level's role is indirect, mainly through national spatial development concepts, stipulating building cultural guidelines

(*Baukultur*) and broader sustainability objectives. However, densification decisions are primarily governed at the federal state and municipal levels through spatial planning laws and zoning.

Planning laws at the federal state level govern land-use allocation and development guidelines. Federal states establish the legal framework for zoning, designate priority development zones, and may introduce incentives for infill development. However, the application of these instruments is typically delegated to municipalities. Therefore, municipalities lead the implementation of densification, albeit with constraints. Through zoning plans and development controls, they manage infill development, mixed-use zoning, and brownfield redevelopment. While densification supports climate goals by reducing land consumption, it often conflicts with local political interests and public opposition. Municipalities must balance housing supply, environmental protection, and community resistance.

	Housing	Housing retrofitting	NBS	Densification
National level	Mainly Legislation (Tenancy Law, Limited-Profit Housing Act, Condominium Act)	Climate mitigation strategies National retrofitting and heating system changeout subsidies Transposition of EU Directives Knowledge production, networking and awareness raising instruments	National Adaptation Strategy (NAS) awareness campaign and research funding Networking efforts and support Limited regulatory role except for waterways	National Spatial Development Concept Indirect influence through sustainability targets Financial infill and densification incentives
Federal state level (Länder)	Main responsibility for housing subsidies and regulation via regional Housing Subsidy Acts Spatial Planning and building code frameworks	Provides and manages housing subsidies for retrofitting Enforces building standards (OIB-guidelines) Regional climate strategies	Legislation and implementation of spatial planning and nature conservation laws Regional adaptation strategies and subsidy frameworks for NBS.	Legislation and implementation of spatial planning and nature conservation laws Densification programmes and subsidies
Municipal level	Defines local zoning and development plans Negotiates building projects and provides building permits	Executes municipal retrofitting projects	Main implementation level for NBS Maintains green infrastructure	Defines zoning and development plans Governs infill development Aligns (urban) greening with densification Balances competing land uses

Table AT1. Multilevel governance of housing, energy retrofitting, NBS and densification in Austria

4 Housing retrofitting

4.1 The policy cycle: emergence of the issue and policy decisions

Since the 1990s, Austria's energy and housing policy has gradually shifted from a focus on energy savings and fuel switching toward climate-oriented renovations and decarbonization, largely driven by **EU accession (1995)** and subsequent EU directives. Key shifts include the adoption of the **Environmental Subsidy Act (1993)** and later the **Federal Climate Strategy (2002)**, which aimed to integrate climate goals into housing subsidies and building standards. The **EU's Energy Performance of Buildings Directive (EPBD)** prompted coordination through **15a agreements** and the development of **nationwide building standards (OIB)**, though implementation remained fragmented due to Austria's federal structure. More recently, the **NEKP (2024)** and **EEffG** reflect a stronger commitment to retrofitting, energy efficiency, and addressing energy poverty, particularly under the influence of the EU Green Deal and rising energy prices.

Reviewing the origins, Austria's energy and housing policies connected to retrofitting go back to the global oil crisis of the 1970s, which resulted in Austria's membership in the International Energy Agency (IEA) in 1974 and its requirements for systematic energy programmes and energy reserves. In 1975, the federal government presented its first **Energy Plan (Energieplan)**. For the building sector, this energy plan and its subsequent amendments focused on a shift in energy sources for heating systems from oil to gas and coal, and more efficient heat energy usage through improved building insulation and heating system maintenance. In the oil crisis context, Austrian citizens were incentivised to lower heating energy consumption through the promotion of centralised heating systems over individual ones, along with consumption-based (instead of flat-rate) billing and financial incentives for efficient energy use. The comprehensive **Energy Report** of 1984, based on then-consolidated energy organisations (such as the **Energieverwertungsagentur EVA**, today: **Austrian Energy Agency**) and scientific findings, defined key energy policy goals: supply security, economic efficiency, and social and environmental compatibility. This expansion of policy objectives was a response to growing environmental awareness and public protests, such as the 1978 referendum against nuclear energy and the 1984 protests against hydroelectric power plants.

As the legal basis of energy policy was not clearly assigned to either the federal government or the nine federal states in the Federal Constitutional Law (Bundesverfassungsgesetz), agreements according to Article 15a (Art. 15a B-VG agreements) regulate until today the competences and implementation procedures on energy between the state and the federal states. For housing subsidies, all competencies have been with the federal states since 1988/89. Since the use of housing subsidies was entirely given to the federal states, a 15a agreement between the federal states and the federal government specifies common environmental quality standards for housing subsidies. In 1980, an essential step towards nationwide energy policy coordination was the **15a-Agreement on Energy Savings (Vereinbarung über die Einsparung von Energie, BGBl. 351/1980)** between the federal

government and federal states, mandating reductions in heating energy consumption through insulation and modern heating systems. Federal-level policy included adjustments to the Tenancy Law (MRG, Mietrechtsgesetz), the Limited-Profit-Housing Act (Wohnungsgemeinnützigkeitsgesetz), and the Condominium Act (WEG, Wohnungseigentumsgesetz). A key measure in terms of implementation was the **Federal Housing Renovation Act** (WSG, Wohnhaussanierungsgesetz) in 1984, which set the legal basis for subsidies of housing renovations (incl. thermal refurbishment), and for the federal states to later adopt their own housing renovation acts and renovation subsidies schemes. Despite the 15a agreement and federal standardized minimum thermal transmittance limit (k-value), by the early 1990s Austria lacked a uniform national standard, with varying building code ambitions depending on the federal states' political priorities on energy and the more and more prominent climate issue (Lang & Energieverwertungsagentur, 1985: 82). While especially energy savings related to building sector and household energy consumption dominated the energy discourse until the early 1990s, Austria's 1995 EU accession and its preparatory phase shifted the discourse. European requirements for energy market liberalization and sustainable energy supply became more relevant.

In 1993, the **Austrian Environmental Subsidy Act** (Umweltförderungsgesetz) was adopted to align with EU environmental regulations in preparation for its EU accession and to respond to global climate agreements, including early discussions on greenhouse gas reductions (that later led to the Kyoto Protocol in 1997). Until today, the act serves as a key legal framework for environmental subsidies and funding programs aimed at reducing pollution, increasing energy efficiency, and promoting sustainable infrastructure. Through the influence of EU policies and the application of renewable energy resources, the long-standing neo-mercantilist tradition of Austrian energy policy underwent an incremental modification (Wenz, 2022). However, challenges remained, particularly regarding implementation speed and coordination between the federal states and the national government (Steurer & Clar, 2015). In the decade following the EU accession and the Kyoto Protocol, Austria was amongst the worst climate policy performers in Europe and could only offset the Kyoto target gap (emission reduction between 2008–2012 by 13% compared to 1990 levels) with cheap **purchases of emission certificates** (Steurer & Clar, 2015).

However, in 2002, the federal government was still optimistic about meeting the Kyoto targets and adopted the **Federal Climate Strategy** (Klimastrategie). For the building sector, the strategy foresaw emission cuts of 27% until 2010 compared to 1990 levels, through reforming housing subsidies schemes at the federal state level. The traditional social policies were to be extended beyond subsidising home ownership to include subsidies for thermal refurbishment, efficient heating systems, and climate-friendly energy sources in households (Steurer & Clar, 2015). The implementation of the strategy failed substantially due to a lack of commitment of the federal states (and binding 15a Agreements). As a result, the Federal Environment Ministry itself actively introduced the **klima:aktiv programme** to promote voluntary quality standards and climate-friendly technologies in the areas of the building sector, energy consumption, renewable energies and mobility, but also to carry out informational campaigns for citizens. The programme additionally facilitated lighthouse projects and the training of building professionals and businesses on climate-friendly options. These national activities

complemented energy and building policies by the federal states, and were therefore tolerated by federal state governments.

Nonetheless, the building standards of the federal states failed to meet the requirements of the EU directive on the **Energy Performance of Buildings (EPBD)** and the EU opened infringement proceedings in 2006 against Austria. In reaction, both national and federal state policymakers concluded a federal 15a Agreement (BGBl. II Nr. 19/2006) that aimed to improve the thermal quality of new buildings and promote thermal refurbishments via adapted housing subsidies schemes at the federal state level. Additionally, the national government transposed parts of the EPBD with a **federal law mandating energy certificates** (Energieausweis-Vorlage-Gesetz/EAVG 2006). Via the Austrian Institute of Construction Engineering (OIB), a coordination platform for building standards, the federal states agreed to update their minimum standards for new buildings and the retrofitting of existing buildings in compliance with the EU directive. Despite these efforts, the results were poor, as thermal standards lagged behind the status quo of new buildings and the housing subsidies schemes had only minimal effects on refurbishment rates (Steurer & Clar, 2015).

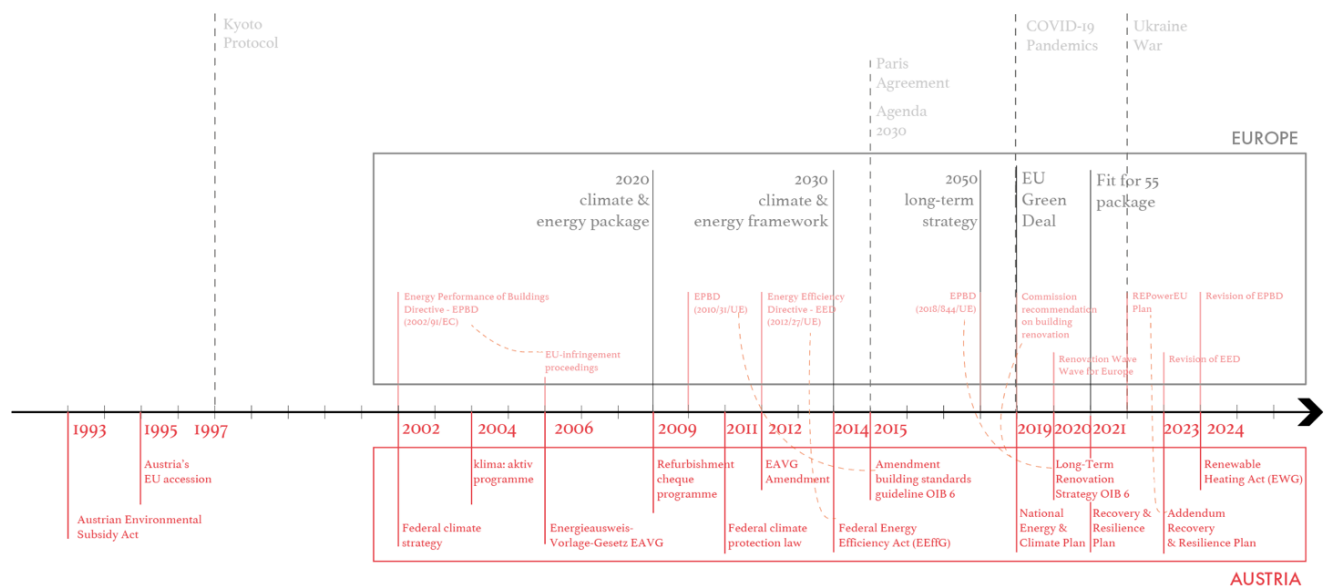


Figure AT1. Timeline of policies, initiatives and strategies regarding energy refurbishments in Austria

Also, the **Federal Climate Protection Law** (Klimaschutzgesetz), passed in 2011 after 3 years of negotiations, was seriously flawed: “The fact that the federal government intervened unilaterally in a provincial domain led not to less emissions but to a ‘federal zero-sum game’ of climate change mitigation” (Steurer & Clar, 2015: 93). In the upcoming years, the law was

set to be amended through working groups. For the building sector, the target was thermal retrofits through provincial housing subsidy schemes, the (re-)introduction of a federal retrofits cheque, and amendments to the residential law – all based on new negotiations on a 15a agreement. In the meanwhile, the federal government transposed the updated **EPBD** (2010/31/EU) with the federal law on energy certificates in 2012. For the other requirements of the directive, the federal states agreed to update the **OIB 6 guideline on building standards**. In accordance with the **EU Energy Efficiency Directive 2012/27/EU (EED I)** Austria implemented the **Federal Energy Efficiency Act** (EEffG, BGBl. I No. 72/2014) in 2014 with the objective of increasing energy efficiency and a maximum final energy consumption of 1050 petajoules (PJ) in 2020. However, for the years 2014–2020 this goal was not achieved (NEKP, 2024: 44).

In addition, based on the **Agenda 2030** and Sustainable Development Goals (SDGs) the federal states adopted their own climate mitigation (and adaptation) strategies, which also included thermal retrofits. For instance, Vienna in the “Smart City Strategie Wien” or Salzburg through the „Klima- und Energiestrategie SALZBURG 2050“. The federal states, responsible for the implementation of the **EPBD 2018/844**, also elaborated the **Long-term Renovation Strategy** following the commission recommendation on building renovation through the adoption of nation-wide building standards in the **OIB-guideline 6** in 2020.

A new federal government starting in 2020, for the first time included the Green Party, foresaw in the government programme a renovation wave with investment incentives for refurbishment, urban densification and a focus on sustainable and energy-efficient heating, cooling, construction, and renovation. Interrupted by the COVID-19 pandemic, Austria’s **Recovery and Resilience Plan (NRRP)** was introduced before a National Energy and Climate Plan in line with the government programme was completed. The Recovery and Resilience Plan did not cover social housing specifically, but the building sector as a whole with a renovation wave supporting the replacement of oil and gas heating systems with renewable technology and thermal renovation of dwellings to reduce the energy costs of low-income households (Housing Europe 2022). Also, the NRRP foresaw the fight against energy poverty. Following Council approval of Austria’s plan in July 2021, Austria’s recovery and resilience plan was updated in November 2023 also to introduce a **REPowerEU** chapter.

In reaction to the *Energy Union and Climate Action* framework (Regulation (EU) 2018/1999) and the **EU Green Deal**, Austria submitted the **National Energy and Climate Plan** (NEKP, Nationaler Energie- und Klimaplan) in December 2024 to the EC. The main aspects of the NEKP in terms of the building sector is the decarbonization through the transition to climate-friendly heating systems and the thermal renovation of building hulls. The budget allocations and subsidies schemes are implemented in a renovation wave programme (**Sanierungsoffensive**, see also section 1.2). The NEKP also states the aim of achieving the energy renovation of 3% of the housing stock annually. This is also set out in the government coalition programme (2020–2024) and should amongst other measures be reached through further development of housing subsidies in line with climate protection goals, prioritizing refurbishment over new construction, the use of ecological building materials based on renewable raw materials, etc. The NEKP also includes goals to tackle the issue of rising **energy poverty**, however, the EC criticised in the first draft of the NEKP (2019) the lack of more concrete measures for energy poverty. The discussion around energy poverty has

become particularly relevant due to the sharp increases in household energy prices since 2022 where many households have experienced a decline in real disposable income to cover energy costs, while at the same time, household energy prices have risen significantly. In reaction to this, the final version of the NEKP therefore not only includes more details on the energy poverty issue but also the aim to install a national coordination platform (Coordination platform to fight against energy poverty: Koordinierungsstelle zur Bekämpfung von Energiearmut, kea) (see Table AT2) and an extension of the group of beneficiaries of subsidies for low-income and energy-poor households (**Wohnschirm Energie**, see also section 1.2).

Apart from the NEKP, other EU directives such as the EED II / Fit for 55 Initiative are in large part being implemented through the **Energy Efficiency Act** (EEffG, Bundes-Energieeffizienzgesetz), which establishes a framework for the rapid implementation of additional energy efficiency measures for businesses and households while also providing additional funding. The law serves to implement EU legal requirements and energy savings obligations. The **Renewable Heat Act** (Erneuerbare-Wärme-Gesetz) introduces a phased approach to transitioning from fossil fuel-based systems to climate-friendly alternatives. Even though the act only includes a ban on fossil heating systems in new buildings, it strongly discourages their use because of decommissioning rules by 2035/2040 (Braungardt et al. 2023).

In general, the policies listed above are not based on an official definition of an energetic retrofitting rate, e.g. deep or partial renovations. Nevertheless, these terms have been used in several government documents and laws, particularly in the **climate and energy strategies** of 2002, 2007, 2010, and 2018; in the **OIB Guidelines** of 2007, 2011, 2015, and 2019; in the **Long-Term Renovation Strategy** coordinated by the OIB in 2020; in the 2023 updated **National Energy and Climate Plan (NEKP)**; as well as in the regional housing subsidy regulations and the underlying Article 15a-agreements on climate protection in residential construction (Amann et al. 2023). In this sense, it becomes apparent that EU-requirements to install such national policies push for declaring these targets, even though not based on unified definitions of what an energetic retrofit includes.

Policy	Energy renovation target	Governance level	Specifically for social housing
National climate and energy strategies (2002-2018)	Aim to rise renovation rate, but no commitment to specific target	national level	No
National Energy and Climate Plan (NEKP, Nationaler Energie- und Klimaplan)	Annual retrofit of 3% of the housing stock as a retrofit target General aim: decarbonization through the transition to climate-friendly heating systems and the thermal renovation of building hulls	national level	No
National Recovery and Resilience Plan Austria (NRRP)	No commitment to specific target for a renovation rate	national level	No

Policy	Energy renovation target	Governance level	Specifically for social housing
	Only targeted investments and milestones through setting tangible targets for heating system replacements and deep refurbishment subsidies		
Energy Efficiency Act (EEffG, Bundes-Energieeffizienzgesetz)	No commitment to specific target for a renovation rate The EEffG focuses primarily on improving energy efficiency across sectors energy audits, energy management systems, and efficiency obligations for energy suppliers and large consumers, setting frameworks for energy efficiency improvement obligations and reporting requirements and requiring public institutions to implement energy-saving measures.	national level	No
Long-term Renovation Strategy / OIB-guideline 6	No commitment to specific target for renovation rate The National OIB-guideline aims at nation-wide building standards and outlines requirements for heat demand, end-energy and primary-energy use, summer thermal protection, building envelope U-values, and mandates high-efficiency systems and renewables	national level	No
Housing Subsidy Act	No specific target for renovation rate Housing Subsidy Acts support energy-efficient renovations through subsidies and incentives, which include specific technical requirements and targets related to thermal insulation and energy efficiency for subsidized projects. (the align with o rare stricter than OIB 6).	federal state level (all 9 have their own Housing Subsidy Acts or equivalent regulations)	Yes

Table AT3. Austrian policies on specific energy renovation targets and dedicated targets for social housing. Source: own elaboration.

4.2 The implementation process

In Austria energy efficiency measures are being implemented through the so-called national **Environmental Funding in Austria** (UFI, Umweltförderung im Inland) for private individuals, businesses, associations, and municipalities. Since its foundation in 1993, the budget allocated to has risen significantly for retrofitting measures such as thermal refurbishments and change of heating systems (see fig. 2). While at the beginning of the 2010s around 45,000 deep refurbishments (1.3% of main residences per year) were subsidised across Austria every year, by 2017, this figure dropped to a third and has since remained at around 15,000 deeply refurbished residential units (Amann et al. 2023). Also, subsidized heating system replacements dropped sharply until 2018 in Austria but have recently rebounded to 53,000 in the year 2023 (Amann et al. 2023). The decrease in deep refurbishment might be due to the limited capacities of the construction industry for refurbishments because of the new-build boom with favourable interest rates in the 2010s. Additionally, renovations – especially deep

refurbishments – are highly price-sensitive and as there was no immediate necessity, project developers might have waited for more favourable conditions (such as new subsidy schemes) or legal frameworks with regulatory easing to enforce decarbonization measures (such as the Renewable Heat Act) (Amann et al. 2023). In this sense, funding for individual thermal renovation measures declined until 2023, but are foreseen to rise according to budget allocation of the **National Energy and Climate Plan**. The updated National Energy and Climate Plan foresees an annual allocation of an additional €190 million (to the total budget of €620.5 million) from 2023 until 2030 for environmental measures such as energy efficiency, biodiversity, circular economy etc. Since 2022, this substantial budgetary expansion of existing funding programs, particularly focused on thermal-energy refurbishments and the introduction of new funding initiatives, including support for low-income households, industrial transformation, district heating decarbonization, and the Energy Efficiency Fund (NEKP, 2024: 186).

In 2022, considering subsidized and non-subsidized as well as deep and partial individual renovation measures amounted to just under 1.5% of the housing stock (main residences) and the renovation rate has thus stagnated at more or less the same low level since 2015 (Amann et al. 2023). The subsidized renovation rate applicable to all sectors has increased significantly from 0.6% to 0.9% since 2018, while a declining trend can be observed in the non-subsidized sector (Amann et al. 2023). Subsidies for deep renovations have continued to decline until 2023, whereas subsidized individual component renovations increased up to 2022 due to the boom in heating system replacements (Amann et al. 2023). Calculations show, that in order to reach the decarbonisation of the building stock by 2040, a refurbishment rate of 2.8% would be necessary (Amann et al. 2023). Amann et al. (2023) state that while the need for deep refurbishments is particularly high in the private rental sector and municipal housing, it is comparatively low in the limited-profit (rental) sector. Single-family homes (mostly owner occupied) hold particular significance in increasing the refurbishment rate due to their large number. In general, the Austrian approach for increasing refurbishment rate relies on subsidy schemes, which apply to all sectors, however as stated above, the private rental sector and municipal housing are in more urgent need of increasing the refurbishment rate of the building stock.

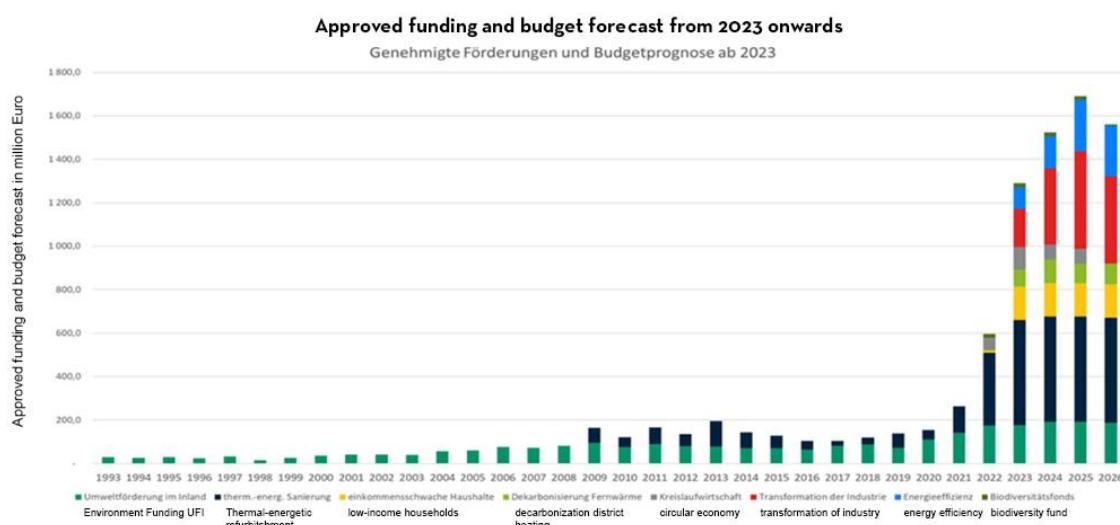


Figure AT2: Development of Environmental Funding in Austria (UFI)⁵ since 1993 (including approved extensions until 2026). Source: Austrian Climate Ministry (NEKP 2024, p. 185).

The refurbishment subsidies programme **Sanierungsscheck** initiated in 2009 with a budget of €61 million only moderately increased the refurbishment rate of residential buildings, because federal states reduced their budget for renovations at the same time (Steurer & Clar, 2015). In contrast, the federal environment ministry introduced the renovation wave programme **Sanierungsoffensive 2023/2024**, where funds for subsidies for thermal refurbishments and the transition to climate-friendly heating systems were increased from €2.445 billion for the period 2023 to 2027 by an additional €1.2 billion for the years 2024 to 2026 (NEKP 2024: 304). The renovation wave includes three major aspects in terms of retrofitting and housing affordability:

- **Phase-Out of Oil and Gas (Raus aus Öl und Gas):** Financial support for replacing fossil-fuel heating systems (oil, gas, coal, but also single electric heating systems) in private homes with eco-friendly alternatives. Priority is given to connecting buildings to efficient district heating. If that's not possible, subsidies are provided for switching to woodchip heating or heat pumps. From this financial tool mostly home-owners benefited, due to difficulties of implementation in condominiums or multi-household residential buildings (both private or social rental).
- **Renovation Bonus (Sanierungsbonus):** Funding for thermal renovations in residential buildings over 15 years old. Eligible projects include full energy-efficient refurbishments, window replacements, and green roofs/facades in multi-story buildings or semi-detached buildings. The funding for a deep renovation is up to €300/m² floor space, additional funding with up to €525/m² if renewable insulation materials are used. The financial tool addresses multi-unit residential buildings both in ownership or rental including limited-profit housing.
- **Climate-Resilient Buildings for Vulnerable Groups:** Since 2022, 100% funding for thermal renovations and climate-friendly heating upgrades in buildings over 20 years old that house low-income or vulnerable individuals. Non-profit or religious

⁵ The Umweltförderung im Inland UFI (Environmental Funding in Austria) is one of Austria's key funding instruments for investments in the climate and environmental sectors. Until 2026, a total of €620.5 million is available for this funding instrument for investments in accordance with §23 of the Environmental Funding Act (UFG).

organizations, and municipalities operating such housing can apply for funding, which means that this financial tool is directed at vulnerable population groups.

In addition to these schemes, programmes have been introduced that react to the rising energy costs and subsequent energy poverty, especially focusing on households in vulnerable situations. Energy poverty in Austria manifests where socio-economically vulnerable households face difficulties affording adequate heating and energy services. According to Statistik Austria (2022), approximately 2% of Austrian households reported being unable to heat their dwellings adequately in 2021, while another 3.2% experienced disproportionately high energy costs relative to their modest incomes. These conditions are exacerbated by disproportionate energy cost burdens: low-income households allocate approximately 8.5% of their income to housing-related energy (compared to 5.3% for middle-income and 3.2% for high-income groups), with those officially “at risk of poverty” spending up to 11.4%, and energy-poor households an alarming 22.7% (Statistik Austria, 2024). The recent “Faktencheck Energiearmut” (Klima- und Energiefonds, 2025) further underscores that such disparities have deepened recently, highlighting the urgent need for continued policy intervention, such as targeted one-stop advisory services and EPBD-aligned energy efficiency measures to alleviate energy poverty (Klima- und Energiefonds, 2025). Amongst the programmes and subsidies schemes dealing with energy poverty, that are initiated on the federal level and then adapted for implementation by the Federal States, are the following:

- **Clean heating for all** (Sauber heizen für alle): covers up to 100% of the investment costs for boiler replacement in households in the lowest income third (Klima- und Energiefonds, 2025). It is directed at both owner-occupied and renting households.
- **Wohnschirm Energie**: To prevent or mitigate electricity and gas cut-offs, the Wohnschirm Energie program (funded by the Federal Ministry of Social Affairs) offers free counseling, mediation between energy providers and households (owners or renters) and financial support. In 2023, the Wohnschirm Energie provided financial assistance to around 57,000 households (Klima- und Energiefonds, 2025).

With the updated version of the National Energy and Climate Plan submitted to the EC in December 2024, a legal basis for additional budget was established, supporting the Climate-Resilient Buildings for Vulnerable Groups Subsidies, totalling €1.6 billion until 2030. Furthermore, the **Austrian Environmental Subsidy Act** established the **Energy Efficiency Programme** with a total of €1.52 billion until 2030 to meet energy efficiency targets and energy-saving obligations. Within the programme, especial funding priority is given to **thermal refurbishments of the limited-profit housing sector** (Thermische Gebäudesanierung für gemeinnützige Bauvereinigungen).

This focus goes back to the so-called ‘refurbishment scheme’ of the Austrian limited-profit housing sector – an example that seeks to ensure long-term affordability and energy-efficient housing is the (Amann and Mundt 2021). The scheme is based on the sector’s strict regulation on the national level. Rent is controlled according to the cost-based rent principle, which means that rents are set in such a way that it covers the maintenance of the buildings and allow only for a limited amount of profit (Friesenecker and Litschauer, 2021). Based on this principle, the collection of a maintenance and improvement contributions (Erhaltungs- und Verbesserungsbeitrag - EVB) is key for retrofitting the buildings in a socially fair way. These mandatory contributions depend on the building age in such a way that contributions are lower

in new buildings and higher in older ones, but are regulated so that they do not exceed a certain amount. According to Amann and Mundt (2021), regulation stipulates that these funds are used only for the house in question and are only spent for defined maintenance works and deep retrofits. As such, limited-profit housing providers adopt long-term strategies to maintain their buildings and preserve the value of their properties whilst still providing affordable housing which might be even further supported by housing subsidies (Amann and Mundt, 2021).

Additionally, to this focus on the limited-profit housing sector, as part of the Austrian **eco-social tax reform** (a national carbon pricing system adopted in 2022), private individuals (owners) have the possibility to claim tax deductions for costs resulting of switching to climate-friendly heating systems and thermal refurbishments. The tax allowance amounts to €400 per year for heating system replacements and €800 per year for thermal refurbishment (over five years), or ten years if both measures are implemented simultaneously (NEKP 2024: 305). For the effects of a CO₂ tax on housing, Müller et al. (2024) see a landlord-tenant dilemma with the danger of higher energy expenses for renters while landlords receive no incentive for improving the energy performance.

Category	Tool Name	Level	Description	Responsible Authority
Financial Tools (direct subsidy)	Sanierungsoffensive 2023/2024	National	Increased funding for retrofits and heating upgrades; additional €1.2 billion for 2024–2026, targeted broadly at owner-occupied housing, building owners, landlords or condominium associations (to a limited extent), but also at municipalities and public entities for district heating extension.	Federal Ministry for Climate Action
Financial Tools (direct subsidy)	Raus aus Öl und Gas	National	Subsidies for replacing fossil fuel heating systems with eco-friendly options, prioritizing district heating. Targeted at private homeowners (due to easier implementation), limited applicability in condominiums and multi-unit rental buildings (technical & legal challenges)	Federal Government / Klima- und Energiefonds
Financial Tools (direct subsidy)	Sanierungsbonus	National	Up to €300/m ² (or €525/m ² for renewable materials) for thermal retrofits in older buildings. Targeted at owners, persons with building rights or tenants of single-family homes, two-family homes or terraced houses or owners (incl. LPHAs) and condominium	Federal Government

			associations for multi-unit residential buildings	
Financial Tools (direct subsidy)	Climate-Resilient Buildings for Vulnerable Groups	National/Sub-nat.	Full funding for retrofits in vulnerable group housing; €1.6 billion until 2030. Targeted at housing with low-income households operated by non-profit or religious organizations or municipalities	Federal Government / Federal States / Municipalities
Financial Tools (direct subsidy)	Clean Heating for All (Sauber heizen für alle)	National/Sub-nat.	Covers 100% of boiler replacement costs for low-income households.	Klima- und Energiefonds
Financial Tools (direct subsidy)	Wohnschirm Energie	National/Sub-nat.	Free counselling and financial aid to prevent gas/electric cutoffs; helped ~57,000 households in 2023. Targeted at vulnerable or low-income households	Federal Ministry of Social Affairs / Federal States
Financial Tools (fiscal incentive)	Eco-social Tax Reform (Carbon Tax Deductions)	National	Tax deductions for retrofit-related costs (€400–800/year for up to 10 years).	Ministry of Finance / Tax Authority
Regulatory Tools	Environmental Subsidy Act – Energy Efficiency Programme	National	€1.52 billion to meet energy-saving obligations, focusing on limited-profit housing retrofits.	Federal Environment Ministry
Regulatory Tools	Limited-Profit Housing Act	National	Regulates cost-based rents and mandatory improvement contributions, ensuring funding for socially fair retrofits.	National Legislation / Housing Authorities
Support & Information	One-Stop Advisory Services	National/Sub-nat.	Tailored support services for energy-poor households to access retrofitting assistance and energy advice.	Klima- und Energiefonds / Federal States
Other Tools	Energy Poverty Monitoring	National	Analytical tool highlighting disparities and guiding intervention design.	Klima- und Energiefonds / Coordination platform to fight against energy poverty kea

Table AT4. Tools for fostering the implementation of Retrofitting in Austria. Source: own elaboration.

4.2.1 Vienna's strategies for retrofitting

In Vienna, the use of housing subsidies for retrofitting is organised via the “Soft Urban Renewal” (Sanfte Stadterneuerung) programme. The origins of this programme date back to the 1970s with the aim to subsidise the renovation of pre-WWII private rental units while at the same time minimising negative impacts for the existing tenants (see Franz, 2015, p. 175ff). If private landlords use public loans for renewal within this programme, they must comply with

certain regulations, e.g. they are not allowed to convert rental flats into condominiums and must observe a rent freeze for the duration of the subsidies - usually for 15 years. Managed by the “wohnfonds_wien” which distributes renewal subsidies in the form of loans and non-repayable grants, the programme includes several types of renewal and retrofitting. On the one hand, singular measures, e.g. dwelling improvements, improvements for liveability (shading systems, greening, etc.), but also subsidies for adding attics are subsidized. Most common, however, are the so-called base renewal (Sockelsanierung) where renewal of the building but also the dwellings are done either with tenant’s present upon their agreement, or their relocation including a financial compensation or the denial of tenants in having their apartments renewed (see Hatz, 2021 for more details). A so-called total renewal, on the other side, is done in vacant buildings and can include the demolition, new-construction or addition of storeys. In the years prior to the global financial crisis of 2008, subsidies granted to private owners, hence, the effectiveness and popularity of the instrument decreased. According to Gruber and Franz (2019, p. 390), reasons can be found in the high administrative efforts of subsidized renewals vis-à-vis an increased inflow of international investments capital and low interest rates.

According to Hatz (2021), political priorities also shifted towards environmental and climate protection efforts and subsidized energetic retrofits (Thewosan – Thermisch-energetische Wohnhaussanierung), which since its introduction in 2000 has become more important. The funding regulation stipulates that a full energetic retrofit requires the improvement of at least 3 parts of the building hull and/or heating system: replacing windows and outer doors, insulation of roof or top floor ceiling, façades, basement ceiling, or improvements in relation to the heating and hot water provision (Wohnfonds_Wien, 2024). Furthermore, they must comply with minimum requirements regarding heating and energetic standards according to the housing renovation ordinance which have been introduced in 2008 (Sanierungsverordnung). In contrast to deep renovations including the exchange of heating systems, energetic retrofits such as thermal insulation were to a large degree applied to municipal housing estates because retrofitting the building hull can be applied in occupied buildings as well (Hatz, 2021). A report of the Austrian Court of Audit, however, identified a lagging behind of retrofitting activities in recent years. Based on the assumption that a 30-year renovation cycle is the most cost-efficient, around 7,000 units should be retrofitted every year, while in between 2013 and 2023 only about 45% were undergoing retrofits or were being planned to be retrofitted (Rechnungshof Österreich, 2021). However, according to that report, Wiener Wohnen introduced a retrofitting strategy in which it identified 9% of its stock be in an insufficient energetic and building condition and to become the primary target for retrofitting.

4.3 Size and role of the market

Examining the role of the market in advancing energy-efficient renovation in Austria key analytical dimensions include the connection of policy instruments and economic incentives, and the influence of energy prices, as well as private finance mobilization, innovation support, and structural constraints affecting market capacity. As outlined above, economic incentives through public subsidies are considered one of the key policy instruments to ensure and implement high environmental standards in housing. Since construction businesses and other businesses in the realm of refurbishment and decarbonization in the building sector benefit

from thermal refurbishment subsidies, the Austrian Economic Chambers have supported respective policies repeatedly (Steurer & Clar, 2015). However, the federal structures have proved to slow down or even hinder the implementation of energy-efficiency or retrofitting measures and Steurer & Clar (2015) state that especially for the period until 2014, market forces in the sense of energy prizes rather than public policies were the main drivers behind emission reductions in the building sector. As an example, figure 3 shows the development of gas and electricity prices semi-annually in Austria from 2007 onwards. A key observation is the sharp increase in both gas and electricity prices starting from 2021, which coincides with the onset of the global energy crisis.

In terms of private sector involvement, Austria's Environment and Finance Ministry introduced the Green Finance Agenda (based on the Paris Agreement), which aims to encourage the private sector to participate in funding climate-friendly projects, including retrofitting and heating system transitions, through creating funding mechanisms where government incentives are combined with private loans, low-interest green mortgages, or energy efficiency investment funds. While the Austrian Green Finance Agenda does not directly fund programmes, it plays a critical role in securing and directing financial resources, ensuring private sector involvement, regulatory alignment, and efficient carbon pricing revenue allocation.

Additionally, Austria's Recovery and Resilience Plan defines green investments in enterprises with a 14% investment premium granted to businesses which invest in the priority areas of the green transition (such as thermal renovations of buildings, heating optimisation and other energy saving measures, etc.). In terms of research and innovation, the Austrian Climate and Energy Fund and the Austrian Research Promotion Agency (FFG) fund private companies' innovative project developments to decarbonize the building sector. Despite these efforts to support the market, a lack of qualified energy and construction sector professionals is a key barrier to scale up refurbishments and retrofitting projects in the housing sector, alongside the high costs of labour.

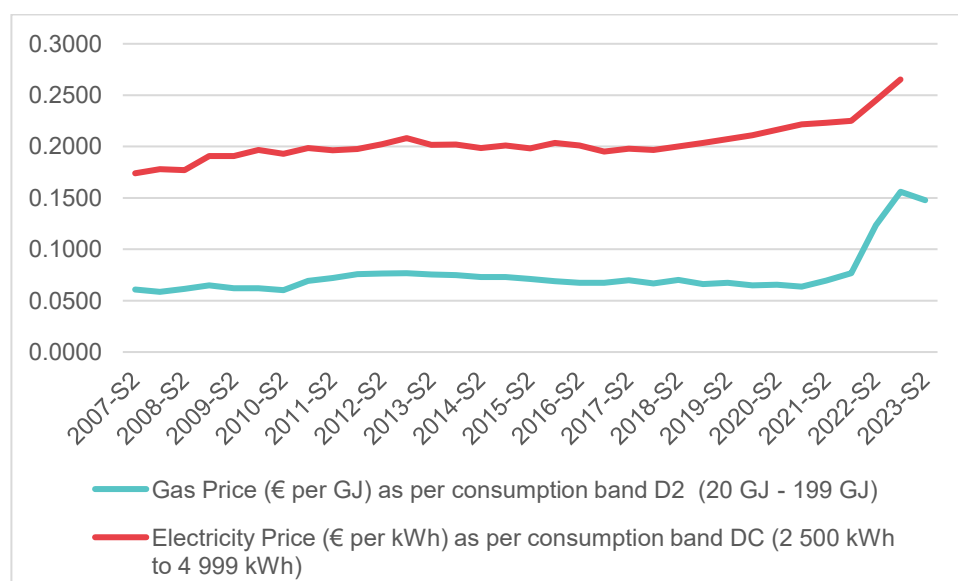


Figure AT3. Development of semi-annual gas and electricity prices, Austria. Source: compiled by authors, data from EUROSTAT-Statistical Office of the European Communities

4.4 The multilevel governance process

Austria's federal structure significantly shapes its housing and energy-efficiency policies, as governance is divided between the federal government, the nine federal states, and municipalities. While the federal level sets overarching climate targets, such as achieving climate neutrality by 2040, implementation largely falls under provincial jurisdiction. Housing policy, including building regulations and energy standards, is primarily the responsibility of the federal states, leading to regional differences in retrofitting incentives, construction standards, and heating system regulations. The provincial governors are responsible for issuing the permits for the emission of greenhouse gases and may also entrust the district administrative authority (*Bezirksverwaltungsbehörde*) with implementation measures for certain types of installations. Municipalities further influence energy efficiency by enforcing local building codes, zoning laws and managing district heating networks. The already mentioned agreements according to Article 15a of the Federal Constitutional Law are essential to regulate the competences and implementation procedures on energy between the state and the federal states, while for housing subsidies all competences lie within the federal states field of action. Main actors for retrofitting and housing policy on a federal level are the Federal Ministry for Environment and Energy (mainly responsible for reaching the Kyoto target), and the Federal Economics Ministry (mainly responsible for the building sector), Ministry of Social Affairs (mainly responsible for subject subsidies e.g. in housing). Various provincial units are responsible for different aspects of building policies and energy standards, housing subsidies schemes, etc. Additionally, the economic Chambers and the Federation of Industries play a key role in shaping Austria's energy and building sector policies. The complex scheme of subsidies and refurbishment programmes is managed by a number of public institutions, such as the Klima- und Energiefonds, Austrian Energy Agency, or Kommunalkredit Public Consulting.

In terms of the federal budget the Austrian Environment Ministry is responsible for allocating funding to building refurbishments and heating transition programmes through the Austrian Environmental and Climate Protection Fund (UFI). Via the EU Recovery and Resilience Facility (RRF) a €3.5 billion grant is allocated to building decarbonization and heating system replacement, while the Climate-Resilient Buildings for Vulnerable Groups programme is fully funded through EU sources. Revenues from CO₂ pricing (via the eco-social tax reform) are invested in subsidies for Phase-Out of Oil and Gas and Renovation Bonus. The federal states provide co-financing or complementary funding programmes, especially for subsidized housing schemes or also district heating expansion.

Name	Type	Level	Roles
Austrian Energy Agency (AEA, Österreichische Energieagentur)	Public	National	Austrian Energy Agency executes the climate protection initiative klima:aktiv. Federal Government, all federal states, leading companies in the energy industry and the transport sector, interest groups, and scientific organisations are members of this agency

Klima- und Energiefonds	Public	National	Promotion of climate protection projects and sustainable energy supply through subsidies and project calls
Austrian Research Promotion Agency (FFG)	Public	National	national funding institution for industry-related research and development in Austria, also in the sector of energy efficiency
Kommunalkredit Public Consulting	Private	National / International	Implementation of subsidies distribution
Umweltbundesamt	Public	National / International	Important environmental expert organisation and leading international environmental consultants, experts provide the basis for decision making with politics, administration, business, science, and civil society at local, regional and international levels
Austrian Institute of Construction Engineering (OIB)		National	Responsible <i>harmonising the construction engineering regulations in Austria, such as the OIB6 Long Term Renovation Strategy</i>
<i>Austrian Federation of Limited-Profit Housing Associations</i> GBV	Private	National	Organization of the limited profit-housing associations in Austria, important actors in implementing decarbonization and retrofit measures in the subsidized housing stock
wohnfonds_wien	public	federal state	Responsible for subsidies of urban renewal and retrofitting in Vienna
MA25 – Municipal Department Technical Urban Renewal of the City of Vienna	public	federal state	Municipal department responsible for the implementation of the programme WieNeu+ (refurbishment & energy saving)
MA50 – Municipal Department Housing Promotion and Arbitration Board for Legal Housing Matters	public	federal state	Distribution of housing allowances and energy cost support
Energy consulting services (Klima- und Innovationsagentur Wien (UIV Urban Innovation Vienna GmbH, Hauskunft, Energiesparverband Oberösterreich, Energieagentur Tirol, Netzwerk Energieberatung Kärnten,...)	Public	federal states	Consultation services for renewable energies, refurbishment and retrofitting
Coordination platform to fight against energy poverty (Koordinierungsstelle zur Bekämpfung von Energiearmut, kea)			The kea (situated with the klima- und energiefonds) develops and coordinates measures and recommendations to combat energy poverty in Austria and provides information for households, energy suppliers, local authorities and relevant institutions and organisations. The tasks and budgetary resources of the kea are regulated in the national Energy Efficiency Act.

Oesterreichs Energie	Private	National	Umbrella organization representing Austrian energy companies, advocating for the energy sector, renewable energy transition, and security of supply
Building industry, building technology companies (Strabag, Scheuch technology, VASKO+PARTNER INGENIEURE, architecture- and engineering offices,...)	Private	National / local	<i>Implementation of energy refurbishments, including thermal insulation, windows, and renewable energy installation</i>
<i>Consulting firms and networks of certified consultants on energy efficiency (Energieberatung "DIE UMWELBERATUNG", En2-Consulting,...)</i>	Private	National / local	<i>Advisory services to improve energy efficiency in homes and businesses. Support for energy-efficient renovations, including insulation, heating systems, and renewable energy solutions</i>

Table AT5. Actors involved in the policy cycle of energy retrofitting in Austria. Source: own elaboration.

4.5 Achievements, assessments, and challenges

Overall, the residential sector in Austria accounts for 10.1% of the total of Austria's CO₂ emissions (IEA, 2022). In general, the development of CO₂ emissions in the building sector in Austria shows a significant decline since the 1990s, while household energy consumption per capita remains stable over the last 20 years. Overall, this trend indicates improvements in energy efficiency, suggesting that any rise in total energy use has been offset by gains in efficiency of the housing sector or a shift toward less carbon-intensive energy sources for household use. Despite these reductions in the building sector, Austria's per capita CO₂ emissions remain slightly above the European Union average since in 2023, per capita emissions were 7.8 tonnes of CO₂ equivalent (tCO₂e), compared to the EU average of 7.2 tCO₂e (European Parliament, 2024).

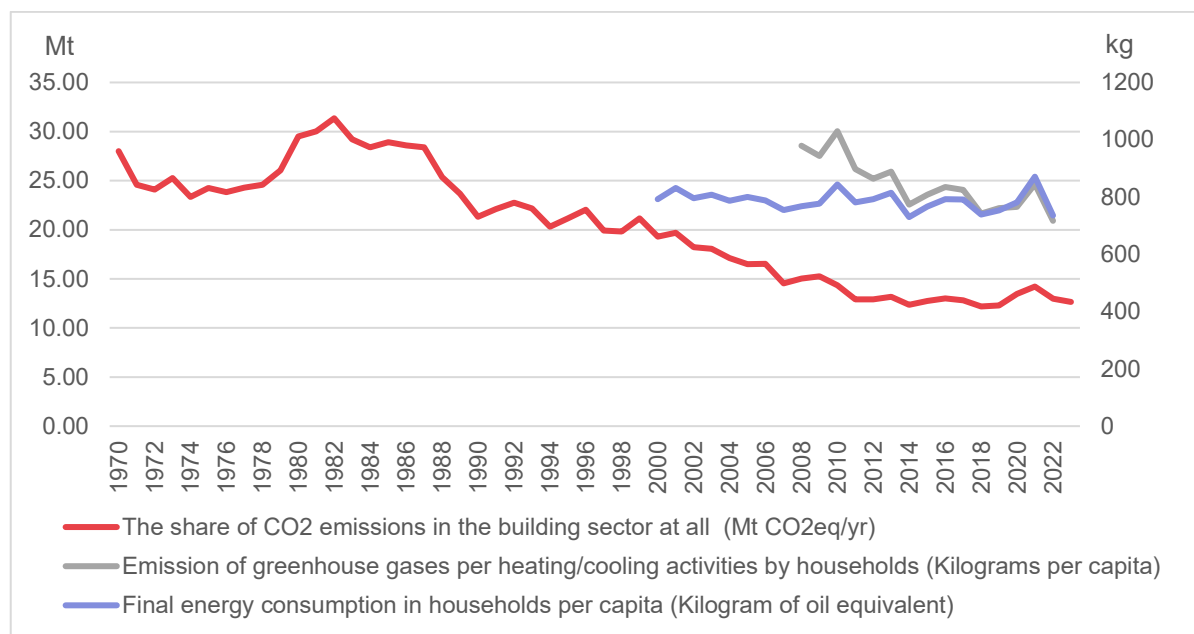


Figure AT3. Development of Emissions in the housing sector and households, Austria. Sources: compiled by authors, data from: EDGAR-Emissions Database for Global Atmospheric Research, EUROSTAT-Statistical Office of the European Communities

In general housing subsidies are considered one of the key policy instruments to ensure and implement high environmental standards in housing (IIBW & FV Steine-Keramik, 2022). This characterises the Austrian way in which rather than implementing stricter regulations, economic incentives are granted. As stated above, housing subsidies have been increasingly coupled with demanding ecological standards, e.g. for thermal refurbishment of the building hull. In this light, the 15a agreements between the federal government and the federal states that also influence housing, are important for building regulations. Since the use of housing subsidies was entirely given to the federal states, a 15a agreement between the federal states and the federal government specifies common environmental quality standards for housing subsidies (followed by an earlier agreement on the reduction of emissions) (Amann and Mundt, 2021). Here, the influence of EU regulation becomes apparent as directives regarding the energy performance of buildings had to be translated into national law and via these agreements has been handed down to the federal states.

EU requirements for the creation of climate and energy strategies were also influential, when it comes to attempts of defining refurbishment rates. However, as stated in section 1.2. the figure of deep renovations dropped to a third since the early 2000s and has since remained stable at this low stage (Amann et al. 2023). Even though subsidized heating system replacements were in decline until 2018, they are recently rebounding not at least due to a higher budget allocation during the government period of 2020–2024.

Refurbishment rate 2009-2022 subsidized / non-subsidized

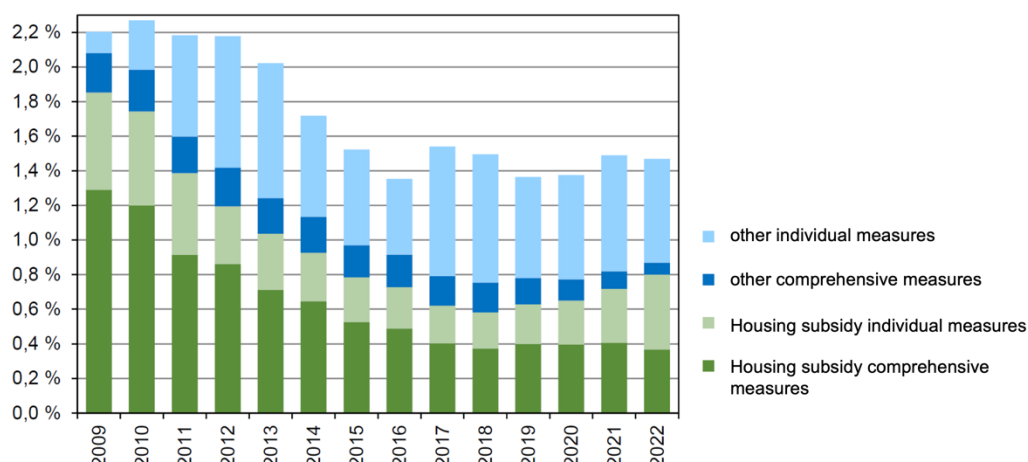


Figure AT4. Deep renovations (share per year in relation to main residences). Translation by authors.
Source: Amann et al. 2023, p. 39.

At more specific look at the policy renovation targets and implementation of these in the nine federal states shows that despite the efforts and requirements on energy efficiency (such as in the OIB-guidelines and beyond), the nine federal states show varying and low degrees of success in achieving renovation targets through their housing subsidy frameworks, with a strong emphasis on energy efficiency and renewable integration. Vienna leads with stringent requirements aligned with or exceeding the OIB-guideline 6, linking subsidy amounts to energy savings and mandating renewable heating systems for substantial renovations / deep energy retrofits. Lower Austria similarly enforces rigorous U-value thresholds and prioritizes comprehensive renovations, requiring the replacement of fossil-fuel boilers with renewables, which supports the move towards decarbonization, but does not meet the aim to rise renovations beyond the current level. Styria's focus on "Klimahaus" certification promotes high energy standards beyond legal minima, tying subsidies to measurable energy savings. Tyrol mandates compliance with OIB-Richtlinie 6 or better and promotes renewable heating alongside deep renovation packages, encouraging holistic improvements rather than partial fixes. Salzburg stands out for its stricter insulation requirements and higher subsidy levels for Passive House or equivalent standards, strongly incentivizing top-tier energy performance. Collectively, this overview shows the fragmented approaches within Austria's federal structure to boost renovation rates and energy efficiency, though actual progress in raising the energy rate has not been substantial in the last years.

Currently one of the main challenges is in changing the heating systems. This is not only valid for Austria as a nation, but for Vienna in particular, because around 500.000 units are still powered by gas heating systems. This amounts to nearly one half of the total dwelling stock (Magistrat der Stadt Wien, 2022). Again, this is to be subsidised, hence, economic incentives are the main policy instruments, but are also coupled with large informational campaigns – fuelled by the energy crisis of 2022/2023. Consequently, a varied system of subsidies at the national level emerged among longer ongoing funding initiatives. Among such initiatives are Phase-Out of Oil and Gas ("Raus aus Öl und Gas") or Clean Heating for All ("Sauber Heizen für Alle"), which focus on low-income households and subsidize the change of the heating system with 100%. Although specific funding programmes have been developed for multi-

storey / multi-ownership buildings, most national subsidies are still targeted at single family houses.

This also reflects the different impacts that housing retrofitting policies may have across diverse urban and territorial contexts. In rural areas, low-income homeowners and private landlords often struggle with the financial burden of meeting new efficiency standards, further deepening spatial inequalities. In this sense, older generations are more negatively affected than younger generations due to their more restricted access to bank loans for renovations. However, in general in more rural areas, middle-income homeowners in low-density buildings like semi-detached houses or single-family houses benefit more from funding schemes for decarbonization and thermal insulation, because renovation decisions do not have to be negotiated with building co-owners and also, because these homeowners can more easily afford the up-front payment of renovations as well as the own-funds ratio. The higher share of the rental sector in urban areas accounts for different impacts, especially when it comes to cost-burdens and energy-consumption of tenants. While retrofitting promises lower energy costs due to more efficient heating systems and thermal insulation, certain heating systems (especially district-heating) go along with rising costs for renters. Particularly in private rental markets across all city sizes, low-income tenants and long-term residents (Altmietler) with relatively low rents are disproportionately affected, facing disproportionate rent increases upon retrofit and heating system exchanges.

The high share of the rental sector in Austria, which accounts for 43,2% of Austrian households, also means significant influence of effects of a CO₂ tax and a resulting landlord-tenant dilemma (Müller et al. 2024). As the tax reform includes a CO₂ price on fossil fuels, including natural gas, heating with gas (as prevailing heating system in the urban rental sector) gets more expensive over time. With a higher share of low-income households living in rented apartments, stringent measures like a retrofitting obligation are needed to compensate for negative effects of this decarbonisation target (Müller et al. 2024). In this sense, clear measures of retrofitting obligations for the large rental sector are missing.

While a refurbishment-friendly rental law or the consideration of climate mitigation in spatial planning emerged occasionally in policy documents, they have never been implemented systematically (Steurer & Clar, 2015). In terms of the actual implementation of retrofitting measures, the exchange of gas heating systems situated inside apartments poses significant challenges (e.g. restrictions to access rented apartments) in the framework of the existing Rental Law. Multi-ownership buildings – of which some are rented out – face difficult processes to reach the required majority amongst owners for retrofitting initiatives or heating systems shifts towards district heating or other renewable solutions. The Law of Condominiums (WEG) therefore inhibits sustainable transformations.

In terms of the federal structure, sectoral approaches, such as EU directives and federal agreements, have proven more effective in Austria than broad, multi-sectoral strategies for climate policy implementation. While the amended Climate Protection Law (2008) had the potential to serve as the first effective cross-sectoral climate policy instrument—particularly due to its sector-based implementation structure—its non-binding nature rendered it ineffective, aligning it with previous federal policy shortcomings. The change in climate discourse and EU directives over the past years eventually led to a refined National Energy

and Climate Plan, however, measures such as the Renewable Heat Act and the Energy Efficiency Act fall short in reaching their goals of CO₂-reductions and current rate of building retrofitting. Furthermore, Austria's federal system has not facilitated climate change mitigation but rather complicated it by introducing an additional vertical layer of governance to an already complex horizontal integration challenge (Steurer & Clar, 2015).

Impact Area	Potential Impacts
Retrofitting / object-based housing subsidies on renovation rate	Austria's main policy tool to increase the renovation rate is economic incentives. Housing subsidies are tied to environmental standards like OIB-guideline 6. The 15a agreements between federal and state governments help standardize criteria and manage budgets but leave room for fragmentation and result in least common denominator. Subsidies have helped advance refurbishment but have not significantly raised the renovation rate. Simplifying funding access (considered as the most important tool within the Austrian context) and minimizing bureaucracy is seen as a key measure.
Retrofitting on vulnerable groups and social housing and subject-based subsidies	While retrofitting promises lower energy costs due to more efficient heating systems and thermal insulation, certain heating systems (especially district-heating) go along with rising costs for renters and owner-occupied units. National programmes (e.g., "Raus aus Öl und Gas", "Sauber Heizen für Alle") provide full subsidies for low-income households to reduce energy costs. The combination of object-based housing subsidies (targeted at buildings) with subject-based subsidies (targeted at tenants and homeowners) is therefore seen as a key measure to support vulnerable and low-income households.
Retrofitting on rental sector and multi-ownership buildings	The rental sector is highly exposed to landlord-tenant dilemma and cost-sharing issues. Retrofit upscaling is limited by the Rental Law and the Law of Condominiums (WEG), which complicate decisions in shared ownership buildings. This limits decarbonization of large parts of the housing stock. Communication strategies with tenants and homeowners are essential to tackle this issue.
Institutional and governance schemes on retrofitting	Austria's federalism hinders coherent climate action. Federal states vary in ambition as does the knowledge and capacity level of public institutions. Fragmentation across sectors and jurisdictions limits strategic implementation. The non-binding nature of national climate laws has weakened enforcement. Sectoral EU mandates (e.g., EPBD) have been more effective than domestic cross-sectoral efforts.

Table AT6. Potential Impacts of Retrofitting implementation on housing inequalities in Austria. Source: own elaboration.

5 Nature-Based Solutions

5.1 The policy cycle: emergence of the issue and policy decisions

The **2002 non-binding Austrian sustainability strategy** marks a first milestone for Nature-based Solutions (NBS) (BMLFUW 2002). The strategy refers to events such as Rio's (1992) Agenda 21 and is framed as a contribution to the European Union's Lisbon strategy acknowledging the focus on environmental protection – amongst the other dimensions of sustainability. The strategy frames the loss of landscape diversity and biodiversity as a threat to the interests of future generations and their development opportunities. A major key objective is the nationwide protection of species and habitats, as well as natural and cultural

landscapes. Given Austria's accession to the EU in 1995, the implementation of **nature conservation** area such as Natura 2000 sites following the Habitats Directive (1992) including management plans was the primary aim in this period. A second objective, focused on prioritizing **ecological restoration of rivers** and floodplain management over what the strategy terms hard engineering solutions. Finally, a third focus is preventing soil take and sprawl in housing and infrastructure (which will be dealt in the next section on densification). In 2010 the strategy was updated by stating that the 2002 strategy is still accurate. Hence, no crucial changes were introduced and the 2010 strategy was also not adopted by the Council of Ministers (BMLFUW 2010).

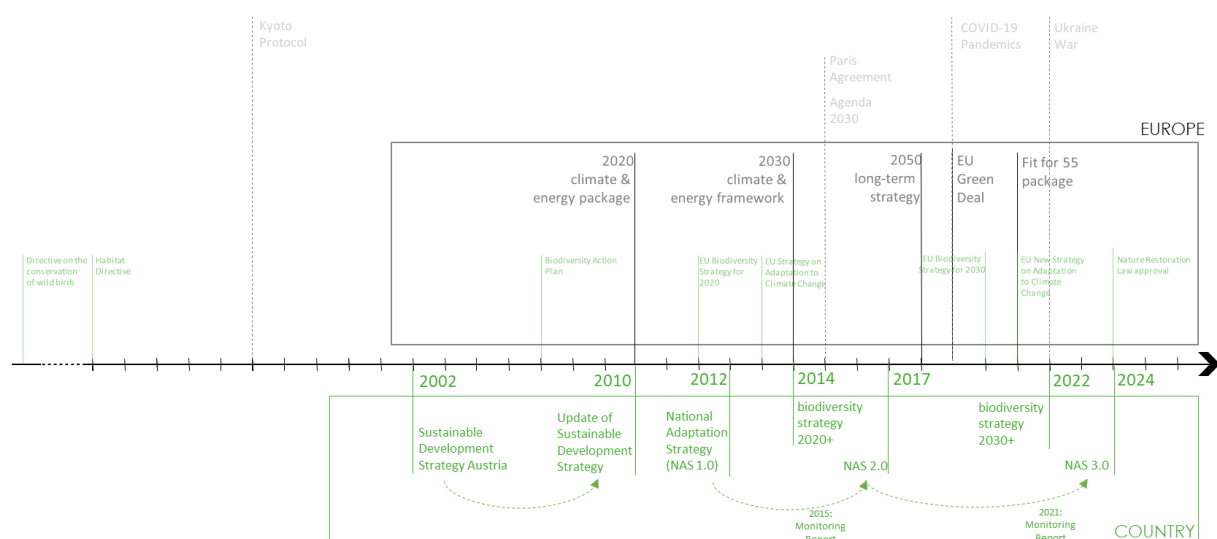


Figure AT5: Timeline of main policies and strategies fostering NBS in Austria

A second crucial milestone regarding NBS is the adoption of **the 2012 'Austrian Strategy for Adaptation to Climate Change' (NAS 1.0) of non-binding character** by the "Council of Ministers", which was also endorsed by the Provincial Governors' Conference in **2013** (BMNT 2017, BMK 2024a). Endorsement by the federal states is key because nearly all competences for implementing NBS is with the nine federal states of Austria (more details in section 2.4). The NAS is related to Austria's obligation in developing a national climate change adaptation strategy outlined in the United Nations Framework Convention on Climate Change (UNFCCC 2007) following COP13, which Austria has ratified, as well as in Article 10(b) of the Kyoto Protocol, which entered into force in 2005. The process of developing the strategy started in 2007. Initial recommendations from a scientific perspective were developed through a broad participatory process involving around 100 organizations (including ministries, federal states, interest groups, environmental and other organizations) into aims and recommendations for action organised around 14 action fields. The Strategy was updated in 2017 (NAS 2.0) and 2024 (NAS 3.0) following qualitative evaluation reports as demanded by the European Union (BMLFUW 2015, BMNT 2017, BMK 2021, BMK 2024a). While no substantial changes have been made between 2012 and 2017, the role of green and blue infrastructure was

strengthened in the 2024 version, including a more detailed description of the ecosystem services they provide in terms of flooding and cooling.

The latest update relates clearly to the European Climate Law, adopted in 2021 (Regulation (EU) 2021/1119), which establishes a binding framework for EU-wide climate neutrality by 2050 and climate change adaptation. In doing so, nature-based Solutions (NBS) are mentioned for the first time explicitly. Nevertheless, amongst grey adaptation measures (e.g. technical) and soft measures (e.g. knowledge creation & awareness raising), already the 2012/2017 strategies mentioned green and blue infrastructure as well as green and open spaces in urban areas primarily aiming at creating ventilation corridors that bring in fresh and could air as one of their key ecosystem functions (see Table AT3). From a spatial planning perspective, the preventive preservation of a network of open and green spaces, including a strengthening of their nature-based functions, e.g., cooling functions, rainwater retention, was addressed more clearly and explicitly as an objective. This also included the preservation of green and blue infrastructure within and outside of settlement areas. The strengthening of this aim also resonates strongly with a renewed strengthening of the objective to further reduce land take and sprawl in the action field of Spatial Planning (see also Section 6 on densification).

Furthermore, according to the strategy of 2024, synergies between climate change adaptation and biodiversity protection should be enhanced through nature-based solutions as well as their integration with public health issues, such as urban heat. For both the NAS3.0 and the Austrian Biodiversity Strategy 2014/2022 (BMLFUW 2014, BMK 2022), the implementation of the renaturation and extension of near-nature green and blue spaces in densely built-up settlement areas is to reduce climate change impacts, such as heat and floods, but also increasingly contributes to biodiversity.

To summarize, the most important action fields and (qualitative) objectives for NBS in the context of housing are (BMK 2024a, own translation and synthesis):

Action Field of NAS	Overarching objectives of NAS 3.0
Construction & Housing sector	Ensuring housing quality through adaptation measures for buildings and their surroundings, including nature-based solutions (NBS) for water retention and cooling.
Protection from Natural Hazards	Strengthening the precautionary principle through land-use planning, individual preparedness, and behavioral adaptation to reduce the negative impacts of climate change-related natural hazards
Spatial Planning:	Safeguarding fresh air and cold air formation areas, ventilation corridors, and "green" and "blue infrastructure" within urban areas. Enhancing the protection of ecologically significant open spaces (e.g., large unfragmented natural areas, habitat corridors, and biotope networks) while minimizing further habitat fragmentation.
Cities – Urban Open and Green Spaces	Preserving urban quality of life under changing climate conditions by maintaining and enhancing the diverse functions of urban open and green spaces.

Table AT7. Action Fields of the 2024 Austrian National Adaptation Strategy (NAS). Source: own elaboration based on (BMK 2024a).

Climate change adaptation in the NAS is understood as cross-sectional issue. As such, the recommendations and aims are mirrored in other important federal strategies, e.g., the Austrian Spatial Development Concept, the Austrian Strategy for Sustainable Development, Austria's Integrated Climate Strategy, and the Austrian Biodiversity Strategy – all of which are non-binding. A main example, which translates the aims and actions from the European strategies into national ones, is the Austrian Biodiversity Strategy 2014/2022 (BMLFUW 2014, BMK 2022). Selected main aims in relation to NBS are: 1) Effective protection and connectivity of all ecologically valuable habitats (e.g. 30% of the country's land area is legally protected under nature conservation regulations; the connectivity of protected areas through habitat corridors is ensured). 2) Restoration of ecosystems critical for biodiversity and climate protection (e.g. Forests, floodplains, etc.); 3) Significant reduction in land consumption and fragmentation (to 2.5 ha, more details in Section 3).

5.2 The implementation process

The choice of tools and structures of implementation reflects the federal state design of Austria. The Austrian adaptation strategy states that the implementation of the recommended actions must take place within the existing responsibilities of all levels of government (federal, state, and municipal). Furthermore, they must be financed within the available budgetary frameworks of the federal, federal state, and municipal governments through priority setting and budget reallocations in line with climate policy objectives. The main responsibilities for the implementation of NBS are with the federal state level and the local, municipal level.

Hence, the choice of tools on the federal level is mostly restricted to formulating and monitoring the (non-binding) climate change adaptation strategies (NAS) and information-based tools, in general terms. One strand is focusing on awareness raising and producing information-material, often through funded applied research (see Table 4). Awareness raising, networking and consulting lower policy levels are another strand of information-based tools used by the federal level. A major instrument are stakeholder dialogues with federal states or regions, also through the introduction of climate change adaptation model regions (KLAR!) in 2016⁶. One sectoral policy, however, the federal level is responsible for, are waterways. Hence, for NBS in the form of river restoration the federal level has competences over legislation and co-finances implementation projects with the federal states. Furthermore, the federal level supports the federal states in fulfilling their nationwide and international nature conservation responsibilities (e.g., Natura 2000, national parks). In 2022, the Biodiversity Fund was endowed with a total of 80 million euros, financed through national resources and NextGenerationEU (RRF) funds.

Based on the efforts at the national level to formulate climate change adaptation strategies, all nine federal states in Austria implemented their own adaptations strategies. Besides, that the choice of tools for implementing NBS on the federal state level is related to two main responsibilities: a) legislation over spatial planning, while implementation of spatial planning is in the hands of municipalities; b) legislation and implementation of nature conservation.

⁶ <https://www.klimawandelanpassung.at/kwa-politik/kwa-oesterreich/kwa-umsetzung-strat>

Additionally, regional and local development concepts allow regions⁷ and municipalities to integrate NBS into sectoral plans, such as Vienna's Green and Open Spaces Concept within its Urban Development Plans. Zoning and development plans can further specify NBS implementation, including regulations on tree planting, green facades, and green roofs, as done in Vienna. The extent to which these tools are applied depends on the local context, with some municipalities leveraging them more actively than others. Especially, smaller municipalities lack the capacity and administrative resources for coordination efforts, therefore limiting their ability for climate change adaptation (see also Brad et al. 2025)

Funding for NBS typically comes from public resources, with financing often involving a mix of federal-state and municipal budgets, supplemented by national and European subsidies. Some federal states also offer targeted subsidies for private owners (e.g., green roofs in Vienna) or municipalities (e.g., greening public buildings in Upper Austria), reflecting the varying degrees of NBS support across different governance levels.

Tool	Structures of Implementation	Governance Level	Time Horizon
Monitoring	Federal level issues monitoring reports on climate change adaptation.	Federal	Every 5 years
Climate Change Adaptation Model Regions Program (KLAR!) ⁸	Initiated in 2016, the funding program supports regions and municipalities with two aims: a) to raise awareness for climate change adaptation and b) implement actions at local and regional levels (e.g. NBS). Regions are supported by subsidies and by experts in developing an adaptation concept, followed by the implementation of at least 10 measures. A continuation phase monitors and continues adaptation measures.	Federal	since 2016
Networking	The federal level (BMK), the federal states and the Climate and Energy Fund initiated and steer a 'climate change adaptation network' to foster knowledge transfer and support decision makers. Different annual working groups prepare information material and share them amongst practitioners in annual yearly network events.	National	Since 2021
Consulting	Education of administrative members from the federal states as climate adaptation consultants for regions and municipalities. Specification of contact persons at federal states that serve as consultants for lower policy levels.	National	Since 2017
Awareness Raising and Research	The federal level (BMK), in cooperation with other actors, supports the development and dissemination of informational materials, brochures, guidelines, best practice documents, and more. These materials are often funded and produced through applied research projects	National	Since 2007

⁷ in the Austrian setting understood as an intermediary level between the federal states and municipalities, usually composed of multiple municipalities with the aim to coordinate spatial development.

⁸ <https://klar-anpassungsregionen.at/service/english-summary>

Tool	Structures of Implementation	Governance Level	Time Horizon
	within the Austrian Climate Research Programme (ACRP).		
Regional and local adaptation plans	All federal states have climate change adaptation plans (as of 2024). Most of the Federal states (5) have integrated climate protection and adaptation plans. ⁹ Upper Austria since 2023 and in Vienna climate change adaptation is integrated into umbrella strategies, but has been mainstreamed since 2022 (c.f. Magistrat der Stadt Wien 2022).	Subnational	n.a.
Spatial Planning Laws	Federal states are formally responsible for spatial planning. Spatial Planning Laws are key instruments. These planning laws usually defining guidelines, objectives and instruments binding for regional and local spatial planning. Their orientation towards integrating NBS is very differentiated.	Subnational	n.a.
Nature Conservation Laws	Federal states are responsible for nature conservation: both in terms of legislation and implementation. Besides European protection categories (e.g. Natura 200) or international (National Parks), also several other categories and areas may be defined by national conservation acts.	Subnational	n.a.
Federal-state, Regional and Local Development Concepts	Federal states and municipalities have the possibility to issue regional and local development concepts. Also, sectoral plans, e.g. for green and open spaces or floodplains, may be used. Vienna, for instance, issued a concept on Green and Open Spaces as part of the Urban Development Plans (2014) issued every ten years.	Subnational	n.a.
Zoning Plans and Development Plans	When changes to plans are made they follow specified steps, such as basic research and considerations of overarching planning and environmental protection procedures. When the change of plan is issued, statements by citizens can be submitted. After the deliberation of statements, a resolution is made by the municipal government and (dis-)approved by the federal state authorities. Zoning and development plans can be used to specify the implementation of NBS. Vienna, for instance, uses zoning plans to prescribe details about tree planting in streets or the demanding green facades and green roofs.	Subnational	n.a.
Public Resources and Subsidies	Usually NBS are financed through public resources. Often in form of a mix of sources from federal states and municipalities – often with support of federal and European subsidies (e.g. for river restoration). Some federal states also provide subsidies to private owners (e.g. for green roofs, facades and	All Levels	n.a.

⁹ <https://www.klimawandelanpassung.at/kwa-politik/kwa-bundeslaender>

Tool	Structures of Implementation	Governance Level	Time Horizon
	de-sealing for private owners in Vienna ¹⁰) or to municipalities for greening public buildings, as in Upper Austria ¹¹).		
Biodiversity Fund	The national biodiversity fund is the main funding tool of the biodiversity strategy. A funding rate of 100% is granted to organizations (e.g. NGOs) and public authorities. Usually public authorities and legal entities that manage biosphere, nature- and national parks in Austria are main recipients of this funds. Private persons and companies are eligible receiving funding rates of 70-90%. The fund provides 30 Mio. €. ¹²	EU / Subnational	2022-2026
RRF – Biodiversity Fund	Additional subsidies are financed through the RRF – Biodiversity Fund (NextGenerationEU). Funding conditions are the same as with the national biodiversity fund. EU sources provide a budget of 50 Mio. €. ¹³	EU / Subnational	2022-2026

Table AT8. Tools for fostering the implementation of NBS in Austria. Source: own elaboration.

5.2.1 NBS implementation in Vienna

Vienna has a long-standing tradition in nature protection and the provision of public parks (see Brenner et al. 2022). The introduction of new zoning categories on nature protection in the 1990s effectively imposed a building ban that makes rezoning for other purposes highly challenging. Also, the planning of new development areas since the 1990s, put an emphasis on providing green spaces based on guidelines from the administration. The recent decade has been marked by the increasing effects of heat waves, leading to a strategic shift of cities towards focusing on the greening public spaces in densely build-up, historic housing stock while keeping the other two pillars of green space development (Brenner et al. 2022, Friesenecker et al. 2024a).

The implementation of climate adaptation strategies in Vienna builds on (1) strategic documents binding for the work for the public administrative units, (2) adapting legal regulations, and (3) adapting financial support. Based on a set of strategic documents a shared policy framework, which are binding to public authorities, has led to a diverse set of concepts, guidelines, policy instruments at the level administrative units that accelerate NBS implementation. Notable documents include the Vienna Street Greenery Concept (2012¹⁴), Surface Drainage Guidelines (2018¹⁵), Green Facades Guideline (2019¹⁶), and the COOLing

¹⁰ <https://www.gbsterm.at/news/mehr-unterstuetzung-fuer-gebaeudebegruenungen-in-wien/>

¹¹ <https://www.land-oberoesterreich.gv.at/236810.htm>

¹² <https://transparenzportal.gv.at/tdb/tp/leistung/1060474.html> ; <https://www.biodiversitaetsfonds.com/#faq>

¹³ <https://transparenzportal.gv.at/tdb/tp/situation/npo/klima-und-umwelt-energie-und-bauen/umwelt-klima-natur-und-artenschutz/1059187.html>

¹⁴ <https://www.wien.gv.at/umwelt/parks/pdf/strassengruen-leitbild-2012.pdf>

¹⁵

https://wien.arching.at/fileadmin/user_upload/redakteure_wnb/D_Service/D_1_1_Baurecht/Richtlinien/oberflaechenentwaesserung-leitfaden.pdf

¹⁶ <https://www.wien.gv.at/umweltschutz/raum/fassadenbegruenung.html>

Fibel (2023¹⁷). These efforts have fostered a "common understanding" of key NBS measures across city administration. In sum, the core strategies include street trees with automated irrigation, de-sealing surfaces, water features (e.g., fountains, fog showers), green facades and roofs.

Second, legal regulations in the building code (Bauordnung) has been a second key tool for implementation. In 2024, amendments to the Building Code have strengthened requirements for green infrastructure, including streamlined approval for green facades, an increase in street trees, and mandates for de-sealing surfaces¹⁸. For instance, two-thirds of landscaped areas must remain unsealed and contain soil-bound greenery (Section 79 (6) BO2024). Façade greening is now permit-free for the first three stories (Section 62a(1)(14) BO2024), and tree planting regulations have been tightened, requiring one tree per 200 m² of landscaped land (previously 250 m²) (Section 79 (7) BO). New parking space regulations (as of 2023) further promote urban greening by reducing required parking spots in public transport-accessible areas, freeing space for 2–3 additional street trees per 3,000 m² residential building. However, these changes in legislation are immediately binding for property owners unless modifications or new developments are undertaken.

Third, financial support has been recently adapted as well. In Vienna, 23rd district governments are responsible for managing, providing and expanding green spaces, including tree planting in street greening. Since 2018, Vienna's 23 districts have received dedicated funding to preserve, adapt, and expand green spaces¹⁹. A 2021 funding reform increased financial allocations to districts, linking funds to green space maintenance needs, prioritizing climate-stressed areas such as those requiring additional tree watering. The budget for new green infrastructure was further expanded, but districts maintain control over fund allocation. Additionally, the "Lebenswerte Klimamusterstadt" (Livable Climate Model City) program, launched in 2021, provides €20 million annually for district greening projects, totaling €100 million by 2025. Projects receive 40–80% co-funding, depending on factors like soil de-sealing, greenery proportion, and use of sponge city principles. Surface sealing levels are particularly considered due to their direct impact on urban heat stress (Friesenecker et al. 2024b).

5.3 Size and role of the market

Austria's market framework for NBS is primarily public sector-driven, in which federal-states and municipal governments play the dominant role in funding, regulating, and implementing nature-based solutions. When it comes to nature conservation areas operation and coordination is often done by non-profit public enterprises. Financing is largely publicly funded, with NBS supported by federal-state and municipal budgets, as well as EU subsidies (e.g., RRF, Biodiversity Fund).

Purely market-based NBS interventions are limited, as implementation depends primarily on public policies, regulations, and subsidies rather than private-sector investments or profit-driven incentives. While some financial incentives exist for private actors, such as subsidies

¹⁷ <https://www.wien.gv.at/kontakte/ma42/publikationen.html>

¹⁸ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=LrW&Gesetzesnummer=20000006>

¹⁹ <https://www.wien.gv.at/bezirke/dezentralisierung/budget/>

for green roofs and façade greening in Vienna, these measures remain supplementary to state-led initiatives.

5.4 The multilevel governance process

As already written in the previous section on instruments, the Austrian adaptation strategy clearly outlines that the implementation of NBS must take place within the existing responsibilities of the federal, state, and municipal levels. Additionally, existing federal, federal state, and municipal budgets need to finance NBS especially through priority setting and budget reallocations to meet climate adaptation objectives. The main role of the federal level, with two main federal ministries BMK and BML as shown in **Fehler! Verweisquelle konnte nicht gefunden werden.**), is therefore ensure a broad ‘consensus’ base that leads to the implementation of NBS at local levels. The coordinate and steer across this vertical dimension information-based tools, e.g. strategies and awareness raising methods, subsidies and setting regulatory framework conditions are used. A key approach therein is stakeholder involvement, mainly for developing strategies. According to the NAS (BMK 2024a), stakeholders were engaged through online surveys, written feedback on policy drafts, and participation in advisory committees. The process actively involved national and sub-national government officials, while also incorporating input from the private sector, interest groups, researchers, and the general public²⁰. The role of federal ministries is complemented by public enterprises, like Umweltbundesamt and KPC as shown in **Fehler! Verweisquelle konnte nicht gefunden werden.**, by managing funds and subsidies and knowledge creation.

The implementation of NBS requires collaboration among a wide range of public – usually at the Bundesland and municipal level – and private sector actors depending also on land and property ownership. While Vienna is both a federal state and municipality coordination between vertical levels is easier. For other federal states coordination efforts between the municipal level and province level is considered particularly challenging. Yet, as highlighted in the monitoring reports and the NAS (BMK 2021; BMK 2024a), the necessary coordination and cooperation between the various sectors and policy levels is only taking place to a limited extent. Furthermore, the report stated that the impacts of climate change are still insufficiently considered in relevant planning and decision-making process.

In Austria, the responsibility for planning, designing, and maintaining open and green spaces lies with the municipal administrations. From a horizontal multi-level perspective, one major issue is the disparity in knowledge and awareness across different municipalities regarding the importance of green and open spaces (BMK 2021). Many cities and local governments still harbor reservations about implementing greening measures, such as rooftop or façade greening, often due to concerns about maintenance costs and long-term management. Hence, policy implementation at the local level varies considerably.

However, bigger cities like Linz or Vienna, for example, released local adaptation programs which have important consequences for the horizontal coordination of actors (Magistrat Linz – Planung, Technik und Umwelt 2023), Magistrat der Stadt Wien (2022), Stadt Wien 2024).

²⁰ see also: https://climate.ec.europa.eu/document/download/75ad3c4f-cb89-400e-8be4-56ab24690681_en?filename=summary_fiche_at_en.pdf

These programs usually detail a) needs of coordination between administrative units (e.g. transport, health, etc.) and b) the integration of adaptation objectives into urban planning procedures to govern NBS implementation in public and open space, but also at property- and building level where greening is the responsibility of the property owner. Though due to varying degrees, municipalities started to amend their zoning and development plans with respect to adaptation demanding more green features. However, the integration of climate adaptation strategies into urban development is still in its early stages, with conflicting land-use demands posing additional hurdles (BMK 2019). Adapted zoning and development plans usually demand compulsory greening of the building stock (e.g. green roofs/facades), outlining the ration of street trees vs. parking lots in public spaces, the shares of non-sealed areas on properties, etc (as outlined in Vienna building code reform above, but also Linz introduced a reform²¹). Providing subsidies for green roofs and facades in bigger cities are another main approach to govern the implementation of NBS at the building level, sometimes they are deployed by the federal state level and in bigger cities also by municipalities²².

Name	Type	Level	Roles
Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK)	Public	National	Most important responsibilities are the development, coordination, monitoring of national strategies, e.g. jurisdictional competences (e.g. climate law) and providing subsidies Resorts falling under this ministry are traditionally energy, mobility and technology (e.g. research). Environment and Climate has been often with the agriculture and forestry ministry. In 2020, with the coalition between the People's Party (ÖVP) and the Green Party, climate and environment agendas were merged. Depending on the coalition, resorts dealing with these themes have been usually in the hands of the Social-Democratic Party (SPÖ), the Freedom Party (FPÖ) or the Green Party (2020-2024)
Federal Minister for Agriculture, Forestry, Regions and Water Management (BML)	Public	National	This ministry is important for water-based NBS-based policies as it has competences in legislation over forest and water-related issues (including flood risk management). As such it also issues subsidies for the renaturation of water ways. This ministry is traditionally run by the people's party.
Environment Agency Austria (Umweltbundesamt)	Public Enterprise	National	In relation to NBS and climate change adaptation the Environment Agency Austria is involved in coordination and knowledge transfer, e.g. the provision of basic information on climate adaption through a website, The most significant expert institution for environmental matters in Austria and a leading environmental advisor in Europe. The institution develops foundations for decision-making at the local, regional, national, European, and international levels engaging in dialogue with policymakers, public administration, businesses, academia, and civil society.

²¹ https://www.linz.at/images/files/Amtsblatt202023_Bebauungsplanaenderung_Ediktal_VO_2.pdf

²² <https://gruenstattgrau.at/wissen/foerderungen/>

Name	Type	Level	Roles
Climate and Energy Fund	Public Enterprise	National	The fund handles and manages the KLAR! regions, but also handles subsidies for companies, municipalities, research and private persons. It also organizes activities within the Austrian network of climate change adaptation.
KPC	Public Enterprise	National	The “Kommunal Credit Public Consulting” (KPC) handles environmental and adaptation subsidies, e.g. NextGen Funds for Biodiversity and Densification.
Spatial Planning Departments	Public	Federal State	Responsibility for developing spatial planning programs at the federal and regional levels. This includes strategies, action fields, development plans, etc. These have binding character for local spatial planning (municipalities).
Nature Conservation Departments	Public	Federal State	The nature conservation departments of the federal states have the responsibility to coordinate and manage nature protection areas.
Municipalities	Public	Local	Responsible for local spatial planning, mainly for local development concepts, zoning and development plans.
Austrian Association of Cities and Towns	Public	National-Local	The principal task is to represent the interests of local government in negotiations over the sharing of budgetary funds and taxing rights between the federal government, the federal states and local authorities (revenue sharing).
Social Partners	Public	All Levels	Depending on whether on the
Environmental NGOs	Civil Society	All Levels	Environmental NGOs in Austria often take the role of opposing (transport) infrastructure and housing developments, advocating for nature conservation and pushing local governments to take urban greening seriously and comprehensively (e.g. Naturschutzbund, WWF, Greenpeace, System Change not Climate Change, Fridays for Futures)
Property and Building Owners	Private	Local	Implementing and managing building and property-level NBS.
Planning offices	Private	Local	Designing NBS projects in urban and rural settings.
Community based support and organizations (Citizen based)	Civil Society	Local	Supportive measures that e.g. fosters the watering of plants (as done by the urban renewal offices in Vienna). Community-based organization – in relation to NBS – often limit to communal gardening efforts.

Table AT9. Actors involved in NBS governance in Austria. Source: own elaboration.

5.5 Achievements, assessments, and challenges

The national adaptation strategies acknowledge that measures – such as NBS – have to consider the social consequences and, therefore, adaptation should also avoid negative impacts, especially for those who are vulnerable to flooding's and urban heat (BMK 2024a). The strategy frames social vulnerabilities in relation to impacts of the climate change and that these different vulnerabilities need to be considered when designing climate policies. On the contrary, another national study commissioned by the Federal Ministry for Social Policy and Health reports that social policies do not align with climate change criteria (BMSGPK 2021:

103). Hence, despite a common agreement amongst Austrian policy maker that integration of climate and social policies are key, the coordination and integration is still lagging behind on the level of implementation, e.g. in laws or funding schemes. Hence, social and spatial inequalities should be considered more effectively in adaptation planning, while spatial planning must integrate climate change adaptation more consistently (BMSGPK 2021, Reinwald et al. 2024).

When it comes to NBS, knowledge on the potential relation to, and evidence of potential impacts on housing inequalities is so far limited. For Vienna, Brenner et al. (2022) have shown that uneven patterns in the availability of urban green spaces (UGS) per inhabitants have remained stable and limited. Most of the neighbourhoods are characterised by an adequate availability of green. Nevertheless, Friesenecker et al. (2024b) highlight that especially central areas lack large green spaces providing cooling functions, which is a major factor in Vienna's heat island effect. Furthermore, Neier (2024) provides robust evidence that minorities (non-Austrians) are more segregated from urban vegetation than Austrians. Friesenecker et al. (2024a) highlight that NBS are currently not considered as a risk for displacement amongst policymakers, mostly because of the robust social housing provision and still existing rent regulation. However, they show that less effective rent regulation in the private rental segment enhances risks of gentrification, while greening in central areas – either in public spaces or at the building level – remains isolated and fragmented. Enhancing NBS in these areas, therefore, might increase the risks of displacement for vulnerable groups.

Impact Area	Potential Impacts
NBS on public land	With regard to NBS – such as tree planting in streetscapes or greening squares and at the building level – currently only limited impacts on the local housing market are observed. Nevertheless, socio-spatial inequalities in availability and, depending on the housing segment, differentiated risks of displacement exist. Based on Friesenecker et al. (2024) and Friesenecker et al. (2025), for Vienna, higher displacement risks based on NBS emerge in the private rental segment where rent control is not in effect or has been subject to increasing deregulation of rent control (applying to buildings built before 1945) and an allowance for time-limited contracts (e.g. 3-5 years). Here, landlords might increase rents because of improved liveability through green measures, while the effect of public on greening is currently still limited. On the contrary, buildings owned by limited profit housing associations and by the municipality (municipal) housing (and their regulation of rent setting) do not allow for charging higher rents based on locational qualities such as public green. However, increased greening and more heatwaves might enhance housing inequalities in the future.
NBS on buildings and properties	Less is known about how building or property-level NBS impacts rents and house prices. It is assumed that the implementation of building or property-level NBS (green roofs and facades, trees, bushes, grassland) increases rents and utility costs due to maintenance of green, such as watering). Private developers are – in most cases – more reluctant to implement NBS, but if stricter demands for the implementation of NBS by the public sector emerge, trade-offs are to be expected. In Austria, a distinction between the private and social housing providers is essential. Even in social housing rent payments might increase due to higher utility costs.

Table AT10: Potential Impacts of NBS implementation on housing inequalities in Austria. Source: own elaboration.

6 Densification

6.1 The policy cycle: emergence of the issue and policy decisions

In relation to densification, Austria is facing a growing challenge due to urban sprawl and the increasing sealing of green spaces, which not only disrupt ecosystems but also impose significant financial burdens on infrastructure development. On average, in the year 2002 25 hectares of land were irreversibly sealed every day for construction and the expansion of transport infrastructure (BMLFUW 2002: 70), by 2023 the amount has been reduced to a still high number of 11,5 hectares per day (EC Country Report Austria 2023). According to Getzner & Kadi (2019) increasing land prices and therefore resulting scarcity of land and the higher efficiency of the land use (resulting from population density and urbanization) contributed to the reduction of land consumption. Although land consumption slowed down at a moderate speed soil sealing continues to be a major environmental policy challenge in Austria.

A major driver of the issue of sealed surface is the persistent demand for single-family homes in suburban areas, which requires large amounts of land and generates high traffic volumes. Austria has one of the highest per capita numbers in Europe of road kilometres and supermarket surface (EC Country Report Austria 2023). This sprawling development pattern contradicts the principles of sustainable urban planning and exacerbates environmental and economic pressures. At the same time, rural areas remain underutilized, with many regions experiencing structural weaknesses and population decline, further deepening disparities between urban and rural areas. In response to these challenges, densification strategies are becoming increasingly critical, aiming to optimize land use, reduce infrastructure costs, and promote more sustainable urban growth.

Different strategies and guidelines along the past three decades focussed on soil sealing as Austria's major environmental policy challenge with one of the earlier milestones for sustainable land use being the **Austrian Strategy for Sustainable Development** (NSTRAT) adopted in 2002 (BMLFUW (2002)). The 2002 Austrian Strategy for Sustainable Development of the federal state is – though legally not binding – a key event not only for nature-based solutions but also in Austria's recent land use policy. The strategy, influenced by Rio (1992) and its sustainable development, is also a direct response to the strategic aims of the EU formulated in Lisbon in 2000. The Austrian Strategy for Sustainable Development was adopted by the federal government in April 2002, being previously developed by a working group consisting of around 40 representatives from ministries, federal states, and municipalities, as well as social partners, interest groups, and NGO platforms. The process was accompanied and moderated by a professional team.

The NSTRAT features the “Key Objective 13 – Responsible Use of Land and Regional Development”, which sought to reinforce Local and Regional Agenda 21 processes and aimed at a reduction in the increase of permanently sealed surfaces to a maximum of one tenth of the current growth rate by the year 2010. Additionally, the NSTRAT (BMLFUW 2002: 71) states that “With more density of construction, a higher intensity and efficiency of surface use is to be made possible and **optimal exploitation of the use potentials in areas already built up** is to be guaranteed.” The strategy additionally outlines the preference for “space-saving housing

construction” and prevention of further sealing of surfaces, while at the same time sustainable housing through subsidies is to be promoted. Also, NSTRAT featured monitoring land use as a key indicator for reaching the Key Objective 12 “Preserving the Diversity of Species and Landscapes”, however also stating that these indicators partly still had to be developed or/and data on those was not collected regularly. The NSTRAT 2002 further developed into the **Austrian Strategy for Sustainable Development 2010** (ÖSTRAT, BMLFUW 2010), which refined NSTRAT goals, integrating new challenges such as climate change, resource efficiency, and stronger policy coordination at national and EU levels. At the same time the new, legally non-binding strategy emphasized more in depth on implementation, **monitoring of land development**, and alignment with international sustainability frameworks such as the **EU SDS (2010)** and the **EU Climate and Energy Package**.

A second milestone in tackling land use and soil sealing in Austria was the **Bodencharta 2014** (Land Charter 2014²³), which is a reference to the **European Soil Charter** of 1972 and resulted as a reaction to the inadequate and ineffective policy response on continuing excessive land consumption after the release of the NSTRAT in 2002. On initiative of the think tank Ökosozielles Form, ten institutions amongst others the Climate Alliance, Federal Ministry of Agriculture and Environment, Austrian Association of Municipalities, Austrian Hail Insurance, Chamber of Agriculture Austria endorsed the charter, which advocates for compact urban development, mixed-use zoning, and the revitalization of brownfield sites to optimize land use while preserving natural landscapes and agricultural areas.

In 2017, the **Baukulturelle Leitlinien des Bundes** (Architectural Guidelines of the Federal State) were adopted in 2017 by the Austrian federal government and aimed at providing a framework for guiding sustainable and high-quality urban development in Austria (Bundeskanzleramt 2017). The guidelines were developed by various experts, architects, urban planners, and stakeholders in the fields of architecture, urban design and the Austrian Federal Ministry for Sustainability and Tourism (BMNT). Amongst the recommendations for the promotion of architectural culture and awareness building in Austrian society, the guidelines emphasized the importance of densification in the context of a growing (urban) population. The guidelines advocate for the compact development of urban areas, encouraging the efficient use of land through the revitalization of existing buildings and the creation of mixed-use spaces that combine residential, commercial, and public functions. In terms of densification, the guidelines stress the need to avoid urban sprawl by promoting infill development and constructing multi-story buildings that integrate well with the surrounding environment. The guidelines also outline the importance of a balance between increased density and maintaining a high quality of life for residents, prioritizing green spaces, public transport, and pedestrian-friendly environments.

As a third milestone in 2021, the **Austrian Spatial Development Concept ÖREK 2030** was introduced, which serves as a set of guidelines followed by all institutions represented in the Austrian Conference on Spatial Planning (Österreichische Raumordnungskonferenz, ÖROK). However, by its nature the concept only works as a recommendation and serves as a voluntary agreement. Amongst the spatial objectives of ÖREK 2030 the following is stated in terms of densification: “Austria's cities and towns should be developed in a compact manner

²³ https://www.unserboden.at/files/bodencharta_2014.pdf

encouraging mixed uses. In order to protect valuable soil and the climate, distances must be shortened, surface areas revitalised and unsealed, town and city centres regenerated with high quality urban densification” (ÖREK, 2021: 11). In reference to the **EU Roadmap for a Resource Efficient Europe**, the aim 2 of ÖREK “Reducing land consumption and soil sealing” stresses key measures such as stabilising land consumption at 2.5 ha per year with differentiated specifications for the various spatial types, a standardised evaluation of discontinued land uses in Austria, development of regionalised calculation of building land demand, the trading system for land use certificates between municipalities and the acceleration of the (re-)activation of multifunctional urban and town centres.

A more recent milestone, is the **government coalition programme (2020–2024)** of the People’s Party and the Green Party with the main objective of reduction of land use and soil sealing and the subsequently developed aims in the **National Energy and Climate Plan** (NEKP, Nationaler Energie- und Klimaplan). However, the envisioned nationwide **Land Protection Strategy** (Bodenschutzstrategie), in collaboration with the federal states to establish legally binding principles for reducing land consumption and improving soil quality, failed in various incidents due to a lack of collaboration efforts between the federal and provincial governments in committing to a quantitatively defined maximum of land take (in ha per day). The adoption of the strategy was hindered by inconsistent commitment and varying levels of implementation across the federal states, with some regions prioritizing economic development or urban expansion over soil protection, which contributed to the overall lack of policy success (BMK 2024b).

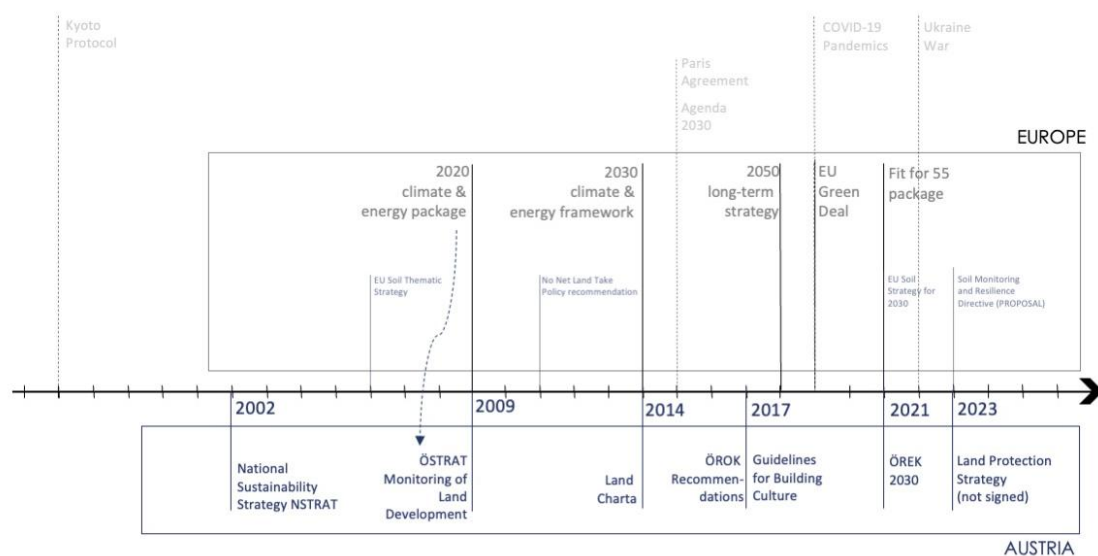


Figure AT6: Timeline of policies, initiatives and strategies on densification and land-use in Austria.

6.2 The implementation process

One of the measures to implement strategies and objectives described in the **Austrian Spatial Development Concept ÖREK 2030** or the **government programme 2020–2024** are cross-municipal and regional implementation of land use planning with high-quality (re)densification

and space-efficient internal development by utilising the legally binding development plan and building regulation instruments. Additional, planning procedures and decisions are meant to consider natural soil functions and high-quality soils to be safeguarded in order to maintain the adaptive capacity of natural systems (the so-called ‘climate proofing’ of spatial plans).

Through the recent information-based tool of **Brownfield Dialogues** (Brachflächen Dialoge), funding for brownfield conversion was made available for municipalities, individuals and businesses. The Brownfield Dialogue was initiated by the Ministry of Environment (BMK) and serves as a platform for knowledge exchange amongst stakeholders. The Federal ministry is also responsible to manage subsidies aiming at reducing land consumption (**Flächenrecycling Klimafitte Ortskerne**). For municipalities, associations of municipalities or other landowners (natural or legal persons), development concepts for reuse of brownfield development in settlement areas are supported with a grant rate of 75% up to a maximum of 60,000 euros. For the same stakeholders, funds can also be used for examining the subsoil – e.g. for potential contamination – and the existing building substance (75% up to a maximum of 50,000 euros), as well as for planning related to potential difficulties that may arise from the location in city/town centres (50% up to a maximum of 15,000 euros). The funding scheme of Klimafitte Ortskerne - Flächenrecycling is financed by the EU **Recovery and Resilience Facility** (RRF) as detailed in the **Austrian National Recovery and Resilience Plan** and budgeted with a total of €8 million for the years 2022 to 2025 and administered by Kommunalkredit Public Consulting (KPC).

Additionally, funding targeted at municipalities and cities for **local and town centre promotion** (Orts- und Stadtkernförderung), based on the CAP Common Agricultural Policy Strategy Plan 2023–2027, is available through the **European Agricultural Fund for Rural Development** (EAFRD) and supports investments in regions for revitalizing, renovating, or repurposing vacant, misused, or underutilized buildings and public spaces. The subsidies depend on restrictions such as public relevance or heritage value of the (vacant) buildings or sites and are granted to municipalities and only in exceptions (heritage value) to private legal entities or persons

Also, **ÖREK** recommends a number of tools and measures to tackle land use consumption. For brownfield activation, formal instruments of local spatial planning may be used as well as fees and charges, vacancy registers and vacancy management, together with subsidies. To reach the objective of maximum 2.5 ha/day soil sealing and to foster space-efficient internal development of settlements, ÖROK recommends effectively using a mix of cross-regional and local spatial planning instruments (zoning plans, development plans und building codes), funding and incentive systems (federal states / municipalities funding for urban renovation, e.g. Ortskernbelebung tailored for public institutions such as municipalities and cities), and monitoring. Especially for densification and multi-functional city cores (Klimafitte Ortskerne), informal and formal instruments of cross-regional and local spatial planning (regional and local adaptation plans, Spatial Planning Acts) are recommended to be combined with concepts and subsidies (including housing subsidies through Housing Subsidy Acts), built environment education, master plans, participation procedures and vacancy monitoring.

Housing Subsidy Acts in Austria can be an additional instrument to promote densification by linking density requirements to funding – a way to foster the production of affordable housing

in densification areas. In this case, the federal states' Housing Subsidy Acts would e.g. require certain measures from housing developers in favour of obtaining object-subsidies when building subsidized housing that go hand in hand with low land-consumption and soil sealing as well as higher building densities. At the same time, sophisticated housing subsidy instruments, such as developer competitions (Bauträgerwettbewerbe) in Vienna, enable the balancing of densification efforts—driven by high land prices—with the need for high spatial residential quality (e.g., access to green and social infrastructure). In combination with special categories of Zoning Plans, such as Vienna's **zoning category of Subsidised Housing**²⁴, these instruments allow for targeted implementation of affordable housing and densification at the same time.

Tool	Structures of Implementation	Governance level	Time Horizon
Monitoring	ÖROK monitors land use developments ²⁵ .	national/subnational	Every 3 years since 2022
Networking, Funding	The federal level (BMK), Brachflächendialog Brownfield Dialogue	national	Since 2021
Consulting	Education of administrative members from the federal states as climate adaptation consultants for regions and municipalities. Specification of contact persons at federal states.	subnational	Since 2017
Awareness Raising and Research	The federal level (BMK), in cooperation with other actors, supports the development and dissemination of informational materials, brochures, guidelines, best practice documents, and more. The materials are often funded and produced through applied research projects within the Austrian Climate Research Programme (ACRP).	national	Since 2007
Regional and local adaptation plans	All federal states have climate change adaptation plans (as of 2024). Most of the Federal states (5) have integrated climate protection and adaptation plans.	subnational	n.a.
Spatial Planning Acts	Regulations on regional and local spatial planning: e.g. also zoning categories for social or subsidized housing	subnational	n.a.

²⁴ The zoning category of Vienna's building plan "Subsidised Housing" is applied in cases of zoning category change, 2/3 of residential floor space in these areas have to be realised as subsidised housing projects with a max. land price per m² floor space limited by law to € 188/m².

²⁵ <https://www.oerok.gv.at/monitoring-flaecheninanspruchnahme>

Tool	Structures of Implementation	Governance level	Time Horizon
Housing Subsidy Acts	A possible measure to steer densification through funding requirements.	subnational	n.a.
Federal-state, Regional and Local Development Concepts	Federal states and municipalities have the possibility to issue regional and local development concepts regulating land uses that affect densification (e.g. prohibiting commercial centres at outskirts).	subnational	n.a.
Zoning Plans, Development plans and Building Codes	Details, for instance, nature protection or green areas. When changes to plans are made they follow specified steps, such as basic research and considerations of overarching planning and environmental protection procedures. When issued statements can be submitted by citizens. After the deliberation of statements, a resolution is made by the municipal government and (dis-)approved by the federal state authorities. These plans can be used to support densification and prevent urban sprawl (e.g. by preventing the zoning of commercial estates at the outskirts of municipalities).	subnational	n.a.
Public Subsidies	Some federal states provide subsidies for the retrofitting existing, underused stock or aim at strengthening the central areas of smaller towns and cities (see also below).	subnational	n.a.
EAFRD	Local and town centre promotion (Orts- und Stadtkernförderung), based on the CAP Common Agricultural Policy Strategy Plan 2023–2027, supports investments in revitalizing, renovating, or repurposing vacant, misused, or underutilized buildings and public spaces.	national/subnational	2023-2027
RRF	Klimafitte Ortskerne - Flächenrecycling	national	2022-2025

Table AT11. Tools for fostering densification in Austria. Source: own elaboration based on ÖROK (2002)

6.2.1 Densification in Vienna

In Vienna, originally the densification of already built-up central areas aimed to ease the pressures of population growth. These urban areas are largely dominated by private rental housing of the pre-war area which are subject to rent regulation under the national tenancy

law. Due to the rapid increase in population (around 450,000 since 1990) and increasing housing prizes in the private housing market, the construction of affordable housing has been a primary goal of the City Government in recent decades. Hence, to ensure the production of affordable housing, the key mechanism used is the continuous construction of new apartments across the city (Friesenecker and Litschauer, 2022). Although, the City tries to (re-)use brownfield sites, increasing land prices has forced the city to construct new affordable housing on greenfield sites as well (Friesenecker and Litschauer, 2022). For large greenfield site developments, the administration regulates the construction of new green spaces via land zoning, developer competitions and general urban planning guidelines, e.g. how large parks shall be, which features green spaces should have, etc. The Viennese administration has strategically supported the construction of limited-profit housing units since the 1990s through a policy mix of: a) developer competitions (Bauträgerwettbewerbe), b) housing subsidies and c) an active land policy in place since the mid-1980s. In brief, developer competitions are not competitions that favour cheap bidders, but are competitions on high construction quality in combination with providing low rents therefore favouring limited-profit housing associations (see Friesenecker and Litschauer, 2022 for more details).

Assessing the spatiality of new urban developments since 2005, most of these new large-residential building areas have been developed on the outskirts of the city or on previous brownfield areas distributed across the city. For example, outskirt projects included developments for more than 25,000 citizens are located mainly in the Seestadt (22th district), Oberlaa (10th district) or in southern parts of Vienna (23th district). Most of these areas were developed at previous sites with other green space uses – such as gardens or former air-field sites. Usually, a proportion of the land has been owned by the city itself allowing for the subsidized production of affordable housing. Therefore, the land price was below the usual market-price and the production of large amounts of subsidized, affordable housing through limited profit housing associations is the main aim for these areas.

At the same time, Viennese housing projects also include the use of large brownfield projects within the city centre. This usually occurred at different previous railways and train stations, such as Nordbahngelände (2nd district), Nordwestbahngelände (20th district) or Sonnwendviertel (10th district), or previous industrial production facilities. These areas are usually characterised by a mixed approach to housing including subsidized social housing by limited-profit housing associations, but also freely financed housing and ownership models.

In sum, the Viennese housing policy include a strong focus to build new and more residential buildings within existing urban areas. The largest advantages of the Viennese housing policy are to provide a strong instrument for integrating social and ecological aspects under the banner of liveability. While the new residential developments include the main effort to provide a minimum limit of green space for the new citizens, this came at the trade-off to improve the overall green space within the city, especially in areas, where historically dense urban built-up structures lead to problems with urban heat waves and biodiversity loss. Viennese policy shows a potential to counteract the increasing socio-spatial inequalities, which can be observed in most urban areas across the globe.

6.3 Size and role of the market

Policy changes concerning tenures and building standards in the last two decades increased the influence of private market actors and influenced the affordability of densification measures. For example, under the conservative/right-wing ÖVP-FPÖ government (2000–2007) detached and semi-detached dwellings mostly constructed by private housing developers were excluded from the Tenancy Law regulation, implying that neither rent regulation nor regulation of contracts (like protection against dismissal) applied in 2001. Furthermore, this amendment to the tenancy law also excluded attic conversions – one of the measures of densification in urban areas –, thereby effectively abolishing rent controls. This exclusion was extended to other conversions and extensions in 2006 (Friesenecker and Kazepov, 2021). In practice, this means that if a ground floor apartment is newly built, or new living space is created by an attic conversion, these dwellings do not fall under the regulation of the Tenancy Law, while the old, existing stock within this building continues to be subject to rent-setting and other tenant protection regulations. Hence, these reforms made it nearly impossible to build affordable housing into already existing residential areas and affordable densification was not an option. Furthermore, the demolition of existing pre-war buildings, usually of lower height, and the construction of newly built private rental or homeownership units were increasingly reported (see Kadi and Matznetter, 2022; Musil et al., 2022 for instance).

Looking at trends of housing segmentation and its relation of density within different degrees of urbanisation, a steady decline in ownership from around 30% dropping to about 24% characterises densely populated areas. Notably, it also seems that in intermediate areas (suburbs and towns), the share of tenants becomes more important, especially after the GFC in which professional developers became important key actors in these areas as well. In rural, thinly populated areas, ownership rates remain stable with only minor shifts between declining shares of tenants and expanding shares of accommodations provided for free. Austria's urban and intermediate areas are characterised by a clear trend towards more densified housing supply. The expansion of apartment buildings with more than 10 dwellings in densely populated areas and intermediate regions reflect a clear shift towards high-density living in cities. This effect is most likely driven by population growth, environmental ambitions in land use, and already existing space constraints within city boundaries. As a result, detached houses and semi-detached houses (usually related to private market activity) play an increasingly minor role in urban areas, with their shares remaining marginal over time.

In Vienna, additionally a shift in the stakeholder setting and actors involved in the development of housing in large brownfield projects is visible. Former highly active limited-profit housing associations (LPHA) as major developers of these sites were replaced by private developers and banks for developing large scale urban brownfields in areas such as Nordbahnhof or Sonnwendviertel Ost. While apartments in these urban development areas are still labelled by developers as affordable, they are not bound to the rent caps and quality requirements of the Housing Subsidy Act. This shift in the stakeholder setting is based on rising land prices on the one hand, and, on the other hand, on the favourable financial environment which spurred significant investment in the real estate sector in the past decade in Europe. To counteract these trends, the City of Vienna introduced a new zoning category “Subsidized Housing” in 2018 (see section 3.2.).

6.4 The multilevel governance process

Since the early 1970s, a predominant cooperative system with the federal state system relying on coordination and cooperation between policy fields and regional authorities has developed due to a lacking legal framework for spatial planning. Instead of introducing separate legislation, these coordination and cooperation mechanisms take place on various spatial levels between the federal government and the federal states and was shaped by social partnership. Today, regional policy today takes place within a complex multi-level governance system that integrates various actors, coordination processes, strategies, and instruments for development promotion, from the EU down to the local level. For densification strategies and planning instruments, all three planning levels, federal, provincial and municipal are key. Equal to energy policies and retrofitting measures, 15a agreements (Art. 15a BVG-Vereinbarung) are essential instruments to define roles and tasks between the federal state and the federal states as well as the concrete implementation procedures for densification programmes at municipal level.

The complex multi-level governance system integrates diverse groups of actors, coordination processes, strategies, and development of instruments from the EU level down to the small regional level. Spatial aspects, such as densification measures, are addressed in the Austrian Spatial Development Concept (ÖREK), as well as in the subsequent ÖREK Partnerships. However, many sectoral strategies scarcely integrate spatial or regional components explicitly. Strategic coordination is carried out in sessions of the Austrian Spatial Development Conference (ÖROK, Österreichischen Raumordnungskonferenz), along the ÖREK Partnerships for implementation or in panels such as the „dialogue of the federal states“ (Bundesländerdialog). ÖROK is especially important as it serves as a platform for informal cooperation between the federal state, federal states, municipalities, other parties and social partners. This platform compensates for the lack of formal legal coordination procedures in matters of spatial policies in Austria. Planning bodies and competences include authorities and outsourced legal entities of the federal government, the federal states as planning authorities responsible for regional planning, regional associations (such as in Salzburg, Upper Austria, Tyrol) where provincial governments formally issue binding spatial plans where applicable, and eventually municipalities as competent planning bodies for local spatial plans (see **Fehler! Verweisquelle konnte nicht gefunden werden.**).

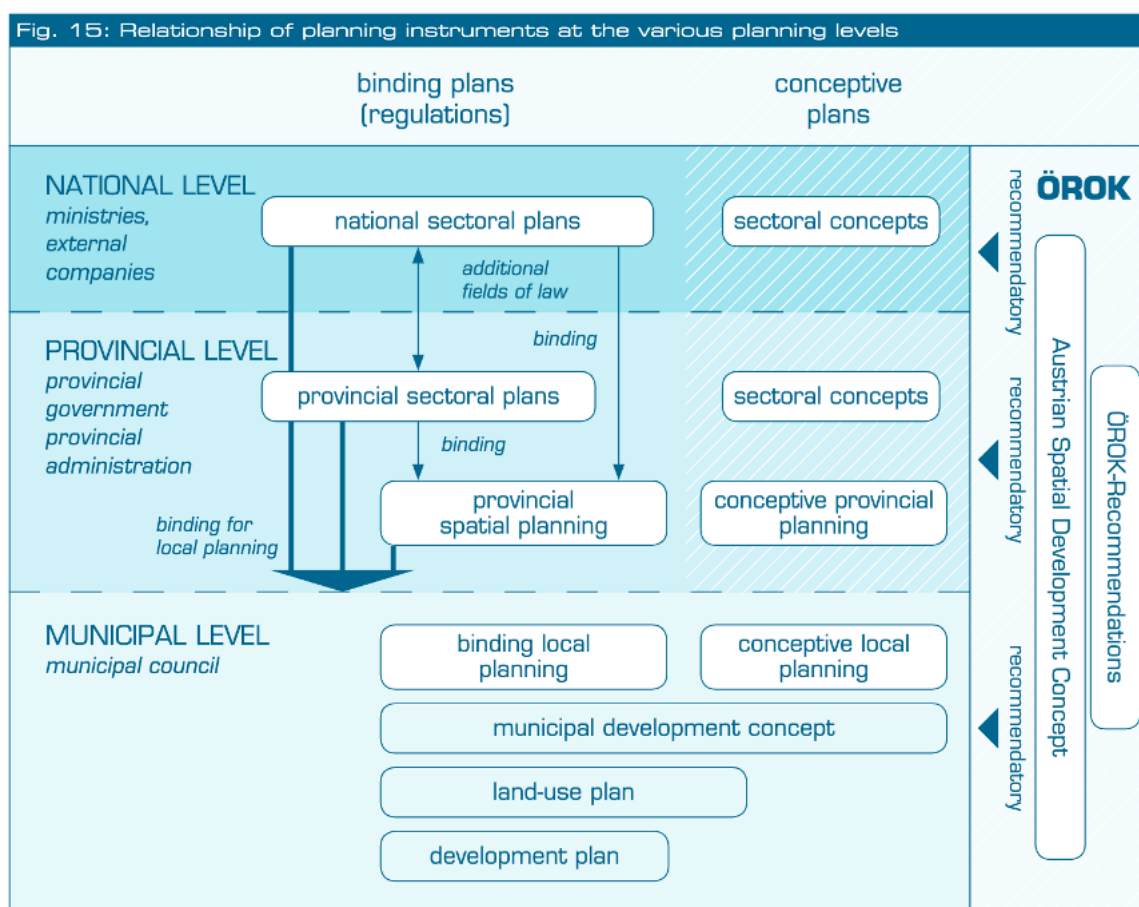


Figure AT7. Competences and planning bodies in Austria. Source: Schindelegger & Kanonier in Gruber, M. et al. 2018: 77

In terms of densification measures, municipalities have a key role that is connected to their function in spatial planning, which is anchored in constitutional law: The Municipalities, only active in administration (and not legislation), are responsible for local spatial planning within their own territories, in accordance with federal and state laws. Planning decisions such as densification measures are therefore in the sphere of municipalities with a comprehensive planning authority. The three main instruments are as follows: The local development concept, as a strategic planning instrument, is followed by the zoning plan as the central regulatory instrument, which is then followed by the land development plan (Bebauungsplan). The provincial government has only an advisory role for these three instruments. The zoning plan is a key instrument of local land-use planning, which is generally established as an independent planning tool within local spatial planning (exceptions exist in the federal states of Upper Austria, where the local development concept is part of the zoning plan and, in Vienna, where zoning and development plan (Bebauungsplan) are represented in one plan). The land-use regulations established by the zoning plan do not interfere with existing rights but only allow for a possible change in land use as specified by the plan. The zoning designations in the zoning plan have a normative effect for future decisions, are highly contested and not always strictly followed in practice. However, the ÖROK (Gruber, M. et al. 2018: 105) states that “public interests defined in the zoning plans are relatively clear and well-

established through decades of practice – and also by the corrections made by the high courts.”

Name	Type	Level	Roles
Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK)	Public	National	Most important responsibilities in relation to densification are the development, coordination, monitoring of the national adaptation strategy.
Federal Minister for Agriculture, Forestry, Regions and Water Management	Public	National	This ministry is important for water-based NBS-based policies as it has competences in legislation over water-related issues (including flood risk management). As such it also issues subsidies for the renaturation of water ways. This ministry is traditionally run by the people's party since 2020.
Federal Ministry for Arts, Culture, Civil Service and Sport	Public	National	Within the Ministry Department IV/B/4 is responsible for supporting architects, architecture and building culture mediators, associations, other institutions, and initiatives in the field of architecture. Based on their works reports and guidelines on building culture have been released and adopted by the government.
Environment Agency Austria (EEA, Umweltbundesamt)	Public Enterprise	National	The most significant expert institution for environmental matters in Austria and a leading environmental advisor in Europe. The institution develops foundations for decision-making at the local, regional, national, European, and international levels engaging in dialogue with policymakers, public administration, businesses, academia, and civil society.
Austrian Conference on Spatial Planning (ÖROK)	Public Enterprise	National	Although ÖROK has no formal competences in planning, it prepares the Austrian Spatial Development Concept, organises expert working groups, knowledge transfer and issues recommendation. It's main working ethos is to establish a broad consensus amongst actors involved in planning to support a coordinated spatial development.
KPC	Public Enterprise	National	The “Kommunal Credit Public Consulting” (KPC) handles environmental and adaptation subsidies, e.g. NextGen Funds for Biodiversity and Densification.
Federal State Governments	Public	Federal State	Responsible for legislation, e.g. spatial planning laws defining regional and local instruments (e.g. zoning categories) and setting out objectives; and nature protection laws defining protection schemes and objectives. Vienna has one law (Vienna Building Code), not differentiating between the federal state level and the local (municipal) level.
Spatial Planning Departments	Public	Federal State	Responsibility for developing spatial planning programs at the federal and regional levels. This includes strategies, action fields, development plans, etc. These have binding character for local spatial planning (municipalities).

Name	Type	Level	Roles
Municipalities	Public	Local	Municipalities are key actors in spatial planning. They are responsible for local zoning and development plans, but can also issue local development concepts.
Austrian Association of Cities and Towns	Public	National-Local	The principal task is to represent the interests of local government in negotiations over the sharing of budgetary funds and taxing rights between the federal government, the federal states and local authorities (revenue sharing).
Architects & Planners	Public	Local	
Property Owners	Civil Society	Local	
Private Investors and Developers	Private	Local	
Social Housing Provider and Developer	Public/Private	Local	
Social Partners	Civil Society	All Levels	
Environmental NGOs	Civil Society	All Levels	WWF, Greenpeace, System Change not Climate Change, Fridays for Futures
Stadtmarketing	Public/Private	Local	

Table AT12. Actors involved in densification, Austria. Source: own elaboration.

6.5 Assessments, achievements and challenges

While rising land prices and greater land-use efficiency due to urbanization help to reduce land consumption, for Austria it is essential to highlight the urgent need for more effective policies like brownfield development, land mobilization strategies, higher land taxes, and urban agreements to achieve sustainable land use (Getzner & Kadi 2019). The challenges in the implementation and execution of these instruments and policies stem from Austria's federal structure, which is characterized by significant resistance, particularly from the federal states. One example for this resistance is visible in the difficulty to legislate maximum limits for land consumption. This issue is reflected in the failure to adopt the federal government's **Land Protection Strategy**, which was ultimately hindered by disagreements between the federal government and the federal states. The current policies of spatial planning in Austria also hinder effective implementation due to the conflicting role of municipalities in terms of land use and tax revenues from new constructions. Even though public interests defined in the zoning plans are relatively clear and well-established, they are not strictly followed in practice and regularly require interventions by the high courts.

In terms of housing affordability in relation to densification it is important to note the increased influence of private market actors. Market dynamics such as rising land prices on the one hand, and, the favourable financial environment, on the other hand, spurred significant investments by the real estate sector in the past decade. It also shifted the housing production to the disadvantage of limited-profit housing associations and towards profit-oriented housing

developers. To counteract these trends, the municipality of Vienna introduced a new zoning category, but recent brownfield developments and new constructions are dominated by private developers producing high-priced free market rental and ownership units (Plank et al. 2022). Other measures such as vacancy monitoring and vacancy taxes are also implemented in urban agglomerations and touristic regions such as Salzburg or Tyrol, with medium success rates due to the high level of personnel resources required for implementation. However, measures as these are not implemented nation-wide and highly depend on the local governments.

Impact Area	Potential Impacts
Federal structure and governance fragmentation	Austria's complex federal system limits effective implementation of densification strategies. Disagreements between federal and state governments (e.g. on the Land Protection Strategy) undermine coherent land use policy and enforceable land consumption limits.
Municipal land use incentives and planning contradictions	Municipalities are incentivized to approve new developments due to tax revenues, leading to inconsistent application of zoning laws. Despite clear public interest goals in planning documents, practical implementation often deviates, requiring court intervention.
Market-driven urban development and affordability	High land prices and favourable financing conditions have increased the influence of private developers especially in urban areas, leading to a shift from limited-profit housing associations to profit-driven housing production. This has exacerbated affordability issues and reduced the share of limited-profit housing associations.
Zoning and land mobilization tools	Recent zoning law reforms, such as in Vienna, aim at protecting affordable housing through land use designations (applicable to all types of rezoning, also brownfield conversions). However, in other federal states and municipalities brownfield developments remain largely dominated by private actors limiting affordability.
Vacancy management	Instruments like vacancy monitoring and vacancy taxes are in place in some regions (e.g., Salzburg, Tyrol) but their enforcement and control is labour-intensive and not implemented nationwide due to the restricted fees, that can be applied. Their success varies greatly by local government commitment and administrative capacity.

Table AT13. Potential Impacts of densification on housing inequalities in Austria. Source: own elaboration.

7 Summary and discussion of results

As this report has shown, over the past decades, Austria has developed a wide range of environmental and energy policies (EEPs) aimed at retrofitting buildings, which nowadays shifted towards decarbonizing heat systems, fostering urban densification and limiting urban sprawl, while more recently also implementing nature-based solutions (NBS) in response to climate change gained importance. While each policy field shows varying levels of maturity and integration, they are shaped by a common set of challenges: federal fragmentation, uneven implementation capacities, and weak integration with housing equity objectives. This section summarises key developments in each policy domain and highlights the associated governance mechanisms and trade-offs.

7.1 Changes in Environmental and Energy Policies and their Governance Implications

Housing retrofitting policy in Austria has evolved from a predominantly technical focus on energy efficiency toward a broader strategic orientation centred on climate mitigation and the decarbonisation of heating and energy cost reduction. This shift was initially shaped by European Union directives, and increasingly by national decarbonisation commitments and lately by recurring energy price shocks and high inflation. At the federal level, the actor constellation has expanded from federal energy ministries to forming advisory networks (e.g. klima:aktiv) and intermediary agencies (e.g. Klima- und Energiefonds). Through decentralisation of housing subsidies, the federal state authorities in 1989 became a very important actor in steering housing retrofits, especially in relation to social and affordable housing. While financial incentives remain the dominant policy instrument—channelled through national and housing subsidies of the federal states—the governance structure remains fragmented. Regulatory mandates are limited, and implementation is hindered by ownership structures and administrative challenges, especially in the condominium and rental sectors. As a result, retrofitting remains a strategically ambitious yet structurally constrained policy field.

The strategic orientation of NBS policy in Austria has broadened significantly, moving from a focus on biodiversity and landscape protection (through green infrastructure) to a more integrated framing that encompasses climate adaptation, urban resilience, and public health. This evolution is reflected in successive iterations of the National Adaptation Strategy (NAS), most notably NAS 3.0 (2024), which prioritises urban cooling, flood management, and ecosystem restoration through NBS. Implementation, however, is predominantly local and territorially uneven. While federal ministries and federal states shape strategic direction and distribute (little) support (e.g. through the Biodiversity Fund), municipalities are central to land-use decisions. They, however, largely need to stem investments within existing budgets, which are tight in smaller municipalities. Larger cities, especially Vienna as a federal state and a municipality, can steer NBS through a wider range of policy instruments, including planning guidelines, subsidy schemes, and regulatory provisions in building codes. Nonetheless, gaps in intergovernmental coordination and limited municipal capacity restrict the institutionalisation of NBS across the Austria.

Densification has shifted from being primarily an environmental concern about soil sealing and sprawl to a multifaceted urban policy objective encompassing sustainability, infrastructure efficiency, and housing supply. Its strategic relevance has grown in response to rising land costs, demographic pressures, and national climate targets. Municipalities, particularly Vienna, have taken a lead role through zoning reforms, integration of greening standards, and public–private development frameworks. However, liberalised tenancy legislation and the growing dominance of private developers have increasingly decoupled densification from social affordability goals. National guidance exists but is only loosely integrated with implementation mechanisms. Policy instruments include spatial planning laws, zoning tools, and incentive structures, but affordability-oriented regulation remains underdeveloped. As a result, densification is both politically supported and socially contested depending on the local context.

7.2 Trade-offs between EEPs and Housing Inequalities

Austria's retrofitting programs, especially in the last government period, are extensive and relatively well-funded. These efforts have contributed to measurable reductions in emissions from the residential sector since the 1990s, reflecting improvements in energy efficiency and a gradual shift to less carbon-intensive energy sources. However, renovation rates remain below climate neutrality targets, with deep renovations stagnating at around 1% annually, far below the rate required to meet 2040 decarbonisation targets. A key strength of the Austrian model lies in its potential use of housing subsidies as a vehicle for (social) housing retrofits.

However, housing retrofit policies exhibit significant distributional asymmetries. Subsidy structures tend to favour owner-occupiers and detached housing, marginalising tenants (specifically in the private sector in buildings with no rent-protection) and residents of multi-owner buildings. Legal frameworks do not adequately resolve the landlord–tenant dilemma or collective decision-making barriers in condominiums. Moreover, retrofits in private rental housing often lead to rent increases, diluting energy cost savings and exacerbating affordability pressures. Though some subject-based measures and targeted programmes like “Sauber Heizen für Alle” have been introduced, retrofitting remains challenged by administrative complexity, institutional fragmentation, and sectoral silos, rather reproducing existing social and tenure-based inequalities.

Regarding NBS, the Austrian Strategy for Adaptation to Climate Change (NAS), although lacking legal force, has guided actions across federal and state levels since 2012. The evolution of NAS has progressively emphasised the multifunctional benefits of green and blue infrastructure, and of Nature-based Solutions in NAS 3.0 in 2024. Despite these strategic advances, the implementation of NBS remains inconsistent. Territorial disparities based on the dominance of federal states in land-use and environmental legislation have slowed systemic uptake.

Social concerns have received increased attention in recent strategy updates, acknowledging the need to shield vulnerable populations from climate risks such as flooding and heat. Nevertheless, national social policies are still inadequately aligned with climate adaptation needs, and coordination between environmental and social planning remains weak. At the

urban level, evidence from Vienna reveals spatial disparities in green space availability, with central, dense neighbourhoods particularly underserved. In combination with the predominance of decommodified rental housing in these neighbourhoods, studies have highlighted potential socio-spatial displacement risks. Nevertheless, policy actors (such as politicians, civil servants, public planning entities,...) and stakeholders (such as planning experts, LPHA, real estate developers,...) consider risks of displacement through greening currently as limited.

Densification policies in Austria are strongly influenced by the interplay of spatial planning, land-use pressures, and market forces. While urbanisation trends and land scarcity have encouraged greater land-use efficiency, institutional and political resistance—particularly from Länder governments—has slowed down national efforts to enforce limits on land consumption. A key example is the failure of the federal Land Protection Strategy due to lack of consensus among governance levels. Municipalities play a central role in densification through zoning and development planning, but they face contradictory incentives: fiscal dependence on new construction revenues undermines sustainable land-use goals. As such, spatial planning instruments, although well-established, are frequently bypassed in practice, requiring court interventions to uphold planning standards.

From a housing inequality perspective, densification goes hand in hand with an increased dominance of commodified housing provision. Rising land values and a favourable financing environment have enabled private actors to outpace limited-profit housing associations, diminishing the production of housing that is more affordable. Although Vienna, for instance, has implemented progressive tools—such as new zoning categories for affordable housing—other cities lag behind, with brownfield developments often prioritising private and commercial housing developers. Furthermore, efforts to regulate vacancy and speculative use of housing stock have had limited success due to high enforcement costs and uneven implementation.

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NATIONAL REPORT ON THE REGULATORY SYSTEM OF EEPs in FRANCE

1. Executive summary

The main objective of this report is to provide insights on the national regulatory and institutional system of Energy and Environmental Policies (EEPs) in France. The analysis specifically focuses on housing retrofitting (section 4), nature-based solutions (section 5), and densification policies (section 6), framed within the broader context of national climate change mitigation and adaptation policies (introductory section). The concluding section revolves around main changes in EEPs in France and outlines hypotheses on the relations and trade-offs between these policies and the housing inequalities that are further discussed in another report on the housing system from a multi-level perspective in France (D4.2).

Since the late 1990s, France has progressively strengthened its commitment to climate mitigation and adaptation through national strategies (SNBC) and plans (PNACC). Parallel to this, national legislation has progressively translated these strategic orientations into specific objectives and introduced regulatory and financial tools. However, challenges emerge, and recent obligations face political backlash, leading to setbacks and implementation delays.

Housing retrofitting policies in France include specific targets for the social housing stock, particular attention to energy poverty issues, and a focus on renovating the most energy-inefficient buildings. In recent years, there has been a shift of focus from fiscal incentives to direct subsidies, with recent particular focus on owner-occupiers and low-income groups. Despite growing involvement of local authorities and horizontal coordination, the national level continues to play a central role in setting objectives, regulatory frameworks, and implementation tools. No specific tools, such as rent control after renovation, are currently in place to address affordability challenges, which raises the risk of renovictions, while the regulatory framework remains undifferentiated across urban contexts and regions, potentially exacerbating spatial inequalities.

Densification policies have evolved from a focus on the reuse of urban areas near public transport to the integration of zero land take objectives as part of a broader land sobriety scope. Several fiscal and regulation tools have been introduced to support the reuse of industrial sites or vacant buildings, with varying outcomes depending on the degree of urbanization of the targeted areas (metropolitan, peri-urban, rural, etc.). While densification regulations affect local planning tools, their implementation remains optional and uneven, also depending on the willingness of local authorities. Zero land take objectives face national-local tensions and political resistance especially in smaller urban contexts and rural areas and may lead to uneven territorial impacts.

The institutionalisation of NBSs is a recent process, driven by European and international frameworks. There are no regulatory or financial tools explicitly dedicated to NBSs, and implementation mainly relies on incentivising instruments such as project promotion,

information dissemination, and guidelines. The absence of shared definitions, regulations, and targeted funding makes the implementation of NBS particularly complex. More recently, the *Plan Nature en Ville*, part of the national biodiversity strategy, has reinforced the focus on the integration of nature into urban areas. Overall, the landscape remains fragmented, shaped largely by local political will.

2. Introduction and methodology

The main objective of this report is to provide a national assessment of the regulatory systems of Energy and Environmental Policies (EEPs) in France. It specifically focuses on housing retrofitting, nature-based solutions, and densification policies which are framed within the context of national climate change mitigation and adaptation policies.

2.1 Introduction

Since the late 1990s, France has progressively strengthened its commitment to climate change mitigation and adaptation, developing national plans, regulatory framework aligned with, and evolving in parallel to, international and EU targets. As stated by Halpern (2017), the origins of EEPs in France, a country with a unique position as a nuclear state within its context, can be traced back to the ecological and anti-nuclear movements that emerged in the late 1960s and subsequently in the 1970s. As stated by Poupeau (2013) there is a strong path dependence in energy and environmental policies: "*The state's choices are still heavily influenced by the paradigm of nuclear energy, considered a cheap source of energy that contributes (or would contribute) to national energy independence, and is moreover highlighted for its contribution to the fight against climate change*". Recently, the "*Affaire du Siècle*" campaign represents an emblematic example of the growing wave of criticism directed at the French government by environmental organizations, who engaged in legal litigation for inaction against climate change (Redon et al., 2020). This criticism focuses on the deregulation in climate policies and the government's failure to take meaningful action to meet its commitments under international agreements (e.g. the Paris Agreement).

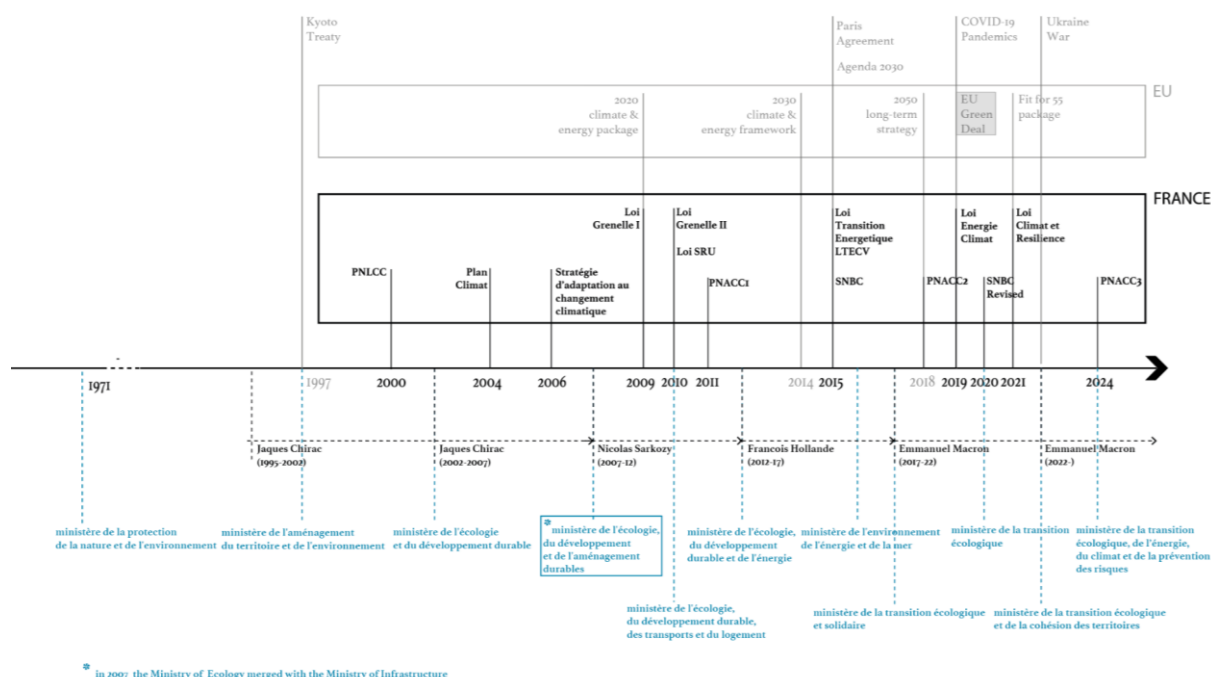


Figure FR1. timeline illustrating key EEPs in France over time within the European and global contexts. In light blue the evolution of french ministries in charge of EEPs.

In line with the Kyoto Protocol objectives, France's commitment to addressing climate change emerges between the late 1990s and the early 2000s, particularly with the adopted *Programme National de Lutte Contre le Changement Climatique* (PNLCCC) and the *Plan Climat*. In 2007 an important milestone was represented by the merger of the Ministry of the Ecology, the Ministry of Infrastructure and part of the Ministry of Industry as part of the administrative reorganisation under the Sarkozy presidency (Bonnaud and Martinais, 2014)²⁶. Shortly afterwards, the environmental laws *Grenelle I*²⁷ and *Grenelle II*²⁸ were adopted, defining the national regulatory framework that prioritised environmental issues across different domains, such as transportation, energy and agriculture. The *Loi de Transition Énergétique pour la Croissance Verte* (LTECV) of 2015²⁹, coincided and aligned with the adoption of the Paris Agreement and the elaboration of the Agenda 2030.

More recently, the *Loi Énergie Climat* in 2019 sets national targets in line with European goals, committing to achieve carbon neutrality by 2050. Later in the same year, also in response to the Yellow Vest movement and in name of “climate justice”, the Macron presidency launched the *Convention citoyenne pour le climat* (CCC), as citizens consultation aimed at supporting the elaboration of measures to reduce GHG emissions.

²⁶ It led to the creation of the DGALN (*Direction Générale de l'Aménagement, du Logement et de la Nature*), which brings together competences for urban planning, landscape planning, housing, and nature

²⁷ *Loi n° 2009-967 relative à la mise en œuvre du Grenelle de l'environnement*. Available at the link <https://www.legifrance.gouv.fr/loda/id/JORFTEXT000020949548>

²⁸ *Loi n° 2010-788 portant engagement national pour l'environnement*, Available at the following link: <https://www.legifrance.gouv.fr/loda/id/JORFTEXT000022470434/>

²⁹ *Loi n° 2015-992 relative à la transition énergétique pour la croissance verte*. Available at <https://www.legifrance.gouv.fr/loda/id/JORFTEXT000031044385>. From now on referred to as the *Loi Transition Énergétique*

As highlighted by Réseau Action Climat (2021) the French government supports the EU's overall target, contributing significantly to the push for higher climate ambition (see Annexe 2). However, France did not support the European Parliament or countries such as Denmark and Sweden in advocating for even more ambitious goals, such as 60% or 65% GHG reductions by 2030. Overall, France commits to the EU's long-term strategy of becoming the first climate-neutral continent by 2050, primarily based on two pillars: the *Stratégie Nationale Bas-Carbone* (SNBC), for implementing climate change mitigation policies, and the *Plan National d'Adaptation au Changement Climatique* (PNACC), specifically dedicated to France's adaptation strategy.

The **Stratégie Nationale Bas-Carbone** (SNBC) was introduced in 2015 by the *Loi LTECV*, with the aim of establishing a framework to guide the implementation of national energy and climate objectives (Poupeau, 2023). The latest adopted version (SNBC2), revised in 2018-2019, aims for a 100% reduction, making France a net-zero emissions country by 2050 and defining an intermediary objective of 40% reduction in GHG emissions by 2030 compared to 1990 levels³⁰. While overall objectives over the long term are set in national plans and programs (e.g., the SNBC), the actual resources to meet these goals are allocated through annual budget processes, which may result in year-to-year adjustments of operational targets. The elaboration of SNBC3 started in 2023 at includes the aim of raising the 2030 target from 40 to 50% reduction in GHG emissions by 2030. It remains an ongoing process also affected by political instability.

In addition, since the early 2000s, France has also developed a **Plan National d'Adaptation au Changement Climatique (PNACC)**, starting with the *Stratégie d'adaptation au changement climatique* (2006) and the with PNACC1 (in 2011) and PNACC2 (in 2018). At the end of 2023, a public consultation phase was launched to inform the drafting of the third version of plan³¹. The goal is to protect the population and build societal resilience, taking into account the projected +4°C temperature rise in France by 2100 compared to pre-industrial levels, considering that this rise will manifest differently across the entire national territory (Réseau Action Climat, 2024). The new PNACC includes 51 measures organized around 5 main pillars³². According to the document presenting the PNACC 3 *"The measures have been designed with an approach that takes into account the differences in situation between territories and actors, with the goal of not increasing or creating inequalities, both social and territorial, by identifying the populations and territories least able to cope and therefore most in need of support"*³³.

³⁰ The SNBC sets emission thresholds not to be exceeded from 2019 to 2033 (the carbon budgets). The SNBC2 sets carbon budgets for 2033 and, among the strategic orientations for specific sectors, prioritizes the building and public works sectors in achieving France's ambitious climate targets. It is available at the following link: https://www.ecologie.gouv.fr/sites/default/files/documents/2020-03-25_MTES_SNBC2.pdf. A summary in English is available here: https://unfccc.int/sites/default/files/resource/en_SNBC-2_summary_compl.pdf

³¹ https://consultation-pnacc.ecologie.gouv.fr/sites/default/files/2024-10/Document_de_presentation_du_PNACC_3.pdf

³² Namely: protecting the population, particularly the most vulnerable groups; ensuring the resilience of territories, infrastructures, and ecosystems; adapting human activities; protecting natural and cultural heritage; and mobilizing society

³³ See footnote 56

2.2 Methodology

Following this introduction, the report is organized into three sections, each focusing on a single type of EEP, namely: housing retrofitting, nature-based solutions, and densification policies in France. Key transversal issues are addressed in subsections for each selected EEP, including the emergence of the issue and related policy decisions, the implementation process, the size and role of the market, the multilevel governance framework, achievements, assessments, and challenges. The final section provides a summary and discusses the changes in energy, environmental, and retrofitting policies, along with their impacts on multilevel governance across the EU, national, and local levels. The report draws on a mixed-methods approach, including document analysis, policy lab and semi-structured interviews.

Document analysis include both grey and scientific literature. Grey literature mainly consists of policy briefs, technical reports, regulations, and legislative acts collected from institutional websites and available in open access. Scientific literature is collected and organized into thematic clusters according to whether it refers to housing retrofitting, Nature-Based Solutions or densifications policies.

A *policy lab*, in the form of a focus group, was held in Paris in March 2025 involving policy makers, national agencies, social housing representatives, experts and advocacy groups on housing needs. The main aim was to gather worldviews from a plurality of stakeholders on key issues. The main topics under discussion included 1) the synergies and trade-offs between environmental and social goals and 2) cooperation and frictions in multilevel horizontal and vertical governance, and territorial variations (Cremaschi et al., 2025³⁴). The policy lab helped in gathering information for this report and collecting contacts for the interview phase.

Semi-structured interviews were conducted between May 2025 and July 2025 and contributed to enriching the present report, as well as integrating additional references and documents. Different institutions were engaged, including national ministries, governmental and para-public agencies, interests and advocacy groups and experts (see Annex 1 for the list of interviewees). The purpose of interviews is twofold: to fill the research gaps identified in a draft version of the present report, and to delve deeper into first hypotheses on the relations and trade-offs between EEPs and the housing issues.

3. General governance system

In France, multi-level governance is organized around the State, regions, departments, intercommunalities, and municipalities. While decentralisation reforms since the 1980s have transferred significant responsibilities to local authorities, particularly to intercommunalities for urban planning, the State retains a central role in setting overall objectives and regulatory frameworks, especially in housing and energy renovation policies.

³⁴ unpublished document reporting on the first Policy Lab held in March 2025 at SciencesPo, Paris. It offers insights into current policy debates on the social consequences and trade-offs of green policies, as perceived by key stakeholders in France.

In France, housing policy remains very much centralized despite four decades of devolution of various sectors of urban policy to local authorities. The central state assumes a key role in defining the main policy orientations and instruments for the production and financing of housing. The *Housing and Construction Code* sets rules at the national level, which cannot be adjusted; while 80% of all state aid depends on schemes set at the national level (Driant 2024)³⁵. Likewise, key housing policies are conducted by the central state, such as tax incentives to support individual investment into private rental housing, or through national agencies (such as ANRU for urban regeneration or ANAH for housing retrofitting). This centralization is due to a combination of political-economic factors: keeping control of a key industry (in terms of economic growth, employment, tax revenues), ensuring an equal treatment of local situations across the country, and a mistrust of local interests (Ibid.). Indeed, housing was not included in the first devolution laws of the 1980s, or only indirectly as the 36,000+ municipalities had become responsible for zoning plans through which they could control construction. For policymakers, further devolution has been conditioned on reaching a form of institutional integration above the municipalities through the creation of intercommunal institutions (1999), which then became responsible for setting local targets and implementation measures through elaborating local housing programs (*Programme local de l'habitat*, PLH), either as a condition of exercising the distribution of construction subsidies on behalf of the central state (2004), or mandatory (2009). However, such distribution of construction subsidies (*aides à la pierre*) for the social and private housing remains optional, while their volumes are still set by the central state and remain limited overall (Driant 2014)³⁶. Since then, the role of intercommunal institutions in housing has been reinforced by subsequent reforms, which have transferred them the responsibility of zoning plans (*Plan local de l'urbanisme intercommunal*, PLUi) from municipalities (2014), as well as in social housing allocation. Additional transfers have been opened to some as leading organisations on housing (*autorité organisatrice de l'habitat*) since 2022, but only three of them have opted out for this status.

It should be noted that the Paris region is specific in that regard. First, the governance of housing remains particularly fragmented given multiple actors, and the fact that intercommunal institutions are more recent (Le Hervet 2012). In particular, the regional council has attempted to endorse a key role in the coordination of local housing policies through the target set by its regional plan (*Schéma directeur régional de la région Île-de-France*, SDRIF)³⁷. Second, additional, specific rules apply. On the one hand, the City of Paris is also a district (*département*), which means that it combines attributions, technical and financial resources that would otherwise be separate across different tiers of government. Additionally, the metropolitan authority (*Métropole du Grand Paris*) created in 2016 should adopt a plan on housing and emergency shelter (*Plan métropolitain de l'habitat et l'hébergement*)³⁸. On the

³⁵ The remainder of state aid financed by local authorities is mostly made up of brick-and-mortar subsidies contributing to the financing of social housing construction and renovation.

³⁶ By that time, the most developed form of devolution was the transfer of social support schemes (*Fonds de solidarité pour le logement*, FSL) to districts (*départements*).

³⁷ In addition to its implication in the financing of social housing production. However, the regional council had to revise its plan to adjust its housing targets with those set by the central state (from 60,000 to 70,000). Moreover, the commitment of the regional council towards housing has slowed since its shift to the right: recently, subsidies for social housing were stopped (source: Interview with housing policy expert, April 22, 2025).

³⁸ Although it did not in practice, due to political disagreement over the geography of social housing production. See D4.2 for more details.

other hand, the central state retains control over key elements: housing construction targets (set at 70,000 per year since the Grand Paris law of 2010) and their spatialisation (*territorialisation des objectifs de logement*) through negotiations between state representatives (Prefect) and local authorities, as well as the co-chairing (with the head of the regional council) of the regional committee on housing and shelter (*comité régional de l'habitat et de l'hébergement*, CRHH) that has to elaborate a regional plan (SRHH). This plan is instrumental in spatialising the housing construction targets, and is based on many elements prepared by the central state administration³⁹.

In 2008 the DGALN (*Direction Générale de l'Aménagement, du Logement et de la Nature*) was created to merge responsibilities for urban planning, housing, nature, and biodiversity under a single directorate. The organisation of competences and cross-sector coordination within the DGALN is strongly influenced by the broader ministerial structure, which has evolved over time with varying degrees of stability⁴⁰. Within DGALN, Nature-Based Solutions are mainly integrated by the DEB (*Direction de l'Eau et de la Biodiversité*), but also by the *sous-direction de l'aménagement durable* within DHUP (*Direction de l'Habitat, de l'Urbanisme et des Paysages*). Densification issues fall primarily under the *sous-direction de l'urbanisme réglementaire et des paysages*, which, together with the *sous-direction de l'aménagement durable*, are the two main sub-departements working on urban planning. Finally, energy renovation is addressed both by the *sous-direction du financement et de l'aménagement* and by the interministerial body CIPREB, currently responsible for coordinating the national energy renovation plan for buildings (*Plan de Rénovation Énergétique des Bâtiments*).

³⁹ Interview with housing policy expert, April 22, 2025.

⁴⁰ Today, the DGALN operates under the Ministère de la Transition écologique, de la Biodiversité, de la Forêt, de la Mer et de la Pêche, but also interacts with other ministries, such as the Ministère de l'Aménagement du Territoire et de la Décentralisation

Direction générale de l'aménagement, du logement et de la nature (DGALN)

sous direction des ressources humaines et des compétences
sous direction territoires et usagers (T&U)

Direction de l'habitat, de l'urbanisme et des paysages

- Sous-direction du financement et de l'économie du logement et de l'aménagement (FE)
- Sous-direction de la qualité et du développement durable dans la construction (QC)
- Sous-direction des politiques de l'habitat (PH)
- Sous-direction de l'urbanisme réglementaire et des paysages (UP)
- Sous-direction de la législation de l'habitat et des organismes de logement social (LO)
- (AD)

Direction de l'eau et de la biodiversité

- Sous-direction de la protection et de la restauration des écosystèmes terrestres (ET)
- Sous-direction de la coordination, de l'appui, de la stratégie et du pilotage des politiques de protection et de restauration des écosystèmes (CASP)
- Sous-direction de la protection et de la gestion de l'eau, des ressources minérales et des écosystèmes aquatiques (EARM)
- Sous-direction de la protection et de la restauration des écosystèmes littoraux et marins (ELM)

Gouvernance Partagée

- Coordination gouvernementale du plan de rénovation énergétique des bâtiments (CIPREB)
- Délégué interministériel forêt-bois
- Plan urbanisme construction architecture (PUCA)
- Mission plan bâtiment durable (MPB)

Figure FR2. Schematic representation of the distribution of competences among the directorates and sub-directorates of the DGALN. Red, green, and blue circles refer respectively to housing retrofitting, Nature-Based Solutions, and densification. The solid black circle refers to urban planning, while the dashed black circle refers to housing

Parallel to the horizontal distribution of competences within the ministry, governance also unfolds vertically, involving multiple levels of government from the national to the local scale, each with its own responsibilities.

The governance of housing retrofitting operates through a multi-tiered structure from the nation to the intermunicipal level.

- Although local authorities are playing an increasingly active role in supporting the implementation and coordination over **building renovation** and energy poverty matters, the national level plays a central role in terms of defining main energy and climate objectives, setting regulations and designing implementation mechanisms.
- Regarding **densification** policies, the State plays a primary role by defining long-term objectives for combating land take (*Zero Artificialisation Nette* by 2050) and setting medium-term objectives and conditions for local authorities (a 50% reduction of land consumption by 2030). The implementation of these policies is entrusted to planning instruments at the regional level (SRADDET) and at the inter-municipal level (SCoT) and municipal level (PLU).

	Housing	Housing retrofitting	NBSs	Densification
National level	Definition of national targets (<i>and for Greater Paris: local targets</i>) Setting of regulatory, financial and support tools	Definition of energy and climate objectives as part of national regulations	Definition of biodiversity and water management objectives	Definition of long term and medium-term objectives for combating land take

	Financing of housing policy (80% of all public aids), including through national agencies (Anah)	Setting of regulatory, financial and support tools		Setting of regulatory and planning tools
Regional level	Elaboration of regional planning frameworks integrating energy and climate issues (SRADDET) and housing construction targets			
	Distribution of additional subsidies for social housing construction, remediation against poor housing conditions, etc. In the case of the Ile-de-France region: co-chairing the regional committee on housing (CRHH)	Holding the competence over building renovation and decentralized renewable energy production Elaboration of energy efficiency strategies		In the case of the Ile-de-France region: co-chairing the regional committee on housing (CRHH)
Departmental level	Elaboration of departmental plans to coordinate housing policy between intercommunal level (PLH) and the rest Distribution of additional subsidies for social housing construction Management of Housing solidarity fund (Fonds de solidarité logement, FSL)	Holding the competence over energy poverty Coordination of intermunicipalities, local actors and organisations		
Intermunicipal level	Elaboration of intermunicipal housing programs (PLH) that sets housing construction targets Elaboration of intermunicipal zoning plans (PLUi) that regulates land-use Distribution of additional for social housing subsidies In the case of the Paris region: elaboration of a housing plan (PMHH) by the metropolitan authority	Integration of climate-related issues into intermunicipal planning frameworks (SCoT for one or more EPCI combined with single municipalities, PLUi for each EPCI)		
		Elaboration of a program to improve energy efficiency and reduce GHG emissions (PCAET by EPCI). PCAET includes quantitative climate and energy objectives		Local implementation depends on contextual conditions and remains non-binding
Municipal level	Implementation through delivery of construction permits (if not transferred to intermunicipal institution), eminent domain purchase powers, etc. Distribution of additional subsidies for social housing construction	Supporting households and coordinating locally renovation programs	Local experimentation dependent on political will, resources and interpretation of concept	

Table FR1. competence of ecological transition and housing policies across governance levels

4. Housing retrofitting

The late 1990s saw a growing debate on climate issues, and from the beginning of the millennium, a series of political initiatives aimed at translating general objectives and sectoral initiatives followed. Over the last two decades, and primarily through its technical agencies, the central government carried out this exercise of policy promotion and support for an increasingly sophisticated debate. France's initiatives accompanied and sometimes influenced EU directives on building energy regulations since 2000, although it has taken a cautious stance on some measures such as ETS extension for fear of social impacts.

4.1 The policy cycle: emergence of the issue and policy decisions

Over time, France supported the increasingly ambitious objectives proposed by the European Commission and developed a number of national policies and regulations affecting housing retrofitting (Figure FR3). Recently, France has contributed to the European debate by bringing forward some of the provisions set out in the *Loi Climat et Résilience*, such as the gradual ban on renting energy-inefficient housing (*passoires thermiques*). However, France adopted a more cautious approach to extending the EU Emission Trading Systems (ETS) to building heating and road transport, due to the potential social and economic impacts on vulnerable households with no access to low-emission alternatives. As Réseau Action Climat (2021) stated about the extension of ETS2: "*The government fears a new social crisis, similar to the one it experienced with the Gilets Jaunes protests, this time on a European scale*".

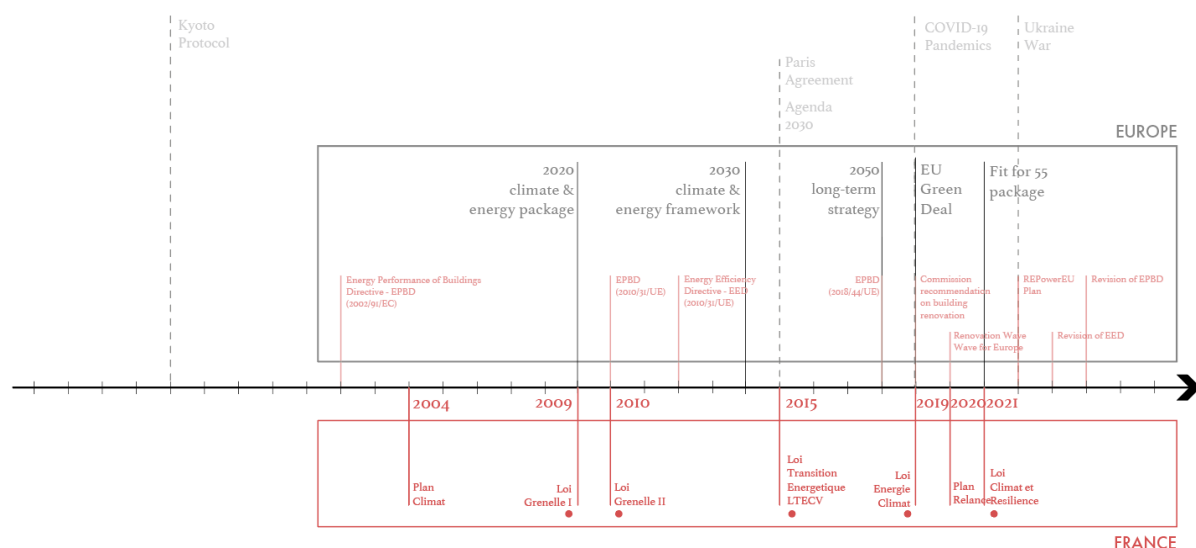


Figure FR3. timeline illustrating key policies and regulations in France and EU affecting housing retrofitting. Binding documents are marked with filled red dots.

In 2004 the **Plan Climat**⁴¹ outlined several guidelines for combating climate change, focusing on improving the energy performance of existing buildings. It highlighted key tool to obligate

⁴¹ https://unfccc.int/resource/country/plan_climat_fr.pdf

energy producers to finance energy-saving projects in construction and industry and to propose tax credits to incentivize property owners to invest in energy efficiency improvements⁴². In 2006, France transposed the European Directive on the Energy Performance of Buildings (EPBD) and introduced the Diagnostic de Performance Energetique (DPE). In this context, The *Plan Climat* also provided local authorities the option to exempt property owners from property tax (*taxe foncière*) if they carried out works improving their energy label.

After that, the ***Loi Grenelle I*** (2009) set a target to reduce energy consumption in the existing building stock by at least 38% by 2020. It also aimed to renovate 400,000 housing units annually starting from 2013, with a target of 80,000 social housing units renovated before 2020. To achieve these goals, the ***Loi Grenelle II***, introduced in 2010, implemented measures to support the objectives of Grenelle I by essentially “greening” the Urban Planning Code (*Code de l’Urbanisme-CU*) and the Building and Housing Code (*Code de la Construction et de l’Habitation* - CCH). Key elements of the *Grenelle II*, related to the renovation of existing buildings, include: reinforcing the obligation for the energy performance diagnosis (DPE); reforming tax credits for energy transition; expanding the CEE system for owners of large properties (such as real estate companies); and providing subsidies for energy-saving works for social housing providers (*bailleurs sociaux*).

In 2015, the ***Loi Transition Énergétique*** aimed to set key objectives and measures in line with the Paris Agreement on climate change. The law devoted special attention to the building sector and the urgent need to accelerate the energy retrofitting of homes and combat energy poverty. The main objectives included the renovation of 500,000 homes per year from 2017, of which at least half would be occupied by low-income households⁴³. In addition, the law aimed to renovate all housing with a DPE rating of F and G (i.e., with a theoretical consumption greater than 330 kWh/m²/year) before 2025, and to achieve a building stock with BBC (Low-Energy Building) standards by 2050 (with energy consumption lower than 80 kWh/m²/year, depending on the climate zone). The ***Plan de rénovation énergétique des bâtiments***⁴⁴, presented in 2018 by the Ministry of *transition écologique et solidaire* and the Ministry of *de la cohésion des territoires*, aligns with the objectives of the *Loi Transition Énergétique* (Pellegrino, 2019). The plan proposed to translate national objectives into 13 actions organized around four key areas: making energy renovation of buildings a national priority, scaling up the renovation of housing and fighting energy poverty, accelerating the renovation and energy savings of tertiary buildings, and strengthening skills and innovation.

The ***Loi Energie Climat***, presented to the Council of Ministers in 2019 by the Ministry of *transition écologique et solidaire*, aimed to enshrine the objective of carbon neutrality by 2050 into law by revising the goals of the *Loi Transition Énergétique* upwards. The ambition was to promote widespread, high-performance energy renovations, with the two factors – massification and high performance – being presented as inseparable by the law. In this context, *MaPrimeRénov’* (MPR) was conceived as a program to improve homes' energy

⁴² Respectively, the so-called *Certificats d’Economie d’Énergie* (CEE) and the *Crédit d’impôt pour la transition énergétique* (CITE), formally introduced with the 2005 finance law.

⁴³ Of which 100,000 thermal sieves of social housing and 150,000 thermal sieves occupied by homeowners

⁴⁴https://www.ecologie.gouv.fr/sites/default/files/documents/Plan%20de%20r%C3%A9novation%20%C3%A9nerg%C3%A9tique_0.pdf

efficiency, aiming to accelerate the energy transition and reduce GHG emissions through a revamping of the funding system.

The following year, the National **Plan de relance (2020)** allocated €30 billion to the first pillar, ecology and energy transition, of which more than €6 billion is earmarked for energy renovation. Specifically, the €6 billion was distributed to buildings distributed across four primary areas of intervention: energy renovation of private buildings, with an additional €2 billion allocated to the *MaPrimeRenov'* (see section 4.2.1) mechanism for 2021-2022; deep renovation of social housing with €500 million allocated for 2021-2022, of which €40 million is reserved for a project call aimed at strengthening industrial solutions for the mass renovation of the social housing stock (*MassiRéno*); thermal renovation of public buildings with €2 billion for 2021-2022; and energy renovation of small and medium enterprises. According to the government website monitoring the *Plan Relance*⁴⁵, the targets of 40,000 social housing to be renovated by 2022 were achieved, and the targets for 700,000 valid applications by 2022 under the *MaPrimeRenov'* program were met. In continuity with the *Plan de Relance*, the *Fond National des Aides à la Pierre* (FNAP) established a budget of €200 millions for retrofitting more than 35,000 social housing in 2023.

Loi Climat et Résilience initially prohibited renting homes classified in energy classes G by 2025, F 2028, and homes classified in energy class E by 2034 even though these restrictions have been relaxed more recently. The law also included a rent freeze for energy-inefficient housing starting in 2022, along with the implementation of state support for the renovation process. As Apur (2022) reported, “*This new regulation represents a major challenge for the evolution of the rental supply in the City of Paris, as well as in many large cities with a predominantly old housing stock*”. The INSEE observed that, in 2018, more than half (54%) of the principal residences in the city of Paris had an energy performance diagnosis (EPD) rated E, F, or G⁴⁶. This percentage was higher than the one defined for the same year at the national level (41%).

A transversal issue that emerged at the international level during the oil crisis of the 1970s is the increasing prioritisation of **energy poverty** in the policy agenda. The issue remains complex, involving multiple factors, such as controlling energy prices in the medium term, reducing poverty among the most vulnerable, and accelerating building renovations (Guyet, 2024). The Energy Poverty Advisory Hub provides several indicators, including arrears on energy bills and the inability to keep homes adequately warm, highlighting the worsening situation in Europe due to the energy crisis and the resulting increase in energy prices. Member states are implementing various actions, ranging from palliative measures, such as income support, to preventive measures, such as energy renovation programs targeting the most vulnerable populations (Guyet, 2024).

Since the 2000s, energy poverty has become increasingly evident in France, partly due to rising energy prices (Meillerand and Nicolas, 2022). In response to this issue, the state implemented measures to improve of housing thermal quality, provide income support to heating and regulate energy pricing. The *chèque énergie*, introduced in 2018 as a replacement for the *tarifs sociaux de l'énergie*, provides a voucher to low-income households to help them

⁴⁵ <https://www.economie.gouv.fr/plan-de-relance/tableau-de-bord#>

⁴⁶ <https://www.insee.fr/fr/statistiques/6458354#graphique-figure2>

pay their energy bills. In addition, France has launched several energy renovation programs targeting the most vulnerable families, such as those run by the National Agency for habitat (*Agence Nationale de l'Habitat*, ANAH)⁴⁷ (see section 4.2.1). The eligibility criteria for ANAH renovation aid are set at the national level; however, implementation varies locally depending on available resources and actor networks (Guyet, 2024).

4.2 The implementation process

Various tools coexist to support housing retrofitting in France ranging from financial to regulatory and support tools. From the early 2000s, public action relied on incentive-based tools such as tax deductions, subsidies⁴⁸, or subsidised loans (Fack and Giraudet, 2024). Over time, advisory and informational tools, such as national and local platforms, were introduced to facilitate retrofitting policy implementation. Since the 2020s, there has been a shift from a focus on tax deductions — which required upfront payments and offered reimbursements over time — towards a stronger emphasis on direct subsidies for private renters and homeowners, with particular attention given to the latter. In contrast, social housing tenants can access only some of these instruments (such as the energy obligation schemes), and public support for the renovation of the social housing stock remains limited. However, certain funding envelopes are made available by public bodies or other institutions (such as ANRU or Action Logement⁴⁹), as well as by other actors, including local authorities. More recently, with increasingly ambitious European and national targets, more coercive measures have been discussed, such as restrictions on renting or selling energy-inefficient buildings (*passoires thermiques*).

4.2.1 Financial tools

Several key financial tools support housing retrofitting in the French context (Figure FR4 and Table FR2). To date, the primary financial mechanism is *MaPrimeRenov'* (MPR), which can be combined with other tools introduced in the early 2000s, such as *Eco-PTZ*, or the *Certificats d'Économies d'Énergie* (CEE), and, where applicable, local subsidies. According to ONRE (2024) the number of homes receiving support by different schemes increased between 56% from 2016 to 2021. Giraudet et al. (2020) assess some of these measures' medium- and long-term impact, evaluating energy improvement trajectories relative to state-set targets in the residential sector.

⁴⁷ Created in 1971 with the aim of supporting the renovation of private housing, it gradually expanded its scope including energy renovation. Over time, it also redefined its targets, shifting from a focus on private landlord to owners-occupiers. On the one hand, the agency supports households, both owners-occupiers and private landlords, in carrying out renovation works; on the other hand, it collaborates with local authorities in designing area-based renovation schemes.

⁴⁸ mainly managed by l'ANAH

⁴⁹ A French association, jointly managed by representatives of employers and employees, financing housing initiatives, especially for employees, mainly through the PEEC (*Participation des Employeurs à l'Effort de Construction*).

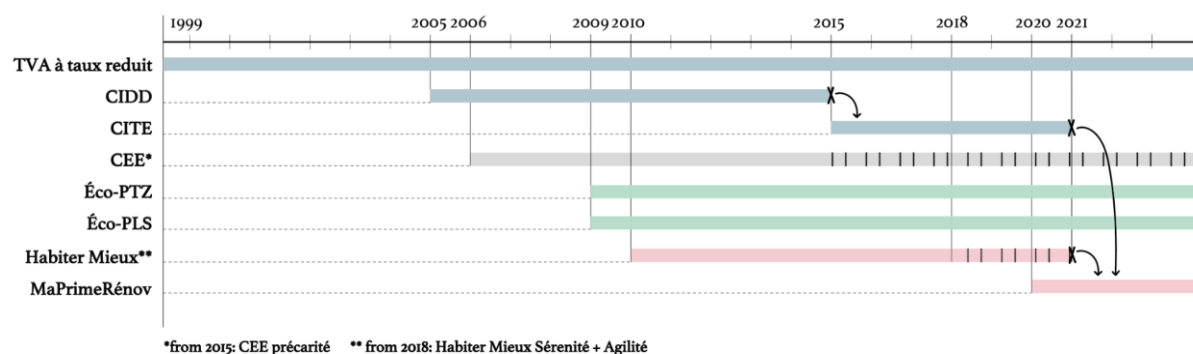


Figure FR4. diagram representing key financial tools for housing retrofitting in France, specifying their duration and evolution over time. A distinction is made between fiscal incentives (in blue), subsidized loans (in green), direct subsidies (in red) and obligation scheme (in grey)

The **TVA à taux réduit**, since 1999, involves improving, transforming, renovating, and maintaining residential buildings older than two years. This measure was introduced in France, following the European Directive 1999/85/EC⁵⁰, initially for a three-year period. It was first extended in 2003, and then permanently implemented since 2005. Over time, the government expanded the scope of this measure to include energy efficiency works (such as solar panel installations, thermal insulation, etc.) from 2005 and materials (such as windows, boilers, etc.) from 2014-2015, benefiting from a VAT rate of 5,5%. Access to the reduced **TVA à taux réduit** is not conditioned on meeting a specific energy performance target.

To replace the **Crédit d'Impôt Développement Durable (CIDD)**, established in 2005, the **Crédit d'Impôt pour la Transition Énergétique (CITE)** was launched in 2015 as part of the *Loi Transition Énergétique*. This incentive promotes energy efficiency works in primary residences in exchange for reduced income taxes. The taxpayer was required to pay the full amount for the works upfront and then receive a refund in the form of a tax credit (typically spread over 5 years). In practice, this scheme proved less encouraging for the most vulnerable households and excluded certain types of work and materials (such as heat pumps). This is also one of the main reasons why the *CITE* was later replaced in 2020 by the *MaPrimeRénov'* program.

In 2009, the **Éco-PTZ (Éco-Prêt à Taux Zéro)** was introduced to finance energy retrofit investment investments for houses used or intended to be used as primary residences⁵¹. As reported by the annex to the draft finance bill for 2024⁵², the number of *Eco-PTZs* quadrupled from 2018 to 2022 due to simplifications and the strengthening of the program, but also due to the context of rising interest rates. It can be combined with other subsidies, such as the *CEE* and *MaPrimeRénov'* (MPR), provided by ANAH. In addition, for social housing only, the **Éco-**

⁵⁰ Directive 1999/85/EC of 22 October 1999 amending Directive 77/388/EEC regards the possibility of applying on an experiment basis a reduced VAT rate on labour-intensive services. The directive is available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31999L0085>

⁵¹ This measure provides an interest-free loan for different energy works (from individual items to complete renovations). The bank loan can be up to 30,000 euros for single-item renovations and 50,000 euros for global renovations, with a repayment period of up to 20 years.

⁵² Available at: https://www2.assemblee-nationale.fr/static/16/pdf/Annexes_PLF/Effort_financier_%C3%89tat_r%C3%A9novation_r%C3%A9nerg%C3%A9tique_b%C3%A2timents.pdf

Prêt Logement Social (Éco-PLS) is a measure stemming from the work of the Grenelle de l'Environnement, aimed at encouraging the energy renovation of the most energy-consuming buildings. The Éco-PLS distributed by the *Caisse des Dépôts et Consignations (CDC) through its Banque des Territoires (BdT)*.

The national agency ANAH provides some state aid for energy renovation of private housing. In 2020, **MaPrimeRenov'(MPR)** replaced the former schemes (CITE, **Habiter Mieux Agilité**, and **Habiter Mieux Sérénité**). Unlike the CITE system, which consists of a tax credit, MPR offers households direct financial support ("invoice discount"). Initially, MPR was reserved exclusively for low-income families. Still, since 2022, it has been extended to all income groups (intermediate and higher incomes) as well as individual landlords (i.e. not corporate), although with varying subsidy thresholds based on income⁵³. For collective housing, **MaPrimeRenov' Copropriétés** (previously **Habiter Mieux Copropriétés**) is now available to all unions of co-owners (*syndicats de copropriétaires*), increasingly questioned about energy renovation works (Briseperre, 2020)⁵⁴. In this context, low-income households often face multiple challenges, including complex administrative procedures and the need for upfront financing (Defay and Driant, 2023). According to Apur's (2022) report on the city of Paris, for owner-occupier households with a monthly income of less than €2,150, the average cost of external thermal insulation represents nearly a full year of income (11.8 months). As a result, this system benefits households with savings or access to credit to the detriment of economically vulnerable ones.

		Beneficiaries				Targeted tenure		
		owners' occupants	owners' landlords		co-owners (syndicats de copropriété)	OO	PR	SR
			Individuals	Collective entities				
Loans	Éco-PTZ	✓	✓		✓	✓	✓	
	Eco-PLS			✓				✓
Subsidies	MPR par geste	✓	✓			✓	✓	
	MPR d'ampleur	✓	✓			✓	✓	
	MPR copropriétés				✓	✓	✓	✓
Fiscal incentives	TVA taux réduit	✓	✓	✓	✓	✓	✓	✓
	CEE	✓	✓	✓	* for shared spaces only	✓	✓	✓

⁵³ The aid amount depends on the type of renovation and the household's income, with different criteria for Île-de-France and the rest of France#. The user receives a discount on the renovation invoice through a combination of MPR and CEE aids, with the remaining cost potentially covered by an Eco-PTZ or additional local aids if available. The company that carries out the energy renovation work applies a discount on the invoice based on the subsidy the household will be able to benefit from. After the work is completed, the subsidy is directly paid by the administration to the company.

⁵⁴ This subsidy is conditional on achieving at least a 35% energy gain and applies to co-ownerships with at least 75% primary residences

Table FR2. main financial tools for energy renovation in relation to corresponding beneficiaries and impacted tenures. This table is not exhaustive; it includes the main state aid and long-term support mechanisms currently in use in 2025.

National financial tools can be complemented with local ones. The study conducted by ONRE (2024) analyzes geographical disparities in provision of aid, finding that aid levels can vary greatly by department. About 60% of local authorities provide some kind of local aid, most of which can be combined with state aid (Vailles and Ousaci, 2024). However, certain departments provide more than others, and metropolises such as Lyon, Grenoble, Bordeaux, and Paris provide substantial local subsidies (sometimes exceeding €10,000 per household).

4.2.2 Regulatory tools

Le **Diagnostic de Performance Énergétique (DPE)**⁵⁵ was introduced in 2006 to provide households with information about the energy and environmental performance of homes. Initially created as an informational tool to enable more informed decisions, the DPE has acquired a regulatory character over time. Some changes occurred in years that followed, particularly between the late 2010s and early 2020s. On the one hand, the *DPE* methodology was broadened to include not only energy consumption, but also the amount of GHG emissions. On the other hand, it became mandatory to include the *DPE* in real estate sales and rental listings. The DPE methodology has evolved over time, affecting the categorisation of the housing stock into most and least consuming categories and the implementation of related policies (see, for instance, below the rental ban the so-called *passoires thermiques*) (Fack and Giraudet, 2024).

The *Loi Climat et Resilience* (2021) initially included a gradual **ban on renting of homes classified in energy classes E, F and G by 2034**. The original provisions of the law stated that, starting in 2025, if a rented property fails to meet the minimum energy performance standards, tenants have the right to act against their landlords⁵⁶. According to a 2022 INSEE study focused on the Île-de-France region, social housing on average has a higher proportion of energy-efficient homes (rated A to D), likely due to the newer construction of its housing stock. In contrast, 55% of privately rented main residences in the region are considered energy-intensive (Chaput et al., 2022). More recently, the rules on banning the rent of energy sieves have been re-discussed and, partially, lifted or relaxed⁵⁷. At present, relaxations are being proposed specifically for co-owners' condominiums, as decision-making takes longer than in situations with a limited number of property owners.

⁵⁵ <https://rt-re-batiment.developpement-durable.gouv.fr/presentation-generale-du-dpe-a783.html>

⁵⁶ Suppose a judge determines the property does not meet the required energy performance standards. In that case, they may order the landlord to make the necessary repairs, impose a rent reduction for the tenant, and even require the landlord to compensate the tenant.

⁵⁷ In 2024, the government issued an order that, by changing the mode of calculus for small size apartments (under 40 sq. m.), lifted the rental ban on 140,000 units initially labeled as F. This was reported by the press as being the result of a lobbying by representatives of the real estate industry (cf. *Mediapart*, 14/02/25, <https://www.mediapart.fr/journal/ecologie/140224/passoires-thermiques-la-calcullette-du-ministre-au-service-des-proprietaires>). In 2025, a draft bill was introduced in the Senate, containing provisions that would lift the ban in specific conditions (e.g. when works for energy upgrading are impossible to implement because of technical, architectural or heritage reasons, or disproportionate costs; or in case of recent negative vote by co-owners).

4.2.3 Support and information tools

Several tools are available and promoted at the national and local levels to support local authorities and individuals in implementing housing retrofitting policies.

Among these, France Rénov' is the national platform coordinating and centralising energy renovation policies. In addition, the *Agences Locales de l'Énergie et du Climat* (ALEC), established by the *Loi Transition Énergétique* in 2015, focus on promoting the energy transition and combating climate change locally. These agencies operate as public services, offering information and awareness-raising activities and providing advice and support to public bodies in their energy transition efforts.

Furthermore, local authorities introduce complementary financial support and tools to those implemented nationally. For instance, the City of Paris launched the *Éco-Rénovons Paris* program to encourage housing retrofitting in 2016, primarily for co-owners (*copropriété*). In addition, the City of Paris provides additional grants for renovation works⁵⁸.

4.3 Size and role of the market

The energy market liberalisation phased out public monopolies and tariffs in the last 30 years, introducing supplier competition. However, rising energy prices forced the government to introduce a 'tariff shield' and incentivise energy-saving measures for low-income households. As the complexity of public market regulation increases, innovation and challenges become intertwined, making it difficult to evaluate the resulting policy mix.

4.3.1 Energy price setting

For a long time, the French state maintained a monopoly on electricity and natural gas through two national companies (*Électricité de France - EDF* and *Gaz de France GDF*), which distributed energy at government-regulated prices. This situation changed with the liberalization process of the energy market initiated at the European level between the late 1990s and early 2000s and the subsequent opening of national markets to competition (Poupeau, 2013). From 2019, the *Tarifs Réglementés de Vente* (TRV) for gas were gradually removed, while regulated tariffs for electricity partly remain in effect. However, they were expected to be adjusted or phased out gradually. Indeed, following the market opening, users can choose from different suppliers offering fixed tariffs (where the energy price remains unchanged for the duration of the contract), indexed tariffs (where the price follows market trends), or tariffs exclusively linked to renewable sources, depending on the case.

From 2021 onwards, partly in response to inflation dynamics and rising energy prices, and likely also due to concerns about massive social unrest similar to the Yellow Vests movement sparked by proposed additional taxes on oil, the French state introduced several support measures for households to help with energy bills (electricity and gas), including the *bouclier*

⁵⁸ In 2022, for instance, the combined support from ANAH and the City of Paris helped 3,314 housing units. Of these, 2,302 benefited from the Habiter Mieux/MaPrimeRénov' program, thanks to energy savings of over 35% (Aur, 2022). The total amount of subsidized works reached €61.8 millions, with €28 millions in grants from ANAH and €8.2 millions from the City of Paris, bringing the total financial support for renovation projects to €36.3 millions (approximately 58% of the overall amount).

tarifaire (tariff shield). The study by INSEE (2022)⁵⁹ assesses the impact of this tool, stating that "gas TRVs would have gradually increased by 66.5% including taxes between October 2021 and February 2022 in the absence of the tariff shield. As for electricity TRVs, they would have increased by 35.4% including taxes on February 1st, 2022. Furthermore, since market offers are partly indexed to regulated tariffs, the prices of these offers would likely have been more dynamic without the 'shield'".

4.3.2 Energy obligation schemes

One of the most common tools in energy obligation schemes in France is the *Certificats d'Économies d'Énergie* (CEE). The program drives private sector investment in energy-saving measures and acts as a key incentive for housing retrofitting. The CEE, introduced in 2006 by the *Loi POPE*⁶⁰, set obligations for energy companies to promote and finance projects that reduce energy consumption. CEE, which can be sold or traded on the market between energy suppliers, certifies the amount of energy saved through the implemented projects. Since 2015, a portion of these energy savings obligations must be achieved for low-income and very low-income households facing energy poverty. The share of CEE allocated to energy poverty compared to the traditional CEE has evolved over time: starting in 2022, in line with the goals of the *Loi Climat et Résilience*, the targets to be met have increased by 25%, setting more ambitious levels for CEE aimed at those in energy distress (Figure FR5). This system can be combined with other subsidies, such as *MaPrimeRénov'* (see section 4.2.1).

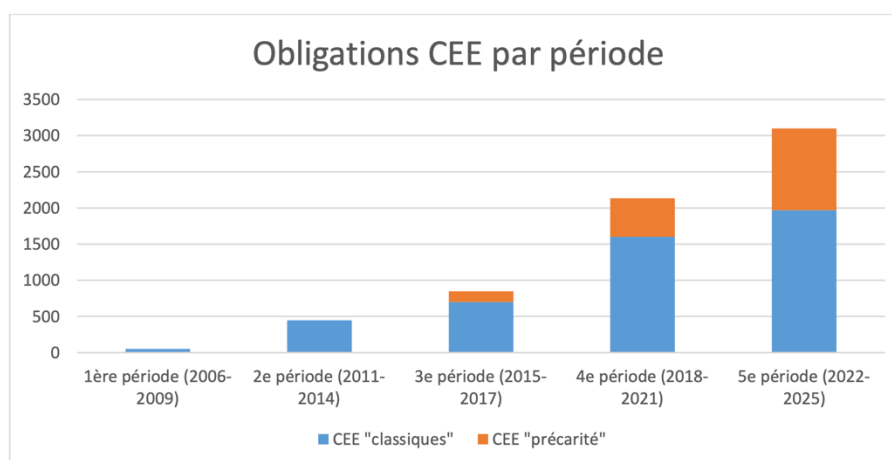


Figure FR5. evolution of CEE obligations objectives (in terms of TWhc) over time (source: CEE annual report, 2023⁶¹)

4.3.3 Bank loans

Banks also finance housing retrofitting through credit instruments linked to financial markets (Gimat et al., 2022). One example is the Prêts verts (Green Loans) offered by Banque Postale

⁵⁹ <https://www.insee.fr/fr/statistiques/6215309?sommaire=6215395>

⁶⁰ <https://www.legifrance.gouv.fr/loda/id/JORFTEXT000000813253/>

⁶¹ <https://www.ecologie.gouv.fr/sites/default/files/documents/Bilan%20annuel%20CEE%20P5%20-%202023-%20VPubli.pdf>

to social housing providers for the renovation of social housing stock. These loans are financed through green bonds issued by the *Caisse Française de Financement Local* (CAFFIL). For instance, since 2021, Néolia (an *Entreprise Sociale pour l'Habitat* – ESH, see WP4 4.1) has benefited from these loans to renovate its housing stock, mainly to address technical constraints that limited access to éco-prêts issued by the CDC and to take advantage of the competitive interest rates offered by Banque Postale⁶².

Additionally, in 2024, the Minister of Housing commissioned a report from two senators on the creation of a public bank to finance energy retrofit. Its purpose would be to help households to finance the outstanding cost of investment that is left once subsidies and other public support schemes are deducted⁶³.

4.4 The multi-level governance process

Local authorities managed energy networks before nationalisation in the early 20th century. Following the energy crises of the 1970s, they sought to improve the energy efficiency of their building assets and later address energy poverty issues. Since the 1990s, new regulatory frameworks have assigned regions, departments, and inter-municipal authorities additional responsibilities related to housing energy renovation, energy poverty and, more generally, climate action plans. Historically, local authorities have been the organizing bodies for public energy distribution networks. As noted by Poupeau et Bouteaud (2021), the involvement of local authorities in energy-related issues is part of a long-standing process. Their competence was somewhat limited with the creation of large national monopolies (*Électricité de France* - EDF, and *Gaz de France* GDF) around the mid-1900s. With the energy crisis of the 1970s and 1980s, new opportunities emerged for local authorities, who began acting in parallel with public policies defined at the national level by state organizations (such as the ANAH or ADEME⁶⁴). At that time, municipalities initially focused on improving the energy performance of their own asset (e.g., sports and cultural facilities), and later extended their efforts to social and private housing through two key programs: *Opérations Programmées d'Amélioration Thermique des Bâtiments* (OPATB) and *Opérations Programmées de l'Habitat* (OPAH) (Debizet, 2011). These actions primarily addressed disadvantaged situations, tackling issues of energy poverty. In the 1980s, during the economic crisis, the state required EDF and GDF to establish a financial aid system. Another example is the *Fonds Solidarité Logements* (FSL), where municipalities are crucial in implementing various systems for managing arrears.

The 1990s and early 2000s marked **the growing involvement of local authorities (regions, départements and intermunicipalities) in the energy transition**, facilitated by a new regulatory framework that defined the perimeters for energy-climate planning. However,

⁶² <https://www.labanquepostale.fr/bailleurs-sociaux/actualite/rehabilitation-logement-social-pre-vert.html>

⁶³ The creation of such an *ad hoc* institution was already suggested in the framework of the housing task force (*Conseil national de la refondation*) formed in 2023, and the special commission at the National Assembly (*Mission d'information commune sur la rénovation énergétique des bâtiments*).

⁶⁴ It supports national and local ecological transition policies and is overseen by the Ministries of environment, energy, and research.

despite the growing involvement of local authorities in policy implementation and horizontal coordination among local institutions and organisations, the national level continues to play a primary role by defining key objectives, elaborating regulation framework, and setting the corresponding implementation tools (see Table FR3).

	Roles and responsibilities	Actors
National level	Define the roadmap for decarbonisation of the housing sector (SNBC) Set the financial tools (MPR, CEE, PTZ., etc) and support tools (e.g France Rénov') to implement energy retrofitting policies Coordinate the public service for housing retrofitting (France Rénov)	Ministries (DGALN) ADEME ANAH
Regional level	Since the <i>Loi Transition Énergétique</i> (2015) the regions have been assigned the responsibilities of energy performance of buildings and housing and renewable energy production The regions are responsible for developing the <i>Schéma Régional d'Aménagement, de Développement Durable et d'Égalité des Territoires</i> (SRADDET), introduced by the Loi NOTRe, which aims to consolidate existing schemes, including the <i>Schémas Régionaux Climat Air Énergie</i> (SRCAE)⁶⁵. The regions are also responsible for creating a <i>Programme Régional de l'Efficacité Énergétique</i> (PREE) to formalize a strategy for energy renovation.	Régions
Departemental level	Departments take the lead on issues related to energy poverty. Coordinating with intermunicipalities as well as local actors and organizations that operate directly on the ground.	Departements
Intermunicipal level	At the level of intermunicipalities, the Grenelle II Law (2010) allowed for the "greening" of the <i>Schémas de Cohérence Territoriale</i> (SCoT)⁶⁶ by integrating climate-related issues into these documents⁶⁷. The <i>Loi Transition Énergétique</i> (2015) introduced the <i>Plan Climat Énergie Air Territorial</i> (PCEAT), which sets an action program to improve energy efficiency and reduce climate-changing emissions within the territory.	EPCI

⁶⁵ Introduced by the Grenelle II Law, the SRCAE has provided regions with a global vision to mitigate the effects of climate change and adapt to it.

⁶⁶ urban planning document that, at the scale of a territory, project, or living area (inter-municipal perimeter or beyond), defines the spatial organization and the main development directions of a territory.

⁶⁷ It also enables the definition of additional rules, such as determining areas where urbanization is conditional on meeting strengthened environmental and energy performance criteria.

	Finally, the <i>Plan Local d'Urbanisme Intercommunal</i> (PLUi) operationalizes the guidelines set out in the <i>SCoT</i> , which must be compatible.	
Municipal level	Supporting households through information tools, counselling or technical assistance Coordinating renovation programs at the local level with engagement and awareness rising activities	Communes

Table FR3. roles, responsibilities and actors in housing retrofitting organized by governance level

4.5 Achievements, assessments, and challenges

Despite national ambitions, the pace and performance of energy renovations remain insufficient to meet goals set by the National Low-Carbon Strategy. This target is 370,000 “deep” retrofits per year, increasing to 700,000 per year after 2030. This is ambitious given the 2022 pace of 66,000 deep retrofits (Fack & Giraudet, 2024). Even the main national scheme, *MaPrimeRenov'*, has highlighted several critical issues, such as the focus on replacing heating systems rather than comprehensive renovations, which are more costly and can reduce usable space. Additionally, the long payback period for these renovations, often exceeding the lifespan of the equipment, poses a significant challenge. The cost of renovation risks disproportionately affecting lower-income owners, who may see their property values decline.

Overall, the pace and performance of renovations remain below the national targets set by the horizon of 2050 (Reseau Action Climat, 2021). In fact, energy renovations are rarely carried out comprehensively and are often done in small steps that have minimal impact on the building's overall performance. On average, considering energy labels, in 60% of cases, only one energy class is improved after the work, and two classes in 40% of cases (Valranges, 2018).

As Defay and Driant (2023) highlighted, *MaPrimeRenov'* raised several critical issues. Firstly, the works implemented so far mainly relate to replacing heating systems rather than comprehensive renovation, which primarily targets the overall insulation of buildings significantly more expensive than those involving only heating⁶⁸. In addition, comprehensive renovations can lead to a loss of usable space, which means sacrificing valuable square meters for owners, affecting both the quality of living and the resale value. Another significant issue is the theoretical payback period of these renovations, often longer than the expected lifespan of the equipment and materials used.

These issues overlap with concerns related to the recent *Loi Climat et Résilience* and the progressive ban on renting out energy-inefficient homes. Defay and Driant (2023) argue that the outflux of these now-deemed energy-inefficient homes from the market could lead to a shortage of rental supply in major cities. In this context, the high cost of effective renovations raises the risk of a growing divide between renovated properties and those that will remain unrenovated due to the owners' lack of financial resources or the absence of a clear return on

⁶⁸ According to data from the first half of 2022 published by the ANAH, only 6% of applications are for comprehensive renovations, compared to nearly 70% for individual heating systems.

investment. Lower-income owners are the ones most likely to bear the brunt of these challenges, gradually seeing the value of their properties erode, often after having invested much of their life savings into them as a form of retirement security. As one interviewee pointed out, those most affected by this loss are often people who already face long and expensive commutes, bearing a double burden of transport costs and the shrinking value of their properties. Moreover, as underlined by a recent study about the risk of *renoviction* in France (Barry and Sabrinni-Chatelard, 2024), renovation works may pose a threat to tenants, who may face the landlord invoke energy renovation as a reason to simply evict them from their homes.

	Potential Impacts
Territorial disparities in accessing resources	National subsidies might be complemented with local subsidies, but the availability vary greatly across territories, risking to exacerbating existing territorial inequalities
Renovation costs and housing quality	The high “out-of-pocket” renovation costs and long payback periods risk deepening the divide between renovated properties and those that will remain unrenovated due to the owners’ lack of resources
Lower-income homeownership vulnerabilities	Increased likelihood of property devaluation might imply higher risks for lower-income owners who invested life savings, especially when compounded by peripheral location and high transport costs.
private rental sector	Landlords may use renovation as a pretext for eviction, exposing tenants to the risk of <i>renoviction</i> and potentially reducing the supply of most affordable housing
Social rental sector	Limited financial resources may lead social housing providers to adopt strategies such as diversifying social housing production, partially selling stock, and prioritising renovation over new construction.

Table FR4. Potential impacts of housing retrofitting policies on housing inequalities and urban and territorial dynamics.

5. Nature-Based Solutions

Nature-Based Solutions (NBSs) emerged in relation to a renewed interest in urban nature, driven by the growing ecological imperative and the recognition of the multiple benefits associated with natural elements in urban contexts (Bourdeau-Lepage, 2019). In France, NBSs have recently gained prominence in policy discussions, largely influenced by international debates (Drapier et al., 2024). Currently, NBSs are integrated into broader national policy frameworks for climate change adaptation, biodiversity protection, and water management. Moreover, policies and projects not explicitly labeled as NBSs may still involve or translate into nature-based initiatives (such as *politiques de végétalisation*). Despite strong national support, local implementation remains challenging.

5.1 The policy cycle: emergence of the issue and policy decisions

NBSs have become part of national environmental policies over the past decade (Guerrin et al., 2023). Before that, other policies integrated the issue of nature, albeit in a more transversal manner. The *Loi Grenelle II* highlighted the importance of the blue and green infrastructures, while the subsequent ALUR law placed particular emphasis on the issue of urban sprawl (see section 6.1). However, the institutionalization of NBSs in France within public policies is a more recent process. It has driven by key integration vectors (Drapier et al., 2024), including: the French Committee of the International Union for the Conservation of Nature (CF IUCN), the *Direction de l'Eau et de la Biodiversité* (DEB) of the Ministry of Ecological Transition (also through the *Agences de l'eau*), and the *Office Français de la Biodiversité* (OFB)⁶⁹. In parallel, some institutional actors in the housing sector have begun integrating nature-based solutions (NBS) into their professional practices. The HLM organizations formally committed to this approach in 2022 by signing the *Manifeste pour la Biodiversité dans le secteur HLM*⁷⁰.

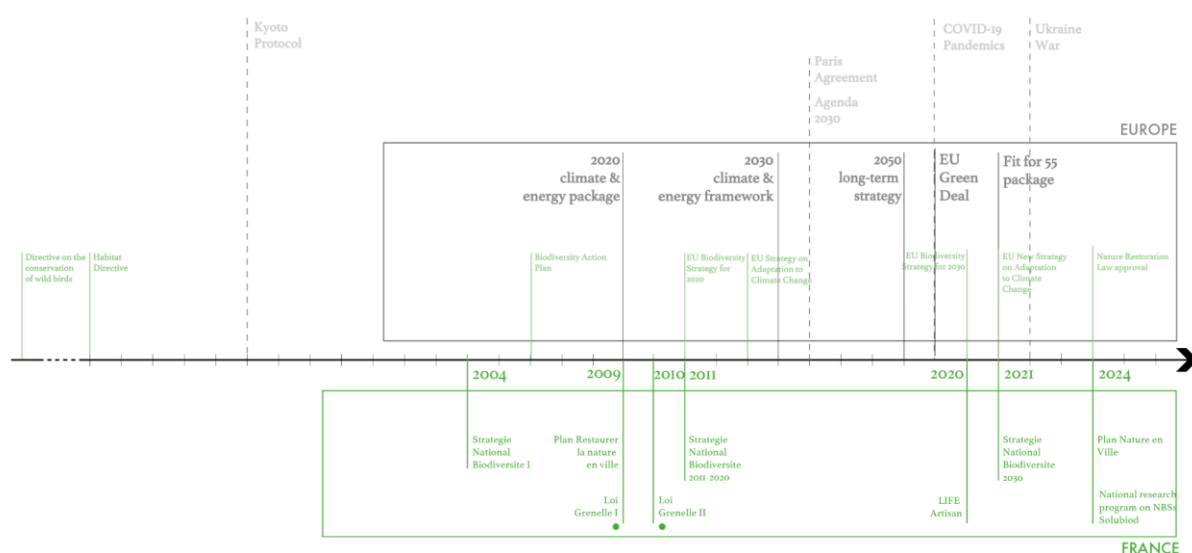


Figure FR6. timeline illustrating key policies and regulation in France and EU related to NBSs. Binding documents are marked with filled green dots.

Since the 2015 Paris Climate Conference (COP21) the **French Committee of IUCN** has been instrumental in introducing and promoting NBSs, particularly . They produced reports, organized working groups, and actively advocated for NBSs in various policy spheres. The IUCN and the European Commission rely on different definitions of NBSs, while sharing common ground (Hanson et al., 2020). The European Commission relates the concept to the three pillars of sustainable development and gives higher priority to innovation and economic

⁶⁹ Public institution, formed in 2020 from the integration of *Agence Française pour la Biodiversité* (AFB) and *Office National de la Chasse et de Faune Sauvage* (ONCFS)

⁷⁰<https://www.union-habitat.org/centre-de-ressources/patrimoine-maitrise-d-ouvrage/manifeste-de-l-ush-pour-la-biodiversite-dans-le>

dimensions; while IUCN focuses more on human well-being, the use of existing ecosystems and the protection of biodiversity (ibidem).

In parallel with this, the Ministry of Ecological Transition, particularly through its water and biodiversity directorate (*Direction de l'Eau et de la Biodiversité* - DEB)⁷¹, has explicitly incorporated the European notion of NBSs into national strategies and plans. This includes the **Stratégie Nationale pour la Biodiversité 2030** (SNB)⁷², published in 2021, which aims to integrate biodiversity objectives and NBS into key sectoral policies. Among the flagship actions of SNB 2030, the *Plan Nature en Ville 2024-2030* aims to combat biodiversity collapse in cities and to mitigate and adapt cities to climate change. The plan defines a roadmap by identifying key axes: improving knowledge, preserving and restoring nature in territorial strategies, and promoting nature in urban planning projects. A fourth cross-cutting axis of the plan involves bringing together stakeholders to foster a shared culture.

From 2020 the OFB⁷³ pilots the **LIFE Accroître la Résilience des Territoires au changement climatique par l'Inciation aux Solutions d'adaptation fondées sur la Nature (ARTISAN) program**, that aims to promote NBSs as a key strategy for climate adaptation across the country. It is funded by the European commission through a call for projects, to which the OFB responded at the request of the Ecological Transition ministry. The project's approach includes a demonstrator program featuring ten pilot projects across mainland France and its overseas territories (Annex 3). The projects are primarily funded by EU funds, with a small share of local co-financing over a 5-year period. In addition, LIFE ARTISAN has established a network of regional coordinators who play a crucial role in facilitating local NBSs implementation (organizing events, and connecting project leaders with potential funders and support structures, etc.). Concrete examples of the project's work can be seen in pilot sites like Martinique, where mangroves are being used for coastal protection against sea-level rise, and in Les Mureaux, where urban heat islands are being addressed through the greening of school grounds. These examples illustrate how NBSs can provide multiple benefits, addressing climate challenges while also enhancing biodiversity and improving quality of life for local communities.

5.2 The implementation process

At the national level, there are no regulatory or financial tools explicitly referring to NBSs. Incentive-based tools prevail, including the enhancement of existing projects, the dissemination of information, guidelines and more. The lack of shared definitions, regulatory instruments, and, above all, financial tools makes the implementation of NBSs particularly challenging (Ershad Sarabi et al., 2019). However, local actors can benefit from resources

⁷¹ The DEB is a directorate that is part of the *Direction générale de l'aménagement, du logement et de la nature* (DGALN)

⁷² The first *Stratégie Nationale pour la Biodiversité* was elaborate in 2004, with subsequent revisions in 2011 and 2021.

⁷³ Public institution, formed in 2020 from the integration of Agence Française pour la Biodiversité (AFB) and Office National de la Chasse et de Faune Sauvage (ONCFS)

linked to European initiatives specifically targeting NBSs or from local funds more broadly dedicated to the greening of urban spaces.

5.2.1 Financial tools

There are no national tools specifically providing funding for NBS implementation. However, since 2023, the Ministry of Ecological Transition has launched the *Fonds d'accélération de la transition écologique dans les territoires*, also known as the *Fonds vert* (literally: Green Fund)⁷⁴. This fund aims to finance projects submitted by local authorities and public or private partners in three areas: environmental performance, territorial adaptation to climate change, and improvement of living conditions. The fund's balance report at the end of 2023, states that “*Endowed with 2 billion euros, it has enabled massive mobilization of stakeholders across the entire national territory. With 10,683 beneficiary projects in the first year alone, supported by more than 6,800 local authorities and territorial actors*”⁷⁵.

The Institute for Climate Economics (2016) analyses financing tools for urban greening projects in Europe and America. The report notes that overall “*The deteriorated state of public finances places a constraint on the amounts and distribution of local government budgets. This pushes local authorities to mobilize resources and/or expertise from the private sector and individuals*”. This dynamic has clear implications at the national level as well, fostering public-private partnerships (see sections 5.3 and 5.4).

5.2.2 State-owned financial institution

A primary role in the promotion and financing of NBSs is played by *CDC Biodiversité*⁷⁶, a established in 2008 by the *Caisse des Dépôts* that manages the financing of mandatory ecological compensation within the ERC (*Eviter, Réduire, Compenser*)⁷⁷ (Guerrin et al., 2023b). In addition, in 2016, *CDC Biodiversité* launched the Natura 2050 program, a national initiative that promotes, funds, and oversees the implementation of NBS. The program gathers voluntary contributions from both public and private actors (CDC's website lists the main contributors) in support of biodiversity. Finally, CDC works closely with the *Office Français de la Biodiversité* (OFB) and the French Committee of IUCN within the framework of the European LIFE ARTISAN project.

5.3 Size and role of the market

Among the incentive-based benchmarking tools, the proliferation of awards and green labels for cities has gained prominence since the 1990s, both at the national and European levels (Guerrin et al., 2023b). As Epstein (2013) highlights, their development has taken on a dual role over time: on the one hand, they contribute to differentiating territories in a competitive logic; on the other, they can foster forms of cooperation and the dissemination of good

⁷⁴ Led by the Direction générale de l'aménagement, du logement et de la nature (DGALN)

⁷⁵ Available at the following link:

https://www.ecologie.gouv.fr/sites/default/files/documents/Bilan_Fonds_vert_2023_comprese.pdf

⁷⁶ CDC Biodiversité is a subsidiary of the CDC group, a state-owned financial institution.

⁷⁷ <https://www.ofb.gouv.fr/mettre-en-oeuvre-la-sequence-eviter-reduire-compenser>

practices. However, as Bourdeau-Lepage (2019) points out, the promotion of NBSs awards and green labels for cities in urban environments might become a territorial marketing tool, contributing to the attractiveness of a territory—often to the benefit of more affluent population groups

5.4 The multi-level governance process

As reported in section 5.2, NBSs are mainly promoted in the form of non-binding recommendations. The financial resources allocated to NBSs at the national level remain limited. Therefore, the implementation of NBS policies is entrusted to local communities, leading to a heterogeneous landscape shaped by local political will (Guerrin et al., 2023b).

On the other hand, EU programs and national initiatives tend to foster public-private partnerships. In this regard, the ARTISAN LIFE project includes around 27 public-private partnerships. As noted in the OFB report (2024), external partnerships—bringing together private actors, public institutions, and research organizations, among others—are often more developed than inter-service collaborations (e.g., between public offices in different sectors such as education, public works, etc.). Similarly, the Nature 2050 program, promoted by CDC Biodiversité, encourages voluntary public and private funding (see section 5.2.3).

On the one hand, there is the emergence of "exemplary cases" where urban greening is a priority axis in the political agenda (Rochard, 2024). For instance, since the early 2000s, the City of Paris has developed several programs and initiatives strongly oriented towards urban greening. In this regard, initiatives such as the *Permis de végétaliser* and the platform *Végétalisons Paris* have become instruments for legitimizing the policies promoted by Anne Hidalgo between 2014 and 2020 (Deschamps, 2024). More recently, the Hidalgo 2021-2026 mandate has been characterized by tools aimed at increasing urban canopy, notably through the *Plan Arbre*⁷⁸.

Additionally, a cross-cutting issue concerns definitional debates and the local appropriation of the NBS concept. Some initiatives and policies that could qualify as NBSs are often categorized under other terms (green infrastructures, ecosystem services, nature restoration, etc.). Furthermore, even when the term NBS is adopted, there is an ongoing "*work of definition, translation, or reinterpretation of the concept*" depending on the period and the social groups engaging with it (Drapier et al., 2024). For instance, in the case of the ecological restoration and adaptation targeting the Salins de Camargue site, "*the qualification of these projects as nature-based solutions became a source of local tensions, and the term was eventually abandoned*" (Guerrin et al., 2023b).

5.5 Achievements, assessments, and challenges

While much of the existing work focuses on broad environmental policies, fewer studies specifically examine the intersection of NBSs policies, housing affordability and socio-spatial inequalities (Institute for Climate Economics, 2016). In addition, there is a prevalence of reports

⁷⁸ <https://cdn.paris.fr/paris/2021/12/13/daf6cce214190a66c7919b34989cf1ed.pdf>

and research on green spaces policies in a broader sense, including green and blue infrastructures, ecological services, compared to those specifically exploring NBSs. No studies or reports have explicitly analyzed the impacts of NBSs on housing rental and selling prices.

A number of studies addressed environmental justice issues, green spaces accessibility and the social sustainability of ecological transformations (Blanc et al., 2024). In this regard, Clerval (2011) emphasizes the role that urban transformation processes and green spaces can play in gentrification processes at the city scale, particularly in the context of Paris. Similarly, Newman (2015) talks about the contestation and negotiation behind the transformation of Jardins d'Éole in northern Paris as an example of a *“post-industrial brownfield repurposed as a sustainable landscape.”* The contribution shows how ecological policies and public space planning in Paris interact with cultural and social inequalities, revealing a disconnect between sustainability objectives and the lived realities of marginalized groups.

Fewer studies specifically explore Nature-Based Solutions and socio-spatial inequalities. Herivaux and Le Coent (2023) examine the acceptability of NBSs in relation to the urban-rural gradient in Basin-Versant du Lez, Montpellier. As a result, residents in urban areas with limited access to nature and higher exposure to summer heatwaves tend to be more supportive of NBSs. In contrast, residents in peri-urban areas, with better access to nature but greater dependence on cars, show less support for NBSs that might reduce space for vehicles. In this regard, Cardinal (2023), demonstrates how NBSs can actually exacerbate existing inequalities in terms of the distribution of environmental risks and benefits, based on a study conducted in the La Bouillie area (in the Loir-et-Cher department).

	Potential Impacts
green spaces and eco-gentrification	urban transformation processes and green spaces (eco-neighbourhoods) can play a role in driving gentrification processes in urban and metropolitan contexts
spatial disparities implementation	the implementation of NBS policies mainly entrusted to local communities, leading to a heterogeneous landscape shaped by local political will
acceptability and policy fragmentation	differing acceptability of NBS along the urban-rural gradient may generate tensions between territories and hinder coordinated supra-local strategies

Table FR5. Potential impacts of NBSs policies on housing inequalities and urban and territorial dynamics.

6. Densification

Urban density and densification issues have long been subjects of debate over time (Fonticelli, 2018; Touati, 2010). From the late 1990s and early 2000s, the topic gained renewed attention also in relation to energy and environmental sustainability of urban transformations (e.g. reducing energy consumption, limiting car use, etc.). European-level impulses regarding densification mainly focus on measures aimed at reducing land consumption, partly due to the fact that the EU has competencies primarily in environmental matters (see Green Deal note). A pivotal moment came with the EU policy recommendation in 2011, which set the goal to halt land consumption by 2050. This same objective was later reaffirmed by the EU Soil Strategy in 2030. **France is one of the few European countries that has integrated this objective into national law, thus setting stringent goals regarding the reduction of soil artificialization at the national level (under the *Loi Climat et Résilience* of 2021).**

6.1 The policy cycle: emergence of the issue and policy decisions

In France, a number of policies were developed promoting densification processes in relation to environmental and climate change issues (Figure FR7)⁷⁹. The 2000s, marked a crucial moment in time, with urban renewal becoming an 'official doctrine' (Charmes, 2010). These policies gained momentum throughout the 2010s, focusing on the densification of urban areas, and the reuse of industrial sites or vacant buildings near public transport. By 2021, policy priorities evolved in response to European policies and growing 'political pressure' on ecological issues (Charmes, 2021), emphasizing the fight against soil artificialisation and the protection of natural and agricultural spaces (where densification represents one possible area of intervention)⁸⁰. At present, the term "densification" is subjected to criticism, as it tends to be associated by residents with an increase in concrete construction, according to experts (Cremaschi et al. 2025⁸¹). Instead, mainstream policy discourse tends to shift toward the principle of land sobriety (*sobriété foncière*) giving priority to the reuse of vacant housing and the redevelopment of brownfields.

⁷⁹ Fonticelli (2019) highlights that policies that are not necessarily framed as densification may still imply and translate into densification actions.

⁸⁰ See also Fondation Abbé Pierre and Fondation pour la Nature et l'Homme, 2024 for a timeline of policy initiatives aimed at reducing land artificialisation

⁸¹ It is an unpublished document reporting on the first Policy Lab held in March 2025 at SciencesPo, Paris. It offers insights into current policy debates on the social consequences and trade-offs of green policies, as perceived by key stakeholders in France.

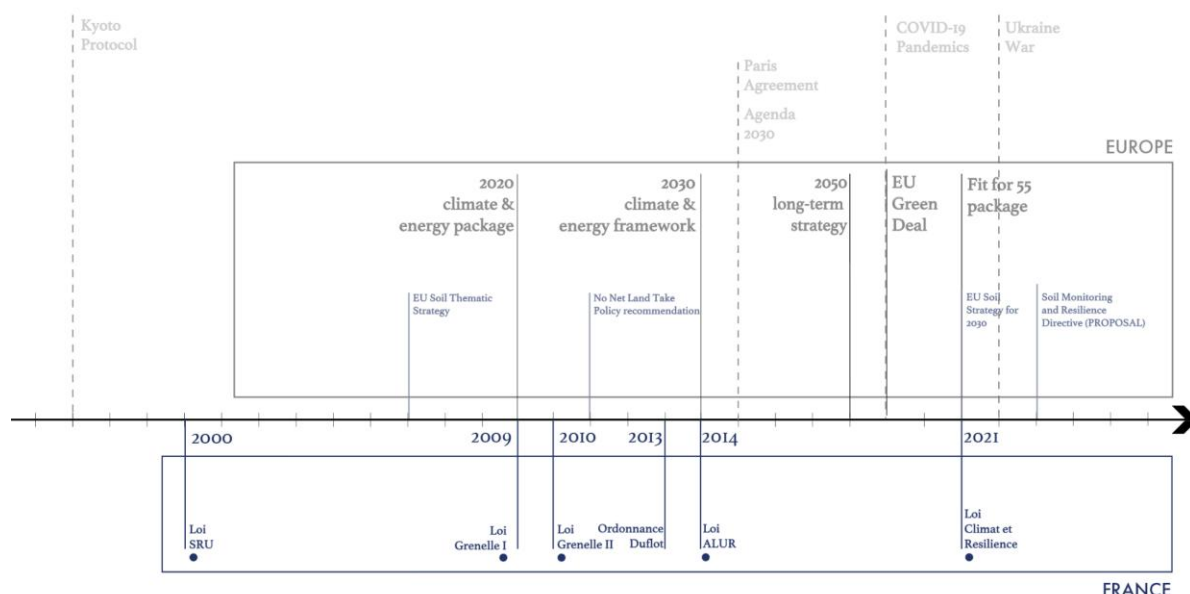


Figure FR7. Timeline illustrating key policies and regulation in France and EU affecting densification. Binding documents are marked with filled blue dots

The **Loi Solidarité et Renouvellement Urbain (SRU)** of 2000 was the first national law to promote densification (Fonticelli, 2018). The law stems from the recognition that certain urban areas with high urban stakes were rapidly deteriorating, that urban sprawl had negative consequences and that the sustainability of urban development needed to increase. Overall *"the provisions clearly mark a shift: they pave the way for a densification policy without imposing it"* (Lebreton et al. 2015, p. 47). The SRU law addressed the issues within the framework of general principles for urban planning documents and removing some barriers to densification⁸².

This policy was then reinforced with the Grenelle I and Grenelle II laws during Sarkozy's presidency (2007-2012). **Grenelle I (2009)** set the goal of combating the artificialisation of agricultural and natural land in favor of nature protection (considering densification as a tool). The main aim was *"to fight against urban sprawl and energy wastage, as well as to enable the revitalization of city centers"*. It provided local authorities with the tools to: 1) link new development projects (residential or commercial) to the creation or improvement of transport infrastructure and 2) set minimum density requirements and higher energy performance standards than existing regulations (Article 7 II b). After that, **Grenelle II (2010)** defined densification as both an objective and an obligation also through some reforms of planning tools (mainly the *Plan Local d'Urbanisme* – PLU and the *Schéma de Coherence Territoriale* - SCoT) (Table FR4). However, the tools introduced by the reform remain optional, as it depends on *"the willingness of the EPCI in charge of the SCOT to strengthen densification"* (Fonticelli, 2019).

⁸² Such as the Plafond Légal de Densité – PLD (the legal density cup), which allowed higher density in urban areas; and the contribution for exceeding the Coefficient d'Occupation des Sols – COS (the floor area ratio), which lightened the financial burdens and facilitated densification

After the Loi Grenelle II, the **Duflot ordinance (2013)** introduced measures aimed at stimulating housing construction, notably through the vertical extension of buildings and the harmonization of building heights⁸³. The ordinance also established exceptions to PLU to encourage the densification of "*dents creuses*" (urban voids and interstitial spaces).

In 2014 the ***Loi pour l'Accès au Logement et un Urbanisme rénové (ALUR)*** represented, in continuity with the SRU and the Grenelle laws, a further step to accelerate densification (Lebreton et al., 2015, Charmes, 2011). The law ALUR operated by integrating reforms of the PLU and the SCoT, as well as of the regulation of plot subdivisions (Jeannin and Carcian, 2015). At the municipal level, the law set the removal of two articles that previously allowed for density control⁸⁴. In fact, it encouraged the administrations responsible for land-use planning through PLU to better combine the other tools available to them (setbacks from property lines, height, placement relative to roads, etc.) to define urban forms adapted to their territory (Tahier and Conreaux-Mantziaras in Touati and Crozy, 2015). At the intermunicipal level, the law required the SCoT to identify the areas in which PLUs should analyze the potential for densification and transformation, taking into account the quality of landscapes and architectural heritage.

	SCoT (intermunicipal level)	PLU (municipal level)
Grenelle II (2010)	- defining objectives for reducing land consumption; - conducting studies on the potential for densification in already urbanized areas before new development projects; - the possibility to include additional regulation for 1) opening new areas for urbanization conditioned by proximity to transport or 2) allowing urbanisation only if the land in urbanized areas equipped with networks has already been used.	- introducing a diagnosis of the consumption of natural, agricultural, and forestry land; - defining objectives for reducing land consumption - the possibility to impose "a minimum density of construction in areas served by public transport or collective facilities"

⁸³ The competent authority, whether the mayor or the president of the EPCI, can grant exceptions to the PLU to facilitate residential densification projects in four specific ways: exceeding the height limits set by the PLU, allowing vertical extensions, converting existing buildings into residential units, and adjusting parking requirements based on project needs (for developments located within 500 meters of public transport with good accessibility).

⁸⁴ Specifically, the setting of minimum plot sizes for construction and the Coefficient d'Occupation des Sols – COS (the floor area ratio). This "mathematically strengthens the possibilities for densification" (Charmes, 2011), although other regulations in urban planning codes have been used to limit densification (Fonticelli, 2019).

ALUR (2014)	- identifying the areas where the PLUs should analyze the potential for densification and transformation, taking into account the quality of landscapes and architectural heritage. - the SCOT has the authority to set minimum density thresholds that are enforceable against the PLUs, or to designate areas where local urban planning regulations must impose a minimum construction density.	- integrating an analysis of the potential for densification and transformation, taking into account the quality of landscapes and architectural heritage - introducing a diagnosis of the consumption of natural, agricultural, and forestry during the 10 years before the approval of the plan; - defining quantified objectives for reducing land consumption
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Table FR6. Overview of the main elements introduced by Loi Grenelle II and the Loi ALUR regarding planning documents and regulations (the PLU at the municipal level and the SCoT at the intermunicipal level).

Finally, the **Loi Climat et Résilience** (2021), with its implementation further supported by the subsequent law of 2023, sets ambitious targets for land artificialization: a 50% reduction by 2030, followed by the goal of no net artificialisation ("**Zéro Artificialisation Nette**", ZAN) within 50 years. In this context, densification is one of the key strategies, among others, to achieve these objectives (Pele and Chategnier-Mizzi, 2024). Operators should prioritize redeveloping urban and already artificialized land (vacant housing, brownfields, urban voids, interstitial spaces, etc.) over consuming agricultural, natural, and forest areas. However, some aspects of the law do not ensure an equitable distribution of efforts to reduce artificialization across territories. As highlighted by Doré (2023), while distinctions can be made in interregional planning documents (SCoT and PLU), the goal is defined uniformly at the regional level, which may not address regional disparities. Furthermore, the lack of a precise definition leaves room for varying interpretations of the policies aimed at reducing artificialization, allowing different stakeholders to adapt these policies to suit their own priorities (Charmes, 2021). Financial concerns also arise, particularly regarding supporting local authorities in achieving these objectives (Fédération Nationale des Agences d'Urbanisme - FNAU, 2023). This law is subject to intense political controversy, mainly between the central government and local authorities, regarding its implementation and implications for urban development. As a consequence, the law undergone delays and adjustments in its implementation and goals. In March 2025, also in response to pressure from small municipalities association (Association des Petites Villes de France APVF), the Senate approved a law aimed at easing local constraints, raising concern about the weakening of land preservation national goals⁸⁵.

6.2 The implementation process

6.2.1 Planning documents and regulation

The national regulatory framework, developed over the years, encourages densification while protecting natural areas. More recently, it has set an ambitious goal of achieving zero land artificialization on a national scale. The national regulatory framework shapes the national urban planning code, which is implemented through territorial governance tools operating at

⁸⁵ <https://www.ecologie.gouv.fr/presse/proposition-loi-trace-maintenir-assouplir>

various local scales. National regulations on densification primarily affect intermunicipal and municipal planning tools. However, the Île-de-France region stands out as an exception, with national policies granting the regional authority a central role in steering densification efforts (Touati, 2015).

At the intermunicipal level, the SCoT (Schéma de Cohérence Territoriale, as defined by Grenelle II and the ALUR law) establishes objectives to limit land consumption by setting minimum density requirements and densification goals. Over the years, the central government aimed to strengthen the integrative role of SCoTs by expanding their scope to address various cross-cutting issues, such as promoting compact cities (Lévêque, 2015, in Touati and Crozy, 2015). More specifically, SCoTs identify areas where PLUs should analyze the potential for densification and transformation, considering the quality of landscapes and architectural heritage. Moreover, the SCoTs define zones where urban development is conditioned on their connection to public transportation and set minimum density thresholds to encourage the urbanization of vacant spaces (dents creuses) and promote densification in new developments. Fonticelli (2019) highlights some limitations that challenge the effectiveness of SCoTs in controlling land consumption. First of all, the elaboration of SCoTs is optional and depends on the willingness of intermunicipal entities (EPCIs). In addition, SCoTs define density thresholds only for undeveloped areas (new developments) and not for already built areas.

Exceptionally for Île-de-France, the 2014 Schéma Directeur de la Région Île-de-France (SDRIF) sought to control land use by establishing quantified objectives at the regional level to reduce the consumption of natural, agricultural, and forested areas. More recently, the SDRIF-e, adopted by the regional council in September 2024, aims to manage an ambitious trajectory of “*urban development limitation*.” It prioritizes residential development within existing urban areas, based on density thresholds, and designates preferred urbanization zones according to specific contextual conditions (Annex 4).

At the municipal level, zoning plans (PLU) offer less leeway than intermunicipal planning documents when it comes to regulating the densification of areas. Where SCoTs exist, the prescriptions they define are binding for local PLU documents. Nonetheless, PLUs have certain tools to regulate densification (e.g., minimum building heights) and retain the authority to assess the capacity for densification and transformation of specific areas. They are also responsible for setting quantified objectives to reduce land consumption at the local level.

6.2.2 Financial tools

Over time, several financial tools have been developed to encourage densification and limit urban sprawl (*Fondation Abbé Pierre* and *Fondation pour la Nature et l'Homme*, 2024). These are mostly fiscal, such as:

- since 1999, the *taxe annuelle sur les Logements Vacants* (TLV) has been in place. As of 2022, this tax is allocated to the general state budget, whereas previously, it was directed to ANAH. Municipalities or intermunicipalities can also impose the *Taxe d'Habitation sur les Logements Vacants* (THLV) in areas where the TLV does not apply (typically in so-called zones non tendues)

- the *versement pour sous-densité* (VSD), created in 2010, is a tax on new constructions that fail to meet a minimum building density threshold set by the municipality. However, the tax was abolished in 2021, as it was rarely used by municipalities
- since 2012, the *taxe d'aménagement* allows municipalities to set different tax rates depending on the characteristics of the construction or renovation project. It can be adjusted to encourage higher density developments;
- since 2015, municipalities where the TLV is in effect can apply a surcharge on the *taxe sur les propriétés foncières non bâties* (tax on undeveloped land).

More recently, France has implemented various financial instruments to promote the reuse of *friches industrielles* (brownfield sites). For instance, the Plan de Relance allocated €750 million over 2021-2022 to in grants for projects involving the redevelopment of brownfields and, more broadly, of already artificialized land⁸⁶.

6.2.3 Monitoring tools

At the European level, ongoing debates highlight the lack of a shared definition of *land take* (Decoville and Feltgen, 2023), leaving member states with significant leeway to interpret and adapt concepts such as artificialization, soil sealing, and land consumption (Fédération National des Agences d'Urbanisme - FNAU, 2023). Similarly, at the national level, the definition of "artificialization" remains highly debated —particularly following the adoption of *Loi ZAN*— with no widely agreed-upon meaning (Charmes, 2021). The definitional challenges are closely linked to the elaboration of quantitative and qualitative tools for measurement and monitoring. Moreover, depending on the territorial scale at which density is measured or monitored (regional or more local), the narratives and conclusions may differ (Darley in Touati and Crozy, 2015).

Since 2000, the CORINE Land Cover database (Coordination of Information on the Environment Land Cover) has provided publicly accessible data on land use across European member states. In France, the *Loi Climat et Résilience* establishes the obligation to create **land and housing observatories** (*observatoires de l'habitat et du foncier*) no later than three years after the adoption of a local housing program (*programme local d'habitat*) (Pele and Chategnier-Mizzi, 2024). These observatories are intended, among other objectives, to identify sectors where density falls below urban planning thresholds, vacant properties, and developable brownfields, as well as opportunities for building elevation and demolition-reconstruction. Moreover, the Ministry of Ecological Transition highlights the importance of making monitoring tools available to promote *sobriété foncière* (land-use sobriety). In this regard, the national platform *Data Foncier*, developed by Cerema, offers a number of tools for analyzing and observing land use at the national level, using datasets such as land files (*fichiers fonciers*), DV3F, RFP, and LOVAC (Table FR7).

Beyond the above-mentioned national tools, territories also develop their own systems for measuring and analyzing land use data—for example, the cartographic atlas *Mode d'Occupation des Sols* (MOS) for the Île-de-France region. However, challenges arise concerning the interoperability of these datasets across different territorial scales and levels of detail, as well as their effective use to leverage the value of this information (Thépot, 2023).

⁸⁶ <https://www.economie.gouv.fr/plan-de-relance/mesures/fonds-recyclage-friches>

	Database	Main information	Year of data update	Accessibility
European level	Corinne Land Cover	Land use	2000 (first release) then every 6 years (2006, 2012, 2018, 2024)	Open access
National level	Portail de l'artificialisation des sol	Land consumption of natural, agricultural and forester areas (ENAF)	From 2011 until 2023	Primarily intended for local authorities (<i>collectivités</i>), state services, and their partners
	Cartofriches	Redeveloped brownfields (<i>friches reconverties</i>), brownfields with projects (<i>friches avec projet</i>), and brownfields without projects (<i>friches sans projets</i>).	Created in 2021 (last update: 2024)	Open access
	Zero Logement Vacant (based on multiple databases such as LOCAV)	Vacant housing and rental properties in the private sector according to their energy labels	2020, 2021, 2022, 2023, 2024	Primarily intended for local authorities (<i>collectivités</i>), state services, and their partners

Table FR7. Summary of some of the data available on land use and consumption at the European and national levels.

6.3 Size and role of the market

Although market dynamics in densification are regulated by a national framework, they tend to vary according to the land and real estate situation in different areas and/or the type of (re)development. Different submarkets can be distinguished, such as:

- **“Build in my backyard” (BIMBY) initiatives** located in periurban areas: since the mid-2000s, the densification of periurban housing (*pavillonnaire*) has been framed as one of the major components of EEPs. Indeed, it represents up to 75% of the urban fabric at the national scale, even more in some areas, with the internal division of existing houses representing up to 25% of the supply of new housing in 2001-2011 (Touati and Crozy 2015). With the funding support of the State, BIMBY initiatives have become a commercial enterprise in its own right, ending as a trademark owned by two architects-engineers (Miet et Le Foll 2013). This initiative has raised many some heavy

controversies within the planning and architectural field (Robin 2013; Biau, Fenker, et Macaire 2015).

- Turnkey urban regeneration projects** in metropolitan areas, led by large-scale developers: France has traditionally been characterized by a strong public intervention over land development, based on the combination of i) significant public landowners less geared towards rent extraction, ii) para-public urban development corporations (EPA, SEM, SPL and SPL-A, EPF) acting as intermediaries between former public/private landowners and developers, using iii) legal tools to acquire land (e.g. eminent domain purchase, zone d'aménagement concertée aka ZAC), determine future land-use, and negotiate contributions (e.g. planning gains) from developers willing to acquire it for redevelopment in order to pay for public spaces and amenities (e.g. schools). However, over the past 20 years, this model has been undermined by a number of major shifts, including the development of rent-seeking behaviours by public landowners turning into real estate developers, such as the railways (Adisson, 2018; Piganiol, 2017); and urban redevelopment practices based on the direct purchase of large tract of lands by large-scale developers acting as 'ensembliers', i.e. taking care of housing development and public space (Citron, 2017; Guironnet, 2016). This has gone hand in hand with the introduction of new legal tools to allow local authorities to negotiate contracts (PUP) with private developers for the provision of public space (Thibault, 2017).
- Transit-oriented developments (TOD)** in metropolitan areas, such as the Grand Paris Express: in the Paris city-region the massive public investment into the creation of 200 km of new rail infrastructure in the periphery and 68 new neighborhoods around the train station is likely to drive up land and real estate prices, therefore pushing out working classes (Clerval & Wojcik, 2024).
- Office-to-housing conversion schemes:** this form of densification policy was initially put on the agenda by public authorities in the 1990s to fight against what was then called the "housing crisis," and has been reframed over the past decade as a lever for green transition. However, the interest of developers and investors seems to have been limited so far. Between 2013 to 2023, this type of densification contributed to 2.5% of the supply of housing (Coulondre et al. 2024). In the Paris region, 32% of the operations were concentrated in the core (City of Paris), especially in outer districts (*arrondissements*) where the value gap between housing and office is positive, and is supported by a proactive engagement of social housing providers (Trouillard and Quatrain 2022). However, this represented only 3% of the official objective of 70,000 new units per year set by the Grand Paris law in 2010 (over the period 2013-2021). There have been many reports advancing different solutions to try to unlock this. Besides the usual zoning instruments, this policy is mostly based on symbolic (e.g. a prize was created in 2019, but short-lived) and tax instruments.
- Air rights (*surélévation*):** the construction of additional floors on top of existing buildings has been pushed as a tool of densification, both supported by arguments for the compact city and housing affordability that would result from an increase in the supply (Bouchet-Blancou 2020). In that regard, the ALUR law (2014) was the main milestone as it suppressed the floor area ratio (*coefficient d'occupation des sols*, COS) that used to regulate the construction capacity of a given plot, and sought to facilitate

projects with co-owners as direct contractors (*maîtrise d'ouvrage directe*) rather than selling air rights to developers. However, this did not fundamentally alter the structural bias of the French legal system in favor of outsourcing to developers (Ibid.). This form of densification has been identified by the City of Paris as a key intervention in its new zoning plan (*PLU bioclimatique*), as well as by social housing providers in Lille and Rennes.

6.4 The multi-level governance process

Historically, the state has been responsible for the development and implementation of spatial planning policies (Touati, 2015). Following the decentralization policies initiated in the 1980s, urban planning competences—including densification policies—were transferred to the local level. As noted in Sections 6.1 and 6.2, since the 2000s, the national regulatory framework has promoted densification and influenced the urban planning code, which is implemented through territorial governance instruments at various local levels (mainly intermunicipal and municipal). While densification regulations primarily affect local planning tools, their implementation remains optional and depends on the willingness of local authorities (Touati, 2015). In this context, Île-de-France represents an exception, as it establishes quantified objectives at the regional level to limit the consumption of natural, agricultural, and forested areas.

Moreover, various actors—including private stakeholders, para-public entities, and third-sector organizations, among others—support densification policies (Fonticelli, 2016). As highlighted in Section 6.3 and WP4, para-public urban development corporations play a key role as intermediaries between former landowners and developers. Additionally, grassroots mobilization can be crucial in combating land artificialization. This is the case of the Triangle de Gonesse, where strong opposition from local elected officials, farmers, and associations led to the abandonment of a planned mega tourism and commercial complex in 2019 (Tonnelat, 2022). Furthermore, Fonticelli (2016) notes that the actors involved in densification in urban areas differ from those operating in rural contexts. In the latter, for instance, developers tend to be smaller-scale operators, constructing a limited number of housing units and specializing in specific territories or types of development.

6.5 Achievements, assessments, and challenges

Since the 2000s, densification policies have yielded varied outcomes depending on the degree of urbanization of the targeted areas (metropolitan, peri-urban, rural, etc.) and their interplay with other policies not explicitly focused on densification (e.g. policies promoting homeownership). The recent study of CEREMA (2024) provides data on land consumption from 2009 to 2023, alongside population growth, which has proceeded at a slower pace during the same period. Overall, 66% of the urbanized land by 2023 was allocated for housing. At regional and local levels, this phenomenon is highly polarized, primarily driven by metropolization and the attractiveness of coastal areas (see annex 5).

Several studies have examined the effects of these policies on peri-urban areas, particularly in single-family housing neighborhoods (*tissus pavillonnaires*), where they might take the form of plot subdivisions or the construction of accessory dwellings (see part II of Touati and Crozy,

2015). Fonticelli (2019) observes that densification has been more pronounced in Île-De-France (IDF) than in other peri-urban areas of France (where housing development generally aligns with the objective of diversifying housing options). The author further notes that exceptional regulations limiting urbanization in Île-de-France (see section 6.2.1) have driven up housing costs, inadvertently fueling urban sprawl beyond IDF. Focusing on Lyon, the second most important urban agglomeration in France, Rousseau (2017) has highlighted the tension between the two main goals of urban renewal, namely land densification and social mix. This tension had led to discursive changes in regional planning, and the introduction of social housing in some territories due to regulatory quotas. However, the political consensus between municipalities and the Metropolitan Council has led to a preservation of functional reproduction, i.e. densification under control in the wealthy municipalities of the West vs. post-industrial densification in the East. In the latter this includes new-build gentrification that aims at attracting middle class populations in formerly working-class areas.

Other studies have focused on the effects of policies densification that favour the renovation of public transit proximity areas (primarily in metropolitan and peri-urban areas). In 2010, the Loi Grand Paris introduced a framework for transit-oriented development, setting an annual target of 70,000 housing units and establishing *Contrats de Développement Territorial* (CDTs) to spatially organize production and “control urban sprawl”. However, as underlined by Clerval and Wojcik (2024) the Grand Paris transit-oriented development project is accompanied by large-scale urban renewal initiatives, characterized by evictions in the private housing market under eminent domain purchase, demolitions and upgrading of social housing, and rising property prices.

In already dense areas, local authorities might also engage in densification through elevation (*surélévation*), i.e. by adding additional levels to existing buildings through the commodification of air rights. Focusing on the city of Paris, Bouchet-Blancou (2025) has found that elevation is likely to lead to real estate speculation, and thus to hinder affordability that it was supposed to bring through a rise in the housing supply. However, the number of these operations remain quite limited (120 per year in Paris, i.e. 1.33% of the plots identified) so that the effects of densification through air rights does not have the expected impact on prices. More fundamentally, this results from relying on the private market: due to the technical and administrative uncertainty tied to these operations, private developers tend to require a higher return, translating into a higher sale price leading to housing unaffordability. While supporters of this form of densification advocate for further fiscal advantages that are expected to generate price decrease, Bouchet-Blancou argues that this would only have a marginal impact.

Regarding the recent ZAN policy, Charmes (2021) suggests that its implementation might disproportionately impact rural areas by restricting single-family home construction, thus shifting the housing market in favor of cities at the expense of villages. He also associates ZAN with heightened land tensions, exemplified by the *Gilets Jaunes* protests. As Defay and Driant (2023) highlight: “ZAN seems to be just the tip of the iceberg of deeper, structural land issues that have been affecting housing production for several years.” According to the authors, the issue is not—or at least not solely—the scarcity of land itself, but rather the tools currently available to local governments, particularly in terms of price regulation, land acquisition, and

the separation of land from property ownership⁸⁷. As one interviewee pointed out, the ZAN highlights a paradox between ecological transition goals and the current local economic model. Small municipalities remain partly dependent on a local tax system tied to new construction (e.g. *taxe foncière*), rather than to land preservation.

	Potential Impacts
urban renewal and social mix	demolition of social and most affordable housing stock; risk of displacements for low-income households, new social housing often oriented towards middle-income
transit-oriented development and eviction risk	TOD might trigger evictions particularly in urban and periurban areas and rising property prices in working class areas, affecting affordability
zero artificialisation nette law (relaxed)	risk of disproportionately affecting small municipalities partly dependent on local tax system encouraging new construction over land preservation
air rights (limited so far)	particularly in <i>zones tendues</i> it might fuel real estate speculation and housing unaffordability; technical and administrative uncertainty might induce the increase of sale prices

Table FR8. Potential impacts of densification policies on housing inequalities and urban and territorial dynamics.

7. Summary and discussion of results

This report provides an overview of the regulatory systems of Energy and Environmental Policies (EEPs) in France. The note specifically focuses on housing retrofitting, nature-based solutions, and densification policies which are framed within the context of national climate change mitigation and adaptation policies. A number of considerations arise concerning both the evolution and key changes of these three types of EEPs over time, as well as the relationships and trade-offs between each EEP housing affordability and equity issues.

7.1 Summary of changes in EEPs

When examining the three types of EEPs for France, some differences emerge in their trajectories, changes and implementation processes. Key milestones that have accelerated the move towards the three EEPs includes the *Grenelle I* and *II* (2009, 2010), the *Loi de Transition Énergétique* (2015) and, more recently, the *Loi Climat et Résilience* (2021). While emission reduction goals have been strengthened over time, implementation remains challenging, hindered by political instability, budgetary constraints, and global crises. Recent regulations, such as the ban on renting poorly insulated homes and limits on land artificialisation, have also triggered forms of backlash or resistance.

Housing retrofitting policies have been integrated into the national regulatory framework since the 2000s, also as a result of European directives on the subject. Over time, housing retrofitting

⁸⁷ the ongoing research programme *Le foncier et le logement abordable 2022-2025* aims to further advance reflections by integrating issues of densification, land consumption, and affordability. More information at: <https://recherche-foncierlogementabordables.fr>

policies have favoured incentive-based instruments (such as direct subsidies, tax deductions, or subsidised loans). In recent times, direct subsidies have mostly prioritized owner-occupiers over private renters, while social housing has received fewer subsidies for renovation. Additionally, housing retrofitting policies have also been gradually integrated in local and national urban regenerations policies. Although local authorities have progressively gained competencies related to energy renovation and energy poverty, their role remains mainly focused on support and coordination within a vertically structured governance system.

The institutionalisation of NBS is relatively recent and still lacks a common reference in terms of conceptual definition and implementation tools. NBSs are integrated into broader national policy frameworks for climate change adaptation, biodiversity protection, and water management. The absence of shared definitions, regulations, and targeted funding makes the implementation of NBS particularly complex and uneven. Overall, NBS has gained significant traction in national policy circles but faces considerable challenges in practical, local-level implementation.

Densification policies have their roots in the 2000s, linked to urban regeneration strategies, transit-oriented developments and efforts to counter urban sprawl. More recently, the focus has shifted towards achieving zero land artificialisation and preserving open and agricultural areas. Though their outcomes vary depending across metropolitan, peri-urban and rural areas, different financial instruments have been promoted for the reuse of industrial sites and vacant buildings. However, densification policies are still applied discretionarily unevenly, with a significant influence from local political will. Furthermore, zero land take goals recently caused political opposition and strain relations between the federal and local governments, especially in rural and small towns.

7.2 Relations and trade-offs between EEPs and housing policies

The relations and trade-offs between EEPs and housing policies appear to be shaped by institutional, political contexts, and the evolution of the national housing systems (see D4.2 for more details). This section presents some hypotheses on how EEPs might create tensions with housing affordability and social equity, across different housing tenures, territorial configurations, and diverse forms of urban regeneration.

Different dynamics can be observed in housing retrofitting also depending on housing tenure, existing policy tools and the regulatory framework. In addition, the lack of territorial differentiation and the uneven distribution of local energy renovations funding may exacerbate territorial inequalities.

Upfront energy renovation costs and complex administrative procedures tend to benefit households with saving or access to credit to the detriment of economically vulnerable ones. Moreover, a growing divide might emerge between deeply renovated properties and those left unrenovated or lightly renovated due to owners limited resources or a lack of clear return on investments.

The recent law stating the ban on renting poorly insulated housing may impact low-income owner-occupiers who rely on renting out part of their property for supplementary income. If

their dwelling becomes non-rentable, and they are unable to afford renovation, they may face a loss of monthly income and be pushed to rent informally or sell the property.

These dwellings might then be acquired, renovated and re-rented at higher prices. Furthermore, the lack of weakness of rent control measures after energy renovations works might tend to rent increase and to displacement of low-income tenants.

In the social housing sectors, limited financial resources and public subsidies may push social housing providers to adopt strategies to ensure financial viability of energy renovation operations. These may include diversifying social housing production, partially selling the stock, or prioritising the renovation of existing units over new construction.

Among the three type of EEPs considered, NBS policies appear to be least developed and more recently institutionalised. There is a limited number of studies and policy debate on their potential impacts on housing inequalities. However, urban transformation processes and green spaces (eco-quartiers) have shown to drive gentrification dynamics in urban and metropolitan contexts.

Additionally, the implementation of NBS policies is mainly entrusted to local communities, resulting in a fragmented landscape shaped by local political will and resources availability. The varying exposure to environmental risks across different regions and populations is often overlooked, potentially leading to uneven distribution of environmental benefits and deepen existing inequalities.

Lastly, the acceptability of NBSs might vary depending on urban gradient, urban areas with limited access to green spaces and nature might be more supportive of NBSs, while other territories might express resistance. This may generate tensions and hinder coordinated supra-local policies (inter-municipal, metropolitan. etc.).

Various configurations of densification might result in different effects on housing affordability issues in relation to national housing policies system and evolution and local political contexts (see also D4.2).

Urban regeneration and social mix can lead to the demolition of social or most affordable housing units, potentially causing the displacements of low-income households. In some cases, newly built social housing tends to mainly target middle-income groups.

Massive investment into rail infrastructure and neighbourhoods around the train station (such as TOD approaches) is likely to raise land and real estate prices, pushing out working class residents, particularly in urban and peri-urban areas.

BIMBY approaches may reproduce or reinforce existing spatial disparities, where wealthy areas remain unchanged and only lightly densified, while working-class neighbourhoods undergo major transformations attracting more affluent residents.

Zero Artificialisation Nette may disproportionately affect small municipalities and rural areas, which partly rely on local tax system linked to population growth and new construction over land preservation.

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9. Annex

9.1 List of interviewees

Name of the institution	Type	Date	Place	Length (in min)
Fédération des offices publics de l'habitat (FOPH)	Social housing provider (public)	28/04/2025	FOPH headquarters, Paris 8ème	110
Institut Paris Region (Regional planning agency for the Paris region) (IPR)	Local agency	22/05/2025	online	60
Coordination gouvernementale du plan de rénovation énergétique des bâtiments (CIPREB)	National government	22/05/2025	Paris La Défense	90
Agence nationale de l'habitat (national agency overseeing energy retrofit policy) (ANAH)	National agency	07/05/2025	ANAH headquarters, Paris 1er	80
Direction de l'Habitat, de l'Urbanisme et des Paysages (DHUP), Ministry of Ecological Transition	National government	18/06/2025	Paris La Défense	100
Fédération des entreprises sociales de l'habitat (ESH)	Social housing provider (private)	16/07/2025	ESH headquarters, Paris 8ème	80
Association des directeurs généraux des communautés de France (ADGCF)	Intermunicipal government	17/07/2025	ADGCF headquarters, Paris 9ème	80

Table FR8. List of interviewees

	France		Europe	
	Framework	Objectives	Framework	Objectives
2000	PNLCC (in agreement with Kyoto Protocol)	- maintain emissions in 2010 at their 1990 levels	/	/
2004	Plan Climat	- reduce France's GHG emissions by at least 75% by 2050 compared to 1990 levels (Factor 4)	/	/
2009 (and 2010)	Loi Grenelle I (and Grenelle II)	- reduce France's GHG emissions by 20% by 2020 compared to 1990 levels. - increase the share of renewable energy to 23% of final energy consumption by 2020.	2020 climate and energy package	- reduce GHG emissions of 20% by 2020 compared to 1990 levels; - achieve 20% energy dependence on renewable sources - increase energy savings by 20% compared to 1990 levels

2014	/	/	2030 climate and energy framework	- reduce GHG emissions before 2020 by 40%, - achieve 32 % energy dependence on renewable sources - increase energy savings by 32,5 % compared to 1990 levels
2015	Loi Transition Énergétique + SNBC (in agreement with Paris Agreement)	- reduce emissions by 27% by 2030 compared to 2013 levels. - achieve carbon neutrality by 2050. - achieve 32% energy dependence on renewable sources by 2030.	/	/
2018	/	/	2050 long-term strategy	- become the world's first climate-neutral continent by 2050 - an intermediate ambitious objective to reduce GHG emissions by 55% by 2030 from 1990 levels
2019 (and 2020)	Loi Energie Climat (and SNBC revision)	- achieve carbon neutrality by 2050. - in the short and medium term, adhere to carbon budgets set by decree, meaning emission caps to be respected over five-year periods.	European Green Deal	- making the EU the world's first climate-neutral continent by 2050 -- an intermediate ambitious objective to reduce GHG emissions by 55% by 2030 from 1990 levels
2021	Loi Climat et Résilience		/	/

Table FR9. France and European climate and energy framework: key targets

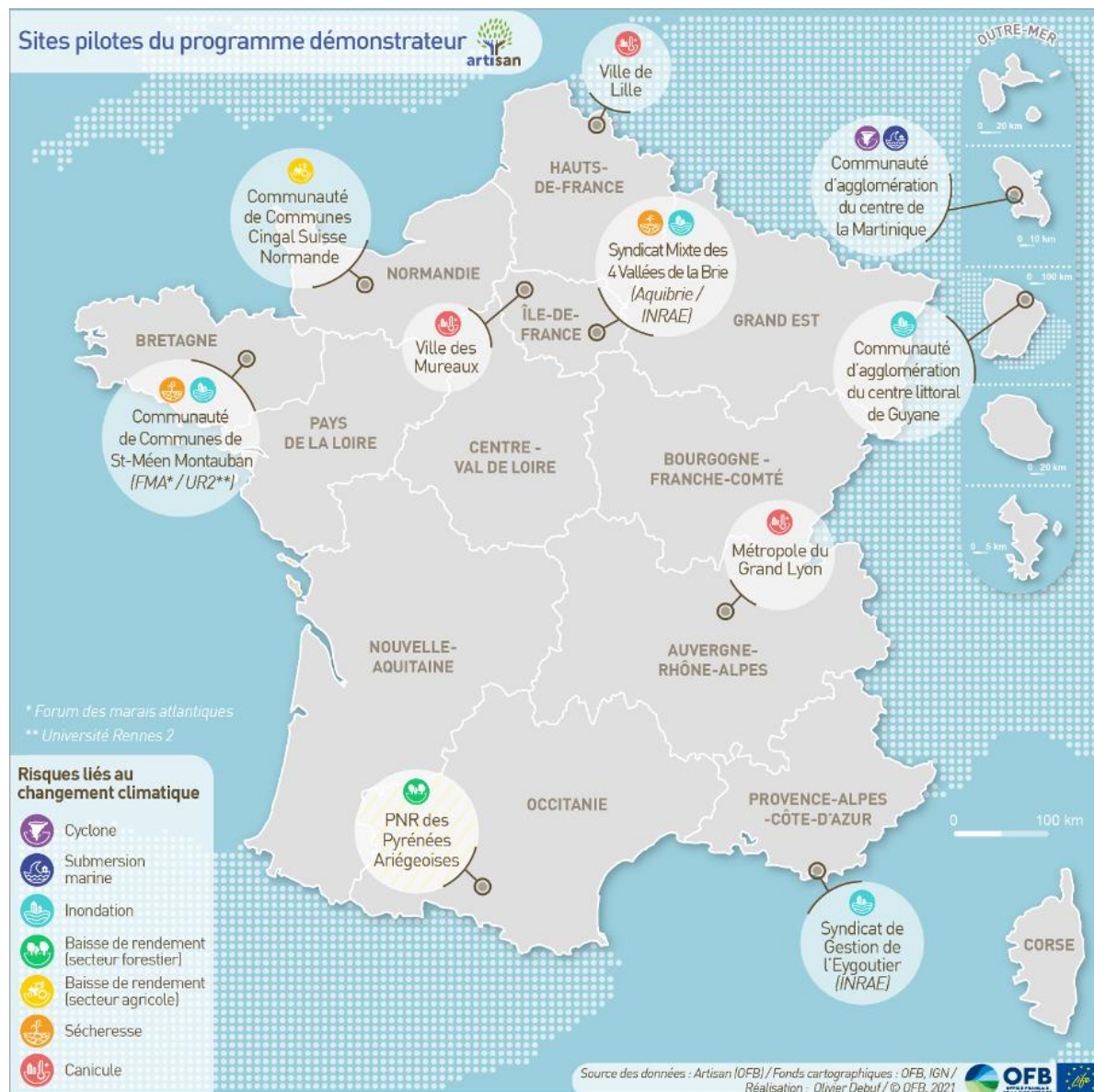


Figure FR9. LIFE ARTISAN pilot projects.

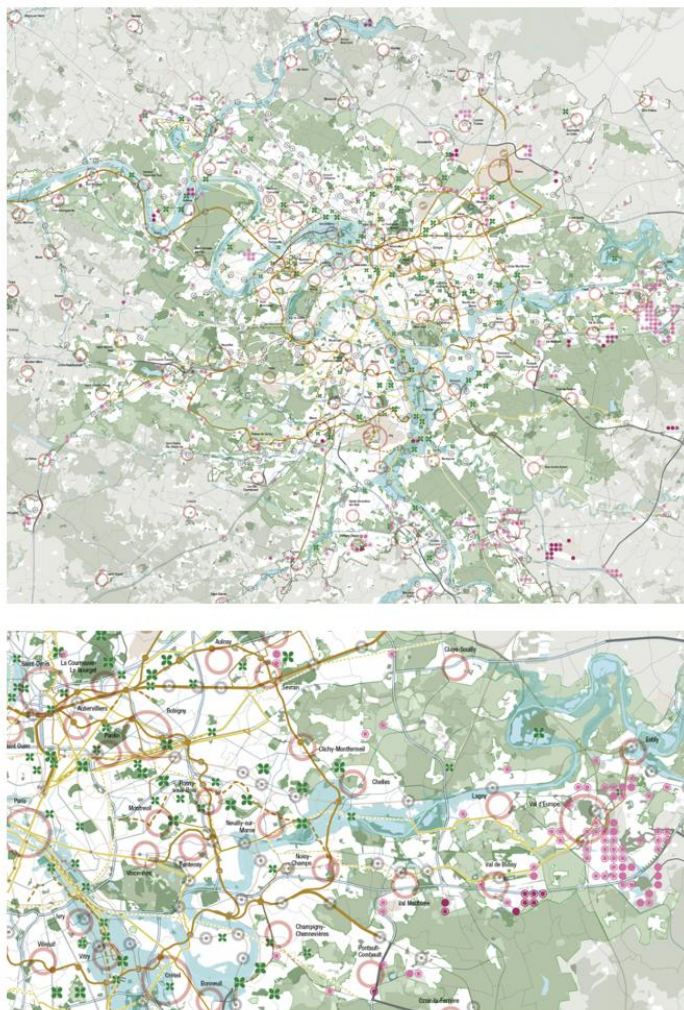
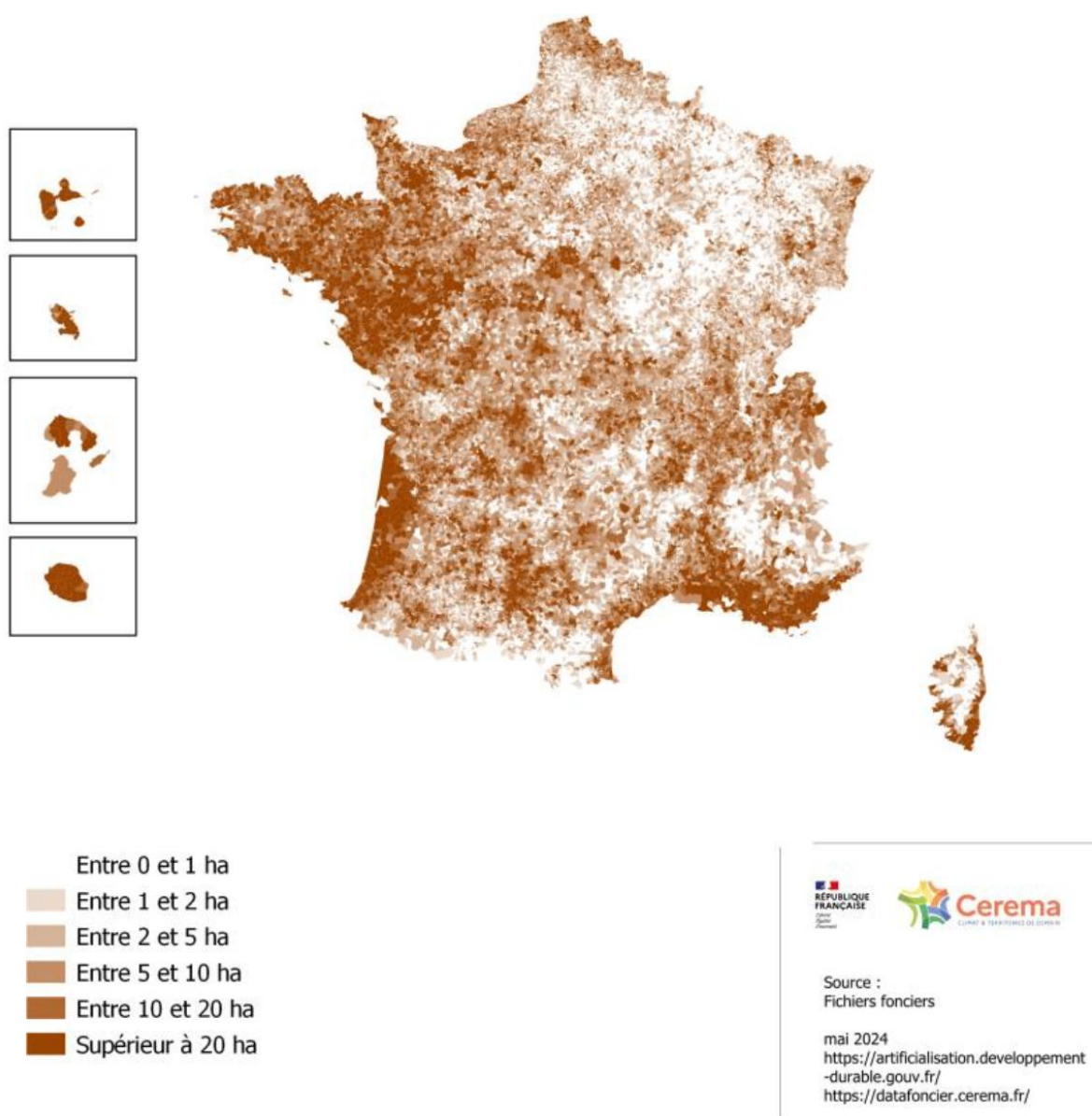


Figure FR10. Excerpt from the map *Maîtriser le développement urbain* of the SDRIF-E, 2024 (source: SDRIF-E, 2024)



* Consommation d'espaces naturels, agricoles et forestiers (NAF) d'après les Fichiers fonciers 2009-2023 : cette consommation est calculée à partir des déclarations d'impôts de la taxe foncière. Une parcelle est donc consommée à partir du moment où une déclaration fiscale fait passer cette parcelle en espace artificialisé. Cette déclaration fait souvent suite à un autre acte administratif (permis de construire, d'aménager, etc.). Elle ne prend pas en compte les surfaces non cadastrées, ni la consommation d'espaces provoquée par les acteurs ne payant pas de taxe foncière (notamment collectivités). La consommation est calculée en faisant le différentiel des surfaces artificialisées entre chaque millésime des Fichiers fonciers. Des redressements à la main ont été effectués sur certaines communes. Les détails de la méthode et les chiffres bruts sont présents sur <https://artificialisation.developpement-durable.gouv.fr/>. Pour des raisons de représentation, la Guyane apparaît 3 fois plus petite qu'elle ne l'est en réalité.

Figure FR11. NAF land consumption for housing purposes in hectares between 2009 and 2023 at the municipal level (source: CEREMA, 2024)

NATIONAL REPORT ON THE REGULATORY SYSTEM OF EEPs IN HUNGARY

1 Executive Summary

The current report is the final version of the study on the assessment of the regulatory framework of Energy and Environment Policies in Hungary. It aims to present the conditions in which retrofitting, densification and Nature-based Solutions are implemented. It also aims to set the first hypothesis on the impact of these three policy interventions into housing inequalities. This issue is not researched nor discussed in Hungary yet, for several reasons.

One of the main reasons can be the lack of large scale public-led urban development projects that are either of green nature or intend to create affordable housing solutions. Consequently the traditional trade-off between the green content of a new development versus providing affordable housing is far not the question that was ever raised.

Patchwork retrofitting interventions in a primary (over 97%) privately owned housing environment have much less and much less rapid impact on real estate prices and the change of residents. Densification in the already dense urban structure, in case it has a patchwork style, also hardly reaches a critical mass that changes the social environment. While large scale densification projects happen on brownfields that do not have original residents, and these projects are poorly market based, not considering affordable housing provision at all. Green interventions are mostly of patchwork nature as well, and except for the major urban centres, these green interventions are small and build on the already existing green areas, not resulting in a completely new living environment.

For all these reasons gentrification or renoviction is not discussed in the context of green investments. What is rather discussed is the consequence of the absence of green investments on the quality of living and the quality of housing. Coping with the challenges of climate change, the heatwaves and the uncertain energy supply requires green interventions which are currently going on at a rather low intensity. Due to not meeting certain legislative and political conditions, Hungary has a limited access to EU funds, and the economic recession also limits the financial scope public entities have. The financial difficulties are coupled with the strong centralisation process since 2011, which has taken away several funds and competencies from local municipalities, who are otherwise the actors responsible for local housing, spatial planning and green investment.

2 Introduction and methodology

The current study is the final version of a national report on the framework conditions of green investments in Hungary.

It covers the three major themes of ReHousIn, namely the retrofitting of residential buildings, the Nature Based interventions in urban areas and the densification processes in and around

urban centres. The three themes are covered by main chapters, broken down to sub-chapters on the policy cycle, the implementation process, the role of the market and the multi-level governance. All three themes end with the measured and potential impacts of green investments on housing inequalities.

The study is primarily based on desk research, using the publicly available datasets, the national legislation and strategies, but it also builds on scientific evaluations and the own direct research and consultancy experiences of the authors. The document also relies on inputs from the first Policy Lab implemented on the 1 of April 2025, which event brought together a diverse group of stakeholders among them policy experts and national and local level policy implementers. In order to fill in the knowledge gap after the desk research phase and include the field experiences of planners and practitioners, national and local level expert interviews were carried out in May-June 2025. (The detailed list of interviews can be found in Annex 3).

The major limitation for the study is the fact that the housing inequality aspects of green investments is not a topic that is highly discussed in the scientific and policy community. Consequently, there are no studies available that the authors could rely on, rather the research framework had to be developed from scratch in the ReHousIn project.

3 General governance system

Hungary has a population of 9.6 million people, out of which 70% lives in cities – including 1.7 million people in Budapest. Hungary's population has been declining since 1980. Natural increase has been negative since 1981, 0.3-0.5% per year. Within the country, there is a strong migration of population to abroad (about 4% of the inhabitants with Hungarian nationality live in other EU countries, and another 1-1.5% may commute every day crossborder). According to the statistics, from 2016 the outmigration of people with Hungarian nationality is counteracted by people coming back from abroad. In addition there is a slight immigration from other countries, that consist of a rather short term labour force under regulated conditions⁸⁸. Additional migration can be experienced inside the country to certain urban centres, resulting in a significant decline in rural areas.

As Figure 1 shows, real increase of population can only be experienced in the agglomeration of a few urban growth poles (like Budapest, Győr, Debrecen, Szeged) and in settlements around the lake Balaton.

⁸⁸ <https://www.oekonomus.hu/irasok/a-munkaero-aramlas-20-eve-magyarorszagon-es-az-eu-ban/>

A lakónépesség változása a 2011. évi népszámlálás óta településenként, 2022

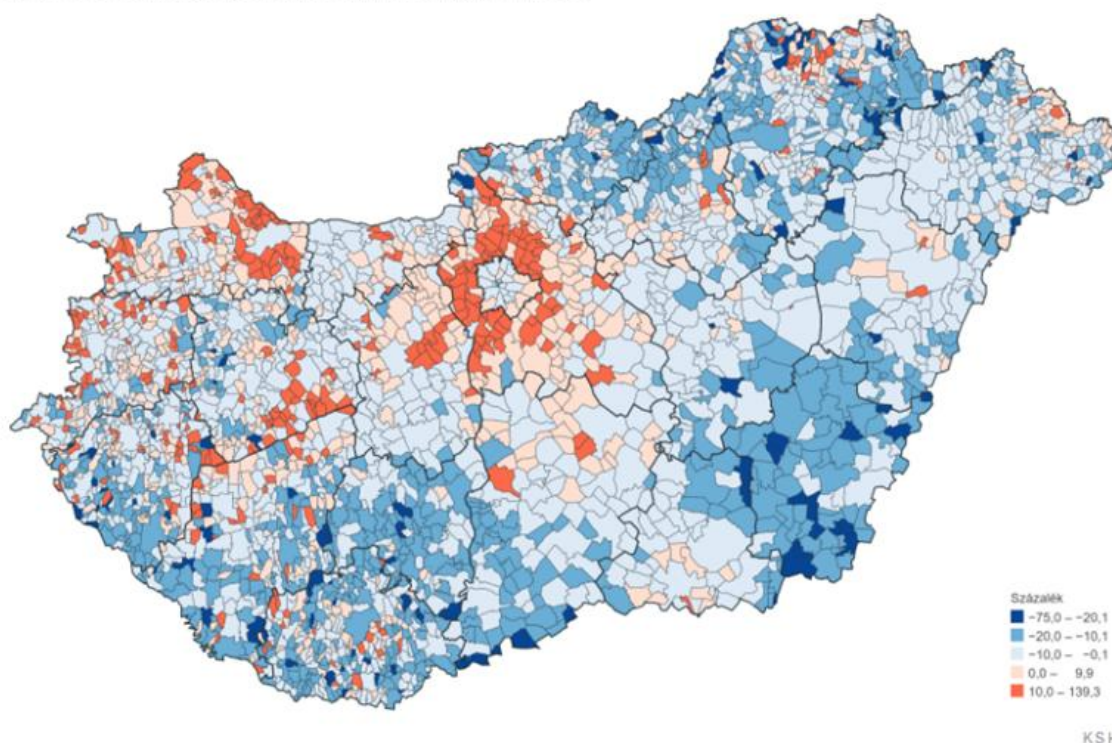


Figure HU1. Change of population in all the settlements of Hungary between 2011-2022

The consequence of this overall demographic decline and selective growth of urban agglomerations is that the pressure on the urban housing market is much smaller than that of the urban centres of most parts of Europe. It has an impact on the lower relevance of densification and green gentrification in general. On the other hand it is important to mention that the highest growth rate of real estate prices between 2015 and 2024 could be experienced in Hungary (especially in Budapest) among the European countries. According to the Eurostat⁸⁹, the price of average units increased by 198% as opposed to the 47% European average. This price growth however does not strictly come from the increase of the population (as it is officially decreasing), but rather from financialisation - growing share of short term rentals mostly in Budapest- the high inflation rates and demand side subsidies of the government against the decreasing supply.

Regarding the country's housing stock, an increasing trend can be seen in the number of dwellings, reaching 4,586,000 by 2023. In 2022 (census) about 2.4% of the whole dwelling stock was municipally owned, the rest was privately owned, and the rate is ever decreasing. While the rate of owner occupation is very high, the respective population living in owner-occupied housing is 90%, while the remaining 10% are tenants, as was mentioned, 2.4% in municipal housing and 7.6% in private rental dwellings (Central Statistical Office, 2023).

⁸⁹ <https://telex.hu/valasztasi-foldrajz/2024/11/11/legmagasabb-ingatlanar-emelkedes-europai-oroszagok-magyarorszag-terkep>

Although this tenure structure has been favoured by most governments and their housing policies since the changing of the system in 1989/90, in recent years an even further push for homeownership can be seen by the government. Not only ownership is heavily favoured by the current policy environment, but it is also specifically the ownership of single-family homes that has been preferred.

In 2011, 62% of the housing units were in single-family homes (buildings with 1-3 apartments), and 38% of the flats were in multi-family homes (buildings over 3 apartments) in Hungary. This division is substantially different in cities, e.g. in Budapest 16% of the apartments are in single-family homes while 84% in multi-family buildings (Census 2022).

Housing and green policies are implemented in a multi-level governance system. The transition from the socialist system before 1990 resulted in a strongly decentralised new governance method, in which local municipalities gained high competencies. The decade following the financial crisis however can be characterised by new governance approaches, most of which can be labelled as 'centralisation' and "deconcentration". Local municipalities have lost most of their competencies in the field of education, health, social policy, and also competencies as authorities in various fields e.g. construction, foster care. In the 2000s NUTS 2 regions (there were seven of which in Hungary, and currently there are eight with the split of the Central-Hungarian Region into two) obtained important roles in the distribution of EU funds, which function was centralised also in the 2010s. Regions recently have only a statistical role. Strategic planning was delegated to the 19 counties of Hungary, which have practically no competencies in any other public issues. The central government functions are deconcentrated into 174 territorial units (called "járás")⁹⁰ where most of the every-day issues are handled such as obtaining documents or applying for unemployment benefit.

The share of Hungarian subnational government expenditure in total government expenditure (12.5%) was significantly below the OECD average (36.6%) in 2020, and decreased since then. Using Covid as a new argument, the central state imposed new taxes on urban centres (so-called solidarity tax) which further decreased the room of maneuver local municipalities have and made them more dependent on central resources.

The division of roles in a multi-level governance perspective regarding the main themes of ReHousin can be seen by the following table.

	Housing	Housing retrofitting	NBS	Densification
National Parliament	Annual national budget Housing law	National climate and renovation strategies Laws on climate change and energy efficiency	National environmental strategies	Framework laws in spatial and urban planning, architecture, environment, etc. National spatial development plans Spatial development plans of priority regions
National government	Decrees on state level housing	Decrees on technical standards of	Governmental decrees on the	Governmental decrees governing

⁹⁰ „Járás” is equal to the aggregation of local municipalities with regard to governmental functions, and includes 20-50,000 people in rural areas, and 100-200,000 people in urban centres.

	subsidies and programmes	retrofitting and new construction Decrees on subsidies for retrofitting	role of municipalities in green investments	details and implementation Direct government of “national priority projects”
Regional level	<i>Until 2010 regional authorities planned and distributed EU funds dedicated to regional levels</i>			
County level			Spatial development plans	Spatial development plans
Microregions (deconcentrated governmental authorities - járás)			Construction authority	Construction authority
Local municipalities	Local decrees on housing allowances Management of the municipal housing stock	Local renovation subsidy schemes Local regulations on heritage protection	Local building codes	Local spatial plans and building codes

Table HU1. General role of different governance layers with regard to housing and green policies

4 Housing retrofitting

In 2020, 34% of all primary energy went to residential buildings in Hungary. 71% of all energy used in residential buildings was used for heating. Regarding heating, 52% of the energy used for heating came from natural gas, 22% from renewable sources (mostly firewood), electricity was used in 18% of the cases and district heating is responsible for 8% of the energy use in the residential heating sector (Tóth, et al., 2023).

According to the Odysee-Mure database **Hungary has the second highest energy need for heating concerning the residential building stock in the European Union.** In general, the energy need for heating per square meter in residential buildings has decreased in the European Union from 2000-2021 by 25.9%, while it has decreased only by 4.8% in Hungary.

There are different statistics with regard to the results achieved concerning the renovation process. According to the Census of 2022, about $\frac{1}{3}$ of the Hungarian housing stock has some additional external insulation, while also about $\frac{1}{3}$ of the housing units have an air-conditioner (this rate is increasing fast lately due to the extreme hot summers in Hungary)

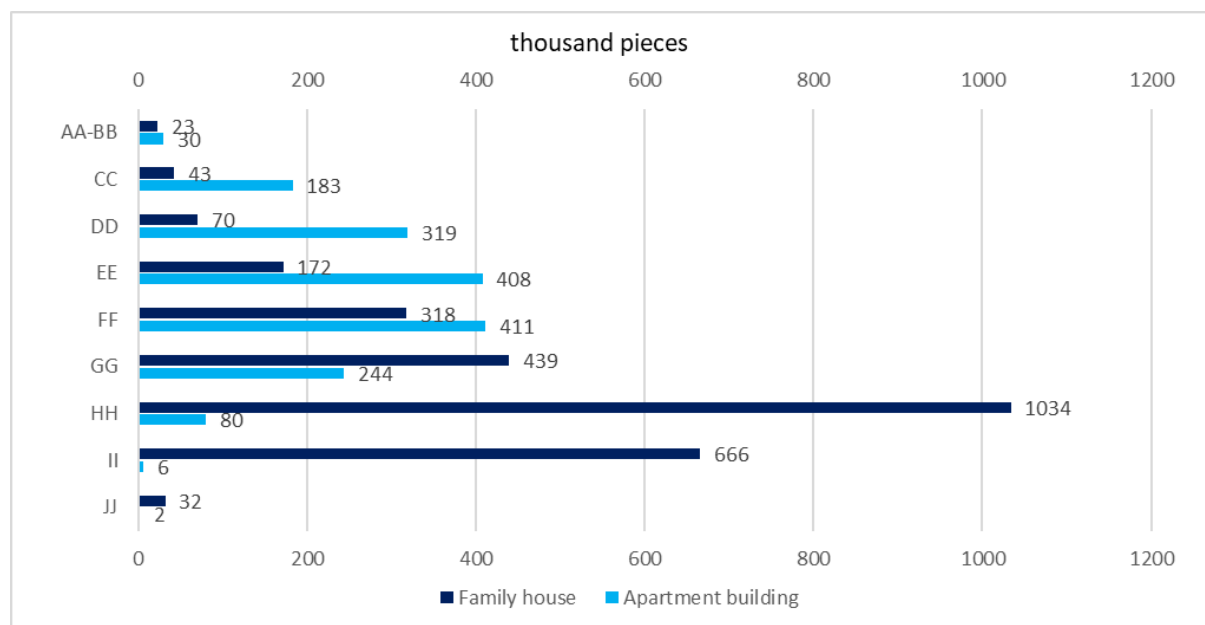


Figure HU2. Composition of the Hungarian housing stock based on their calculated energy consumption (certification)

Source: Bene et al. 2023

As the figure above shows, the worst performing building stock consists of mostly family houses, while multi-family buildings in general have higher standards. As opposed to the common belief on the Eastern European panel housing stock, these pre-fabricated buildings have higher than average energy standards, while family houses of the 1950s and 1960s that were built in high numbers based on unified architectural plans, have much worse energy parameters.

According to the basement report by Price Waterhouse in 2023 about 80% of the Hungarian housing stock needs a refurbishment, which would mean 3 million dwellings by 2050. For this, about 3.2% of the stock should be renovated each year - about 120.000 dwellings per year - instead of the current 0.5-1%. The renovation cost is predicted to be about 150-250 Euro/m², resulting in about 59 billion Euros all together. Comparing the proposed number of units to be renovated annually with the currently running only one subsidy scheme with the target of 20,000 units to be completed in years (exclusively family houses), we can evaluate the challenge of the task.

On the other hand, as regards the short term goals set by the recast of the Energy Performance of Buildings Directive, to reduce the primary energy consumption of residential buildings by 16% till 2030, it is easier to reach. For this the ultimate tool is not only the renovation but the reduction of consumption. E.g. from June 2022 to February 2024 the gas consumption of residential buildings decreased by 24% as a result of increasing gas prices for households whose consumption exceeded a certain threshold level.

4.1 The policy cycle: emergence of the issue and policy decisions

The policy considerations around the energy efficient renovation of the residential stock can be seen from two major angles: 1) renovation as the physical improvement of the stock and 2) energy and climate considerations as one of the attributes of renovation. The two considerations do not necessarily go hand in hand as buildings have generic refurbishment needs and also energy improvement needs.

The physical improvement of the stock was predominantly conceptualised as part of the demographic policy of the government from 2020. Subsidies for renovation of multi-family dwellings and family houses could be obtained in case the family had (or promised to have) children and met some minimum social criteria (having social security, being credible for loans) The largest subsidy schemes with regard to supporting the refurbishment of the building stock were (and are still) tied to these demographic policies.

Regional policy also has a relevance in supporting building renovation. There are renovation subsidies for families with children or most recently for pensioners, that have a special spatial target to settlements below 5000 residents that are also losing population. Thus building refurbishment is encouraged to counteract rural decline.

There is another policy aspect of supporting the renovation of residential buildings, that have a focus on multi-family buildings. Interest rate subsidy for the renovation of condominiums and cooperatives has existed since 1988. The 1980s was the decade when the construction of private cooperatives and condominiums accelerated (in parallel with the enlargement of the state owned rental stock). The relevance of private management of multi-family buildings has strengthened from 1994, when the large scale privatisation process started. This process transferred the ownership of hundreds of thousands of multi-family units from public to private hands, to the sitting tenants, thus creating ten thousands of new condominiums. The state-financed interest rate subsidy (however was not very relevant in scale) was promoted as a tool to help the new communities to finance the renovation process.

In the subsidy schemes mentioned above energy efficiency was not a factor for consideration, however it was not excluded either.

Energy efficiency in the residential sector became an important attribute in 2000, when the decree on housing subsidies was elaborated (12/2001 Government Decree on housing subsidies). The new housing decree entering into force in 2001 contained a new subsidy scheme that provided $\frac{1}{3}$ of the renovation costs by the state and $\frac{1}{3}$ was required from the local municipalities for the energy efficient renovation of buildings built by industrialised technology. That time the focus was on the industrialised stock as was the case in the neighbouring post-socialist countries. The financial crisis terminated the subsidy system that was once reborn in 2015 for one call. Since then no non-repayable subsidies were provided for multi-family buildings.

The emphasis was step by step transferred to the family housing stock. There might be several reasons behind this. The Long Term Renovation Strategy of Hungary (2021) and the technical surveys behind have shown that **family houses in general have much worse energy efficiency conditions than that of multi-family buildings** and many of them can be

renovated in a more cost-efficient way. In addition, the funds used by family houses are easier to spend as the decisions for renovation are much simpler than in multi-family buildings where at least a majority decision is needed in a General Assembly. This simplicity of decision as an argument for family houses when funds have to be used up in a short time period, is reasonable.

The emphasis towards family houses was manifested in the fact that certain subsidy types (e.g. interest free loan between 2017-2022, subsidies for solar panels) were practically accessible only by them. (Sharing energy coming from solar panels in multi-family buildings is still not legally possible in Hungary, however the legislation is about to change.) The most recent grant scheme that started in July 2024 also addresses only family houses, with ringfenced amounts for Budapest and the other regions.

Subsidies currently do not play a major role in financing energy efficient interventions - except for about 20.000 family houses. According to the Long-Term Renovation Strategy of Hungary (2021) the major financial tool is the Energy Obligation Scheme that started in 2021, **thus the government plans to strengthen the private market as opposed to the use of public funds.**

The EU accession had an impact on the energy efficient refurbishment of the urban (and the rural) residential building stock through two major channels: through subsidies and through legislation.

In case of subsidies we can state, that the first waves of subsidies came from the state budget (2001-2009), then from selling CO2 quotas (in 2015), while the interest rate subsidy (2017-2022), the solar panel subsidies (2021-2024) and the latest call from 2024 are financed primarily from EU funds.

The major source of EU funding currently in Europe is the Recovery and Resilience Facility, for which Hungary is not yet eligible.⁹¹ The European Union as a source of financing is considered a benefit in the Central-European Region on the one hand, but also as a set of highly bureaucratized criteria that have to be included into the national calls on the other.

European funds were accessible for housing purposes in the 2007-2013 budgetary period for the first time, but the very first wave of them were not focusing specifically on energy efficiency but on housing in marginalised areas. Housing had to be part of a complex intervention that contained physical and social elements as well. The physical elements included the renovation of public spaces, public buildings but also the energy efficient renovation of the publicly owned and privately owned housing. These programmes (so-called social rehabilitations in Hungary) were the first ones that resulted in completely renovated panel buildings from EU funds in Budapest and also in some other major cities of Hungary.

In parallel with the founding streams the technical legislations have also gained relevance. (The transposition of the European legislation can be followed by the information

⁹¹ Hungary got less than 1 billion Euros as a prepayment from RRF as opposed to the 9.7 billion Euros dedicated to this fund in the country. In addition, this amount may also be withdrawn by the EU in case certain conditionality criteria is not met. The remaining funds can not be accessed either in case some changes in the educational, jurisdictional and media legislations are not changed.

set provided in Annex 2). The main directives (Energy Performance of Buildings Directive, Energy Efficiency Directive) were transposed to the Hungarian legislation in the form of ministerial decrees. The most relevant from them was the 7/2006 TNM decree, which has changed time to time, following the changes in the EU legislation and concluding to the most recent 9/2023 ÉKM decree. These decrees contained the conditions under which new construction, major renovations and energy certification should be implemented. These conditions were tightening gradually aiming to reach the cost-efficient technical parameters of renovation. As an example, based on the most recent recast of the EPBD (spring 2024) the instalment of fossil fuel stand alone boilers should not be subsidized anymore in the current subsidy calls. Interestingly enough, sometimes the Hungarian requirements for building renovations are much more strict than the requirements of the EU legislation. E.g. while the EPBD of 2002, 2010 and also the latest recast says that “Member States shall take the necessary measures to ensure that when buildings undergo major renovation⁹², the energy performance of the building or the renovated part thereof is upgraded in order to meet minimum energy performance requirements set in accordance with Article 4 in so far as this is technically, functionally and economically feasible.... Those requirements shall be applied to the renovated building or building unit as a whole. Additionally or alternatively, requirements may be applied to the renovated building elements.... Member States shall in addition take the necessary measures to ensure that when a building element that forms part of the building envelope and has a significant impact on the energy performance of the building envelope, is retrofitted or replaced, the energy performance of the building element meets minimum energy performance requirements in so far as this is technically, functionally and economically feasible.” In the Hungarian legislation the energy standards in case of major renovation can not only be applied to the renovated part (e.g. facade) alone, but to the whole building, thus buildings undergoing major renovation have to make additional investments in order to reduce their energy consumption below 110-150 kWh/m²/year. This standard requires high investments for many buildings, which hinders the implementation of a step-by-step renovation. On the other hand it is important to note, that even if meeting the obligations of the government decrees is legally binding for the implementers of the renovation, neither the state itself nor the local municipalities and the housing owners follow the rules properly. As the technical standards are set too high, state subsidy programmes, local subsidy programmes and private renovation interventions tend not to follow them and due to the shortage of human resources to check the requirements, the avoidance of laws remain uncovered.

There are no specific requirements with regard to social housing and there are no minimum energy performance requirements introduced for housing either.

With regard to energy poverty, in case we apply some common indicators used in the European Union, we can see, that Hungary has an average position compared to the other EU member states, e.g. having 8.7% of the population not being able to warm up their homes, or 7.3% is declared to have arrears in paying utility bills - EU SILC 2023. As regards the strategy around energy poverty, we can state that Hungary is still at the starting point. It is compulsory to work out a definition on energy poverty at the National Energy and Climate plan, but even in the latest version (2024), the definition is quite vague: “Vulnerable customers/households are those, who have difficulties in securing the basic energy needs of their flat. The term

⁹² Major renovations are those that affect at least 25% of the building envelope.

includes the financial difficulties to pay for energy as well as the high energy consumption of the property.” The Low on Energy Efficiency (57/2015) states, that “households that need support are those, whose costs to heat their apartment up to 20 C and make warm water exceeds 25% of their household income, taking into account the average income and costs from 2020.” Despite these definitions, no concrete action for eliminating energy poverty is elaborated yet. There is a common state consideration, that as the energy prices are capped in Hungary for the households up to a certain consumption level, consumers are protected and energy poverty is a negligible issue.

The elaboration of the Social Climate Plan, which should theoretically be submitted by June 30 2025 to the European Commission, is in a conceptualisation phase, with no clear target groups and toolkit defined yet. In addition, a government decision was made in May 2025, that Hungary is not joining the Emission Trading System 2, not risking the political gains of the energy price capping system. Consequently, Hungary will not be eligible for the Social Climate Fund, thus even if the Social Climate Plan will be developed in autumn 2025, it is not likely to be implemented due to the lack of resources.

The National Building Renovation Plan (the draft of which should be submitted in December 2025), is not conceptualised yet by mid-2025, despite the fact that most of the transposition of the EPBD and EED of 2024 is fulfilled with the statements of this document (e.g. how to make preference for the worst performing building stock, how to make preference for the energy poor households, how to introduce renovation roadmaps or how to reach 16% primary energy savings in the housing stock by 2030).

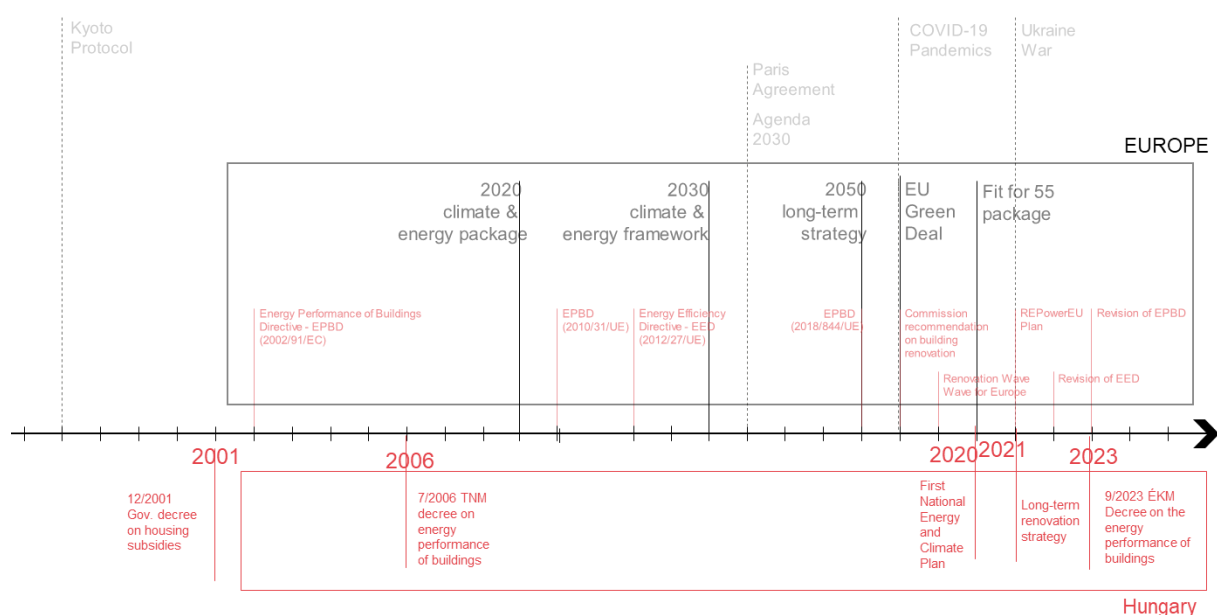


Figure HU3. Timeline of strategic documents in retrofitting

The strategic foundation of energy efficient renovation of the housing stock is not properly set in the strategic documents and the transposition of the latest EU directives are strongly lagging behind. (The transposition of the former directives were also completed far beyond the deadlines.) The most efficient transposition was made with regard to the technical

requirements for new construction and major renovation of housing, however these requirements - even if they are binding - are not properly implemented due to the lack of enforcement.

4.2 The implementation process

As was described in the previous chapter, the strategic background of energy efficient renovation of the housing stock is not properly set, except for the technical obligations for new construction and major renovation.

The subsidy programmes for supporting the renovation of the housing stock can be split into two major categories (like the policies themselves): 1) the ones inspired by demographic and regional development considerations and 2) the ones inspired by energy efficiency goals.

Nearly all the support programmes concentrated on the privately-owned housing stock aiming to assist families to renovate their properties.

CSOK programmes (CSOK: Support for housing for families in Hungarian), reborn in 2015 after a termination due to the financial crisis, primarily aimed to assist families with children to buy new or older housing units. From 2019 the renovation of these newly purchased units were made eligible in small settlements. The programme went through some smaller changes, and in its current state it is only available in villages (all together in 2630 settlements, that have less than 5000 inhabitants). Families with children are eligible for a grant, which is 600,000 HUF (appr. 1,500 Euro) in case of one child, 2,600,000 HUF (approx. 6,500 Euro) for two children, while for 3 children or above 10,000,000 HUF (25,000 Euro). Only those families are eligible, who have a household income that exceeds certain thresholds (e.g. over 500,000 HUF - approx. 1,250 Euro in case of 2 children). These thresholds exclude families living below the poverty line.

A specific renovation programme existed in 2021 and 2022 being targeted to families raising at least one child, and provided a grant of 50% of the renovation costs of family houses or apartments up to 3 million HUF (approx. 7,500 EUR) retroactively. As the grant is paid after the renovation is completed, the state also introduced a state supported loan - 3% interest rate - to help the households to pre-finance the interventions. The programme started in January 2021 and ran till December 2022. 770 billion HUF (approx. 2.2 billion EUR) was spent on the programme, and about 380,000 households benefited from it. Thus, this programme was far the largest renovation scheme in the last decades. However, since the programme's scope was not strictly energy efficiency, no criteria was set about the potential energy saving or energy rating improvement as a result of the renovations.

The programme was terminated in December 2022 and reborn in the form of a Rural Home Renovation scheme in January 2025. The subsidy is now available for renovation only in settlements below 5000 inhabitants (with a serious overlap with the CSOK programmes). The subsidy consists of a grant (up to 3 million HUF - appr. 7,500 Euro) for families with children and a favourable loan up to 6 million HUF - appr. 15.000 Euro. The renovation can include all the necessary interventions including the energy efficient ones.

There were several smaller and bigger programmes supporting specifically the residential energy efficiency in Hungary in the last two decades, that affected at least 400-450,000 households. Hungary was one of the first countries to start with energy efficiency investment programmes.

The first programme supporting the energy efficient renovations of multi-family buildings started in 2001 in Hungary. It was the so-called Panel Programme. It targeted multi-family buildings built with industrialised technology, including the panel buildings, but not exclusively them. This programme required $\frac{1}{3}$ self financing, and the rest was covered by the state ($\frac{1}{3}$) and the municipality ($\frac{1}{3}$). The programme lasted until 2009 when it was terminated due to the financial crisis.

The next bigger renovation programme started in 2015, as part of a general energy efficiency renovation programme called 'Warmth of the Home'. This programme covered up to 50% of the costs, however the final subsidy was calculated based on the kgs of CO₂ saved. The programme targeted multi-family buildings (of any kind) with 4-60 dwellings.

These programmes were very popular. This is demonstrated by the short call in 2015, when the budget was used up in a few days. From a technical point of view the requirements became stricter and more complex. In 2015 the buildings had to have energy audits as part of the application and as a result of the interventions had to meet the complex energy standards set in a government decree (7/2006 TNM decree).

After a significant break, in the 2014-2020 EU programming period, another programme started that targeted both single- and multi-family buildings. It was financed by the Economic Development and Innovation Operational Programme and the Competitive Central Hungary Operational Programme in Budapest and Pest county, and it provided interest free loans for beneficiaries to renovate their homes and make them more energy efficient. This programme required 10% own-share. For the Cohesion regions (all regions of Hungary except for the Central Hungarian) at least 75% of the funds had to be spent on family houses, while this threshold was 50% in and around Budapest. In reality however, there were very few multi-family buildings that could cope with the requirements of the subsidy scheme, thus practically it was used for installing solar panels on family houses.

In 2021, as part of the Recovery and Resilience Facility, later transferred to Structural Funds, a programme for installing residential solar panels on single-family homes' roofs started. The programme provided 100% non-refundable grants for beneficiaries and appeared again in 2024 in the form of a 66% subsidy with the requirement to install household batteries as well. This very advantageous situation can question the necessity of public subsidies for solar panels. However, the new gross based billing procedure from 2024, yet again alters the situation.

On 1 July 2024 a new Home Renovation programme started for the energy efficient renovation of single-family homes as part of the REPowerEU agenda. The whole budget of the programme is 108 billion HUF (approx. 280 million EUR), and it is planned that it will contribute to the renovation of at least 18,000 family houses built before 1990 (later extended to family houses built before 2007). The programme is a mix of a non-refundable grant and a subsidised

loan. In 2024 the amount of the grant depended on the income and location of the beneficiaries. However, from January 2025 this income sensitivity was terminated. The grant's amount varies between 2.5 million HUF to 3.5 million HUF (6,250 EUR to 8,750 EUR) based on these indicators. The rest, up to 2.5-3.5 million HUF, is covered by an interest free loan instrument that serves as the basic funding of the programme and can be taken out from the selected commercial banks, and have a 12 years duration. The grant acts like a bonus: the whole amount (6 million HUF) has to be taken as a loan, and the grant part is paid in case the energy audit shows that the minimum amount of energy is saved. (This minimum requirement is 30%.)

Besides these specific renovation subsidy schemes the Housing Savings schemes were complementary funding sources. These schemes had a saving part, which contained a state subsidy up to 30%, and a favourable loan part. The state subsidy was terminated in 2018, but till that time it was a useful complement to other housing subsidies both for individuals and condominiums.

Condominiums and cooperatives financed their investments (besides the grants at the time they existed) from preferential loans that operated since 1988. The loan has a 70% interest rate subsidy content in the first 5 years, while a 35% interest rate subsidy in the next 5 years.

Several condominiums and a few social housing blocks were renovated throughout the country by means of the so called "social rehabilitation programmes" starting from the 2007-2014 EU programming period. This was the first time when the European Union made housing interventions eligible for European subsidies with the condition that they are implemented in the framework of complex interventions covering both infrastructural and social elements. Areas struggling with social deprivation were eligible for such interventions. In these areas privately owned condominium and cooperative buildings could have been renovated, first with 75, then with 100% subsidy rates. Social housing complexes were also eligible, but as there is a very limited number of purely publicly owned housing complexes, and most of them are in Budapest and the bigger cities, this programme had limited impact on the social housing sector. Outside of this specific programme, social housing has been excluded from state subsidies and the renovation of this stock purely relies on the constantly reducing local funds.

Besides the rather restricted financial schemes there is not much the public sphere offers to support the renovation process. One-stop-shops or other renovation agencies are practically non-existent in Hungary (except for some EU funded pilots).

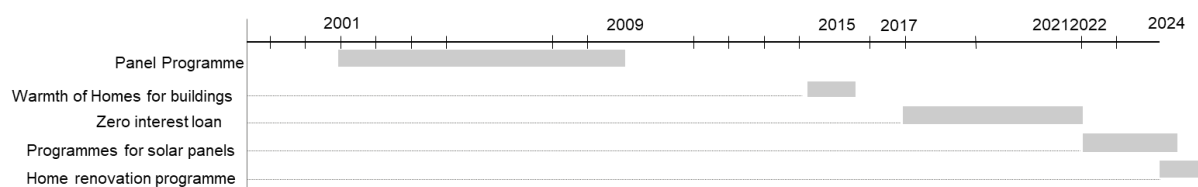


Figure HU4. Specific energy efficiency subsidy programmes in Hungary

4.3 Size and role of the market

There are about 4.5 million housing units in Hungary. It contains about 80.000 multi-family buildings and 2.7 million family houses. About 80% of them would need substantial renovation. The cost of the renovation is estimated to be about 59 billion Euro. This is an enormous market for the construction industry in Hungary, still, the renovation rate is well below 1%. **There are several impediments for the market to grow properly.**

- **The first and most important is that the energy prices (gas and electricity) have been capped since 2013 in Hungary for the households** (the extra costs are paid however by the non-residential consumers). Due to this price cap, the household electricity prices and gas prices in Hungary are practically the lowest in the EU as can be seen on the following figures.

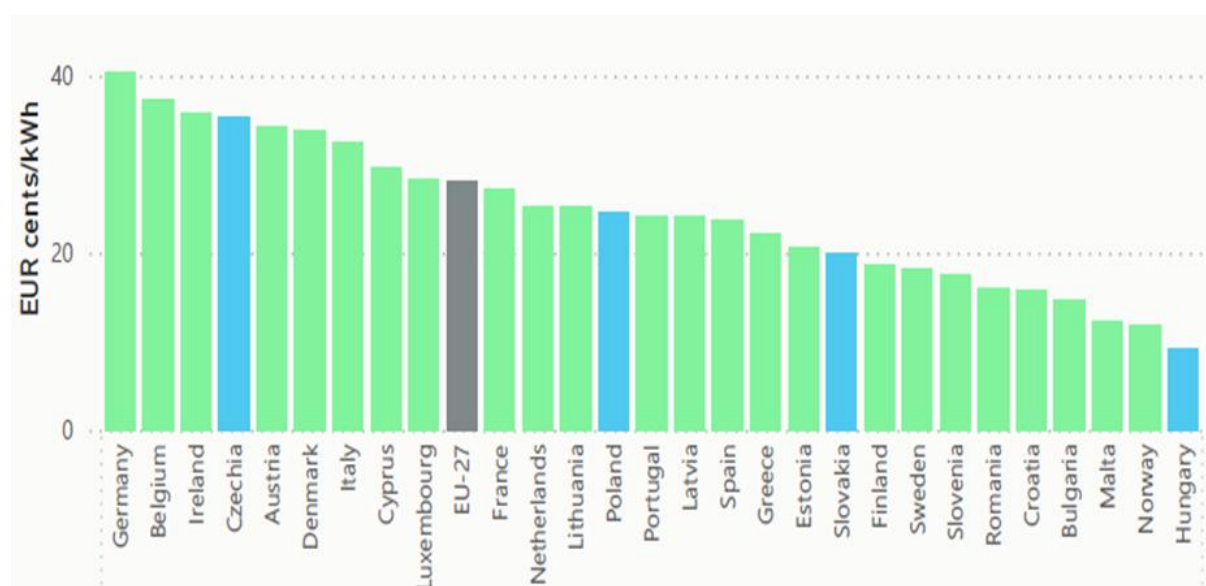


Figure HU5. Household electricity prices - April 2025

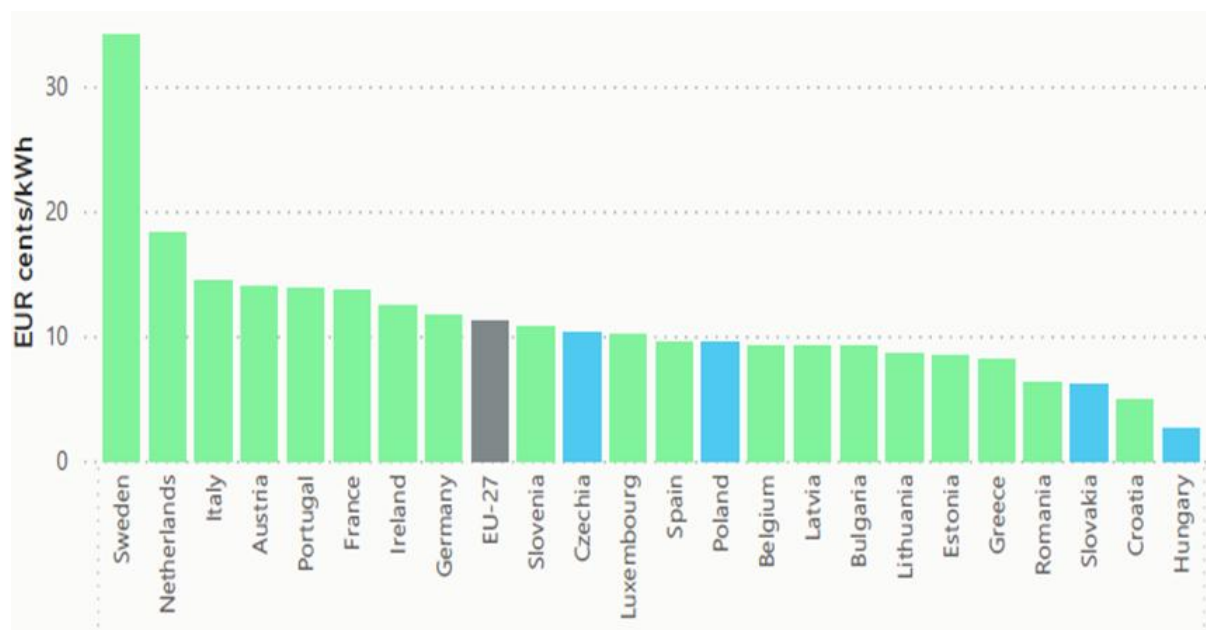


Figure HU6. Household gas prices - April 2025

Source: ACER based on data from VaasaETT, presented by Csilla Bartók in June 2025

- The price cap was partially released in August 2022. From that date the price cap remained up to a certain consumption level (2,520 kWh/year in case of electricity; 1,729 m³/year in case of natural gas), while above that the price became about seven times more in the case of natural gas and about two times more in the case of electricity. District heating is completely exempt from the modification in capping. About 20% of the family houses are affected by the change of the capping of prices, while apartments in multi-family buildings hardly experienced any effects. Under this price capping scheme the pay-off of a deep renovation takes several decades, which is not covered by financial schemes with the duration of decades. Consequently the motivation for energy efficient renovation can not be based on strict financial considerations, and this is why market based interventions like the involvement of Energy Savings Contracts or on-bill financing cannot be used in the residential sector.
- **The state subsidy system is very volatile.** Sometimes schemes appear with a 100% subsidy content, then there is no subsidy available for years, then interest rate subsidies are launched, followed by a combination of grant and loan for special target groups. Under these circumstances the market operates on a very low level without subsidies (property owners are waiting for a new subsidy to come) and the prices become skyrocketing when a new scheme is launched. Thus subsidies are internalised by the market actors, but the final beneficiaries experience low real subsidy rates (coupled with high administrative requirements).

There are however some positive factors as well, that can accelerate the market:

- There is a new financial tool introduced to the market, namely the **Energy Efficiency Obligation Scheme**, since January 2021, which has already brought some results. Service providers, who sell electricity on the grid, natural gas or fuel, have to reach energy savings in their final consumers up to 0.05% of their energy sold in 2021. This compulsory energy saving share increased to 0.5% in 2024 and remains the same each year till 2030. Energy companies may implement the energy efficiency measures themselves, or can buy “Certified Energy Savings” either directly from certified auditors or from a specific stock exchange of CES. In case the obligatory energy saving is not reached, then a certain amount of penalty has to be paid. (Thus, the highest price for a certain amount of energy savings at the market is the amount of the penalty.) The current amount of energy saved in the system is 17 PJ/year⁹³. According to the experiences of the last years, most of the energy saving measures were implemented in the transportation and in the industrial sector. Housing was not amongst the lower hanging fruits except for one intervention: the insulation of the attic of family houses. In this specific case construction companies were the integrators that sold a package of insulation works to energy companies. By the scheme the intervention was nearly costless for the final beneficiaries. According to the calculations the energy efficiency obligation scheme can result in about 10-15% subsidy in case of a large-scale residential retrofitting project, which is not enough alone to make the renovation happen, but can potentially contribute to a more complex financial mix.
- **The market-based finance for the renovation of multi-family buildings (cooperatives and condominiums) is well settled amongst commercial banks.** The Law on Condominiums and the Law on Cooperatives make it possible to get joint loans for the communities, based on a simple majority vote, without liens, just pledging the account of the home owners’ associations. These commercial banking products were developed 20 years ago, and were very popular at the time of the Panel Programme, when they co-financed the state and municipal grants. They became less popular when these support programmes terminated, but are still running and reaching about 40-42 million Euro loan amount every year.
- The market is very reflexive to the state support programmes. It has its dark side, as was mentioned in the case of artificial price increases, but it has its bright side as well: market actors immediately developed their product linked to the subsidies, like making the preparation for the renovations, assisting the communities and preparing the tendering documentation.
- The recent market trends in the construction sector also favours renovation. In the last decade the sector was occupied by state constructions, which have collapsed due to the ban on European funds. For a decade one of the major bottlenecks of renovation was the lack of construction capacity. Recently there are free capacities that may be used for a new wave of renovations.

The current housing renovation market is very modest due to the shortage of financial incentives (both from price and subsidy sides). The new market however, which just opened

⁹³ According to the Hungarian Energy and Public Utility Regulatory Authority (<https://enhat.mekh.hu/>)

up, is the market of auditors. There are about 200-250 professional auditors whose service is required in the energy obligation schemes and in case of complex industrial energy projects (simple energy certificates do not require auditors). The association of auditors - led by bigger auditing firms - has a strong lobbying power to set the requirements for certified energy savings. There are associations for construction companies and solar panel installation companies as well, but it seems that even if their voice can be heard by a wider public, their interests are much less considered, or at least not in a renovation, rather in a new construction framework.

4.4 The multilevel governance process

As was mentioned previously, 97.6% of the housing stock is in private hands, and only 2.4% is owned by the municipalities. **Thus, the energy efficient retrofitting is primarily a private task.** However, as the private owners do not have a market incentive due to the capped energy prices, and there are no obligations either with regard to the energy standards of housing units - except for the new construction - we can not expect that the renovation process will be implemented purely from private resources (even if the moderate renovation process that is currently going on is financed from the owners' resources). In order to accelerate the renovation, process the **nation state has a primary role by setting the legislation and the provision of financial incentives.** As was described in the previous chapters, the state sets the technical standards for new construction and major renovation, and operates financial schemes like the interest rate subsidy for multi-unit buildings, grant scheme for family houses and energy efficiency obligation schemes with the involvement of the energy providers.

As was described before, regions do not have a relevance in Hungary (there are eight regions, but only for statistical purposes).

The local municipalities are victims of the centralisation process of the last 15 years, losing most of their resources and competencies. The small municipalities (villages and small towns) never had the technical and financial capacity to influence the renovation process. The bigger urban municipalities however were strong actors in the 2000s, when they co-financed the Panel Programme and also put a strong emphasis on informing the home owners' communities. In the last decades they have lost this role, while many of them developed their own subsidy schemes (either loans or grants) to support the renovation of private, mostly multi-family houses. These schemes are strongly limited in scope, due to the serious financial constraints these municipalities face.

There are some exceptions however, as the case of Ajka (the small town in the ReHousIn project) shows.

Local municipalities played an important role in implementing the social rehabilitation programmes that also included the renovation of publicly owned and privately owned housing units. These area based programmes were created by the local municipalities and these municipalities participated in EU financed tenders of the Regional Operational Programmes (2007-2013), and in the Territorial Operation Programmes (2014-2020; 2021-2027). Several housing estates and marginalised neighbourhoods with buildings of traditional technologies were renewed by this means.

As regards the municipal housing stock, these are the buildings in the worst physical state. There are no state programmes (besides the very limited social rehabilitation programmes from 2007 till 2020) to support the renovation of these buildings so it has to be financed purely from local resources. As public rents do not cover even the maintenance, the renovation of these buildings is hardly happening. Energy efficiency in these buildings is mostly a secondary issue, as these old - generally over 100 years - buildings suffer from serious structural deficiencies that have to be handled first.

Many of the municipal housing stock is in condominiums, in the form of separate flats in a mixed ownership building. Previously the local municipalities always voted for the renovation of the condominiums at the General Assembly and paid for their share. There is a new tendency however, that due to the lack of resources on municipal level, some municipalities tend to vote against the renovation in order to avoid extra payments. By this means the public sector starts to be the hindering factor in the renovation of private buildings.

The case of Ajka

Ajka is a small city in Western Hungary with 26,000 inhabitants. $\frac{2}{3}$ of its housing stock consists of multi-family buildings mostly built by industrialised technology.

The municipality of Ajka played an active role in supporting the renovation of the multi-family buildings since the launch of the Panel Programme in 2001. It provided $\frac{1}{3}$ of the renovation costs even at those times, when it was not compulsory and the homeowners' associations had the possibility to apply for funding directly to the state. Between 2003 and 2009 the municipality spent 677.7 million HUF to support the multi-family buildings, which affected 133 multi-family buildings out of the 231 buildings that are located in the town. The municipality also provided co-funding in the 2015 call (Warmth of Homes), when the municipal contribution was not at all requested. In addition, the municipality has run separate programmes to support buildings built by traditional (not industrialised) technology and also run a programme to finance non-energy related interventions. It also launched a large-scale renovation subsidy call in 2019 and also in 2024 from its own funds.

All together renovations with a total budget of 6.1 billion HUF were implemented in the town between 2003-2024, out of which the municipality provided 2.37 billion HUF. 87% of the multi-family buildings underwent either energy efficient or structural renovations.

The success of the municipality is based on a strong political commitment of the mayor for decades. This approach has advantages and disadvantages. The residents of Ajka could rely on the support of the municipality in a predictable way, and consequently for today nearly all multi-family buildings are renovated up to a certain extent. The price is paid by the municipality, which had to take substantial loans and made a preference towards multi-family buildings against e.g. public buildings. The municipality also defined its own preference regarding the technical content of the renovations: In case of co-financing the state subsidies the technical standards were set by the state. In the case of local schemes however the main goal was to make visual improvements of the buildings to improve the urban landscape, that is why painting of facades without insulation were implemented as well, and the energy efficient interventions were allowed to be realised on a lower standard.

Governance layer	Role in housing retrofitting
National Parliament	National Energy and Climate Plans; Long-term renovation strategy (the National Building Renovation Action Plan in the future); Social Climate Plan; Energy Efficiency Law; national subsidy schemes for energy retrofitting
National government	Decrees on technical standards of retrofitting and new construction (7/2006 TNM decree, 9/2023 ÉKM decree); 12/2001 government decree on housing subsidies
Regional level	<i>Until 2010 regional authorities planned and distributed EU funds dedicated to regional levels including the social rehabilitation programmes</i>
County level	No role
Microregions (deconcentrated governmental authorities)	No role
Local municipalities	Local subsidy schemes and information campaigns for the local communities; renovation of the public housing sector

Table HU2. Specific role of different governance layers with regard to housing retrofitting

4.5 Achievement, assessment and challenges

All together about 1.4 billion Euro state funds were used for supporting the energy efficient interventions in the residential sector (refurbishment plus instalment of solar panels). While about 2.2 billion HUF was spent on supporting the renovation of homes of families with children. This division has a time dimension as well: energy efficiency in refurbishment was a major issue in the 2000s, while demography became a leading component in the 2020s. Despite these - rather modest - financial tools the annual renovation rate is below 1%, while at least 3% would be required to reach the climate neutrality goals till 2050.

The ignorance of energy efficiency as an important issue with regard to the residential building stock has several reasons behind. The major cause is the lack of market incentives due to the cap on energy prices, which limits the participation of market actors, financial institutions and the property owners themselves. The other main cause is the lack of obligations and enforcement from the EU side. Even in the last recast of EPBD minimum energy standards were not specified for residential buildings, while only an aggregated goal was defined by saving 16% of the primary energy from 2020 till 2030, which will increase to 20-22% by 2035. These goals can be reached without serious interventions, e.g. by releasing part of the price caps alone resulting in a 24% decrease in gas consumption. In addition, Hungary tends not to take EU obligations much seriously and it even ignores the decisions of the European Court, thus one can not expect that even if an obligation exists (which does not in case of residential energy efficiency) the Hungarian government will keep it. This phenomenon is represented by the current decision of the Hungarian government on not implementing the Energy Trading System 2. It is also important to see that large scale energy efficient interventions in the building stock must lead to electrification of the heating systems in order to phase out fossil fuels, which challenges the current state of the grid. Thus not only is there a need for a huge investment into buildings, but also as much should be invested into the electricity system. These, coupled with the ban on EU funds for Hungary, seems to be a challenging task to fulfill.

There is also an additional aspect of housing renovation that has to be noted. Interviews with property owners and property managers revealed that the investments into the housing stock,

even if they contain energy efficient elements, are far not explained by energy and monetary savings aspects. There are four major causes behind the interventions: 1) the need for fixing some structural deficiency like leaking roof, damaged facade or broken heating appliance; 2) the increase of the comfort level - warmer/cooler home with less noise and dust; 3) improvement of the visual outlook of the building; 4) increase of the property value. Energy efficiency and savings on energy usually comes last for most of the owners, that is why energy efficient renovations were going on even utility prices were capped in periods when state or local subsidies were available.

There are practically no studies or scientific articles about the measured or potential impacts of the retrofitting processes on housing inequalities in Hungary. Gentrification, as a social phenomenon, is discussed with regard to the complete redevelopment of certain urban quarters of Budapest (like in the case of the inner part of District IX, or the Corvin-quarter of District VIII). Patchwork renovation of the residential stock is not studied as a potential cause for gentrification. On the other hand, there were attempts to calculate the impact of the energy certificates to the price of the residential units (Ertl et al., 2021). Due to difficulties with linking the database of certificates to the database of housing transactions only family houses were involved in the analysis. The results showed that higher energy level has an impact on real estate prices (if all other factors, like year of construction, size and state of the units are cleared), and better energy efficiency level leads to higher energy prices. On the other hand, this connection can not be validated in the case of Budapest, where the location inside the city is much more relevant, than the energy efficiency category of the given unit.

Due to the lack of measured impacts and evaluated social consequences, the current research can only set hypotheses on the potential housing inequality outcomes of retrofitting policies, which hypothesis have to be validated in the course of the ReHousIn project. The following table summarises this set of hypotheses.

Housing inequality result (hypothesis)	Mechanism resulting in housing inequalities
Bottlenecks in accessing energy retrofitting	•Multi-family housing: not only money matters, but organisational deficiencies •Social housing: lack of financial and technical resources of local municipalities •Family houses: lack of access to existing subsidies due to financial and information deficiencies
Unintended consequences of retrofitting, like mould	Behavioural causes and technically non proper implementation (ventilation deficiencies)
Selective increase in property value	The increase is very much location dependent
Social rent increase	Renovation frequently goes hand in hand with rent/value increase that result in higher social rent categories
Private rent increase	No control on private rent setting
MFABs: potential crowding out effect	Homeowners have to finance the renovation and simple majority can decide which decision is obligatory for all owners

Table HU3. Potential housing inequality impacts of retrofitting policies

The housing inequality consequences of retrofitting policies have two major roots: 1) not being able to benefit from the existing subsidies and not being able to implement the renovation process and 2) being victims of the mostly unintended consequences of the renovation process.

As was mentioned earlier, the renovation is primarily led by state and local subsidies, and the time they were available, the renovation process accelerated significantly. Based on interviews with municipalities, housing managers and housing owners it was discovered that the lack of household funds was far not the most decisive factor for not being able to benefit from the existing subsidies. In the case of multi-family buildings, the more organised communities with ambitious managers were able to get use of the funds regardless of the financial state of the community. In the case of family houses financial capability matters more - as there is no cross-financing mechanism between households like in multi-family buildings - but technical and administrative literacy matters at least as much. The current subsidy scheme for the renovation of family houses excludes marginalised households not only due to their financial difficulties but also due to their inability to follow the administrative requirements.

In case the energy retrofitting is done (has been completed in the 2000s for industrialised residential buildings and lately for family houses) there are some unintended consequences that can be observed. It is a common fear and a complaint that the change of windows and insulation of the walls keeps moisture in the buildings which may create mould inside the rooms. As not all the new windows contain proper equipment for ventilation and people tend not to change their ventilation habits (not to open the windows frequently), mould can appear - despite the fact that proper insulation may be a tool for avoiding wetting and handling thermal bridges.

Energy efficient renovation may increase the value of properties. In the case of family houses this correlation was statistically proven. (Ert. et al. 2021). On the other hand the analysis also revealed that in the case of Budapest location matters more than energy performance, thus residential buildings with higher energy standards in a less prestigious location can be cheaper (in case all other factors are cleared) than technically worse buildings in a high end neighbourhood.

There is sporadic information on the impact of renovation on social rents. There are slightly different rent setting mechanisms in each municipality, but many of them apply a combination of rent setting factors, like location, comfort level and state of the building. As renovation has an impact on some of these factors, the increase may be experienced. On the other hand, social rents are generally so low (5-15% of the market rents), that even with an increase affordability is less of an issue. (In addition, the social rental sector is marginal, thus a rent increase has a limited impact on the market.)

There is no information at all about the impact of renovation on private rents. Most of the private rental units are owned by private persons, who have a maximum of a few units for rent, located in condominium buildings or family houses. There are no studies available on the behaviour of these private landlords. It is probable that in case the renovation of the building requires additional contribution from the owner in the form of an increased maintenance and renovation

fee (in case of multi-family buildings), then this additional cost is transferred to the tenant. On the other hand this may strongly depend on the price setting strategy: in case the rent is already set high, the owner may not have the chance to increase it further as it may lose its market potential. In this case the owner has to internalise the cost.

Finally, there is a hypothesis that energy efficient interventions may have a crowding-out effect. As the housing stock is practically privately owned, and it is enough to decide on the renovation with a simple majority of owners being present at the General Assembly of a Condominium or Cooperative, the minority of the owners have to contribute to the renovation even if they can not afford that. As the renovation cost is in general built in the operational and maintenance fee, this increase in the fee may result in accumulating arrears and being evicted at the end of a foreclosure process. There is no scientific evidence supporting this hypothesis, and the interviews of Metropolitan Research Institute in the past and in the course of the ReHousIn project so far did not support this idea either. It seems that the increase in the operational and maintenance costs is moderate and even if the Condominium and Cooperative Law requires a simple majority voting for the renovation, usually the financial institutions or the state/local programmes require a higher rate of approval, which reflects a more consensual decision of the community.

The housing inequality consequences of retrofitting policies are not yet measured and acknowledged in Hungary, consequently there are no systemic policies against them. Policies to mitigate energy poverty through energy efficiency interventions (to target retrofitting interventions to the poor or to help them co-finance the interventions) are practically non-existent.

5 Nature-Based Solutions

Nature-based Solutions (NbS) is an approach which uses or mimics natural processes to solve climate-related challenges for society. They aim to increase biodiversity and facilitate a sustainable co-existence of humankind and nature. NbS are being increasingly recognised at the international level for its potential benefits, as outlined in the European Green Deal (Wolf et al, 2021). Besides facilitating adaptation to climate risks, NbS can provide numerous co-benefits, such as improving and protecting natural resources which offer a healthy and liveable environment, even in cities. NbS is an 'umbrella' concept, covering concepts like green infrastructure, ecosystem services and natural capital. The systemic nature of NbS requires a broad cooperation of sectors concerned in land and resource management and protection of ecosystems.

The use of NbS can be more cost-effective and create additional co-benefits compared to relying exclusively upon conventional infrastructure. Capital costs for NbS are generally lower than for conventional infrastructure, even though maintenance costs can be higher. A key advantage of NBS is to provide additional benefits compared to conventional infrastructure, such as reducing greenhouse gas emissions, promoting climate change adaptation, amenity and well-being benefits as well as supporting biodiversity. However, the benefits that can be gained from NbS are strongly influenced by the settlement context (OECD, 2023).

Negative environmental impacts of urbanization on the local climate and the water cycle become more apparent with the settlement size and density. While villages define agricultural and grey infrastructure damages as the most significant, flood-related issues and the urban heat island affect larger settlements. Climate and environmental risks are typically found where the green infrastructure network is incomplete or in poor condition, and only a low level of ecosystem services can be delivered.

Low-density areas are usually located in the outer zone of the settlements and have a close connection to the surrounding non-built areas. In Hungary, traditional land-use types and patterns are often still used but usually declining. Their green infrastructure ratio is high, characterized by mainly private gardens. The growing population with an urban lifestyle of low-density areas in metropolitan areas leads to spreading built-in and impervious areas. High-density urban areas can be typically described by a high ratio of impermeable surfaces, which, combined with low albedo and evaporation, and obstructed wind channels, result in Urban Heat Island (UHI) effect. For example, in Budapest, UHI was shown to cause a difference of 15°C between the surface temperatures of a green area and a dense urban housing area (Tatai et al, 2017).

The UN's World Health Organization has already recognized the state of play of urban green areas in health and well-being. Guidelines define a minimum of 9 square meters of accessible public green space per capita which should be provided within 15-minute-walk from one's home (Russo and Cirella, 2018).

The analysis showed that the average canopy cover of the urban areas is 15.7% in Hungary. On average, 75.8% of Hungary's urban area is covered by green spaces (65% in Budapest). The national average however, shows significant territorial differences. In many cities, county capitals or metropolitan districts this aggregate green area indicator is less than 50%. (The indicator is limited by the fact that it does not distinguish between public use or ownership, and therefore only indirectly refers to ecosystem services.) Ecosystem services of urban green infrastructure are basically at a very low level in all towns and cities - some waterfront or mountain towns show better indicators (Agrárminisztérium, 2021).

The environmental pressures and the distribution of green infrastructure shows that settlements with very low green infrastructure typically have to cope with multiplied environmental challenges, underlining the negative impacts of missing ecosystem services. The most impacted are settlements of Central Hungary, the plains, and the agglomeration of bigger cities that have the lowest amount of accessible public urban green infrastructure.

As Hungary has a high vulnerability, climate change is aggravating existing socio-economic and environmental challenges, including flooding and drought, heatwaves and poor air quality. Due to Hungary's unique location in the Carpathian basin, most of its environmental and climate pressures are related to water management: 34% of the land is impacted by drought, 22.3% by flooding and 45% by waterlogging. Due to the history and the tradition of territorial development and landscape management, around 90% of ecosystems are in a deteriorated condition, according to the national database of habitats (Tanács, Fodor, 2021).

Intensifying heat waves are challenging for both small rural and urban settlements, large cities' urban heat island effect poses a risk to human health. Due to the high impervious surface ratio, pluvial and fluvial flooding pose a more significant problem for large cities. Settlements lacking green infrastructure, typically dense urban areas, are more vulnerable to environmental threats (Csizmadia et al. 2022).

5.1 The policy cycle: emergence of the issue and policy decisions

Most measures of NbS are not new in Hungary but a rediscovery and mainstreaming of traditional land-use, building or greening techniques and management tools, combined with modern technologies. Hungarian citizens have a rising awareness for climate change impacts and declining biodiversity. They would generally welcome NbS investments, nevertheless, the complex connections between ecosystem services and community health and well-being still remain unknown to the wider public (OECD, 2023).

At the national level, such as at the EU level, Nature-based Solutions (NbS) are closely aligned with biodiversity objectives and are initially integrated into various policy frameworks aimed at promoting protection and restoration of nature and climate change adaptation strategies. There are three major trends that could be detected:

- National policy derives directly from EU policies (e.g. Nature Protection Law is laid on Birds and Habitats Directives or National Adaptation Strategy on the EU's Climate Adaptation Strategy)
- National policy develops aligned with the EU policy (e.g. Nature Restoration Law of the EU (August 2024) and the National Green Infrastructure Plan (2022) and National Decree on Green Infrastructure (October 2024),
- National or local good practices and measures precede the international strategy (e.g. local measures to keep the urban canopy coverage, Governmental Decree on Tree Protection in 2008, Building Act of 1997 to keep the balance of biologically active surfaces by reforestation or rehabilitation.) At the local level, where climate challenges have been a problem for many decades, good practices and local measures have developed long before national or international action (e.g. actions in Kecskemét, Szeged, Districts in Budapest.)

See the timeline of the most relevant national policies in the European context below.

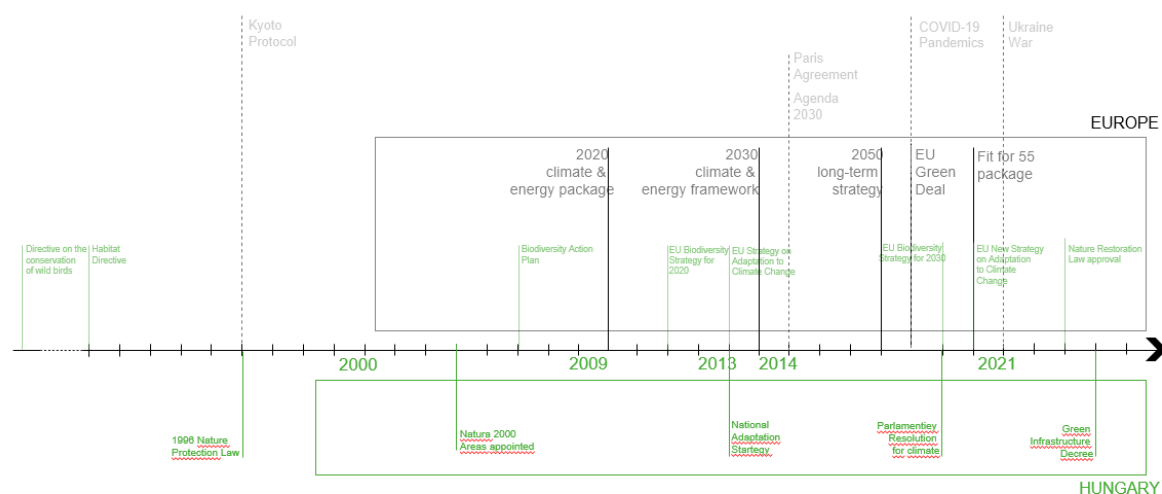


Figure HU7. The development of the policy framework for NbS in Hungary

Article P) of the Hungarian Constitution provides the regulatory cornerstone of NbS implementation: “Natural resources, in particularly arable land, forests and water resources, biodiversity, in particular native plant and animal species, and cultural values are the common heritage of the nation, which the state and all of us have a duty to protect, maintain and preserve for future generations.” These rights and obligations are to be enforced by the legal and institutional system, guided by the principles of subsidiarity, the right to a healthy environment and objective, regular information, and the active participation of society. **The current national policy environment does only partially support the use of these approaches.** The concept of NbS is reflected in several horizontal and sectoral policies and partially in regulations, but the regulatory environment for implementation and the institutional system is still under development and so called ‘fine tuning’.

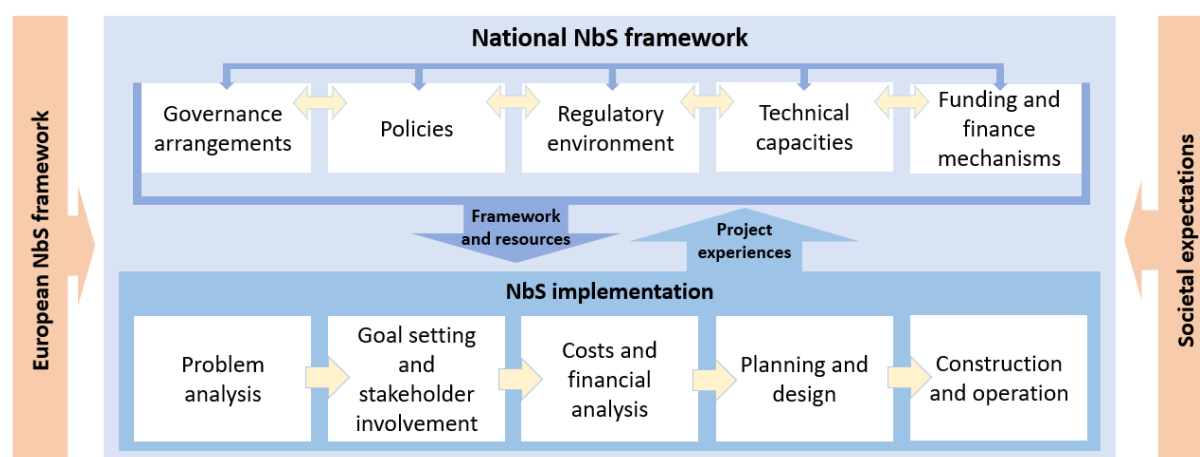


Figure HU8. Strategic and operational phases of implementation of NbS in Hungary, based on Csizmadia 2022

Due to growing environmental challenges, decision-makers are encouraged to find new ways to slow down climate change and adapt as well as to stop the loss of biodiversity. In a resolution, the Parliament (18/2020. (VI. 4.) *Parliamentary Resolution on non-deferral tasks arising from the scale of climate*, 2020) mandated the Government to ensure the necessary decisions on climate change-related effects, anticipation and adaptation, and the means of implementation. The resolution was followed by an intense national policy making period. More relevant national law will be formed later on to support NbS.

Nature protection and Natura 2000 areas in cities

Nature protection has a long tradition in Hungary dating back to the early 19th century and was institutionalized as early as 1919 when the list of protected birds and other animals was published. In 1935, by the adoption of the Forest Act, the first nature protection law act was announced and the National Nature Protection Council as an authority was set up. The first protected area, the Great Forest of Debrecen was legally acknowledged and sentenced in 1939. The country joined the international Ramsar Convention in 1979.

By 2000 the network of nationally acknowledged protected areas formed 8,8 % of the country's territory. For the period of accession to the European Union in 2004, Hungary had an established national framework of nature protection, led by the Ministry of Environment and Water, regulated by the *Decree of Nature Protection (1996.LIII.)* and managed through regional National Park Directorates, acting as authorities and managers as well. The law has set the idea of protection and development of ecosystem services. By 2021, 9,6 % of the territory was under nature protection in Hungary⁹⁴.

The Nature Protection Law has also set the framework of nature protection areas on local level, authorising local authorities to designate their own protected areas, which finally standardised the process and also set the measures of protection. These protected areas (parks, urban forests, wetlands, alleys, cemeteries, church gardens, etc. add up to 43 000 hectares in total) are smaller in size, better known by the locals, situated enclosed or at the boundaries of urban fabric which make them more exposed to townspeople. They are more significant in everyday life as a place of recreation and community gatherings. Locally protected areas are less than 0,5 % of the country's territory.

Hungary designated Natura 2000 sites in 2004⁹⁵, when it joined the European Union. On 13 November 2007, the European Commission adopted Decision 2008/26/EC, within the list of sites of Community importance for the Pannonian biogeographical region. The total area of Natura 2000 areas in Hungary is 1,994,980 hectares which of them are only 6,409 hectares lies in urban areas, less than 0,3 %⁹⁶. These areas are more likely the highly populated, urbanized and frequented waterfronts (along the shores of Lake Balaton and the River Danube), boundary areas of settlements enclosed in or situated next to larger national park territories (Hortobágy, Bükk, Kőrös-Maros NPs, Zempléni Landscape Protection Zone etc.)

⁹⁴ <https://ksh.hu/s/kiadvanyok/fenntarthato-fejlodes-indikatorai-2022/3-8#1-abra>

⁹⁵ It was easy to designate the areas as almost all the areas were already under national or local nature protection.

⁹⁶ [Natura 2000 területek - A magyar állami természetvédelem hivatalos honlapja](#)

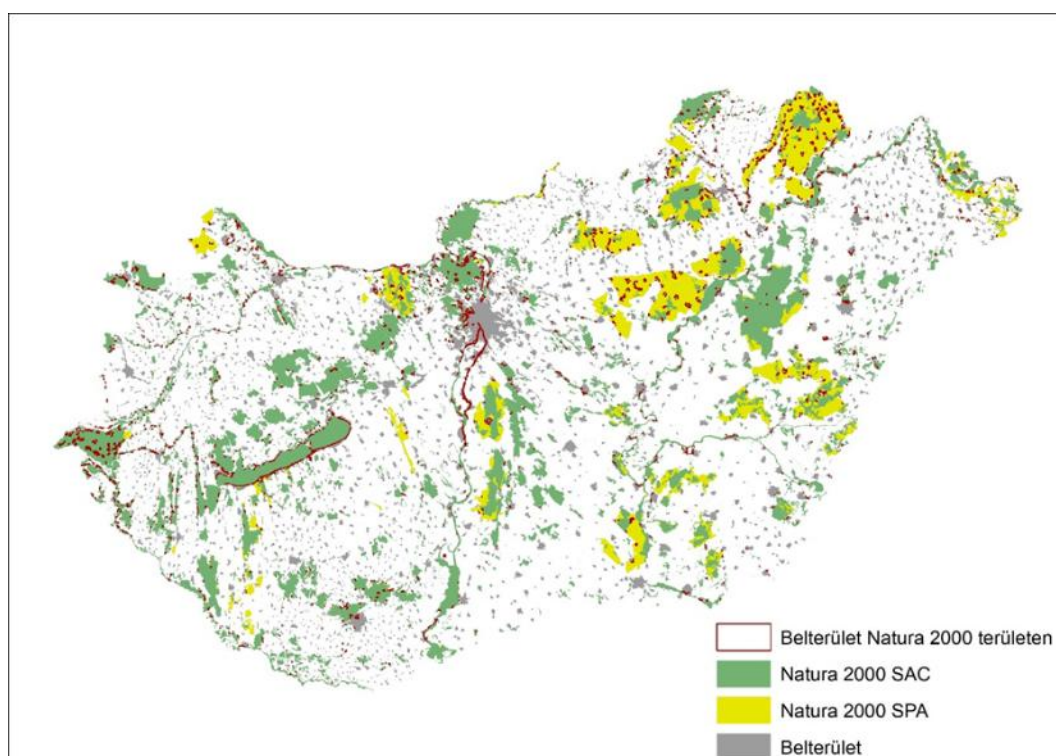


Figure HU9. The distribution of Natura 2000 territories all over the country (including urban areas in red)

Based on the Strategy on Adaptation to Climate Change (in 2013), national adaptation strategies and plans (NAS 1 and 2, ÉCST,) and free access databases (NATÉR) were developed, basically following the EU policy guidelines and requirements. Local authorities could apply for subsidies to develop their own local climate strategies and/or SECAPs. Operational programs required these local strategies among baseline documents or important milestones in order to obtain European funds. Dissemination and community involvement were also integrated in the process.

The importance of preserving biologically active surfaces and keep the balance in urban development occurred as a strong policy in the *Building Act of 1997*. New series of building codes were published in the last few years, which includes a clear definition of green infrastructure and national assets to preserve and develop it on an urban scale. C/2023. *Act on Hungarian Architecture* sets the principles that the natural environment and its network must be preserved and cannot be destroyed by building activity and urbanisation. It sets the preference of brownfield developments and the regulations to stop urban sprawl and green field developments. It announces urban green infrastructure as a tool to preserve natural resources and better adapt to climate. The *Government Decree No 280/2024 (30.IX.) on the Basic Regulation on Town Planning and Building Requirements* gives more specific guidelines

and measures to define urban green spaces. It also sets the priorities of rainwater management and the forestation quotes for paved parking lots⁹⁷.

A significant milestone was the approval of the *Government Decree 282/2024 (IX. 30.) on municipal green infrastructure, green space certification and the green mark* which defines the planning, management and protection aspects of urban green infrastructure based on the approval of ecosystem services. The decree does not mention NbS but the defined tools and measures directly serve its implementation. The basis of compensation of vegetation due to building activity is based on the calculation of the biomass by the so-called 'green volume' (for the baseline and for the projected state), to ensure a balance of biologically active surfaces and canopy coverage, set as an indicator in the Nature Restoration Law. As the decree was announced recently, there is no experience of its implementation yet, but there are high hopes that the implementation of the decree will be an efficient tool to protect the urban green environment.

EU and national funding programs produced, as co-results, a series of handbooks and guidelines for NbS project development and implementation, in harmony with EU guidelines. *The Green Infrastructure Guidance* was published by the managing authority for Operational Programme for Spatial and Urban Development. A *Green Infrastructure Jury for Investments* within the operative programmes during the technical planning phase, was also set up to support NbS, also organized by the Managing Authority. A study package was developed for national project evaluators as well as for local project developers. The EC also provides NbS experts, contracted by EC, to evaluate and monitor the implementation of the EU policies in national operative programming to ensure the performance of NbS.

The definition of NbS has not yet appeared in the Hungarian regulatory system, but the concept of ecosystem services and green infrastructure (GI) supporting the network-based, coordinated planning of NbS is already present in several regional and technical documents.

5.2 The implementation processes

The ministries' current tasks and competencies include numerous areas relevant to the NbS implementation (e.g. environmental protection, nature protection, water management, urban development, urban management). As these tasks are divided among several ministries and governmental agencies, enhanced cross-sectoral coordination is highly required to scale up the use of NbS. The dedicated leader of the NbS national policies is the Urban Development Department of the Ministry of Building and Transport⁹⁸.

The delegation of tasks and competencies of ministries and authorities frequently varies, hampering the cross-sectoral work and knowledge collection and sharing. Several relevant

⁹⁷ "The planting of trees to provide shade for the parking areas must be done by planting 1 large-canopy tree for every 6th parking place started, or 1 medium-canopy environmentally-tolerant, multiple-schooled deciduous tree for every 4th parking place".

⁹⁸ 256/2021. (V. 18.) Korm. rendelet a 2021–2027 programozási időszakban az egyes európai uniós alapokból származó támogatások felhasználásának rendjéről

sectors have started to implement NbS in their fields, sometimes combined with organisational development (e.g., the Municipal Water Management Department of the National Water Directorate or the Green Infrastructure Jury of the Ministry of Building and Transport), but their objectives are not yet harmonised due to the lack of appropriate cross-sectoral cooperation.

There is often a lack of coherence between the different sectoral strategies related to NbS. The lack has hampered their implementation. The achievement of the objectives is hampered by a lack of clarity on funding sources and coordination between operational programmes. Several NbS-related national strategies have been prepared (in line with international strategies and guidelines) for

- climate change adaptation and mitigation tasks,
- stopping biodiversity loss,
- sparing water use at the river basin level and
- sustainable land use.

When NbS are included in national and local strategies, they typically do not have an exact executive task or target, which often leads to a sharp contrast between strategic objectives and implemented projects (e.g., the distinction between the purpose of water retention and the prioritisation of drainage in the projects implemented). The achievement of the objectives is also hampered by the unclarified funding sources and coordination between operational programmes. There is often a lack of coherence between the different sectoral strategies related to NbS.

There has been no fundamental conceptual shift in urban development towards reducing urban sprawl, increasing urban rainwater retention, developing sustainable land use and protecting biodiversity rather than classical urban and infrastructural developments. Despite the fact that stormwater retention is already included in many local strategies (more likely in green infrastructure strategies or integrated water management plans) in a growing number, investments tend to provide isolated, small-scale and partial solutions. But if we count that ‘many a little makes a mickle’ **there is a growing number of local good practices.**

Territorial and local coordination occurs at county and municipal level and can be fulfilled by the sector-independent county and local municipalities or their horizontal cooperation (municipal associations). However, a lack of resources often hampers coordination at both municipal levels. Social awareness and responsibility for climate change, and hence support for NbS is growing, highlighting the potential and importance of civil society's involvement.

Municipalities have local legal instruments to keep ecological balance. In their local building codes, they can set stronger building regulations to preserve urban trees, biologically active surfaces and to develop ecological quality of urban green spaces. Budapest municipality, some of its districts, smaller towns of Budapest suburbia and big cities have their own local code on tree protection which regulates the action of tree cut and replacement, not only on public property but also in private land. They often also reinforce obligatory tree, shrub and forest planting in different building zones, for public and private investors. They can save the permeability of surfaces by requiring permeable pavements in a percentage.

Growing horizontal cooperation, funding opportunities and supporting tools increased interest in municipal NbS implementation. **Implemented solutions are mainly small-scale interventions: parks, street trees, and GI connected to the road infrastructure**⁹⁹.

The crucial points of a successful NbS implementation in Hungary: First, the intensive communication of the benefits of the NbS from the beginning of the project design is essential to inform stakeholders and raise their awareness. Involving locals in all project phases (from planning to maintenance) helps to build a sense of responsibility in the community. Ideas from committed local stakeholders, supported by the municipality, can be the most sustainable NbS examples.

From the residents' perspective, the most important aspects towards an urban green space are cleanliness, tidiness and well-kept public spaces. The size and condition of parks and green spaces, as well as air quality, were also important. Young people prefer sports facilities, while seniors prefer public safety and passive recreation (bench) facilities. For those raising children, the presence of a playground, while important, is not sufficient on its own. They are only really satisfied if there is a complex presence of several functions in the area. "Public spaces can be attractive if they are safe, designed and operated in a way that is appropriate to the function, meet community and individual recreational needs, help ecological conditioning, contribute to more accessible adaptation to climate change pressures, fit harmoniously into the settlement landscape and increase the local community's attachment to their own settlement"- according to a public survey in 2022¹⁰⁰.

The largest funding programme for green urban investments in Hungary was the Green City/Liveable City programmes financed from EU funds in the 2014-2020 (TOP 2.1.2) and 2021-2027 (TOP Plus 1.2.1) EU budgetary periods. This was a practical reorientation of the former renewal programmes in Hungary that concentrated on the complex rehabilitation of urban centres to make them more attractive and livelier. The shift emphasized the role of greenery in urban centres, but unfortunately without a paradigm change towards innovative nature-based solutions. Due to the general mindset of the decision makers and the expectations of the citizens, Hungarian green city projects, implemented in the last financial period through the operational programs, were focusing on 'tidy, well maintained and safe' urban green spaces with multiple functions, reached by a renewal of a former green space. While project preparation was neither funded nor required for the funds, the majority of the projects lack real understanding of the natural assets and the baseline ecological processes. Developments focused more on developing paved community gathering and resting places, paved running paths, paved parkings near the entrance zones, new public lights and zebra crossings, new paved playgrounds, paved sports grounds, upgrading the existing vegetation by planting perennials and felling of dangerous old trees. As most of the developments resulted in loss of effective green areas, gross of paved and sealed surfaces, loss of canopy coverage, we could hardly say these were following NbS principles. Only a minority of projects considered the retention and use of organic matter or rainwater. However engagement and awareness-raising programmes were popular as the social leg of sustainability; only a few projects count

⁹⁹ Research and Policy paper on NbS by OECD and Ministry of Innovation and Technology, 2022

¹⁰⁰ Improving the local quality of life, evaluation of results of the operational program, Phase 2. Final Report, 21.11.2023.

on the public as a potential workforce for green space maintenance. Involvement is typically campaign-like (e.g. litter picking, collective planting), which does not serve to build real and long-term commitment and a stewardship mindset.

Development of NbS was not a primary and singular goal in these projects. Smaller towns facing flash floods e.g. Ajka or others directly profiting from a healthy and nice greenery like touristic towns such as Gyula were more urged to develop their projects based on NbS.

The paradigm shift for incorporating nature-based solutions into the development of urban green infrastructure in order to mitigate and adapt to the climate change in cities has continued on with a specific priority incorporated into the 2021-2027 budgetary period at the Operational Programme on Climate and Energy (KEHOP 2.2.1). Even if the call was long awaited, it was not issued due to the suspension of EU funds for Hungary.

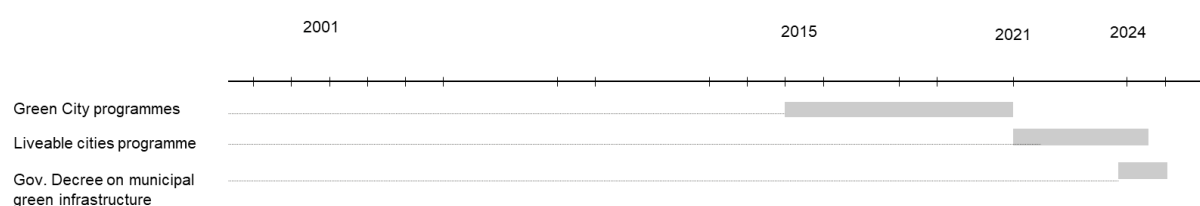


Figure HU10. Timeline of the main tools in nature-based interventions

5.3 Size and role of the market

NbS developments on a larger scale are basically carried out by the public sector. Emblematic public investments (Városliget renewal, Debrecen Nagyerdő renewal, Székesfehérvár - Lungs of the city project etc.) have a reinforcing effect for the development of the surrounding private areas, which also reaps the benefits to the private sector, due to the lack of real estate value tax.

Private investors are highly dependent on the clients expectations therefore the clients' demand has the most crucial impact on NbS instruments. The limited demand makes the market little attractive and limits competition among constructors. Due to the few good construction experts, even well-documented, carefully planned NbS projects tend to be far below the expected level.

NbS construction applies techniques (e.g. bioengineering solutions or habitat restoration) that require specific knowledge and material. These old-new materials and techniques should not be necessarily expensive, but their re-introduction in the market needs higher effort and innovation from constructors. Until the demand for such materials and techniques increases, the limited supply will result in higher costs for NbS projects.

Current building acts still support a non-NbS way of thinking. The investor's interest to gain the maximum profit could result in densification, using only small case NbS. As there are no specific obligations nationwide to incorporate innovative NbS solutions into new construction (like green roofs or facades) there are rather unique cases where these solutions can be experienced.

On the other hand the local building regulations can create obligations for innovative and traditional green infrastructure developments in case of new construction (except the new housing investment is labeled as “priority investments” as will be described in the densification chapter). However, the position of the local government in requiring substantial green spaces or innovative solutions are highly dependent on the market conditions: in case the demand for housing is pressing, and consequently the local municipality is in a favourable negotiating position (like in XI. district of Budapest), then the developers are forced to provide high quality green spaces. While in other locations (like in Veszprém) where the solvent demand is limited, the constructors have a more favourable position to decrease the green obligations.

The weak execution of the regulations results in very few investors claiming to protect existing green infrastructure and contribute to the city's green infrastructure development. In Budapest, the expansion of paving and constantly shrinking tree canopy ratio in the private gardens of semi-detached housing areas resulted in a significant decrease of biological active surfaces.

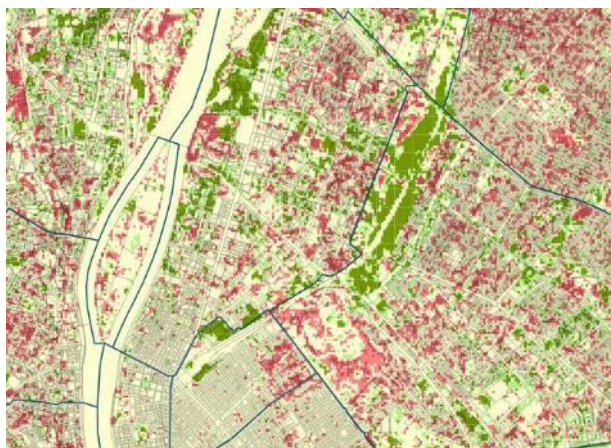


Figure HU11. Green intensity changes of Budapest between 1990-2020. Note: Green: increased GI, red: decreased GI.

Source: (Tatai Zsombor et al., 2017)

5.4 The multilevel governance process

As was emphasized before, the national level provides regulation and guidelines. Regarding the urban green infrastructure, guidelines coupled with European funding are the most efficient tools. National level legislation remained weak, but there is a hope that the most recent government decree on municipal green infrastructure will be an efficient tool to compensate for the loss of green areas due to construction activities.

The local municipalities are the most effective actors with regard to green investments by setting the local building regulations and implementing green investments on public spaces.

Governance layer	Role in Nature-based solutions
National Parliament	Nature Protection Law; National Adaptation Strategy; Nature Restoration Law; National Green Infrastructure Plans; National Building Act
National government	Decree on Green Infrastructure; Governmental Decree on Tree Protection; Government Decree on Town Planning; Government Decree on Municipal Green Infrastructure; Guidelines for urban NBS solutions; EU/national subsidy schemes for green urban developments
Regional level	—
County level	County level development plans
Microregions (deconcentrated governmental authorities - járás)	Construction authorities
Local municipalities	Local climate strategies and SECAPs; local building regulations; local green investments

Table HU4. Specific role of different governance layers with regard to Nature-based solutions

While there is no clear definition of NbS in Hungary, their uptake has grown over the past 10 years, with more than a hundred projects currently underway. Local governments in Hungary increasingly recognise NbS as a valuable tool to address multiple policy goals, particularly in relation to urban development and water management. For example, in Budapest, NbS are being mainstreamed in urban planning documents such as the Budapest 2030 Long-Term Urban Development Concept, the Smart Budapest City Vision and the Green Infrastructure Action Plan (so called Radó Dezső Plan).

Budapest Municipality and Budapest's districts are independent and equal local authorities. Each has its own wealth and properties. There are certain topics they rely on (mobility, urban planning), but the capital and its districts have separate strategies for affordable housing and NbS.

Budapest municipality

Budapest Municipality itself serves as a good practice. As green issues are for the major part of Budapest local policies, local institutional and legal framework was set up, background researches and strategies were formed and approved. Community involvement and the dissemination of achievement are on a high level, action plans are implemented step by step to improve the quality and quantity of urban green spaces, supported by NbS. Budapest has recently won URBACT Good Practice Label from the EU, for that cooperation model. Not only Budapest, but also its districts and other Hungarian big cities made significant steps to move forward.

District 13 in Budapest

District 13 of Budapest has made significant progress on implementing NbS on a local level and serves as an example for other municipalities. A series of 4-year long local green strategies (Angyalzöld 2008-2014, Angyalzöld+ 2014-2019, Angyalzöld 3.0 2020-2024) were developed, proved and implemented in harmony with the integrated urban development strategy. Nice, livable and safe public green spaces and a good network of public institutions formed the basis of the SUD for a district previously industrial, facing economic and population loss. The goal was to attract new residents and businesses. The district had its own brownfield development projects for offices and housing.

Greening of public places, rationalizing parking, developing canopy coverage, turning public green space attractive, creating walkable lines were among the goals of the strategy. The strategies focused on developing public green hubs (big public park or green square) in each residential area and connecting them by green promenades. Each development stage was participatory, important stakeholders were invited to contribute. Implementation was regularly monitored, results affected the development of the next implementation or the next strategy making process.

The local legal instruments of greening (tree protection, tree, green space protection) are more strict and more precise than the national framework. Execution was financed by the district's own budget. The implementation started a slight gentrification in each housing area. Paralelly, renewal of housing estate areas and social housing projects were carried out to keep better social balance of the housing areas, but in a smaller scale

According to a national survey, 70% of local governments used the concept of green-blue infrastructure or NbS in their work¹⁰¹. **But there is no significant connection between housing policies and NbS, neither on national nor on local level.**

5.5 Achievement, assessment and challenges

Due to the lower level of urbanisation and economic development in Hungary, there is a higher proportion of preserved natural habitats and a higher rate of ecosystem services they perform, compared to more developed countries. Therefore the potential for NbS implementation is higher than average. National NbS research, strategy development and implementation goes more less parallel with EU processes. In case of urban green infrastructure, EU directives and policy papers were slightly first, and have been followed by national actions. Meanwhile in the field of nature restoration, national policies and plans have preceded the EU Nature Restoration Law. Therefore, we can say, **in terms of NbS, Hungary**

¹⁰¹ Research and Policy paper on NbS by OECD and Ministry of Innovation and Technology, 2022

is not just following EU policies but has been proactive. There are many good practices, mainly on local level, support to form national policies and implementation as well.

In national policy, since 2010, environment and nature protection have been given less and less importance - the national institutional structure has been broken down, fragmented and restructured on a lesser scale, there is no real cross-sectoral and social consultation in the process. In parallel, there have been results on national level in line with EU policy, e.g. national ecosystem service mapping (2020), national green infrastructure plan (2021) and the policy paper on NbS (2022). Some achievements are very new, e.g. Green Infrastructure Decree, thus their implementation cannot be envisioned and evaluated yet. Due to the lack of a visible and reliable national policy and institutional framework, good practices are more likely to form on a local level where the challenges are.

There is also a geographical pattern in the spread and application of NbS principles. In the western and north-western parts of Hungary, where the climate change pressures are lower, NbS is less of a priority for development. In the regions more affected by climate change, the southern and south-eastern parts of the country, the implementation of NbS is much higher, especially in the large cities like Szeged or Kecskemét.

The largest incentive behind urban green investments are the European funds since 2015 coupled with guidelines and the obligations to create local climate plans. Approximately 370 million EUR¹⁰² were spent on urban renewals containing significant interventions on green and blue infrastructure between 2015-2022.

A typical green infrastructure project of a **small town** from these EU resources is a renewal of a public green space to extend its function, to enhance accessibility and safety. This often results in a reduction of biologically active surface, the creation of new pavements, the cutting of trees or the development of intensively managed green space, which is contrary to the principles and tools of the NbS.

Big cities have a much greater capacity to identify urban and climate challenges, prepare, implement and monitor projects properly. They are also more efficient in attracting higher levels of EU funding, as they can more easily generate the costs of project preparation and implementation. For this reason, a much higher number of innovative NbS solutions, implemented and maintained to a high standard, are found in large cities, especially in the more vulnerable ones in the Metropolitan Districts (Budapest Municipality and Districts 5 to 9 of Budapest) or the Great Plain region (e.g. Kecskemét, Debrecen, Szeged, Békéscsaba).

On the other hand, the EU funds can provide financial support for the creation and upgrade of green spaces, but it does not provide funds for the maintenance of them. Municipalities' income sources significantly decreased in recent years; thus, they have a very limited budget for NbS investments. The Stability Law restricts the municipalities' borrowing capacity, posing a significant barrier to Hungary's climate adaptation and protection goals. The normative fund system for green area management provided by the state to local municipalities does not

¹⁰² The funds used in TOP 6.3.2-15 and 16, and TOP 2.1.2 calls.

consider the green area ratio of a settlement and the required maintenance intensity, which often leads to unrealistically low funds.

Publicly accessible green areas are primarily developed by the public sector. The role of the private sector in shaping the green environment is limited (except for the private family houses). It is acknowledged by the market that greenery increases the selling prices of a newly constructed residential complex, but as new construction is already hardly affordable one of the factors to make it still profitable is to decrease the green investments as much as possible.

The housing inequality effects of nature-based interventions are practically not studied or considered in Hungary. There are very few publications aiming to measure the access of different social groups to green areas and the impact of green investment on housing prices. Green gentrification, as a policy issue, is not part of the public or scientific discourse either.

It is widely acknowledged by urban planners, developers and researchers, that complex interventions into urban areas result in the increase in real estate prices but the question is how much green development alone contributes to these complex interventions. The type of green spaces also matters: as a recent study proves (Csomós, 2024), income level is not a decisive factor in Budapest with regard to the provision of urban green spaces (e.g. parks and gardens), while accessibility to urban forests and urban green in private gardens are strongly linked to the income level of residents. It is not verified yet, but our interviews in Veszprém and Ajka also show that due to the fact that housing estates, currently accommodating the middle class, are built with a high rate of greenery, income loses its importance as a major factor for accessing public greenery. However, large scale green investments might have an impact on real estate prices and, after a while, might lead to a change in residential composition (this is a hypothesis already evaluated in case of Széll Kapu project in Budapest - Csité, 2016 - and is foreseen in Veszprém with regard to the interventions at the Séd stream).

Housing inequality result (hypothesis)	Mechanism resulting in housing inequalities
Bottlenecks in accessing nature-based solutions and suffering from the climate effects	Income seems not to be a decisive factor in accessing urban greenery due to the path-dependent urban structures in Hungary, while private green and urban forests are more accessible by high income people.
In case of large scale urban green projects, the increase of property prices in the neighbourhood might lead to green gentrification.	Large scale green projects are evaluated by the market as relevant as complex urban renewals thus tend to increase the real estate prices.

Table HU5. Potential housing inequality impacts of nature-based solutions

As the phenomenon of green gentrification is not yet included into the public discourse, there are no specific public policies developed to counteract the effect. However, one of our interviews in District 8 of Budapest revealed that public actors decided to implement step by step green space development projects instead of large-scale ones in order to avoid the rapid increase in real estate prices.

6 Densification

6.1 The policy cycle: emergence of the issue and policy decisions

In Hungary, there is no explicit densification policy at neither national nor on municipal level. Increasing population density is not even part of the professional discourse, as the population density of our inner cities has decreased significantly due to the suburbanisation processes that started after the privatisation of housing in the 1990s. The inner districts of Budapest lost even 30-40% of their population between 1990 and 2000. While in 1990, there were 269 people per 100 dwellings in Hungary, this figure fell to 217 in 2025, after a steady decline. In Budapest, the same phenomenon reduced the number of inhabitants per 100 dwellings from 254 to 173.¹⁰³

The densification of the urban fabric is reflected in professional awareness, concepts and education, but it barely reaches the level of political discourse, much less the level of direct governmental or municipal policies, regulations and legislation. In Hungary, purposeful densification of the urban tissue is practically not part of the green toolbox.

Thus the European Union's strategies and directives have only an indirect impact on the densification of Hungarian settlements, mainly through the protection of the amount of natural areas. The key document on this issue is the European Commission's Roadmap to a Resource Efficient Europe, published in 2011, which already sets the target of 'No Net Land Take' by 2050. However, only some of the member states have set quantified targets for reducing land take by 2021. Therefore, the Commission's "Soil Strategy to 2030", published in 2021, reiterates this target, calling on member states to set their own ambitious targets in this area by 2023, at national, regional and also local scales. It also outlines the "land take hierarchy", encouraging the member states to use it, in particular to prioritise urban rehabilitation in their developments.

As seen in Figure 12, even if the related policies and strategies in force in Hungary today generally preceded the European Soil Strategy, Hungary has not made any quantified commitments to reduce artificial land use. However, the issue of urban sprawl has already been addressed in Hungarian policies.

The National Framework Strategy for Sustainable Development (2013) and the National Environmental Programmes prepared on the basis of it in six-year cycles since 1997 provide the basis for the policy of environmental protection. The main structure of the programme, which is in effect until 2026, does not classify the land as a natural resource, but considers spatial and urban planning policy as a strategic instrument for environmental protection. Somewhat contradictory to the above, the strategic instrument of spatial policy stresses that *"Land should be considered as a valuable natural resource. In this context, the protection of natural resources in a fragile state may require the introduction of normative, restrictive measures, possibly even a total ban on their exploitation. It is essential to promote land use that is environmentally friendly, saves land and promotes energy and resource efficiency and*

¹⁰³ https://www.ksh.hu/stadat_files/lak/hu/lak0002.html

climate protection." The analysis of urban policy as a strategic instrument also highlights the damaging process of loss of open land, which it seeks to counter by limiting the amount of land available for new development and by reusing brownfield land. Also related policies, such as the National Landscape Strategy (2017) and the Soil Protection Action Plan (2020) aim at the reduction of urban sprawl and the development of compact settlements.

However, as the most important tools, concepts for spatial development and spatial planning should guide the territorial context, underpinning and coordinating sectoral policies. Hungary adopted a National Territorial Development Concept in 2005 and a National Development and Territorial Development Concept in 2014. Spatial development and planning inherited the principle of territorial convergence - catching up - as an objective from the decades of socialism, which was reinforced by the country's growing territorial disparities after the regime change. Over the years, this objective has been complemented by the objectives of an economic competitive spatial structure for development (1990s), integration into the EU spatial structure (2000s) and, first in general, then more specifically, sustainable land management. The concept, adopted in 2014, for the first time explicitly sets out the objective of creating a compact urban structure and among the instruments leading to this, it highlights the attractiveness and densification of inner city areas and the re-use of brownfield sites. Although these programmes, plans and strategies should underpin Hungary's territorial and municipal plans and also the sectoral decisions, unfortunately they do not contain any requirements that can be quantified and enforced by law on public, municipal or private actors. Thus, although the tool of densification is part of the professional discourse now, it is hardly part of Hungarian green politics.

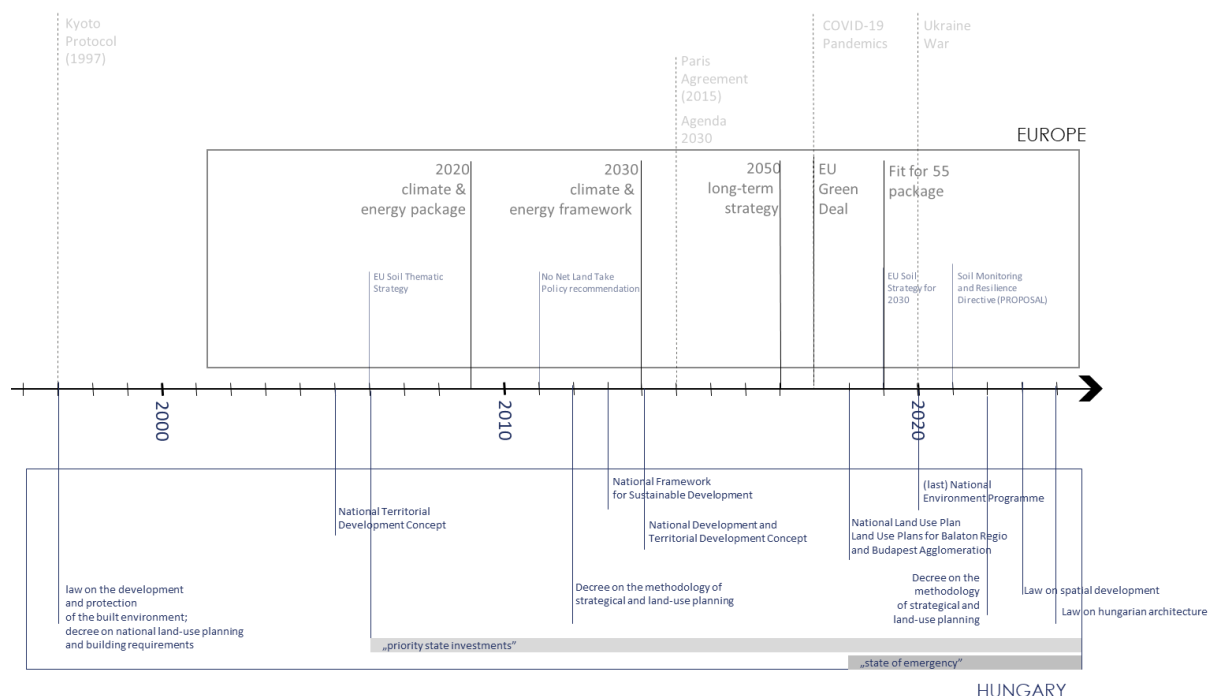


Figure HU12. The changing conceptual, planning and legal environment for urban densification in Hungary

6.2 The implementation process

6.2.1 Spatial planning

The planning tradition in Hungary is linked to the German school of spatial planning and modernist principles of urbanism, and thus relies on the regulation of functional land use at the national, regional, county and municipal level. The methodological basis for spatial development and planning is laid down in a law passed in 1996. The law sets out the hierarchy of Hungary's territorial plans, their mandatory content, the method for their preparation and approval¹⁰⁴. (In 2023, the Parliament adopted a new law on spatial planning¹⁰⁵, but the plans in force were still based on the old law.)

At the top of the hierarchy is the National Land Use Plan¹⁰⁶, the current version of which - relying on the National Development and Territorial Development Concept (2014)¹⁰⁷ - was passed by the Parliament in 2018. This plan sets out the zones that are protected for different reasons - ecological networks, high quality and excellent cropland, landscape protection and world heritage zones, water quality and flood zones, military zones. By integrating all these, it defines the land use of Hungary, dividing it into forestry areas, agricultural areas, water management areas and settlement areas.

In the same law, the land use plans of two priority regions, the Budapest Agglomeration and the Balaton Special Tourist Area, were passed¹⁰⁸. The special status of those regions is partly justified by landscape and environmental sensitivity and partly by the pressure from the stakeholders of the real estate market.

Consistency between the national and priority regions' land use plans is ensured by parallel preparation - in the same urban planning studio - and joint approval. All further county zoning plans, municipal zoning plans, building codes must be adjusted to these highest level plans, according to the following hierarchy:

Responsible level of government	Development concepts	Land use plans, zoning plans and building codes (legally binding)
National level 1: Parliament	National Development Plan 2030 - National Development and Spatial Development Concept (2014)	Territorial (land-use) Plan for Hungary and Some of its Priority Areas (2018)
Sub-national level 2: county	counties spatial development concepts	counties land use plans
Sub-national level 4: municipality	municipal development concepts	municipal zoning plans and building regulations

¹⁰⁴ 1996. évi XXI. törvény a területfejlesztésről és a területrendezésről

¹⁰⁵ 2023. évi CII. törvény a területfejlesztésről

¹⁰⁶ 2018. évi CXXXIX. törvény Magyarország és egyes kiemelt térségeinek területrendezési tervéről

¹⁰⁷ 1/2014. (I. 3.) OGY határozat a Nemzeti Fejlesztés 2030 – Országos Fejlesztési és Területfejlesztési Koncepcióról

¹⁰⁸ 2018. évi CXXXIX. törvény Magyarország és egyes kiemelt térségeinek területrendezési tervéről

Figure HU13. Hierarchy of territorial and municipal development concepts and land use / zoning plans, building regulations in Hungary

National and county-level territorial plans aim to protect natural and agricultural areas primarily by limiting the expansion and growth of urbanised areas. Due to the strict hierarchy between national, county and municipal level as seen in Figure 13, municipalities can mostly designate their for-build zones within the area designated as a settlement area in the national and county-level land use plans.

In responding to real urbanisation trends, the land-use plans of the priority areas - the Budapest Agglomeration and the Balaton Special Tourist Area - primarily sought to restrain the zoning of new, low-build areas through prohibitions, procedural complications and infrastructure requirements. In all cases, however, the role of the national level in granting exceptions was enshrined in the procedural code. It is therefore not surprising that the plans have also produced little results.

6.2.2 National-level regulation of urban planning

Urban development and planning in Hungary is basically the mandatory task of the municipalities, which have to draw up their own development concepts, land-use plans and building regulations within the framework of national legislation and within the hierarchy of national, regional and county-level land-use plans. The national legal framework for the planning process is the Law on Architecture and Urban Planning and its implementing government decrees in force at the given time.¹⁰⁹ However, the increasingly chaotic legal environment since 2012 makes coherent planning more and more difficult for municipalities.

The trend towards compact settlement form is becoming more and more visible in the changes to the urban planning framework. The fresh architecture law, in force from 2024¹¹⁰, has also included in its principles some principles related to densification, such as the "necessary minimum principle" (§5), the "principle of preservation of natural systems" (§7-8), the "principle of priority of brownfield sites" (§9). Defensive instruments in the government decree detailing the implementation¹¹¹ include the formal and procedural obstacles to the designation of new built-up areas, the formal and procedural obstacles to the merging of settlements, and the introduction of biological activity requirements.

¹⁰⁹ The main legislative documents implemented in urban planning and zoning:

- 1997. évi LXXVIII. törvény az épített környezet alakításáról és védelméről
- 253/1997. (XII. 20.) Korm. rendelet az országos településrendezési és építési követelményekről (OTÉK)
- 314/2012. (XI. 8.) Korm. rendelet a településfejlesztési koncepcióról, az integrált településfejlesztési stratégiáról és a településrendezési eszközökről, valamint egyes településrendezési sajátos jogintézményekről
- 419/2021. (VII. 15.) Korm. rendelet a településtervek tartalmáról, elkészítésének és elfogadásának rendjéről, valamint egyes településrendezési sajátos jogintézményekről

The new legal bases that will enter into force in 2024-25:

- 2023. évi C. törvény a magyar építészetről
- 2023. évi LXIX. törvény az állami építési beruházások rendjéről
- 280/2024. (IX. 30.) Korm. rendelet a településrendezési és építési követelmények alapszabályzatáról (TÉKA)

¹¹⁰ 2023. évi C. törvény a magyar építészetről

¹¹¹ 280/2024. (IX. 30.) Korm. rendelet a településrendezési és építési követelmények alapszabályzatáról (TÉKA)

Densification attempts in Budapest's regulatory plan under preparation

Budapest's two levels of local government, planning powers are shared between levels. While Budapest, in consultation with the districts, adopts the urban land-use plan and a regulatory framework; the districts adopt the precise zoning plans and building regulations within this framework.

The urban planners of BFVT have long been committed to structural densification of the urban fabric, and are therefore reluctant to designate, for example, a rural residential area in the city, despite pressure from districts and developers. The new building law now gives the capital the opportunity to designate so-called "development action areas" in the land use plan and to set more detailed building parameters for these areas, which are also binding for the districts. In the plan under consultation, the planners have therefore set not only maximum but also minimum densities for these action areas.

The methodological basis of urban planning in Hungary is, like in spatial planning, the regulation of land use and, on a smaller scale, the restriction of construction parameters. The most important defensive instrument in terms of densification is the limitation of built density, heights and the maximal number of dwellings per plot.

The implementing decree of the law on urban planning specifies the types of land use that can be designated. In the case of residential areas, urban, peri-urban, suburban and rural residential areas may be designated. For each type of residential area, the national decree sets maximum values for density, height, etc., which may be further tightened by the municipality in its building regulations. With regard to the national policies, it can be noted that the modifications in the implementing decrees have been slightly more lenient over the years, mainly in the building parameters for rural, suburban and peri-urban residential areas. For

example, the maximum building heights in rural and suburban areas have been changed to allow the addition of roof spaces to single-storey buildings. The regulation of peri-urban residential areas has allowed for increasingly higher building density, which is often reflected in the urban design of new housing estates in the Budapest agglomeration. However, the regulation of minimum densities is completely missing from the legal framework, which leads to the survival of the low-density family housing zones in the outskirts of cities.

6.2.3. Ruling by government decrees

Despite the hierarchy of planning and the nicely described planning principles, the greatest weakness of Hungarian spatial and urban planning is that it provides countless opportunities for the government to make exceptions to spatial plans. The tool of exception is to declare the development as a 'national priority investment' by a government decree, which excludes it from the scope of regional and municipal plans.

Originally, in 2006, a law¹¹² created the background to “national priority investments” for investments made with EU or state aid in order to speed up the absorption of EU cohesion funds. Later, however, the scope of the law was extended to newer and newer, smaller and smaller-scale public projects, and finally to private developments too, so that even small-scale private housing developments became the subject of a decree of priority. In principle, the new architecture act has tightened the scope of the prioritisation, but the government may still have a number of elusive reasons for prioritisation.

The number of priority investments suddenly jumped after the FIDESZ government took office in 2010. While between 2006 and 2010, 24 such government decisions were adopted, between 2007 and 2021, some 3,000 projects were declared priority projects in some 500 government decrees (Lukács 2021). The increase in the number of national priority investments adopted under this law after 2011 reflects the constitutional change introduced by the new Hungarian Fundamental Law (2011). With the introduction of the Hungarian Fundamental Law, the protection of local interests was eliminated from the list of constitutional values (Siket 2024).

The map of ‘Átlátszó’ in Figure 14. shows the investments prioritised between 2018 and 2021, especially the concentration of such projects in the opposition-led Budapest and its agglomeration. This concentration is partly due to the buoyant real estate development in the Budapest agglomeration, because priority investments now also reach small-scale private developments - housing developments, small-scale offices, castles, gravel mines, anything that could be exempted from stricter building, heritage or environmental regulations or community control.

¹¹² 2006. évi LIII. törvény a nemzetgazdasági szempontból kiemelt jelentőségű beruházások megvalósításának gyorsításáról és egyszerűsítéséről

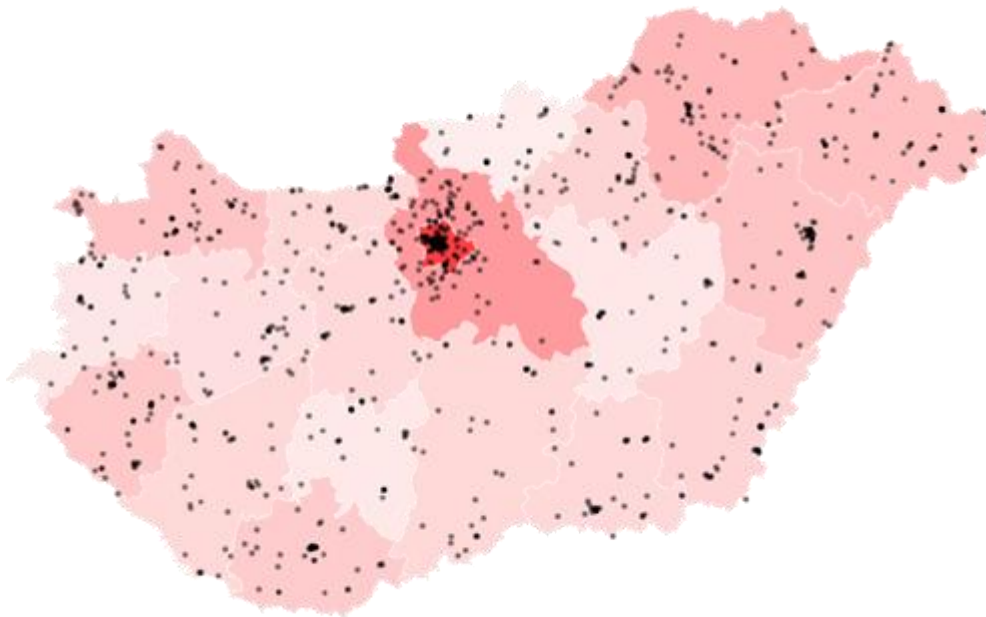


Figure HU14. Developments declared to 'state priority investment' between 2018 and 2021 (Source: Átlátszó)

NGOs have spoken out against the practice, and the Ombudsman for Future Generations - now just a second deputy to the Ombudsman for Fundamental Rights - published annual reports criticising the practice in 2011, 2012, 2013 and 2015 - all in vain. Municipalities also have no protection against government's prioritisation decrees: although municipalities lodged constitutional complaints against prioritisation decisions in 14 cases between 2015 and 2023, the Constitutional Court rejected the complaints in all cases. (Siket 2024)

The political aim of the concentration of priority investments in Budapest is certainly to narrow the policy space of the Budapest municipality and the districts, which have been led by the opposition since 2019. The map of "priority investments" in Budapest (Figure 15) illustrates that the city most regularly loses its planning sovereignty over its most sensitive waterfront development areas, its rust belt development areas and historic neighbourhoods.

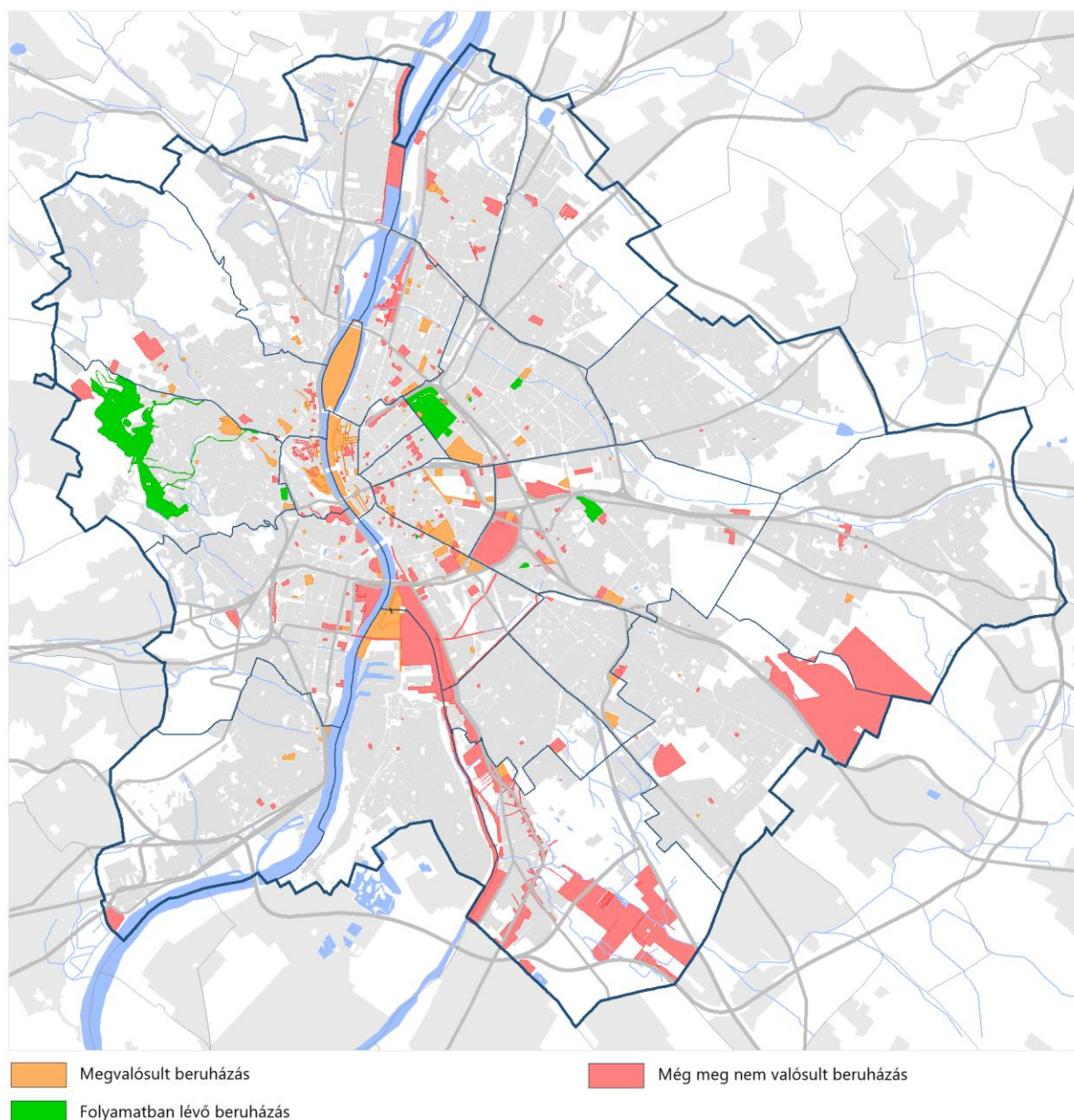


Figure HU15. Developments declared to “state priority investment” in Budapest, until 01.11.2024.

(orange: completed; green: ongoing; red: planned investments)

Source: From City to Home - Urban development Plan of Budapest (under planning), preparatory report, Volume III. p.758.

The building regulation for these investments is subject to individual government decisions, irrespective of the building regulations of the given municipality. Part of the regulation of priority investments is the almost complete elimination of transparency and opportunities for community participation in the planning and permitting processes, making it almost impossible to research the content of projects. It is difficult to make general statements about the nature and amount of the planning simplifications, because they are always tailored to the needs of the individual investor. Nevertheless, the experience has shown that in case of “priority state

investments” there are no more obstacles, whether for environmental, social or urban planning reasons. Their density, building height can be significantly higher than the surrounding area, the capacity of local infrastructure, etc. These exceptions as “national priority investments” decide the fate of a site in such a way that professional urban planning or public consultation are no longer needed, and a purely economic-political decision is made. These developments thus become breeding grounds for corruption. Parallel to this, the possibility of control is weakened or disappears. The rule by decrees takes many areas out of the regulation power of municipalities, thus not only depriving them of tax revenues, but also making coherent urban planning and development impossible.

However, the government sees the system of priority investments as a suitable and systematic tool. This is reflected in the fact that the law establishing this system was integrated into the new architecture law¹¹³ at the end of 2023.

Beyond the practice of “state priority investments”, the Hungarian parliament declared a state of emergency from March 2020, citing the coronavirus epidemic, and from May 2022 citing the war in Ukraine, which gives the government a permanent opportunity to govern by decrees. This allows the overriding of virtually any law. This was the tool used by the government when it overwrote the provisions of the law on urban planning by government decree in December 2022. The content of the decree has nothing to do with the war in Ukraine. This incident perfectly illustrates how direct governmental control upsets the planning order and deprives municipalities of their urban planning rights.

6.3 Size and role of the market

As a result of the territorial disparities of the Hungarian economy and the internal migration processes mentioned in the introduction to this chapter, significant demand for housing, housing construction activity, only occurs in the target areas of migration. As shown in Figure 16., these are the capital and its agglomeration, the second scale cities (Debrecen, Szeged, Pécs, Győr) and their agglomerations, the cities affected by national/international industrial development projects and their agglomerations (e.g. Kecskemét), the immediate vicinity of Lake Balaton and the settlements of the Austrian catchment area of the western border. Building regulation, including the instruments for densification, is only relevant in these municipalities.

¹¹³ 2023. évi C. törvény a magyar építészetéről

A lakások számának változása a 2011. évi népszámlálás óta településenként, 2022

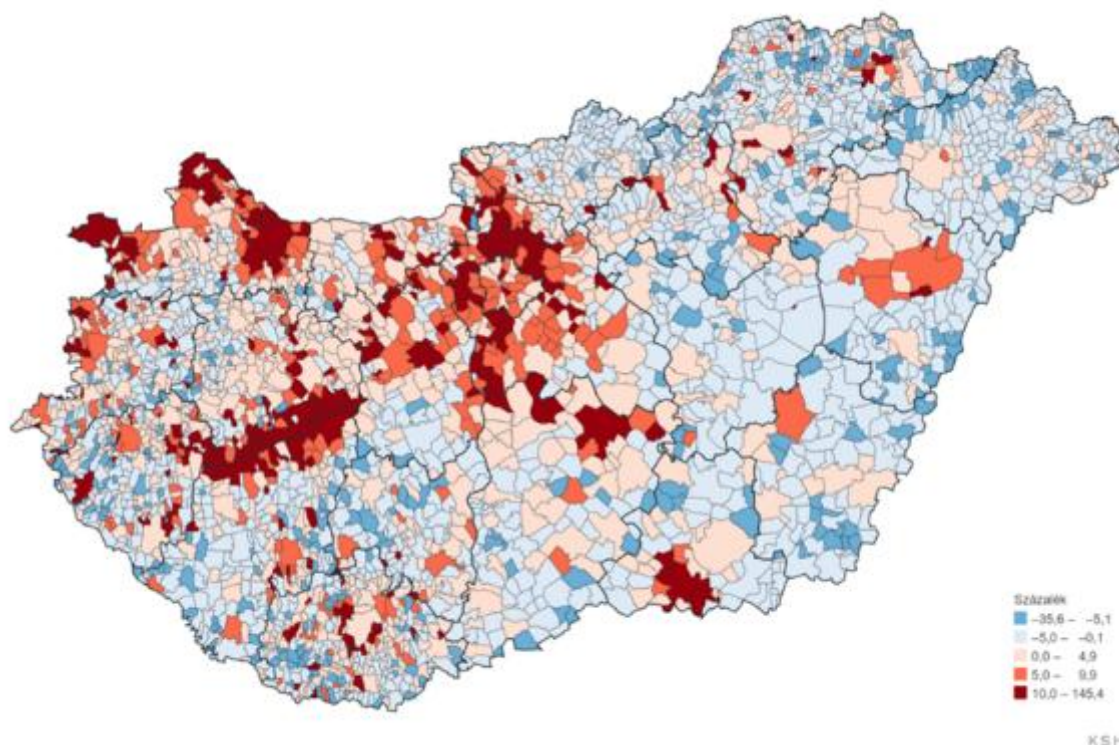


Figure HU16. Change in the number of dwellings between 2011 and 2022

As the volume of public and municipal housing construction is negligible, only private housing developments define the market. Projects with densification effects are developed where there is a market demand for housing and where building regulations allow significantly higher density development than the existing urban fabric.

We can identify five typical types of real estate development interventions that contribute to the densification of the urban fabric

- The development of inner-city gaps, often at a higher density than buildings in the surrounding. (type 1)
- The construction of multi-apartment buildings in traditionally single-family houses or villa areas (type 2)
- Complete redevelopment of old residential areas at significantly higher densities (type 3)
- Conversion and dense urban development of brownfield areas (type 4)
- High-density, low-quality new developments on brownfield or greenfield areas, without any urban context (type 5.)

The five different types of projects leading to urban densification have different impacts on both densification and equal access to urban housing:

The development of vacant or low-use gaps (type 1) in already dense inner-city areas contributes little to the increase of residential density. The districts of Budapest's inner

city have an a priori high density of built-up areas (floor area ratio of 4-5). Until the change of regime, the density of the population was also high in those districts but the suburbanisation following the privatisation of the housing stock reduced the population by 30-40 %. The inner parts of Erzsébetváros and Terézváros (districts VI. and VII.) were valorised in the 2000s by the starting development of the CBD. This motivated the district municipalities to a new building regulation with significantly higher density parameters enabling the real developers the realization of the new market value of the properties. The redevelopments provoked strong opposition from the residents and NGOs defending historic architectural values, and resulted in public lawsuits. In the more outlying, but still inner city residential areas, higher/denser building possibilities for new developments are really needed to kick-start the city's regeneration process by private investments. This has happened in the renewal of Ferencváros (district IX.) from the 1990s to the present, in the regeneration of the areas along the Lehel street (district XIII.) after the crisis of 2015, or happens today in the Magdolna neighbourhood (district VIII.). This latter process clearly shows that low-prestige residential areas may be filtering upwards on the housing market due to the private projects, but the neighbourhood's housing stock and society will retain its heterogeneous character for a long time yet.

To improve the dispersed urban structure, the urban densification of large detached house areas (type 2) would be the most important for Budapest. This type of densification was the aim of the reform of Zugló's (district XIV.) building regulations in the 1990s. New developments were significantly denser and higher than existing urban fabric, up to 6-8 storey multi apartment buildings among historic villas. This met naturally strong resistance from the local population. The regulations were withdrawn. Nevertheless, real estate market pressures continue to result in similar, perhaps a touch less aggressive real estate developments in the most prestigious areas of Budapest (districts II and XII). The developments are motivated primarily by the green environment and high residential prestige. However, the public transport and the institutional infrastructure in these areas is poor, so population growth creates transport, services and environmental problems. Dense, multi-family developments in these districts take advantage of the traditionally high prestige of the area, while targeting a lower, (upper) middle class clientele than the residents of the villas. The processes allow young couples and families to move in these districts, accelerating the change of generations already underway. These neighborhoods have long been and remain the most prestigious residential areas in Budapest, so the new developments play any role in providing access to affordable housing. Similar trends can be observed in the outlying, less prestigious areas of Budapest (e.g. district XVI.) and in the agglomeration, where 4-6 apartment buildings are often built illegally in single-family areas (building regulations allow here a maximum of 1-2 apartments per plot in most cases). The clash between the needs of the young generation of home buyers, the developers who want to serve them and conservative building regulations is causing long-term infrastructure and real property law problems and neighbourhood conflicts.

The only large-scale redevelopment of a downtown residential area (type 3.) was the Corvin Promenade project (district VIII. of Budapest), realised in collaboration between the district municipality and a big real estate investor. The original plans for the redevelopment also anticipated an increase in density. With the withdrawal of the state from the financing, additional costs were passed on to the private investor, which the district

municipality was able to compensate by further relaxing the building regulations - by adding two more additional floors. The area is perfectly served by public transport, which provides the basis for densification. However, a significant number of low-value dwellings have been lost in the project, which has only been partially replaced by new build social housing in the district. In many cases, area residents have received cash redemption, causing them to move out of the neighbourhood, and often out of the district. The urban rehabilitation has resulted in a fairly homogeneous housing stock, aimed at middle-class needs. Following the economic crisis of 2008 and the extreme centralisation policy of the government (since 2011) affecting planning and financing tasks of municipalities, there seems to be no chance for a similar large-scale urban regeneration process led by a city or district.

Similar problems are caused by new residential areas created by **large-scale development of brownfield sites (type 4)**. To slow down the suburbanisation process, it is welcome that since the 2000s real estate developments have discovered these sites, especially the best locations along the Danube. Unfortunately, only a part of the new residential neighborhood has been located on appropriate infrastructure (e.g. the Marina-part in the XIII. district, supplied by a metro line, the widened Váci street and a large shopping centre). In several projects, especially those declared as 'priority state investment', the municipality has not even been able to ensure minimum urban service conditions in term of public transport or children's facilities (e.g. Budapest, Waterfrontcity, etc.). **As these projects are the largest, often neighborhood-scaled housing developments in the city, they are the ones that most reshape the spatial structure of the housing market.** The price per square metre of the developments target a middle-class, upper-middle-class buyer stratum, creating socially quite homogeneous neighbourhoods.

The latest type of uncontrolled densification to emerge are **concentrated projects with very high density, very low architectural and urban design standards and high housing numbers (type 5.)**. These low-price investments are planned in the outer districts of Budapest, in brownfield-, but also often greenfield areas, without public transport and other facilities. Again: as 'priority investments'. It is to be feared that these investments will become the slums of the next decades in Budapest.

In summary, the leading force in any type of urban densification process in Hungary is the private actors of residential real estate development. **Municipalities do not play a role in site allocation due to their lack of real estate ownership.** Private property developers can enter into a planning contract with the municipality if their market interests require a higher density of development than that prescribed in the regulations. If this fails or is not sufficient, they can apply to the government for a status as 'priority investment'. Large-scale private residential developments typically receive priority investment status from the government, which requires just filling in a form - and political connections. The grounds for the prioritisation decisions are not public. The system of priority investments thus makes it easy for private developers to lobby at government level, leaving the municipal level out of the whole process.

Although already the building codes of local authorities often contain alarming floor area ratios, the planning contracts between municipality and developer and especially the 'priority state investments' further increase the density and enable skyscrapers contrary to the municipality and the public opinion, destroying the cityscape.

6.4 The multilevel governance process

In line with the above, theoretically the municipal governments could be the main agents of the structured densification of the urban fabric, and they could control the market-driven real estate development through building regulations. Unfortunately they can only serve this role very poorly.

The desirable way of densifying the urban fabric would be to differentially increase the allowed building heights and building density following urban structure considerations, for example along high-capacity public transport lines. Unfortunately, we hardly see any examples of this: municipalities rarely use this instrument.

The historical reason for this is that after the regime change, municipalities competed for developers through supply-side building regulations. The zonings drawn up at that time offered in total many times more building opportunities than the real developers' demand. For example, a study of BFVT in 2008 (BFVT 2008) examining the development potential of South Budapest finds that the volume of development allowed by the current regulations is 2.6 times more than the projected market need over 15 years. The fear of compensation lawsuits still prevents municipalities from tightening up what the too laxly regulated building regulations fixed. We know of one district (district XI. in Budapest that has been negotiating in recent years to reduce the regulations that allow excessive densities.

As a result, new developments of inner city gaps (type 1) are typically built higher and denser as the environment. In the 1990s and 2000s, there were attempts to systematically densify the built-up area in inner districts (type 3) and one transition zone district (type 2), both of which met with professional, public and political resistance. Minor resistance was triggered by the Corvin Promenade project (also type 3), where the intensity of building also increased significantly. In this urban renewal, however, the entire stock of buildings, housing and population in the action area - of low value - was changed, and therefore the densification met less reaction. Local politicians and chief architects of the districts and smaller cities also fear NIMBY-type conflicts resulting from the densification of existing neighbourhoods, based on these experiences.

Hungarian urban planners consider the reuse of brownfield areas (type 4) as the most important offensive tool for urban densification. The reason is that the industrial restructuring of the 1990s, the withdrawal of Soviet troops and the change in transport technology left behind a large amount of under-utilised sites in our cities, the conversion of which has been limited to the present day. According to Budapest's brownfield land register (conducted since 2015), in 2023 more than 5% of the capital's area represents brownfield areas, which (could be) the basis for densification and a new housing policy of the city.

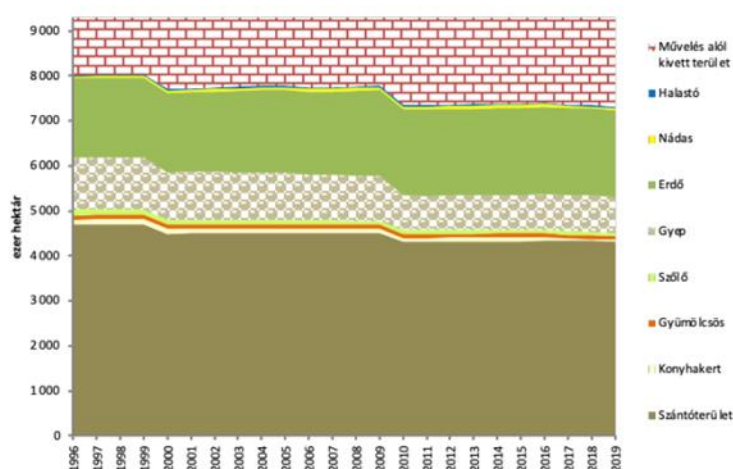
Despite this, from 2020, yearly merely 40-50 hectares of brownfield land will be converted in Budapest, representing just 1.5-1.7% of the available brownfields areas.

To accelerate this process, in 2019, the Parliament introduced the definition of 'brownfield areas' in the law on urban planning and also in the spatial plan of the Budapest agglomeration and the Balaton region, which is linked to municipal planning tasks and later to national housing policy financial benefits (temporary VAT reductions). However, the right to designate those

'brownfield areas' for these benefits was kept in government hands, which did not accelerate the recovery of brownfield sites, nor contributed to a significant volume of new housing construction or to the conceptual structural development of the city. The new architecture law foresees the establishment of a national cadastre of rust belt areas, which would automatically transfer the building regulation of these areas to the state level, further reducing the planning sovereignty of municipalities.

6.5 Achievement, assessment and challenges

Hungary has several strategies, concepts and programmes that consistently fight against urban sprawl, aiming at reaching the ideal of the compact city on a theoretical level. However, all these principles are not reflected in quantified commitments at national level, nor in sectoral plans or building codes at lower levels. The effectiveness of the concepts is also in question in the documents themselves. The background document of the National Development 2030 - National Concept for Development and Spatial Development (2014), states that the implementation of the previous plan (2005) is close to zero and sums up the main reason following: *"governmental will to enforce the objectives of territorial development policy was missing."* Accordingly, the area taken out of cultivation is increasing steadily and we are not approaching the 'No Net Land Take' target, as illustrated on Figure 17.



17. ábra: A földhasználat változása, kategóriák szerint 2019-ig [ezer ha]
 (megj.: a KSH adatgyűjtés módszertani változása miatt 2020-tól már csak a mezőgazdasági terület (szántó, konyhakert, gyümölcsös, szőlő, gyep) adatai állnak rendelkezésre)
 (forrás: KSH)

Figure HU17. Change in land use rates between 1996 and 2019, with artificial (built-in) areas in the upper bar

The timeline in Figure 12. illustrates the accelerated and chaotic change in the legal environment governing municipal planning since 2012, which has become increasingly difficult for municipal planning to follow. Today, the legal framework for urban development is characterised by a patchwork of plans and regulations, often contradictory, and exceptions

that are becoming systemic. In such an environment, it is impossible to implement professional strategies, whether from European or national level.

In sum, it can be concluded that development processes in Hungary, which result in urban densification, are not driven by public policies but by the will of private property developers. The organised lobbying of developers can also achieve systemic advantages at the state level (e.g. the lobbying of large developers has played a significant role in the reduction of VAT rates for the brownfield investments and housing in general). At the same time, a planning agreement with the local municipality or a declaration as 'priority investment' by the government is an easy way to relax the standard values of the local building regulations. Due to financial and governmental pressures, municipalities are also mostly unable and unwilling to orientate or restrict these projects in terms of zoning.

Without public and municipal housing development, projects resulting in higher urban density will not expand the affordable housing stock. The redevelopment of low-status residential areas is a minority of housing projects, and therefore does not have the classic gentrification effect. However, it should be noted that the private housing developments of increasing volume, mainly car-based, target typically upper-middle class customers and restructure also the spatial social composition of the city. At the other end of the spectrum, there's the danger of projects developed in highly isolated environments on low standards to become the future slums.

In Hungary, we have neither quantitative studies nor qualitative analyses on the social consequences of densification projects and their effects on housing. Based on our professional experience, the investments analysed in our previous case studies, and the actual expert interviews, we have summarized our hypothesis in Table 6. In the absence of data and research on the effects of densification, especially of large private housing developments on housing accessibility, policies to reduce these effects are also lacking.

Housing inequality result (hypothesis)	Mechanism resulting in housing inequalities
Deficiencies in accessing homes in densified areas	Densification means new construction that has to follow high energy standards. As new construction is practically exclusively privately developed, it has a high-end price.
Segregated urban structures	Densified areas built for high and higher-middle class increasing the spatial disparities
	Concentrated low-cost investments create new poles of segregation
Worsening the affordability of housing in general	New homes on densified areas are objects of financialisation as most of the new units are not occupied by the owner but are rented out or stay empty. This "artificial" increase of housing demand makes new homes less affordable for the local citizens.

Table HU6. Estimated influence of densifying urban projects on housing inequalities

7 Summary and discussion of results

The first policy attempts in retrofitting, nature-based solutions and densification were established mostly before Hungary's accession to the EU (2004), however the EU regulations and financial sources has accelerated the implementation. Hungary is rich in papers and strategies, but rather poor in tools and implementation.

Energy efficient interventions in the residential sector

The rate of renovation is well below the desired 3-3.2% (hardly reaching 0.5-1% annually). This is due to the lack of financial incentives created by the caps on utility prices - to be described later in the chapter -, the low level of public subsidies that currently concentrate on the family house sector and low level of awareness on energy efficiency compared to the day-to-day problems of making a decent living.

Vulnerability and energy poverty is not considered properly in policy documents (National Energy and Climate Plan, Long-term Renovation Strategy). There is no clear, measurable and operationable definition of energy poverty and the main tool defined against it (besides the utility price caps) is the energy efficiency obligation scheme, which by nature, cannot handle complex social issues. Hungary is not eligible for the Recovery and Resilience Facility due to not meeting the conditionality criteria, and the Hungarian government recently decided to opt out from Emission Trading System (2), thus will not be eligible for Social Climate Fund either. The lack of EU funds further narrows down the possibilities of the public sphere to encourage the renovation process, despite the fact that Hungary is likely to be affected the most by the climate change in Europe.

Implementing nature-based solutions

The first regulations with regard to nature-based solutions were developed independently from the fact that Hungary is a member of the European Union. However, these regulations were mostly affecting the rural environment and green developments in urban areas were less considered. Climate change and some paradigm shifts in urban greening still encouraged the creation of pilot projects with regard to water retention and mitigation of the urban heat island effect. From 2015 these efforts were supported by EU funded operational programmes through which green aspects became one of the driving forces of urban development. Nevertheless, most of these EU funded projects might be called 'green beautification' rather than real nature-based solutions.

Green interventions driven by market forces are rather limited (except for private interventions in family houses) as even if new constructions have a higher prestige in a green environment, these interventions are too expensive for the potential buyers. The majority of the new housing units are bought for commodification purposes, to rent out or let it empty, thus the owner does not challenge the green quality of the investments. The local municipalities can influence the green quality of new construction through local construction regulations and bi-lateral development contracts, but the efficiency of these tools heavily depends on solvent local demand for housing, which is in general rather low in most Hungarian cities and towns.

Densification of the urban texture

In Hungary, the policy of densification for ecological reasons has recently been introduced at the level of the principles of the new building law, which municipalities are still hesitant to apply. However, as a result of the activities of private developers, helped by the system of 'state priority investments', higher-density development than the surrounding area is appearing in the urban fabric - mostly ignoring urban structure requirements and green principles.

The primary 'densification' policy, supported by legislation and funding, is the development of brownfield areas. In the absence of state or local regulation, the increasing volume of residential development projects is creating new homogeneous housing stocks and following social structure, which is transforming the spatial and social fabric of our cities.

In the lack of data and studies, we can only make hypotheses about the effects of such new, dense neighbourhoods on housing accessibility and on the evolution of housing inequalities in general. But the complete absence of state policies to mitigate the negative processes and the severely reduced room for manoeuvre of municipalities imply that the negative effects will be unrestrained: the creation of mono-functional new neighbourhoods for inhabitants with homogenous social status - of low or high -, leading to the polarisation of the spatial-social fabric of cities.

Green policies in the housing sector (energy retrofitting of residential units, applying nature-based solutions and implementing densification) can mitigate or generate housing inequalities depending on the specificities of the national or local housing systems. The three main factors of the green related housing characteristics can be summarized as 1) the withdrawal of market incentives due to capped utility prices, 2) marginalization of the room of manoeuvre of localities and 3) dominance of private ownership in housing.

Capping the utility prices

The cap on household utility prices in Hungary, applied since 2013, results in the lowest electricity and gas prices in Europe. This policy is considered as a major tool against energy poverty while is a major structural barrier to green development in the housing sector at the same time. While it lowers utility bills in the short term, it removes the financial incentive for households to invest in energy-efficient renovations (such as insulation, window upgrades, or heating modernization).

Thus, the level of residential energy efficient interventions is very low, as the investment cannot be motivated by market based financial calculations, except the times when public subsidies appear. Public subsidies were generous in the 2000s, but they concentrated on multi-family buildings built by industrialised technology. After 2010 subsidy programmes remained marginal and the focus shifted from multi-family buildings to family houses. While access to subsidies for multi-family buildings depends less on the financial capacity of the owners as organisational aspects matters more, for family houses the ability to co-finance is the crucial issue besides the capability to follow the administrative requirements.

Instead of encouraging long-term efficiency, the cap on household utility prices basically traps households in outdated, inefficient buildings, missing the opportunity for energy transition

through housing renewal, while simultaneously deepening social inequalities. Wealthier households, who tend to live in larger homes and consume more energy, gain greater absolute benefits from capped prices, when poorer households receive less benefit as they are the least likely to access renovation subsidies, leading to a widening gap in housing quality and energy efficiency.

Marginalization of the room of manoeuvre of localities

Another major issue is the systemic neglect of public and social housing in both housing policy and green transition initiatives. The public rental housing in Hungary is an ever-shrinking share of the total housing stock reaching about 2.4% in 2024. It is home to some of the most vulnerable populations, including low-income households, the elderly, and marginalized groups. Despite this, state-funded renovation programs and energy-efficiency incentives rarely, if ever, include public housing. Most subsidies or even retrofitting schemes are tied to private ownership or demographic conditions like childbearing. This means public and municipal housing units—often the least energy-efficient—are left behind, deepening the energy divide. The result is a structural policy failure: those most in need of improved housing and lower energy bills are systematically excluded from state-led green investment, reinforcing spatial and class-based inequalities. Without a targeted and well-funded strategy for public housing retrofitting, Hungary's green transition risks becoming not only incomplete but socially unjust.

A further constraint on green and inclusive housing development in Hungary lies in the weak land ownership position of municipalities. Unlike in many Western European countries, where local governments own significant amounts of their own resources (local tax revenue, property, etc.) urban land and can leverage it for social housing or sustainable development, Hungarian municipalities possess very limited land assets and authority. This severely reduces their capacity to initiate or control housing projects—especially in brownfield redevelopment, which in Hungary is largely driven by private investment with minimal public regulation — resulting in market-led densification that favours private interests over social or environmental goals. Compounding the problem, Hungary lacks inclusionary zoning regulations—planning tools used elsewhere to require developers to include affordable or energy-efficient units in new projects. In the absence of such mechanisms, new urban development typically excludes lower-income residents, fails to meet climate targets, and deepens spatial inequality.

Dominance of private ownership in housing

97.6% of the housing stock in Hungary is in private hands, more than 90% of which is owner occupied. It means that the energy efficient retrofits have to be initiated, financed and implemented by private owners, no matter how poor or energy poor they are. There are no non-profit or public housing organisations that take the administrative and financial burden from the inhabitants. In addition, the multi-family housing stock, which is dominant in urban areas, consist of private condominiums and cooperatives for which the financial problems of their socially mixed residents is coupled with the organisational difficulties of decision-making. That is why the implementation of retrofits of any kind have a slower pace and further slowed down by the lack of state or local subsidy programmes.

The private rental market, while growing and reaching 8-9% nationwide and 15-20% in Budapest, remains fragmented, informal, and underregulated. Tenants face insecure tenancy, weak legal protections, and are entirely excluded from most renovation subsidies. The split incentive between landlords and tenants discourages investment in energy upgrades, and where renovations do occur, rent prices might skyrocket and renovictions can follow, however this phenomena is not acknowledged yet in Hungary, most probably due to the relatively modest rate and dispersed nature of private rental properties. Given Hungary's weak tenant protections, these scenarios risk amplifying housing insecurity rather than addressing energy poverty.

While green gentrification — displacement driven by environmental upgrades — is a well-documented issue in Western European cities with large, flexible rental markets, its visibility is lower in Hungary. This might be explained by the high rate of homeownership and low mobility that limits rapid turnover. However, Hungary faces a quieter but equally problematic form of green exclusion, as public investments and retrofitting tend to concentrate in higher-income, owner-occupied areas, while marginalized communities — especially tenants — are left behind. This reinforces spatial and class-based green inequalities without triggering the visible conflict seen elsewhere.

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9 Annex

9.1 NbS case studies in Budapest

Thurzó Park, Budapest. In the historic center of 13th District of Budapest, by HUF 707 million project, a 5000 square meter-large pocket park was developed in a former parking lot, instead of an office and housing building. The block was meant to be built in and development plan and the investor was already set when public outcry of the local community turned the future of the site in a different direction. The green investment, financed by the municipality's own budget, has resulted in an eco-friendly, custom-designed public park with recreational features and smart city services. Great achievement that 80% of the park is green space, covered by 3-storey vegetation and two thirds of the pavements are permeable. Rainwater is captured and used on site.¹¹⁴ The new pocket park is very popular in the neighborhood, lacking enough public green space. The creation of the park is a unique example of a dense urban fabric where a park is created instead of a house in a built-up area. This transformation results in a loss of building rights and a consequent devaluation of the property. Park development, on the other hand, can lead to an increase in property values in its indirect surroundings. The only reason that significant gentrification could not be experienced is that the neighborhood is already higher class.

¹¹⁴ <https://www.budapest13.hu/beruhazasok/thurzo-park/>



Picture HU 1. The area of Thurzó Park was a block with only 2 houses and open space used temporarily, as a parking lot (Google Earth)



Picture HU2. Thurzó Park just after its opening in 2023. (Source: <https://welovebudapest.com/>)

Pünkösdfürdő park, Budapest. Metropolitan Budapest created a new public park in 2022 in the maintenance zone of the flood control dams of the Danube, in the 3rd District. The park was designed, constructed and maintained following the NbS guidelines. The green areas of the site, which are largely extensively maintained, not only provide recreational opportunities for park visitors, but also create new habitats for natural bird and insect life. The park showcases that nature, biodiversity and climate protection are our individual responsibility - many of the information panels help to raise awareness of environmental issues. The Pünkösdfürdő park is situated on the edge of a housing estate area of 122 thousand people, within a 300 meters radius, but not directly attached to the residential area. It is more likely of regional importance than local. Though, it sets an example for urban park development based on NbS principles.



Picture HU3. Large extensive green zones of Pünkösdfürdő park. It has a high ecological value and drains the stormwater on site (Photo Credit: Báthoryné Nagy 2023)

Renewal of Homokbánya (sand quarry) neighborhood, Kecskemét. The basic objective of the project is the environmentally, family and climate-friendly renewal of the public spaces of the Sand Quarry neighborhood, being a former military area, framed with former barracks, office buildings, residential buildings and green spaces. The project was financed 100% by the operative programs, and the total budget was HUF 800 million. The renewal of the green space is part of a broader urban development program to create a liveable and attractive urban sub-centre, to develop an urban green environment, the provision of attractive services and the use of thoughtful space. Besides the classic urban green spaces, the central one was developed using NbS in 2021, it drains and uses the rainwater, it keeps and replants as many trees as possible, it prefers permeable pavements and 3-storey vegetation. New park functions were introduced (e.g. bike park, bike cafe, playgrounds) to attract more visitors. Besides the reuse of old buildings, new housing areas (e.g. Boróka Park) with surrounding green areas are developed, step by step¹¹⁵. The neighborhood has a continuously growing population.

Miksa Déri Street, Budapest. The Municipality of the 8th District of Budapest renovated a section of Miksa Déri Street (between Nagyfaluvaros and Fecske streets), costed 580 million HUF, financed by Budapest Metropolitan funding program called TÉR_KÖZ. The concept plan for the green promenade was completed in summer 2020 with a real community design, in a

¹¹⁵

<https://kecskemett.hu/zold-varos-kialakitasa-a-homokbanyan---aktualis>
<https://www.palyazat.gov.hu/hirek/peldamutato-projektek-valosulnak-meg-kecskemeten>

and

multi-stage process, in cooperation with the residents. The street was renovated in 2022. Key objectives were to develop the entire street in line with pedestrian-friendly principles, and a landscaped promenade was created, which is suitable for play and thus connects the playground and the green area of the health centre. It was an important goal to make the new street feel like home to the residents and workers. Part of the rainwater is not discharged into the sewers, but into the extensive green spaces, which are then evaporated to cool the city.¹¹⁶ Citizens of the neighborhood and visitors reaching the institutions and services frequently use the green street and the shady gathering places.



Picture HU4. Changing a street into multifunctional pedestrian green area, Déri Miksa utca, Budapest 8th District, 2022. 3-storey vegetation, semi-permeable pavements and resting places were developed. (Photo Credit: www.jozsefvaros.hu)

Csanády Street, Budapest. The Municipality of District 13 has extended the green area here to 624 square metres, with 16 more trees than before, 8 individual shade trees and 29 planting planters. The aim was to increase the proportion of green spaces in Újlipótváros, the dense and 'green-less' historic center, thus providing a climate-friendly environment for the people living there. Wider pedestrian walkways, more green spaces, rationalised pedestrian and vehicular traffic, rest areas and low-maintenance ecological green spaces were established. A special focus was also placed on creating barrier-free access. The development affects a green network axis of urban structural importance and is therefore in line with the pedestrian-friendly concept of the capital. The municipality spent HUF 490 million on the Csanády promenade green project, using only its own resources. With the creation of the promenade,

¹¹⁶ <https://jozsefvaros.hu/otthon/varosfejlesztes/deri-miksa-utca-megujitasa/>

the parking regime has changed. Instead of 146 parking spaces, 135 regular parking spaces have been created, 9 of which are for disabled persons along the entire stretch.¹¹⁷ The street was a popular pedestrian access before the project was completed. Due to the renewal slight gentrification can be noticed as some new shops and cafes opened, with a terrace to the new public space, in the last year.



Picture HU5. Street greening in Budapest, 13th District, Csanády Street, in historic neighborhood 2022. Perennials, trees and rainwater drainage surfaces were placed instead of parking places (Photo Credit: Báthoryné Nagy 2023)

Népszínház Street, Budapest. Another street greening project from Budapest with similar principles - enlarge green areas, provide shade, manage stormwater, develop walkable surfaces and places for community gathering. Unlike the sports in District 13, this neighbourhood has a lower social status population. According to a survey¹¹⁸ the green islands on Népszínház Street are mainly used by outsiders. Local residents do not like the green lanes, they are considered “untidy, ugly and out of place”. The areas around the meeting places are more littered and noisy, so locals do not like them either.

¹¹⁷ <https://kozszolgaltato.bp13.hu/hirek/a-csanady-utca-kozteruleti-es-zoldfeluleti-fejlesztese/>

¹¹⁸ Several stakeholder interviews were made in September 2024, by a student project for urban design, carried by urban system engineer students at MATE University, Budapest. It is available in draft.



Picture HU6. Green islands and community gathering points in Népszínház street. (photo Credit: Báthoryné Nagy 2024)

In Hungary, there is no comprehensive research on the relation between green space supply or development and housing prices. In this field we either rely on the findings of international research or local, small scale studies, basically focusing on one block. The value of housing in relation to public spaces and urban green spaces proximity to public and urban spaces is inversely proportional to the price per square metre of the property, the closer they are to the park, the more expensive they are¹¹⁹. International studies have shown how the size of the park, its proximity to housing, has a direct impact on house prices. The larger the park and the closer it is, the more expensive the property price¹²⁰. Protection status of the park, safety issues and general value of the streetscape also affects housing prices positively.¹²¹ The view of a park from the window has also high influence on property value¹²² For parks, they have shown a significant difference between the value of a nearby dwelling and the value of the directly overlooking a park¹²³.

In terms of property value growth percentage, there is a wide variation between the international studies - there are values between 1.9% and 2.9%, but there are empirical

¹¹⁹ Morancho, 2003; Brander-Koetse, 2011; Luther 2003

¹²⁰ Crompton, 2001; Neutusi, 2001;

¹²¹ Mourato et al., 2010, Luther, 2003

¹²² Bourassa et al. 2004

¹²³ Jiao-Liu, 2010; Luttik, 2000; Jim-Chen, 2009

estimates between 10 and 16.88% as well¹²⁴. Based on the literature it can therefore be concluded that urban green space development can increase the value of properties in the area, even significantly.

Relevant for the Budapest case study is the preliminary impact assessment for Podmaniczky Park prepared by the Levegő Munkacsoport in 2016. In their study they estimated a 10% increase in value for areas within 200 metres and a 3% increase for areas between 200 and 500 metres.

The Millenáris park Budapest is an investment, in which, in both Phase 1 and Phase 2, research was carried out to see the effect of green space development in housing prices. Millenáris park was a brownfield development, Phase 1 finished in the year 2000, in which a former industrial area embedded in the historic urban fabric was turned into a public park and a cultural hub with museums, event halls, cafes and restaurants. Millenáris Park itself has had a positive impact on property prices in the surrounding residential area even only after the announcement of the renewal.¹²⁵ It was more likely a catch-up, real estate prices of the neighborhood could reach the same level as the district's property prices, by the development. So gentrification of the area was part of the strategy. According to the KSH Real Estate Data and Consumer Price Index and the FHB Housing Price Index, in 2001 (the year of the park's construction), the prices of the surrounding apartments increased by 13.6% per square metre¹²⁶. This positive impact data shows that this positive effect was lost after two years (after which there was a 2% decrease every 10 metres after that), presumably as a result of the dense programme offer and the very intense use of the site (noise, traffic, litter, crowd). Other parks were also examined during the same

Phase 2 was Széll Gate Park (Széllkapu Park) in 2020, which is a renewal of some parts of the 20-year old park and significant enlargement of the green space by demolition of the former buildings of the Ministry of Industry. The building site, attached to Margit Boulevard, was turned into an underground parking for 500 cars. On top of the parking lot a 2,6 hectare-large 'roof garden' was developed for public use, slightly elevated from ground level. According to the benchmark forecast, the area base for the price increase was the 5-minute walk area, where a price increase of 5.9% was calculated. An additional 6.3% increase with park views and a 4% loss in the price equalisation zone, giving an overall increase of 12.2% and 1.9%. The total real estate revaluation impact of the investment was estimated at HUF 16.535 billion.

¹²⁴ Csöter et al. 2016

¹²⁵ Takács 2016

¹²⁶ Takács 2016



Picture HU7. Széll Gate Park in the urban area. (Photo Credit: www.gwd.hu)

How protected areas and urban housing supply are related, there is no relevant research on that field either. Despite the strict regulation on building and land use, living close to protected areas is attractive because the natural environment meets the recreational needs of the residents, in addition to nature conservation (see Normafa, Naplás Lake or Farkaserdő in Budapest).

Briefly, the impact of national or local policy is not clearly traceable on the relationship between green space and housing quality and welfare services. This link is being explored only at the small scale, during the implementation of local strategies or development of a project. But in all cases, there is a complete lack of post-implementation monitoring in this respect.

9.2 Transposition of the European legislation on energy efficiency of buildings

Hungary mostly missed the deadlines of the transposition of the European legislations with regard to the Energy Performance of Buildings and Energy Efficiency Directives. Nevertheless, all the required transpositions were sooner or later completed, except for the latest versions of EPBD and EED.

	European level	Hungarian implementation
2002	Energy Performance of Buildings Directive (EPBD) https://eur-lex.europa.eu/eli/dir/2002/91/oj/eng	The 2002 EPBD did not impose common, precise numerical targets. It required each Member State to develop a national methodology for calculating the energy performance of buildings. It required members states to set national minimum requirements on the energy performance of new buildings and only existing buildings with a total useful floor area over 1000 m² that are undergo major renovation¹²⁷. Member States may decide not to set or apply the requirements for the residential buildings (new and existing) which are intended to be used less than four months of the year. The transposition of this directive was a fundamental step to lay down the technical requirements of new construction and major renovation. (Finally the conditions were stricter in case of major renovation than was required by the EPBD.) The results were reflected in the 7/2006 TNM decree, which became the major guiding legislation for two decades. 176/2008 government decree on the energy certificates that became obligatory in case of sale and long term rent..
2010	EPBD revision https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32010L0031	The 2010 EPBD did not impose common, precise numerical targets but it included some changes with respect to the 2002 version. It established mandatory national minimum requirements on the energy performance of new buildings and only existing buildings that are undergo major renovation, regardless of their surface area. Mandatory national minimum requirements have to be updated every five years and are set with a view to achieving cost-optimal levels. Member States shall ensure that: by 31 December 2020, all new buildings are nearly zero-energy buildings; and after 31 December 2018, new buildings occupied New methods for calculating the cost-optimal level of interventions that are crucial for new construction (Nearly Zero Emission buildings). The serious requirements for new constructions were applied with a constant postponement, and are obligatory from January 2024.

¹²⁷ According to the Directive: “Major renovations are cases such as those where the total cost of the renovation related to the building shell and/or energy installations such as heating, hot water supply, air-conditioning, ventilation and lighting is higher than 25 % of the value of the building, excluding the value of the land upon which the building is situated, or those where more than 25 % of the building shell undergoes renovation”

		and owned by public authorities are nearly zero-energy buildings Member States may decide not to set or apply the requirements for “<i>residential buildings which are used or intended to be used for either less than four months of the year or, alternatively, for a limited annual time of use and with an expected energy consumption of less than 25 % of what would be the result of all-year use</i>”.	
2012	Energy Efficiency Directive (EED) https://eur-lex.europa.eu/eli/dir/2012/27/oj/eng	The 2012 EED set out a number of energy efficiency targets, referring not only to the residential or building sector but more broadly to all sectors. The EU aimed to reduce energy consumption by 20% by 2020. Each Member State was required to set indicative national energy efficiency targets. Member States also had to renovate each year at least 3% of the total floor area of centrally owned public buildings.	The transposition was governed by the 122/2015 government decree. The main result of the transposition of this directive was the establishment of the Energy Obligation Scheme in Hungary from 2021. The transposition also set the formal requirements of energy audits.
2018	EPBD revision https://eur-lex.europa.eu/eli/dir/2018/844/oj/eng	Each Member State shall establish a long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, into a highly energy efficient and decarbonised building stock by 2050, facilitating the cost-effective transformation of existing buildings into nearly zero-energy buildings, in particular by an increase in deep renovations. The long-term renovation strategy shall include indicative milestones for 2030, 2040 and 2050, and specify how they contribute to achieving the Union's energy efficiency targets in accordance with Directive 2012/27/EU.	The National Energy and Climate Plan was completed in 2020 and was updated since then. The Long-term Renovation Strategy was completed in 2021 for the first time. The requirements for major renovation were relieved a bit from November 2023. The 7/2006 TNM decree was replaced by the 9/2023 ÉKM decree.
2023	EED revision https://eur-lex.europa.eu/eli/dir/2023/1791/oj/eng	2023 EED defines higher targets for energy efficiency and introduces the “Energy-efficient first principle” as a key element, meaning that energy efficiency must be prioritised by member states across all policy and investment decisions Public bodies at national, regional and local level should fulfil an exemplary role as regards energy efficiency. Each	Not yet transposed.

		Member State shall ensure that at least 3 % of the total floor area of heated and/or cooled buildings that are owned by public bodies is renovated each year to be transformed into at least nearly zero-energy buildings or zero-emission buildings Member States shall establish and achieve a share of the required amount of cumulative end-use energy savings among people affected by energy poverty, vulnerable customers, people in low-income households and, where applicable, people living in social housing	
2024	EPBD revision https://eur-lex.europa.eu/eli/dir/2024/1275/oj/eng	2024 EPBD objective is the reduction of greenhouse gas emissions from buildings within the Union, with a view to achieving a zero-emission building stock by 2050 Member States shall establish a national building renovation plans that also includes a roadmap with targets and indicators, including the reduction of the number of people affected by energy poverty. Member states must implement measures to reduce average primary energy consumption of the national residential building stock by at least 16% compared to 2020 by 2030; and by at least 20-22% compared to 2020 by 2035. Member States shall ensure that at least 55 % of the decrease in the average primary energy use referred to in the third subparagraph is achieved through the renovation of the 43 % worst-performing residential buildings	Not yet transposed. No information on the National Building Renovation Plan or the implementation of the concept of Renovation Passports. As Hungary decided to opt out from ETS2, the relevance of the Social Climate Plan is negligible.

9.3 List of interviews

In addition to the desk research interviews were carried out in May/June 2025, the details of which can be seen in the following table.

Institution	Interview date
Regional Energy Research Centre (REKK)	27 May, in person
Habitat for Humanity, Hungary	30 May, in person
Solidarity Economy Center, Budapest	30 May, in person
Budapest University of Technology and Economics, Department of Construction Materials and Technologies	10 June, online
M-Teampannon Architecture (spatial planning)	12 June, online
Chief architect of Budapest	13 June, online
Urban Planning company of the Municipality of Budapest (BFVT)	17 June, online

NATIONAL REPORT ON THE REGULATORY SYSTEM OF EEPs IN ITALY

1 Executive summary

The following report provides an overview of the policy and governance landscapes shaping Italy's approach to the ecological transition, as defined within the framework of the ReHousIn project, focusing on three main policy fields: housing retrofit, nature-based solutions (NBS), and urban densification/regeneration. For each of these sectors, it outlines regulatory provisions, policy instruments, governance dynamics, and eventual implications on housing conditions.

In the field of housing retrofitting, Italy has launched a range of incentive-based starting from the late 1990s, most prominently based on tax deductions – with consistent investments in the context of the National Recovery and Resilience Plan (PNRR) – aimed at improving energy efficiency in the residential stock. While this contributed to a strong increase in renovations, the design of these instruments has disproportionately favoured owner-occupied and higher income households and tended to exacerbate territorial and socio-economic disparities rather than reduce them. The public housing stock – arguably among the segments most in need of retrofitting – has largely been excluded from this scheme. To compensate for this gap, the state has subsequently made available targeted funds for public housing through the National Complementary Plan (PNC), demonstrating a renewed attention to a long-neglected housing sector.

As regards nature-based solutions (NBS), national and regional frameworks in recent years have increasingly integrated them into urban development strategies, with objectives encompassing climate adaptation, the safeguarding of biodiversity, and the improvement of public health. While there is no overarching national law dedicated to NBS, their inclusion in strategic documents – such as the National Strategy for Biodiversity (adopted in 2023) or the National Strategy for Urban Green Spaces (2018) – as well as in local planning tools reflects a growing institutional recognition of their importance, in line with developments and provisions at the EU level. However, the implementation of NBS remains fragmented and project-based, and their systematic integration into housing-related policies and regeneration programmes is limited.

Urban densification as such remains an underexplored concept in Italy, and the term rarely appears in public discourse or legislation. Instead, urban regeneration (*rigenerazione urbana*) has emerged as a prominent policy field in recent years, supported by policy and regulatory frameworks (at the level of the regions, which hold competencies over territorial governance), directed at reducing soil consumption and promoting the reuse of existing, dismissed or underused areas and buildings. Various instruments – for instance, integrated programmes like the Contratti di Quartiere and, most recently, the PINQuA – are targeting the regeneration

of deteriorated neighbourhoods with a strong focus on increasing the quality and provision of housing (public, but not exclusively) and, in several cases, residential retrofitting. A second strand of urban regeneration refers to large-scale urban redevelopment, involving negotiations between public and private actors. In many cases it is very much market-led, often targeting brownfield sites such as former railway yards and is guided by objectives of financial valorisation. Lastly, densification also occurs at the local level, plot by plot, through the application of ordinary planning tools (such as changes of use and volumetric increases), typically involving minor provisions of public benefits (e.g. quotas of social housing or public space) by private developers.

Concludingly, Italy has adopted ambitious approaches in addressing the ecological transition, with both positive and negative impacts in terms of housing, facing significant challenges – such as a largely outdated housing stock, fragmented governance structures, a lack of coordination, and limited strategic perspectives, along with a lack of sustained funding beyond currently available resources – while at the same time possessing noteworthy resources: it is an extremely biodiverse country, which has moreover accumulated valuable experiences and developed legal and institutional innovations in urban regeneration projects.

2 Introduction and methodology

This report is part of the comparative framework developed within the ReHousIn project, providing an in-depth analysis of the policy and governance landscape shaping Italy's approach to the ecological transition. It focuses on three policy fields which are particularly relevant in terms of housing conditions and, potentially, inequalities: housing retrofit, nature-based solutions (NBS), and urban densification and regeneration. Specifically, the report explores how the ecological transition is being operationalised in Italy – a context characterised by some specificities, as will be outlined – through legal frameworks, public policies, which actors and instruments are involved, and what implications these have for housing conditions and inequalities.

The analysis is based on a mixed-method approach, combining the consultation of academic literature, document analysis, secondary data review, and expert interviews. Furthermore, the outcomes of two Policy Labs (see annex for participants) undertaken in April 2025 in the framework of the ReHousIn project – one in Assisi and one in Milano, involving 47 stakeholders – proved highly valuable in building knowledge and validating our initial interpretations and hypotheses. The main sources of information include national and regional legislation relevant to the three selected fields, national and regional strategies and programmes (most prominently, the National Recovery and Resilience Plan), project calls and specifications, data, academic and grey literature, as well as a series of interviews (see annex) and informal exchanges with public officials and researchers which helped to validate key findings. The report combines both quantitative data and qualitative insights, aiming to provide a comprehensive overview of the main issues at stake while also conveying the scope and depth of the investigated phenomena. Key dimensions of the analysis included the types and evolution of policy instruments (regulatory, financial, and strategic), governance and actor arrangements, and the degree of integration between the different policy sectors (including ecological transition and housing policies). While the adopted approach is primarily of a

descriptive nature, it at the same time contains an interpretative dimension where the availability of information allows, which will form the basis for further ongoing work within the ReHousIn project. Each of the three policy fields was examined separately, followed by a brief discussion to identify intersections and divergencies. Specific attention was dedicated to understanding whether and how these policies explicitly or implicitly address housing needs, and which segments of the population are favoured, included, or rather excluded.

There are, however, several methodological limitations to this work. The most significant one stems from the fragmentation of the legislative and planning landscape, where regulations, terminologies and instruments vary, which renders the construction of a coherent national picture difficult. Furthermore, the availability of data on implementation outcomes is limited and fragmented, especially with regard to social impacts or housing inequalities, which are typically not measured. This similarly applies to urban regeneration interventions, where monitoring is fragmented, based on differing methodologies, in many cases non-existent or inaccessible. Moreover, conceptual ambiguities emerged during the analysis, as terms such as “nature-based solutions” are used inconsistently across policy documents. Finally, the lack of comprehensive evaluations for several major programmes of recent realisation at this point in time – for instance the Superbonus 110% and the PINQuA – signifies that longer-term effects cannot be evaluated yet.

3 General governance system

At the national level, the state defines regulatory and strategic frameworks, particularly through legislative instruments and major funding programmes like, most recently, the National Recovery and Resilience Plan (PNRR), which includes provisions relevant to all policy fields addressed in this research – housing retrofit, nature-based solutions, and urban regeneration. National authorities regulate incentive mechanisms like the Superbonus 110%, set energy efficiency targets in line with EU regulations, and define overarching objectives related to biodiversity and climate adaptation.

Regions are key institutional actors in translating national frameworks into regional strategic and operational policies and programmes. They are responsible for the development of housing policies as well as for overseeing regional public housing providers who, however, typically operate at the subregional level. They provide funding for housing retrofitting through specific programmes and participate in environmental and climate-related planning, often integrating NBS into broader regional development strategies. Some spatial planning competences and instruments exist at the regional level, with Regional Territorial Plans (PTR) setting strategic objectives and providing a broad territorial framework which municipalities are expected to align with.

Provinces and metropolitan cities have limited formal competencies, particularly following the Delrio reform (Law 56/2014), which restructured provincial governance and established metropolitan cities. However, some coordination functions remain, regarding the planning and implementation of interventions across several municipalities. In metropolitan cities, strategic planning in several cases includes elements of NBS (for instance, green corridors or peri-urban

reforestation activities. In recent years, moreover, several attempts have been undertaken to establish supramunicipal or metropolitan housing observatories.

At the local level, municipalities hold direct implementation responsibilities. They usually own parts of the public housing stock and in some cases manage it themselves (alternatively, as happens in most cases, they entrust regional public housing providers with its management). They are moreover responsible for issuing permits for construction and retrofitting interventions, as well as for the definition of land use strategies (aligned with regional regulatory provisions) through planning instruments, most importantly the Territorial Governance Plan (PGT). Municipalities are furthermore key actors in implementing retrofit, urban regeneration and environmental programmes through incentives and programmes launched at superior (regional, national, and European) governance levels. At the local level, municipalities may moreover choose to adopt voluntary strategic action plans, such as the PAESC (Piano d'Azione per l'Energia Sostenibile e il Clima – Sustainable Energy and Climate Action Plan).

While cross-sectoral integration between different policy fields (for instance, housing retrofit and nature-based solutions) is increasingly present in strategic documents, factual governance and implementation remain largely siloed. However, some degree of integration has emerged at the local scale, where “short institutional distances” between actors in some cases facilitate coordination. In the public housing sector, coordination at various governance levels is structurally embedded, as public housing providers are regional entities, which, however, typically operate at the provincial level and interact closely with municipal administrations, whose housing stock they often manage.

Level	Housing	Housing retrofitting	NBS	Densification
National	Sets general framework through laws (e.g., Law 457/1978, Housing Plans); allocates funding via national programmes	Defines incentives (e.g., Superbonus 110%, Ecobonus), sets energy efficiency targets (aligned with EU directives), manages tax credits and access criteria.	Defines national strategies; allocates funds (e.g., via PNRR); provides coordination for biodiversity and climate goals.	Encourages regeneration/in some cases densification through national programmes (e.g., PINQuA, PUI)
Regional	Implementation of national laws; development of regional housing plans; allocation of regional funds; management of public housing through regional public housing providers	Promotion and funding of targeted retrofitting programmes in some regions (e.g., focused on public housing); maintenance through public housing providers	Implementation of national strategies through regional environmental plans (PEAR - Piano Energetico Ambientale Regionale, SRSvS - Strategia Regionale per lo Sviluppo Sostenibile), landscape plans (PPR, Piani Paesaggistici Regionali), regional climate adaptation strategies or action plans; interventions of regional relevance (e.g., river renaturalisation)	Spatial planning via Regional Territorial Plans (PTR); provision of planning guidelines to municipalities; may apply for specific programmes (e.g., PINQuA)
Sub-regional (Provinces/Metropolitan Cities)	limited formal competencies; in several cases coordination at the provincial/metropolitan level (e.g., metropolitan housing observatories); regional public housing providers typically operate at the provincial level	limited formal competencies; in some cases coordination of interventions at the metropolitan/provincial level; retrofitting promoted by public housing providers (often operating at the provincial level)	limited formal competencies; may integrate NBS into strategic metropolitan plans (e.g., Città metropolitane green corridors); Provincial Territorial Coordination Plans may include ecological networks	Provincial Territorial Coordination Plans (PTCP) to coordinate land use and infrastructural development across municipalities; may apply for specific programmes (e.g., PINQuA).
Local (Municipalities)	Development of local housing policies and plans; typically ownership over parts of the public housing stock (in some cases also management); definition of land use via local plans (PGTs, Piani di Governo del Territorio)	Apply retrofit incentives locally; issue building permits; may set up one-stop-shops (e.g., Sportello energia)	Implementation of small-scale NBS (e.g., urban parks); integration into territorial governance plans.	Local planning tools, local regeneration initiatives; may apply for specific programmes (e.g., PINQuA)

Figure IT1. Governance of housing, housing retrofitting, NBS, and densification/regeneration, author's elaboration.

4 Housing retrofitting

4.1 The policy cycle: emergence of the issue and policy decisions

A significant share of Italy's residential building stock performs poorly in terms of energy efficiency. According to a survey based on the national database of energy performance certificates (SIAPE), out of 4.4 million registered certificates for residential dwellings, the vast majority (71%) are classified in the lowest energy performance categories E, F, and G (see Figure IT2)¹²⁸ (Cresme et al. 2024). Italy's residential sector moreover accounts for a substantial share (27%) of the country's final energy consumption (ibid., p. 24). The high energy demand can be attributed to several factors, among which the fact that much of the housing stock is outdated, the predominance of the typology of single-family homes (51,7% of the residential buildings) – which consume more energy compared to multi-household buildings – and the fact that 42,9% of the residential buildings are located in climate zone E (covering northern regions such as Lombardy, Piedmont, and Veneto), where heating needs are significantly higher (ibid.). Important challenges thus persist, particularly in the post-war housing stock, which suffers from deteriorating building materials, substandard quality, and poor energy efficiency (Daglio and Zanfi 2023). This issue is further reinforced by the fact that 72% of residential buildings had been built before 1980, with almost all of these predating the introduction of Italy's first energy efficiency law (373/1976) (*Norme per il contenimento del consumo energetico per usi termici negli edifici – Regulations for reducing energy consumption for heating in buildings*) (Cresme et al. 2024).

¹²⁸ The *Sistema Informativo sugli Attestati di Prestazione Energetica* (SIAPE) is the national database for Energy Performance Certificates (EPCs), established in 2015 and operational since 2016. As of 30 October 2023, the database included around 5 million EPCs, of which 87% (4,4 mio.) refer to residential buildings, representing around 13,7% of Italy's total housing stock (Cresme et al. 2024). While the SIAPE database includes energy performance certificates for both private and public housing stock, the vast majority refers to privately owned dwellings. Between 2016 and 2019, only 18.500 EPCs related to publicly owned buildings were registered, of which 65% concerned the residential sector and the remaining ones non-residential uses (Ministero dello Sviluppo Economico et al. 2020). Consequently, no comprehensive data is available on the energy performance of public housing specifically. However, evidence gathered from interviews and data provided by public housing providers in various Italian cities (Wolfring 2024) indicate that much of the public housing stock is outdated, in urgent need of retrofitting, and exhibits poor energy performance.

Residential EPCs in the SIAPE database by Energy Performance Class (%)

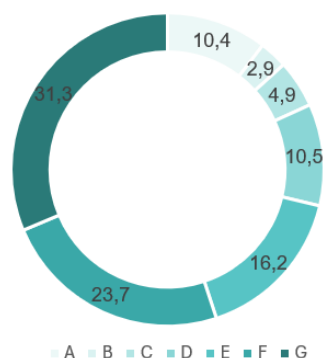


Figure IT2. Energy Performance Certificates in the SIAPE database by Energy Performance Classes in % (Cresme et al. 2024, modified by author).

Over the past two decades, there has been a notable shift in priorities in the Italian residential building sector, moving from a focus on new construction to an emphasis on renovation (Cresme et al. 2024). The balance between new construction and renovation¹²⁹ has evolved significantly during this period (see Figure IT3): between 1997 and 2007, investments in the residential building stock in Italy have still focused primarily on new construction. After a peak in 2006/2007, however, investments in residential construction declined significantly until 2017, whereas renovation investments remained stable. By 2017, investments in renovation have doubled as compared to new construction (ibid.).

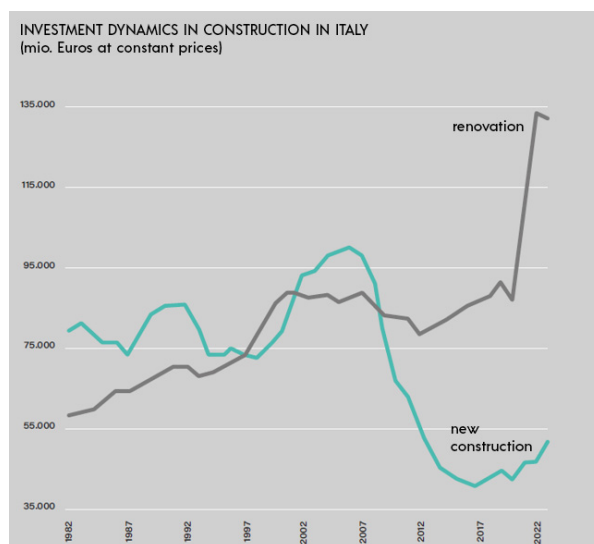


Figure IT3. Investments in new construction vs. renovation (extraordinary maintenance) in Italy, 1982-2022 (Cresme et al. 2024, modified by author).

¹²⁹ The term “renovation” here refers to interventions of extraordinary maintenance as defined by law 457/1978 (Regulations for residential construction), slightly modified by DPR 380/2001 (Consolidated text of laws and regulations on construction), encompassing “the works and modifications necessary to renovate and replace parts, including structural parts, of the buildings, as well as to realise and integrate sanitary and technological services, provided that they do not alter the overall volumetry of the buildings and do not involve urbanistically significant changes in the intended uses implying an increase in the urban load [...]”.

This is largely due to the introduction and promotion of various incentives by a series of laws. Between 2013 and 2020, annual investments in the renovation of buildings reached around €28 billion, with €24 billion allocated to building redevelopment (*ristrutturazione edilizia*) and €4 billion dedicated to energy retrofitting (*riqualificazione energetica*). The introduction of the “Superbonus 110%” scheme in 2020 triggered a significant increase in housing retrofitting investments, reaching €67,1 billion in 2021, €94,6 billion in 2022, and €83,7 billion in 2023. This marked a new (albeit brief) period of stark growth for housing renovation in Italy (Cresme et al. 2024), with the programme being closed in 2023 (as will be further outlined in the next chapter). The incentives introduced in 2020 have had a strong impact, specifically in terms of energy efficiency: “In 2022, 79% of the renovation work carried out in Italy was incentivised, and for the first time, energy efficiency renovations surpassed simple building restoration work in terms of value (€63,6 billion, accounting for 53,6% of the renovation market)” (own translation, Cresme et al. 2024, p.6). Energy retrofitting incentives moreover played a key role in the national economy, contributing 9,9% to GDP growth in 2021 and 25,8% in 2022 (ibid.).

National policies providing funding for the renovation of the private residential stock – first and foremost consisting of tax incentives – have first been launched in the late 1990s in Italy. Such incentives were introduced with the dual objective of supporting the construction sector on the one hand and to reduce the widespread practice of tax evasion on the other (Ufficio Parlamentare di Bilancio 2023). Over time, policies and schemes, which initially targeted renovation measures more generally, evolved to encompass additional goals, particularly regarding energy efficiency and seismic safety. Modifications to policies entailed variations (i.e., the increase or reduction) of tax deduction rates, a growing range of interventions eligible for subsidies, and changing application rules. This reflects both growing efforts and a more targeted approach to the renovation of the residential stock over time. Typical interventions that have taken place in the past three decades, financed through various programmes and schemes, include the replacement of heating systems, windows, and the installation of waterproof layers on roofs, however, interventions overall have demonstrated to be fragmentary and insufficient (Daglio and Zanfi 2023).

Overall, incentives for energy retrofitting have predominantly focused on the private housing stock rather than on public housing. Moreover, the general abolition of structural funds for public housing in the 1990s and the piecemeal alienation of parts of the stock to tenants (at prices far below market) have disincentivised extensive renovation efforts, particularly more complex and integrated ones (Daglio and Zanfi 2023). In public housing estates, the fragmentation of the stock and mixed ownership, insufficient support mechanisms, as well as governance-related complexities further exacerbate existing challenges. However, in recent years, the retrofit and regeneration of public housing have gained relevance in the country’s political agenda (Wolfgring 2024) – some national programmes, under the auspices of the Ministry of Infrastructure, have been targeting the retrofitting or regeneration of public and social housing specifically. These include the “Sicuro, verde, sociale” (Safe, Green, Social) programme and the “PINQuA” (*Programma innovativo per la qualità dell’abitare*), the Innovative Programme for the Quality of Housing, as will be further outlined in chapter 6. These schemes are complemented by some experimental projects, promoted in several regions by various regional and local actors.

The European Union significantly influenced the development of energy retrofitting legislation and measures in Italy, beginning with the adoption of the Energy Performance of Buildings Directive (EPBD) in 2002 (Directive 2002/91/EC), which required member states to introduce measures to enhance the energy efficiency of buildings. These efforts gained considerable momentum throughout the 2000s. The following timeline and table outline key legislative milestones regarding housing retrofitting in Italy (see Figure IT4 and Figure IT5).

Law 373/1976 (*Norme per il contenimento del consumo energetico per usi termici negli edifici*): was Italy's first national legislation addressing energy consumption in buildings, introduced in response to the 1973 oil crisis. It established mandatory thermal insulation standards for new constructions and major renovations, requiring building components to meet maximum U-values to limit heat loss (differing by climatic zones). The law moreover stipulated that building projects include documentation certifying compliance with these efficiency measures.

Law 457/1978 (*Norme per l'edilizia residenziale*): defined, for the first time, interventions in the existing building stock clearly and comprehensively (under Article 31, later amended by DPR 380/2001). These include ordinary maintenance (*manutenzione ordinaria*), extraordinary maintenance (*manutenzione straordinaria*), restoration and conservative rehabilitation (*restauro e risanamento conservativo*), building restructuring (*ristrutturazione edilizia*), and urban restructuring (*ristrutturazione urbanistica*).

Law 449/1997 (*Legge finanziaria per il 1998*): The 1998 budget law introduced the first tax deduction (41%) for the renovation of residential buildings, targeting homeowners and condominiums (Cresme et al. 2024). While it was a temporary measure and not specifically targeted at increasing energy efficiency (but at building retrofit more widely), it marked the starting point of a series of further incentives for renovating residential buildings, however, without defining specific energy renovation targets.

Legislative Decree 19 August 2005, n. 192 (*Attuazione della direttiva 2002/91/CE relativa al rendimento energetico nell'edilizia*): the decree implemented the European Directive 2002/91/EC in Italy, establishing criteria for improving the energy performance of public and private (residential and non) buildings and promoting the rational use of energy. It moreover set out legally binding minimum energy performance standards for new buildings and for existing buildings undergoing significant renovations, tailored to different climatic zones and building types. The decree furthermore introduced energy performance certificates (*Attestati di Prestazione Energetica – APE*) and rendered them mandatory for new buildings and those undergoing substantial renovation interventions. The decree stipulated that as of 31 December 2018, all new buildings occupied and owned by public administrations – including schools – must be nearly zero-energy buildings. Starting from 2021, this requirement applies to all new buildings.

Law 296/2006 (*Legge finanziaria per il 2007*): The 2007 budget law introduced the so-called "Ecobonus", the first tax incentive specifically targeting energy retrofit measures, including thermal insulation, the installation of solar panels, and the replacement of heating systems. Initially providing tax deductions of 55%, the percentage was increased to 65% in 2013, when moreover new interventions to be funded were introduced, including the installation of heat pumps and building automation systems. The Ecobonus didn't require beneficiaries to meet

specific energy renovation targets at the building level but offered deductions for individual energy efficiency measures (e.g., insulation or heating system upgrades), which must comply with minimum technical standards.

Legislative Decree 28/2011 (*Decreto Legislativo 3 marzo 2011, n. 28 – Attuazione della direttiva 2009/28/CE sulla promozione dell'uso dell'energia da fonti rinnovabili*): transposes EU Directive 2009/28/EC into Italian law, promoting the use of renewable energy sources. The decree establishes national targets for renewable energy share in final energy consumption (17% by 2020) and defines rules for the simplification of authorisation procedures for renewable energy installations. It moreover introduces minimum renewable energy quotas for new buildings and major renovations: starting from 2012, at least 50% of domestic hot water demand and 20% of total energy demand (hot water, heating, cooling) had to be covered by renewables. These shares increased to 35% in 2014 and 50% in 2017.

Ministerial Decree 28 December 2012 (*Decreto Ministeriale Applicazione delle metodologie di calcolo delle prestazioni energetiche e definizione delle prescrizioni e dei requisiti minimi degli edifici*): The decree launched the “Conto Termico” programme as a complementary measure to the Ecobonus, aimed at incentivising smaller-scale energy retrofitting measures for both private (individuals and businesses) and public actors. Interventions funded through the programme include the replacement of heating systems, the installation of solar panels and sunshades, as well as the upgrading of building envelopes. It takes form as a non-repayable grant reimbursing a share of the costs (typically between 40 and 65%), with public entities being eligible for up to 100% reimbursement. No numerical targets for interventions, minimum renewable energy quotas, or energy consumption reduction thresholds have been defined by the law. However, an annual maximum budget for allocation has been set at € 200 mio. for public administrations and € 700 mio. for private individuals and businesses.

Legislative Decree 63/2013 (*Decreto Legge, convertito con modificazioni dalla Legge 03 agosto 2013, n. 90, Disposizioni urgenti per il recepimento della Direttiva 2010/31/UE del Parlamento europeo e del Consiglio del 19 maggio 2010, sulla prestazione energetica nell'edilizia per la definizione delle procedure d'infrazione avviate dalla Commissione europea, nonché altre disposizioni in materia di coesione sociale*) amended Legislative Decree 192/2005 to incorporate the provisions set out in Directive 2010/31/EU. It moreover introduced the “Sismabonus”, aimed at improving earthquake safety in buildings (focused on public-use and residential buildings) located in earthquake-prone zones (seismic zones 1, 2, and 3). The programme provides tax deductions ranging from 50% to 85% of the invested costs. While addressing the structural quality of buildings (and thus not energy efficiency specifically), the Sismabonus is often combined with energy efficiency measures for more comprehensive building upgrades. Moreover, eligible interventions include the demolition of buildings, followed by the reconstruction of more energy-efficient buildings.

Law 90/2013 (*Conversione in legge, con modificazioni, del decreto-legge 4 giugno 2013, n. 63, recante disposizioni urgenti per il recepimento della Direttiva 2010/31/UE del Parlamento europeo e del Consiglio del 19 maggio 2010, sulla prestazione energetica nell'edilizia per la definizione delle procedure d'infrazione avviate dalla Commissione europea, nonché altre disposizioni in materia di coesione sociale*) and **Ministerial Decree of 26 June 2015** (*Applicazione delle metodologie di calcolo delle prestazioni energetiche e definizione delle*

prescrizioni e dei requisiti minimi degli edifici) defined the concept of ‘major renovations’ as “work on the integrated elements and components making up the building envelope”, and established a distinction between first-level and second-level renovations, with the former regarding measures involving more than 50% of the total gross dispersing surface of the building, and the latter referring to interventions concerning 25% to 50% of the surface (Ministry for Ecological Transition 2021). Since 2015, newly constructed buildings and those subject to major renovation have to comply with the technical and performance requirements for nearly zero energy buildings (nZEB) as defined in Annex 1 of the decree (ibid.).

Legislative Decree 4 July 2014, n. 102 (*Decreto Legislativo Attuazione della direttiva 2012/27/UE sull'efficienza energetica, che modifica le direttive 2009/125/CE e 2010/30/UE e abroga le direttive 2004/8/CE e 2006/32/CE*) implemented EU Directive 2012/27/EU, introducing measures to improve energy efficiency and setting national energy savings targets. It sets an indicative national target of achieving primary energy savings of 20 Mtoe (equivalent to 15.5 Mtoe in final energy consumption) by 2020 (starting from the benchmark of 2010). The decree furthermore introduces mandatory periodic energy audits for large enterprises and stipulates a 3% annual refurbishment obligation for public building stock.

Law 160/2019 (*Legge Bilancio 2020*): The 2020 budget law introduced the Bonus Facciate (Façade Bonus), providing a 90% tax deduction for upgrading building facades, including external insulation. Originally intended for one year only, the programme was extended (with a reduced deduction rate of 60% in 2022), but closed with the end of 2022. While primarily focusing on increasing aesthetic qualities of facades (having been applicable only on visible walls) and only secondarily on energy efficiency, the instrument did not entail any specific energy-saving targets.

Legislative Decree 34/2020 (*Decreto Rilancio*): the “Relaunch Decree” stipulated the “Superbonus 110%” as part of the economic recovery efforts after the Covid-19 pandemic. The scheme aimed at incentivising retrofitting at a large scale, covering up to 110% of the costs of interventions via tax deductions. Differently from earlier instruments, specific energy-saving targets have been defined: eligible interventions had to result in a minimum improvement of two energy classes, verified through pre- and post-intervention Energy Performance Certificates. The measure distinguished between primary and secondary interventions, with the latter permitted only if carried out alongside major upgrades such as insulation or heating system replacement. All works had to comply with national technical standards and minimum energy performance requirements, rendering the Superbonus a performance-based incentive. Another specificity, as compared to earlier schemes, was that it enabled the transfer of tax credits to a third party (e.g., the companies implementing the works), increasing the accessibility for those with insufficient funds (Ufficio Parlamentare di Bilancio 2023; Ministry for Ecological Transition 2021). Initially addressing private actors only, the programme was extended also to public housing providers upon interventions from within the sector. The programme has had ambivalent effects and was closed in 2023 after heavy criticism (as will be further outlined in the next chapter).

Legislative Decree 10 June 2020, n. 48 (*Attuazione della direttiva (UE) 2018/844 del Parlamento europeo e del Consiglio, del 30 maggio 2018, che modifica la direttiva 2010/31/UE sulla prestazione energetica nell'edilizia e la direttiva 2012/27/UE sull'efficienza energetica*)

implemented Directive (EU) 2018/844 (and amending Legislative Decree 192/2005), with the objective to promote nearly zero-energy buildings and enhancing the energy performance of the existing building stock. It mandates the development of a long-term strategy aimed at decarbonising the national building stock by 2050, in line with EU objectives (the National Strategy for Building Renovation, see below). The decree moreover established the National Portal on the Energy Performance of Buildings (SIAPE), aimed at bundling data on the composition of the building stock and its energy consumption from various data sources into a single, publicly accessible database (Ministry for Ecological Transition 2021).

Legislative Decree 14 July 2020, n. 73 (*Attuazione della direttiva (UE) 2018/2002 che modifica la direttiva 2012/27/UE sull'efficienza energetica*) implemented the 2018/2002 Directive (EU) (and amending Legislative Decree 102/2014), introducing additional energy efficiency measures, including obligations for large enterprises and incentives for energy retrofit measures. It sets a binding national target to achieve cumulative final energy savings of 51.44 million tonnes of oil equivalent (Mtoe) over the period from 2021 to 2030.

Law 101/2021 (*Conversione in legge, con modificazioni, del decreto-legge 6 maggio 2021, n. 59, recante misure urgenti relative al Fondo complementare al Piano nazionale di ripresa e resilienza (PNRR) e altre misure urgenti per gli investimenti*): the law established the Complementary National Investment Plan to the PNRR (*Piano Nazionale Complementare, PNC*), which allocates around €30.6 billion of national funds to complement EU-financed PNRR measures. Among its initiatives, the PNC introduced the "Sicuro, verde, sociale" programme, dedicated to the renovation and upgrading of public housing, with a budget allocation of €2 bio.

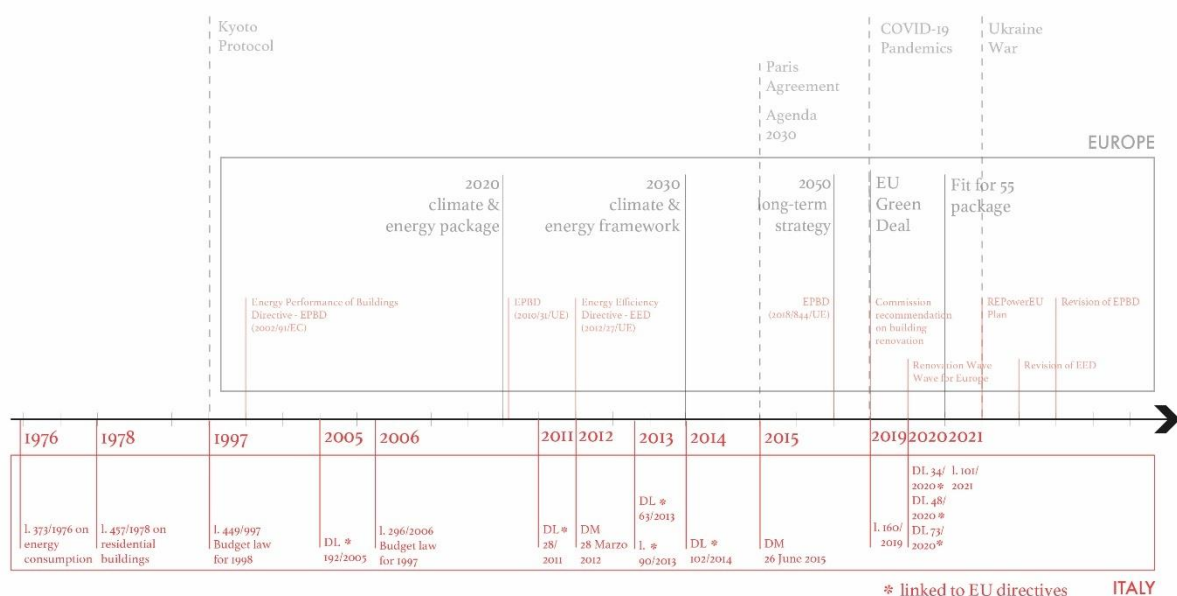


Figure IT4. Timeline illustrating key legislation in Italy and the EU in terms of housing retrofitting, author's elaboration.

Law	Title	Main Contents	Linked to EU Directives	Binding Provisions
Law 373/1976	<i>Norme per il contenimento del consumo energetico per usi termici negli edifici</i> / Provisions for the containment of energy consumption for thermal uses in buildings	First national law on building energy consumption. Introduced mandatory thermal insulation for new construction and major renovation, and documentation certifying compliance.	No	mandatory thermal insulation standards and documentation
Law 457/1978	<i>Norme per l'edilizia residenziale</i> / Provisions for residential buildings	Defined types of interventions in existing building stock (maintenance, restructuring, etc.).	No	
Law 449/1997	<i>Legge finanziaria per il 1998</i> / Budget Law for 1998	Introduced first fiscal incentive for residential renovation (41% tax deduction), but not specifically for energy efficiency.	No	
Legislative Decree 192/2005	<i>Attuazione della direttiva 2002/91/CE relativa al rendimento energetico nell'edilizia</i> / Implementation of Directive 2002/91/EC on energy performance in buildings	Introduced mandatory energy performance standards for new buildings and major renovation, introduced EPCs (APE), nZEB for new buildings (public sector: 2018, others: 2021)	Yes – 2002/91/EC	minimum performance standards and EPCs for new buildings and major renovation, nZEB for new buildings
Law 296/2006	<i>Legge finanziaria per il 2007</i> / Budget Law for 2007	Introduced Ecobonus (first tax incentive targeting energy retrofit specifically), deductions initially 55%, later 65%.	No	compliance of eligible interventions with minimum technical standards
Legislative Decree 28/2011	<i>Attuazione della direttiva 2009/28/CE sulla promozione dell'uso dell'energia da fonti rinnovabili</i> / Implementation of Directive 2009/28/EC on renewable energy	Set national targets for renewable energy share in final energy consumption (17% by 2020) and minimum renewable energy quotas for new buildings and major renovations.	Yes – 2009/28/EC	minimum renewable energy quotas in new buildings and major renovations, increased by year
Ministerial Decree 28 December 2012	<i>Applicazione delle metodologie di calcolo delle prestazioni energetiche e definizione delle prescrizioni e dei requisiti minimi degli edifici</i> / Application of methodologies for energy performance	Introduced 'Conto Termico' scheme for smaller-scale retrofit measures (replacement of heating, installation of solar panels, upgrading of building envelopes) by private and public actors.	No	no numerical targets, but annual maximum allocation defined
Legislative Decree 63/2013	<i>Disposizioni urgenti per il recepimento della Direttiva 2010/31/UE</i> / Urgent measures for implementing Directive 2010/31/EU	Amended 192/2005; introduced Sismabonus to improve earthquake safety (tax deductions from 50 to 85%)	Yes – 2010/31/EU	
Law 90/2013 and Ministerial Decree 26 June 2015	<i>Conversione e decreto attuativo</i> / Law conversion and implementing decree	Defined concept of "major renovations" and distinction between first and second level renovations, mandatory nZEB for new and major retrofits since 2015.	Yes – 2010/31/EU	
Legislative Decree 102/2014	<i>Attuazione della direttiva 2012/27/UE sull'efficienza energetica</i> / Implementation of Directive 2012/27/EU on energy efficiency	Set national energy savings target (20 Mtoe by 2020), introduced mandatory energy audits for large enterprises, 3% annual refurbishment obligation for public building stock	Yes – 2012/27/EU	binding national targets, audits, public refurbishments
Law 160/2019	<i>Legge Bilancio 2020</i> / Budget Law 2020	Introduced Bonus Facciate with 90% deduction for façade upgrades, including insulation; focused primarily on aesthetics.	No	
Legislative Decree 34/2020	<i>Decreto Rilancio</i> / Relaunch Decree	Introduced Superbonus 110% with mandatory two-class energy improvement, possibility of credit transfer; extended to public housing in a second step	Yes - EU Recovery and Resilience Facility	energy performance improvement of two classes
Legislative Decree 48/2020	<i>Attuazione della direttiva (UE) 2018/844</i> / Implementation of Directive (EU) 2018/844	Promoted nZEB and decarbonisation of the building stock by 2050; established SIAPE.	Yes – 2018/844	mandatory national long-term strategy
Legislative Decree 73/2020	<i>Attuazione della direttiva (UE) 2018/2002</i> / Implementation of Directive (EU) 2018/2002	Set binding national cumulative final energy savings target (51.44 Mtoe by 2030); added retrofit obligations and large enterprise duties.	Yes – 2018/2002	cumulative final energy savings target
Law 101/2021	<i>Conversione in legge del decreto-legge 59/2021</i> / Conversion into law of Decree 59/2021	Established Complementary National Plan (PNC); included €2 billion programme for renovation of public housing (Sicuro, verde, sociale)	No	

Figure IT5. Relevant laws on renovation and energy retrofitting in Italy, author's elaboration.

4.2 The implementation process

Several tools for the incentivisation and implementation of energy retrofit interventions have been introduced by national legislation. These include strategic policy documents, tax incentives, other financial instruments, and targeted programmes (mostly regional, national, and European), providing non-repayable grants. The most important tools and their implementation mechanisms will be outlined in the following.

Strategic policy documents

In recent years, several strategic policy documents have been developed at the national level, which entail specifications on energy retrofitting of residential buildings in Italy. These include the long-term renovation strategy in line with the EU's Energy Performance of Buildings Directive, the ***Strategia per la Riqualificazione Energetica del Parco Immobiliare Nazionale*** (National Strategy for Building Renovation), developed by the Ministry for Ecological Transition in 2021. The document provides a comprehensive overview of the national building stock and the current state of retrofitting efforts. It moreover outlines policies and actions aimed at stimulating retrofitting initiatives across both the public and private building sectors (Ministry for Ecological Transition 2021).

Another key policy document is the Integrated National Energy and Climate Plan (***Piano Nazionale Integrato per l'Energia e il Clima – PNIEC***), developed by the Ministry for the Environment and Energy Security (*Ministero dell'Ambiente e Sicurezza Energetica*) in 2024, which entails the country's objectives in terms of climate and energy policies along five dimensions: decarbonisation, energy efficiency, energy security, internal energy market, and research, innovation, and competitiveness. It sets national targets for 2030, including to reaching a 30% share of renewable energy in gross final energy consumption and a 43% reduction in primary energy consumption. Furthermore, the plan acknowledges the importance of the building sector in fulfilling these targets through energy efficiency and retrofitting interventions (Ministero dell'Ambiente e della Sicurezza Energetica 2024).

In a longer-term perspective, the **Italian long-term strategy on the reduction of greenhouse gas emissions** (Ministero dell'Ambiente et al. 2021) – with a time horizon set for 2050 – pursues the objective to reach climate neutrality by 2050. Also here, strong emphasis is put on the building sector. Besides tax deductions (discussed in the following section), the strategy entails obligations to foster renewable thermal energy and to integrate renewable energy sources into buildings, as well as support for municipal investments in energy efficiency measures and district heating systems (European Parliament 2024).

Furthermore, a key policy document, as mentioned, is the National Recovery and Resilience Plan (***PNRR – Piano Nazionale di Ripresa e Resilienza***), Italy's strategic framework within the European Recovery and Resilience Facility (RRF), set up to boost economic recovery after the Covid-19 pandemic. In absolute terms, Italy is the largest recipient of RRF funds, receiving €191,48 billion (26,5% of the total) (European Parliament 2022), and is among the countries with the highest relative allocation (10,79% of its 2021 GDP) (European Commission 2023), reflecting both the country's pressing need and ambition to address longstanding structural deficiencies that predate the pandemic (Wolfgring 2023). The PNRR places particular

emphasis on building renovation, allocating €13,95 billion to measures aimed at enhancing the energy and seismic efficiency of residential buildings, implemented under Mission 2: Green Revolution and Ecological Transition, specifically through the Superbonus 110% (M2C3.2) (Governo Italiano 2021). In addition, Italy launched the **National Complementary Investment Plan (PNC)** to supplement PNRR funding in 2021, earmarking €2 billion for the retrofitting of public housing through the *Sicuro, Verde, e Sociale* (Safe, Green, and Social) programme. Overall, upon finalisation (by the end of 2026), the programme targets the energy upgrading of around 4,5 million square metres of public housing, corresponding to about one tenth of Italy's total public housing stock. Around 1,4 million square metres (corresponding to 1/13 of the national public housing surface) will undergo seismic retrofitting, and an additional 450.000 square metres shall be added through the acquisition of new properties (Corte dei Conti n.d.). Funds were distributed to regions based on intervention plans detailing measures, sites, and ownership (by either municipalities or regional public housing providers). The distributed of funds among regions (see Figure IT8) was based on the number of public dwellings, territorial balance, and seismic risk, with at least 50% reserved for southern Italy (ibid.).

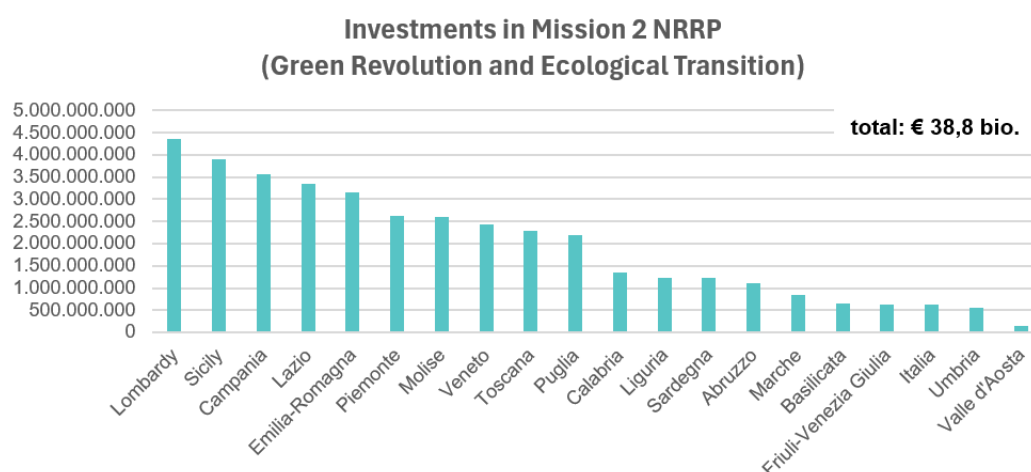


Figure IT6. NRRP investments in Mission 2 by regions, author's calculation based on ItaliaDomani 2025.

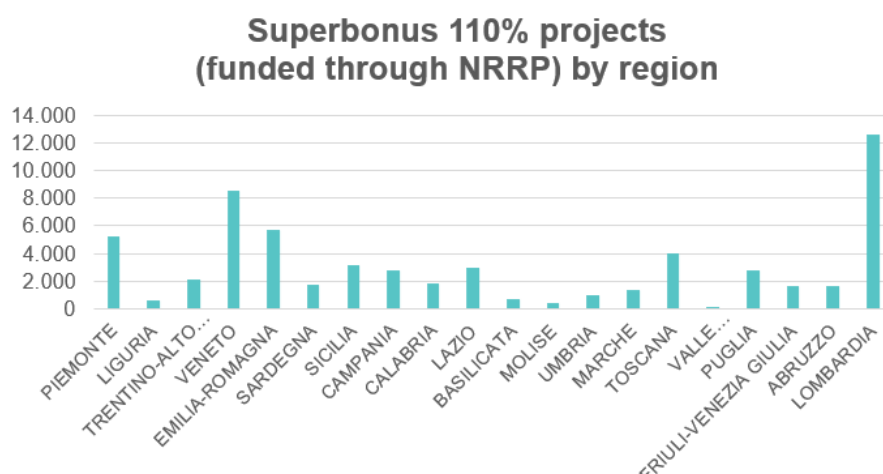


Figure IT7. Number of Superbonus 110% interventions funded through the PNRR by regions, author's calculation based on ItaliaDomani 2025.

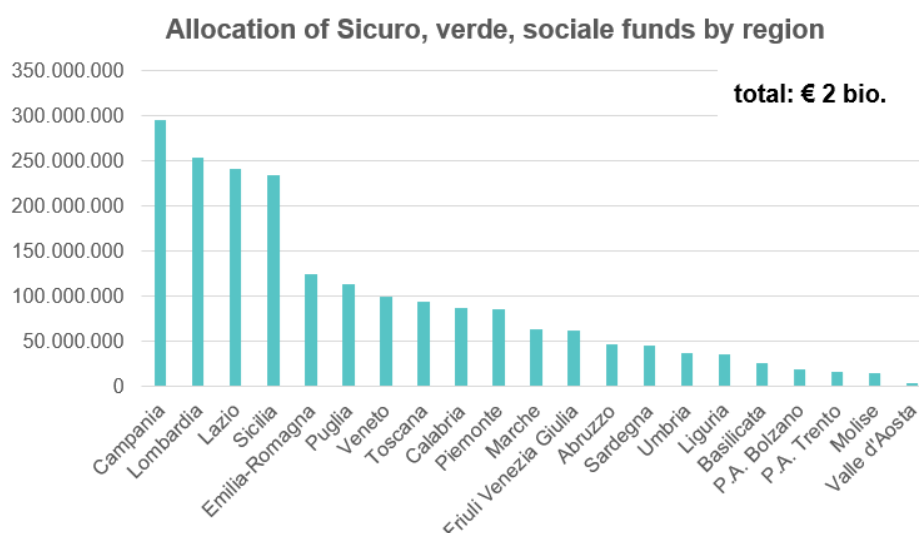


Figure IT8. Allocation of funds from the Sicuro, Verde, Sociale programme (Piano Nazionale Complementare) by regions, author's calculation based on Annex 1 of DPCM 15 September 2021.

Tax incentives

Several tax deduction programmes have been introduced at the national level in Italy, which usually aim to incentivise residential retrofitting. These programmes operate with similar mechanisms, differing mainly in the deduction rates and the timeframes over which the benefits are applied. Typically, specific details and regulations regarding these programmes are outlined in the annual budget laws, which stipulate their scope, eligibility criteria, and applicable deduction rates for each fiscal year. Key instruments, which have meanwhile been concluded, include the **Ecobonus** (aimed at the upgrading of energy efficiency), the **Bonus Facciate** (targeting façade renovations), and the **Superbonus 110%** (for comprehensive and seismic retrofitting). Other programmes, which are still ongoing, include the **Bonus Casa**, targeting

general residential retrofitting, and the **Sismabonus**, focusing on the reduction of earthquake risks.

For some interventions, the combination of different programmes has been possible (e.g., Ecobonus and Sismabonus), building on the premise that a retrofitting intervention can serve as a point of entry to more profound improvements, leveraging synergies and benefiting from piggyback effects. “The idea behind this combined deduction is to exploit the huge potential for improving the efficiency of the building sector while encouraging the seismic retrofitting thereof, using the same ‘trigger point’ represented by the deep renovation of the building, thanks to the economy of scale that can be achieved” (Ministry for Ecological Transition 2021, p. 23).

Most recently, the Superbonus 110% programme has marked a leap in scale in terms of tax-incentivised energy retrofitting, resulting in a substantial increase of government expenditure on “housing and community development” in 2021 and 2022 (see Figure IT9). The programme existed from 2020 to 2023 and entailed the reimbursement of up to 110% of the expenses through tax deductions applied to the invested amount, in a period over four or five years after the investment (Cresme et al. 2024, p. 7). The programme faced stark criticism and was discontinued in 2023. The critiques concerned various aspects, with a key issue being that the scheme failed to benefit actors and segments of the housing stock most in need of renovation. Initially designed to address private actors only, the programme was expanded to the public housing sector only upon persistent advocacy from stakeholders within the sector. This delay, along with specific complexities and obstacles in context with the application to public housing (e.g., legal requirements applying to the public sector, for instance, regarding procurement law, along with differing regional legislative frameworks), have resulted in a low factual application of the instrument to the public housing stock, arguably the one most in need of retrofitting. What had the potential to serve as a transformative tool for large-scale public housing renovation ultimately became a missed opportunity (Wolfgring 2024). In 2023, the national Court of Auditors released an assessment highlighting that the Superbonus benefited disproportionately high-income groups, as emerges from an analysis of 2021 income declarations conducted by ENEA (Corte dei Conti 2023). Recent data moreover show that approximately 73% of the buildings involved (representing 33% of the total investments) had been single-family homes and functionally independent units (ENEA 2024a), which may also include second homes. Moreover, regional divergencies emerged from the analysis, with most interventions having been concentrated in northern (and thus typically economically more prosperous) regions (ENEA 2023; Camera dei Deputati 2023). The Superbonus 110% was moreover criticised for its contribution to producing distortive market effects and for significantly increasing the national debt, as it was designed without a funding cap. By May 2024 (when over 95% of the works had been finalised), investments admitted for tax deduction amounted to €117,7 billion Euros (ENEA 2024).

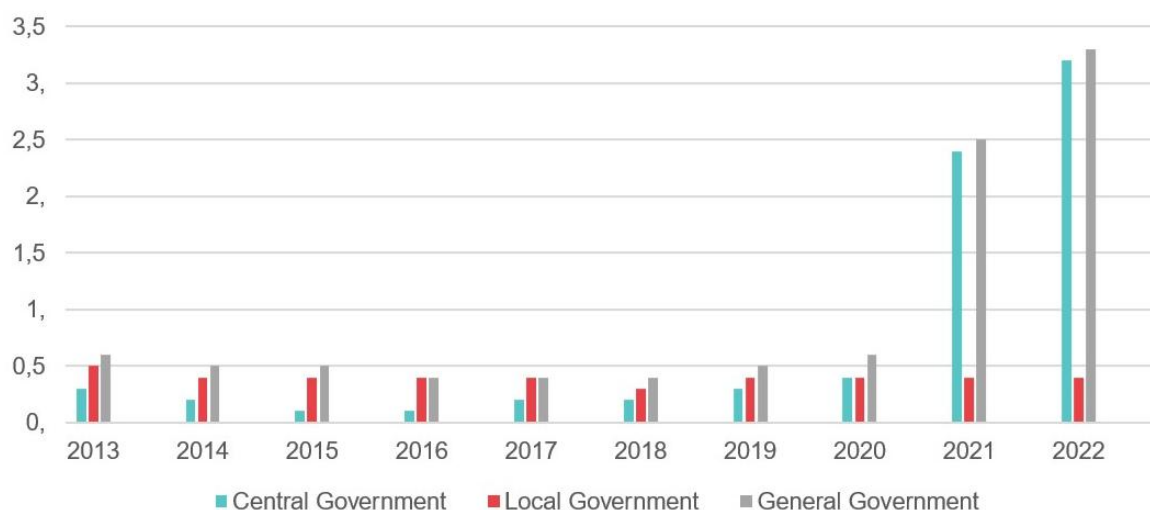


Figure IT9. Public expenditure for “housing and community development” (% of GDP) in Italy from 2013 to 2022 (Bricocoli et al. 2024, data from Eurostat).

Instrument	Eligible Works	Deduction Rate	Eligibility Criteria	Low-Income Support	Duration	Applicable Tenure	Territorial Diversification
Ecobonus	Energy-efficiency upgrades (e.g. insulation, windows, boilers, HVAC)	50%–65% (up to 75% for condominiums)	Taxpayers (individuals, condominiums); works must meet technical efficiency standards	No	Ongoing, with yearly extensions	Private owners, tenants, condominiums	Yes – technical requirements vary by climatic zones
Superbonus	Energy retrofitting + linked works (windows, solar panels, etc.)	110% (reduced to 70% in 2024, 65% in 2025)	Primary residence or second homes under specific conditions (no luxury homes); ≥2 energy class improvement; technical certification required	indirect (possibility of credit transfer and invoice discount, reducing upfront payment)	Until 31 Dec 2025 (reduced rates from 2024 onward)	Owners, cooperatives, public housing providers	Yes – Special terms for municipalities hit by earthquakes
Sismabonus	Seismic improvement works (structural strengthening, anti-seismic upgrades)	50%–85% depending on seismic class gain (until 31 Dec 2024), 36-50% (2025-2027)	Buildings in seismic zones 1, 2, or 3; requires seismic class improvement and certification	No	extended at reduced rates until 2027	Owners of residential and productive buildings	Yes – Only in seismic zones 1–3
Bonus Facciate	Renovation and restoration of building façades	60% (was 90% before 2022)	Only for buildings in zones A and B (urban areas); works must be visible from public space	No	Ended 31 Dec 2022 (no renewal)	All owners, no income restrictions	Yes – Only in urban zoning areas A and B
Bonus Casa	General renovation (bathrooms, kitchens, floors, electrical, etc.), including anti-intrusion and renewables	50%	Any taxpayer, works on existing buildings (not new); annual spending cap (€96,000)	No	Ongoing, usually extended annually	Owners, tenants, usufruct holders	No

Figure IT10. Tax incentives on housing retrofit, author’s elaboration.

Other financial instruments

Another financial tool promoting energy retrofitting is the **Fondo di Garanzia Mutui Prima Casa** (First Home Mortgage Guarantee Fund), established by law 147/2013 in 2013 (Consap 2025). It can be accessed both for the purchase of buyers' first homes and for energy renovation interventions. It provides a guarantee of typically 50% of the capital for loans related to energy efficiency improvements in residential properties. Specifically, the fund can support interventions aimed at restructuring and upgrading the energy performance of properties designated as primary residences (ENEA 2023). In its most recent extension (2025-2027), the fund addresses vulnerable groups specifically, including persons below the age of 36, single parents with minors, public housing tenants, young couples, and large families (Consap 2025). Another instrument, the **Fondo Nazionale Reddito Energetico** (National Energy Income Fund), was introduced in 2020 (with Delibera CIPE n. 7). It aims at supporting low-income families in reducing energy costs through renewable energy. With € 200 mio., allocated for the period of 2024 to 2025, it subsidises the installation of photovoltaic systems for residential use, addressing households with a low income (with an ISEE¹³⁰ below €15.000, or €30.000 for larger households), and targeting primarily southern regions like Abruzzo, Calabria, and Sicily. The fund, managed by the GSE (Gestore dei Servizi Energetici, see chapter 4.4), operates on a revolving basis and is financed through the economic value generated from the withdrawal of electricity which is not self-consumed by the beneficiary, over a twenty-year period. A key aim behind the fund is to pursue social, economic, and environmental objectives in an integrated way while encouraging the adoption of renewable energy sources (ENEA 2023; Ministry for Ecological Transition 2021; GSE n.d.a).

The **Conto Termico** is a fund promoted by the Italian government and administered by the GSE, financed through a small portion of the energy price (Erba and Pagliano 2021). It can be accessed by the public entities, private actors, and businesses, and finances various interventions to promote energy efficiency and the installation of renewable energy systems, including the replacement of heating systems, the installation of heat pumps and solar thermal systems, and the overall improvement of the energy efficiency of buildings. With an annual budget of €900 million (of which €200 mio. earmarked for public entities and €700 for private actors), it provides grants covering up to 65% of eligible expenses. Applications can be submitted directly to the GSE or through an Energy Service Company (ESCO) (GSE n.d.b) (see chapter 4.3). In several cases, the Conto Termico can be complemented by regional contributions, providing further incentives to access the instrument (EcoBonus n.d.).

¹³⁰ *Indicatore della situazione economica equivalente*, an indicator that represents a household's economic situation, considering the income of all household members, their assets, and the household composition using a weighting system.

Instrument	Type	Objective	Eligible Beneficiaries	Benefit	Eligible Interventions	Support for Low-Income Groups	Regional Differences
Fondo di Garanzia Mutui Prima Casa	Guarantee fund	Facilitate access to mortgages for first-time homebuyers (established in 2013)	first-time buyers, from 2025-2027 restricted to fragile profiles (under-36s, low-income families, single parents with minors, public housing tenants, large families)	50% public guarantee on mortgage (up to 90% for large families)	Primary residence mortgage ($\leq$ €250,000)	Priority access and higher guarantee for households with ISEE $\leq$ €40,000, under-36s, large families	No
Fondo Nazionale Reddito Energetico	Capital grant	Reduction of energy costs for low income households; installation of PV systems	Households with ISEE $\leq$ €15.000 in energy poverty	revolving fund dotated with € 100 mio. per year for 2024-2025; fixed grant of €2,000, plus (variable) €1,500 per kW installed	Installation of photovoltaic system for domestic self-consumption	Specifically designed for energy-poor households	Yes, of €100 mio. per year €80 mio. are earmarked for southern regions and islands, € 20 mio. for the rest of Italy
Conto Termico 2.0	Reimbursement	Support renewable heating and energy upgrades	Public administrations, private individuals, businesses	40–65% reimbursement on eligible costs; annual budget of €900 mio. (of which €200 mio. for public entities and €700 mio. for private actors)	installation of renewable energy systems, replacement of heating systems, installation of heat pumps and solar thermal systems	No	Yes – some regions co-finance or top up the Conto Termico with regional funds

Figure IT11. Financial instruments regarding housing retrofit, author's elaboration.

Subnational Policies and Programmes

In addition to the above-mentioned tools, various regions and local authorities have adopted policies and programmes (on an ad-hoc basis as well as more strategically) within the framework of their competencies in terms of territorial and housing policies, to invest in the retrofitting of (typically, the public) housing stock and to promote sustainable housing. Examples include Emilia-Romagna (with, for instance, the *Programma di recupero e razionalizzazione degli immobili e degli alloggi di edilizia residenziale pubblica*), Puglia (*Programma dell'Abitare Sostenibile e Solidale Regione Puglia*), and Tuscany (Wolfgring 2024).

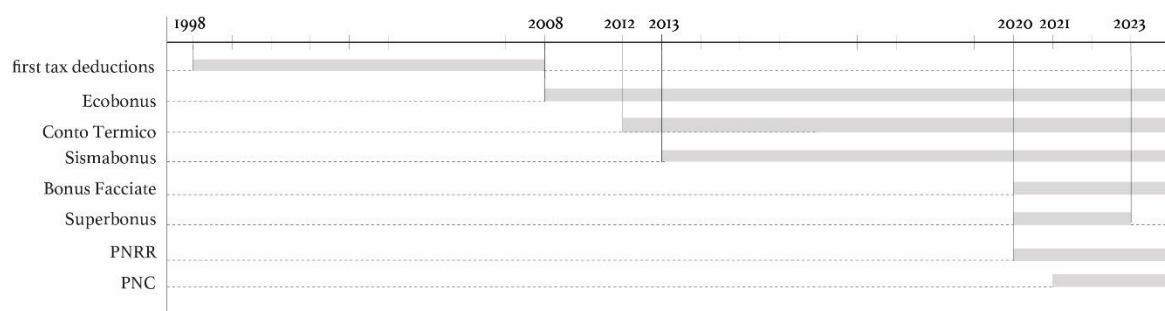


Figure IT12. Timeline of key incentives and programmes of housing retrofit in Italy, author's elaboration.

4.3 Size and role of the market

Italy assumes a rather peculiar position in Europe, with **electricity prices** being among the highest on the continent (Deloitte 2015). In 2024, the average wholesale electricity price amounted to around €100 per megawatt-hour, significantly higher than in Germany (€69) or

Spain (€50) (see Figure IT13) (Reuters 2024). A key reason for this is Italy's large dependence on fossil fuels to generate electricity, particularly natural gas: in 2023, fossil fuels accounted for 55% of the country's electricity production, with natural gas accounting for 45%. This, along with the fact that 95% of Italy's gas derives from imports, renders the country highly susceptible to fluctuations in international gas markets (ibid.). Following the EU's sanctions on Russia in 2022, Italy started to replace gas from Russia (formerly its largest supplier) with imports from other sources, at the cost of higher prices. To somewhat mitigate this burden, Italy's government reduced sales taxes and introduced subsidies to support the expansion of renewable energy generation capacity. However, most of the increased costs have fallen on households through higher energy and electricity bills. In terms of retrofitting, higher electricity costs can have both incentivising or adverse effects: on the one hand, they may encourage retrofitting by increasing cost savings and shortening payback periods, rendering investments more attractive as energy savings quickly offset the initial costs. On the other hand, even with incentives in place, high initial costs of investment remain and constitute a barrier for many households.

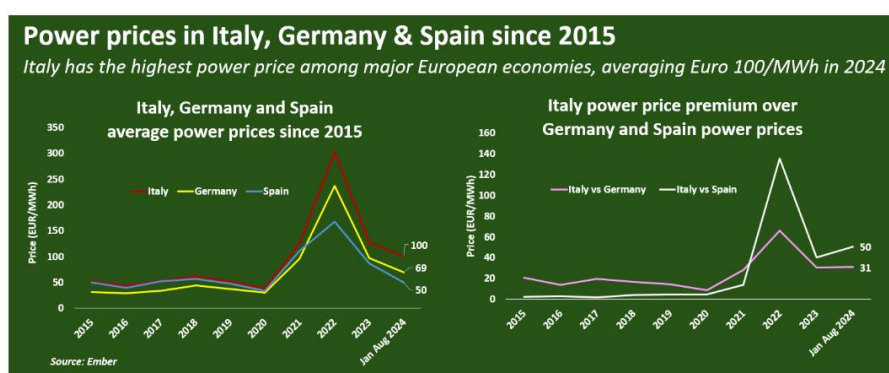


Figure IT13. Power prices in Italy, Germany, and Spain, 2015-2024 (from Reuters 2024, Source: Ember Energy, European electricity prices and costs).

So far, a single national price (PUN – Prezzo Unico Nazionale) has been applied to electricity, a uniform price across the country, calculated as the average price on the electricity market, irrespective of regional variations in production costs or demand. Until 2025, the PUN will be phased out in correspondence with EU directive 2019/944 (the Electricity Directive), aimed at enhancing market integration, increasing efficiency, and better reflecting the real costs of electricity production and distribution in different regions. The PUN will be replaced by zonal pricing, signifying that electricity prices will vary by geographical areas, based on local production costs, demand, and grid conditions (Trio 2024). While this will certainly improve transparency, it might lead to higher costs in areas with less efficient energy production or limited grid infrastructure which may have significant impacts in terms of energy inequality. Reflecting upon what this transition may signify for retrofitting, regional energy cost disparities are likely to influence the extent to which interventions are incentivised or disincentivised. An incentivising effect is to be expected in areas with higher costs, where energy savings have a greater impact. The transition from the PUN to zonal pricing should thus be accompanied by adequate policy measures.

In recent years, average end prices for household **gas consumption** moreover have substantially increased. For households consuming less than 5.000 m³ per year (see Figure IT14), standard offer service tariffs rose by 36,8%, from € 0,604/m³ in 2020 to € 0,826/m³ in 2023. In the same period, free market tariffs (which include commercial offers outside the regulated regime) displayed an even stronger upward trend, increasing from € 0,623/m³ to € 1,057/m³ – a rise of over 69% (ARERA 2023). While the standard offer service is regulated by ARERA (*Autorità di Regolazione per Energia Reti e Ambiente*), the Italian Regulatory Authority for Energy, Networks and Environment, providing a benchmark price set under national oversight, the free market allows suppliers to define their own tariffs, which are often more volatile and reflect changes in procurement and distribution costs more directly.

ANNUAL CONSUMPTION CLASS AND MARKET	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Less than 5,000 m ³											
Standard offer service	60,2	56,8	52,8	47,7	48,2	55,8	60,4	51,0	62,3	115,7	82,6
Free market	63,7	62,4	60,1	56,8	56,1	60,3	65,5	62,0	67,9	95,3	105,7
Differential	5,8%	10,0%	13,9%	19,2%	16,5%	8,1%	8,3%	21,8%	8,9%	-17,6%	28,0%
Between 5,000 and 50,000 m ³											
Standard offer service	52,2	44,1	44,7	37,8	39,2	46,4	48,9	39,6	49,3	115,8	75,9
Free market	50,9	47,6	46,1	42,8	43,5	48,6	50,9	44,1	58,0	124,7	89,0
Differential	-2,4%	8,0%	3,1%	13,1%	11,1%	4,9%	4,1%	11,1%	17,7%	7,7%	17,3%
Between 50,000 and 200,000 m ³											
Standard offer service	50,5	41,9	40,9	36,1	36,1	45,2	44,9	36,7	43,9	117,2	84,5
Free market	43,9	41,4	41,0	37,0	36,3	43,7	44,7	37,3	56,5	122,2	85,0
Differential	-13,0%	-1,1%	0,2%	2,6%	0,5%	-3,4%	-0,5%	1,6%	28,7%	4,3%	0,6%

Source: ARERA, Annual survey on energy sectors.

Figure IT14. Average end prices to household consumers, by consumption class and market type (in c€/m³) (ARERA 2023)

Economically vulnerable households are eligible for social bonuses on electricity and gas bills, regulated by ARERA and provided automatically since 2021. Introduced in 2009 (for electricity) and 2010 (for gas), the bonuses are funded through a solidarity surcharge on all energy users. Eligibility is based on the economic situation of households (an ISEE ≤ €9.530, increased to € 15.000 in 2023 in light of growing prices). Beneficiaries receive a direct discount on their bills, calculated according to household size, location, and type of energy use. The mechanism is coordinated by the INPS (*Istituto Nazionale della Previdenza Sociale*, the National Institute for Social Security). In 2023, 4,5 mio. electricity bonuses and 3 mio. gas bonuses were awarded to households, at an estimated amount of € 1,427 bio. and € 716 mio., respectively (ibid.).

Overall, the topic of energy poverty has gained growing attention in the political discourse in recent years in Italy – in line with similar tendencies at the EU level –, particularly since the 2021 energy crisis. An independent observatory on energy poverty, the OIPE (*Osservatorio Italiano sulla Povertà Energetica*) was established in 2017, with the aim to study and monitor relevant developments in the country (OIPE 2025), predating the creation of the National Energy Poverty Observatory (*Osservatorio Nazionale sulla Povertà Energetica*) in 2022, in line with EU directive EU/2019/944 (SocialWatt 2023). Energy poverty is primarily addressed through welfare mechanisms – such as the aforementioned social bonus on energy and gas bills – rather than being considered a distinct policy domain. The main institutional actors involved are ARERA, which regulates the bonuses, and INPS, which verifies income eligibility. The Ministry of the Environment and Energy Security (MASE) moreover plays a role in

coordinating broader policy strategies, however, no national strategy on energy poverty exists so far. Several Italian municipalities have moreover introduced complementary measures to address energy poverty at the local level. As of 2025, Milan, for instance, is currently developing a strategic Plan for Contrasting Energy Poverty and Precarity (*Piano di Contrasto alla Povertà e Precarietà Energetiche*), after having conducted a participatory process on the theme (Comune di Milano 2025). Additionally, several municipalities have provided targeted support for households with arrears on energy bills or have established energy counters to provide assistance in navigating utility bills and accessing subsidies.

Main further elements of the Italian market framework are energy saving obligation schemes – **Certificati Bianchi or Titoli di Efficienza Energetica (TEE)** –, which were introduced in 2001 in line with the EU Directive on Energy Efficiency and became operational in 2005 (Di Santo and De Chicchis 2019; Erba and Pagliano 2021). General rules and annual savings obligations are set by the Ministry of Economic Development, while the GSE is tasked with monitoring the implementation (ENSMOV n.d.). The scheme requires electricity and gas distributors with over 50.000 users to achieve specific annual energy efficiency targets through the implementation or funding of energy efficiency measures (directly or through third parties), which are then rewarded with White Certificates, certifying the energy savings achieved through the measure (which can include building retrofit). Certificates are only granted for “additional energy savings”, i.e., savings which “wouldn’t have occurred due to legislative, technological, and market developments” (ibid., p. 458). White certificates are tradable, signifying that companies can fulfil their obligations also by purchasing certificates, a process also administered by the GSE (Ricardo n.d.). They are moreover a market-based instrument that is “not selective about technologies or payees” (Pela 2017, p. 15), which entails that no social targeting mechanism nor the use of specific technologies are foreseen in its application.

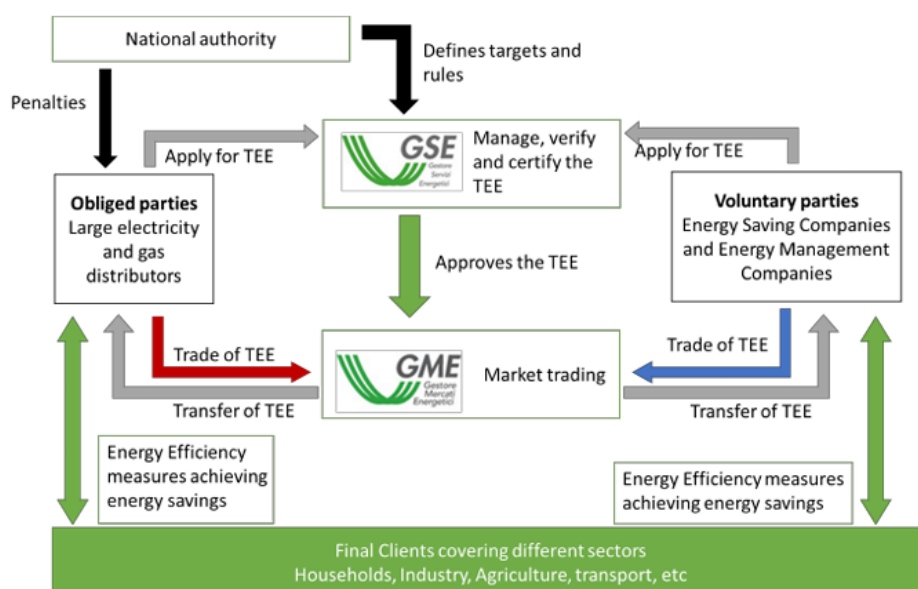


Figure IT15. Key actors involved in the TEE (white certificates) scheme (Ricardo n.d.)

Another market-driven instrument for promoting energy efficiency measures existing in Italy is **Energy Performance Contracting (Contratto di Prestazione Energetica, EPC)**, where

Energy Service Companies (ESCOs) finance and implement energy efficiency interventions and recover their investments through the energy savings resulting from these interventions (Pollo 2017). The Italian ESCO market is considered one of the most developed in Europe (Boza-Kiss et al. 2017), with around 1.500 companies registered as ESCOs, of which around 340 actively operate as such (Skenderi 2023). ESCOs are represented by the ASSOESCO (*Associazione Italiana delle Energy Service Company e degli Operatori dell'Efficienza Energetica*), the Italian Association for Energy Service Companies (ASSOESCO 2024). ESCOs have generated around € 3,7 bio. in revenues in 2018, of which 35% constituted energy performance contract services, while 42% derived from energy efficiency and consulting projects, and 23% from the sales of white certificates (BPIE 2020). However, while EPC has become more widespread in the commercial sector in recent years, its use is limited so far in the residential sector (ibid.). A study by the Joint Research Centre of the European Commission (2019) identifies several structural and institutional barriers in further developing the ESCO market in Italy. Among these, the limited availability of suitable financing instruments and a general lack of trust on the part of potential clients are named as key obstacles. Further constraints include ambiguities within the legislative framework, the relatively small scale and high transaction costs of projects, and the procedural complexity associated with EPCs (particularly in the public sector). Limitations in technical capacities and resources at the local government level add a further layer of complexity (ibid.). As regards the residential sector specifically, the high degree of fragmentation in property ownership – with widespread individual homeownership – and the absence of large-scale commercial landlords are likely to be significant additional limiting factors. Most recently, however, as part of the PNRR (Mission 7, I.17 – RePowerEU), the “Public Residential Building Energy Efficiency” measure is aimed at promoting energy retrofitting of public housing through projects managed by ESCOs, which submit proposals and receive incentives via the GSE. Eligible interventions must target public buildings with centralised heating systems and achieve at least a 30% improvement in energy efficiency, financed through a mix of non-repayable grants (up to 65%) and subsidised loans (up to 35%) (GSE n.d.c).

There is evidence that ESCOs – through lobbying and intermediary associations, such as the ASSOESCO – have inserted themselves into the policy discourse, attempting to influence policymaking and achieve favourable regulatory frameworks. Industry groups like ASSOESCO have called for regulatory stability and improved access to incentives, stressing that the lack of coherent rules might undermine Italy’s capacity to benefit from the energy transition (AGICI 2025). Such advocacy has contributed to the integration of ESCOs into policy instruments, like the PNRR (GSE n.d.c). Moreover, the evolution of the White Certificate scheme from its introduction in 2001 to today reflects that stakeholder influence has been relevant: its design has been repeatedly revised in attempts to increase the economic attractiveness of the scheme, simplify procedures, and expand eligibility (Di Santo and De Chicchi 2019).

Finally, in recent years, **green mortgages** have appeared as a private financial instrument in Italy - these are loans offered at reduced interest rates to incentivise the purchase of energy-efficient residential property (which must fulfil specific energy qualities, usually being classified in energy categories A and B) as well as renovation measures (achieving energy savings of at least 30%) (ENEA 2023). While not being very widespread in Italy yet, both demand and supply of these loans have increased in recent years, as a study commissioned by Banca d'Italia

(Abate et al. 2024) demonstrates. In 2022, green mortgages have accounted for a total value of €3,5 bio., reaching a share of around 10% of all mortgages in the country (Ansa 2023), a proportion reached also in 2024 (La Repubblica 2024). The analysis moreover shows that Italian banks currently offering green mortgages or planning to do so in upcoming years represent over 90% of the total assets included in the RBLIS (Regional Bank Lending Survey), a survey conducted by Banca d'Italia in 2023 (Abate et al. 2024).

Italy moreover is a partner in the **European Energy Efficient Mortgages Initiative (EEMI)**, which aims at providing a standardised framework for green mortgages across Europe. The EEMI has established national market hubs in various European countries, among which Italy, with the aim to investigate the implementation of energy efficient mortgages across different European jurisdictions (EEMI n.d.).

4.4 The multi-level governance process

Energy retrofitting in Italy is operated through a multi-level governance framework encompassing the European, national, regional, and local levels. Italy has aligned to the overarching EU legislative and policy framework – primarily the Energy Performance of Buildings Directive (EPBD) and the Renewable Energy Directive – through the stipulation of various laws and decrees (as outlined in chapter 4.1). Furthermore, Italy has (and continues to) benefit from EU funds for energy retrofitting programmes, first and foremost through the European Regional Development Fund (ERDF) which, in the 2014-2020 ESIF period, has put an emphasis on subsidising affordable housing, with a specific focus on improving energy efficiency. In this period, Italy received € 284 million for investments in housing infrastructure and € 41.3 million for energy efficiency renovations through the ERDF (Lakatos 2018).

The **Ministero delle Infrastrutture e dei Trasporti (MIT)** (Ministry of Infrastructure and Transportation) is a key actor at the national level as it defines, funds and coordinates housing policies and programmes. As the main ministry with competences on urban planning and housing, it sets the overall legislative and policy framework for both new developments and renovation strategies in private and public housing which are targeting the enhancement of energy efficiency as a core objective. Another key actor is the **Ministero dell'Ambiente e della Sicurezza Energetica (MASE)** (Ministry of the Environment and Energy Security) which defines national policies on environmental and energy-related themes as well as technical standards and administers the implementation of the National Energy and Climate Plan. Another important stakeholder is the **ENEA (Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile)**, the National Agency for New Technologies, Energy, and Sustainable Economic Development – a public entity subject to oversight by the MASE, acting as the national point of reference for energy retrofitting. Its tasks include research and development, the collection of data and provision of information on relevant developments in the respective sectors. It moreover provides support to the national government in designing and implementing policies, as well as in managing specific programmes (ENEA 2024b). In 2016, ENEA developed the **SIAPE (Sistema Informativo sugli Attestati di Prestazione Energetica)**, the national database (established with Interministerial Decree of 26 June 2015) for collecting energy performance certificates (APEs), supplied with data provided by the regions (Ministry for Ecological Transition 2021). In 2023, the database contained over 5 million APEs, most of which (4,4 mio., 87%) concern the

residential stock, providing thus valuable insight into the energy performance of the country's housing stock (Cresme et al. 2024). Moreover, a key auxiliary actor at the national level is the **Gestore dei Servizi Energetici (GSE)**, a state-owned company (owned by the Ministry of Economy and Finance and overseen by the MASE) established in 1999 with the aim to promote the development of renewable energy and energy efficiency (MASE 2024b). This entails, for instance, the management of incentives and funding mechanisms, such as the Superbonus 110% and the Conto Termico.

Regional governments are responsible for applying national laws to regional contexts and overseeing their implementation, while they furthermore have specific mandates over housing policies and territorial governance. They have the possibility to exceed national standards by developing additional energy efficiency policies, more stringent building codes, or further incentives according to political priorities (for instance, the establishment of and provision of funding for specific renovation programmes). Furthermore, some regions have introduced the possibility of increasing building volumes when retrofitting of residential buildings is provided (Bonifaci and Copiello 2018). Regional governments are moreover tasked with the distribution of EU and national funds earmarked for regional energy retrofitting programmes. Moreover, some regions have defined comprehensive energy and climate policies and developed respective strategic plans; these include, among others, Lombardy (with the Programma Regionale Energia Ambiente e Clima – PREAC, Regione Lombardia 2024), and Emilia-Romagna (Strategia Regionale Agenda 2030 per lo sviluppo sostenibile, Regione Emilia-Romagna 2024).

At the local level, **municipalities** are responsible for issuing construction permits and overseeing compliance with regional and national regulations. Similarly to regions, it is at the single municipalities' discretion to design priorities according to political and strategic objectives – and thus, for instance, to develop tailor-made local retrofitting policies and programmes (an example for which has been the “Mille Case per Bologna” programme, Wolfgring 2024). Cities can moreover choose to adhere to voluntary policy initiatives such as the “Covenant of Mayors for Climate and Energy”, which aims to encourage and support municipalities in the development and implementation of comprehensive strategies to adapt to climate change (European Commission n.d.a).

Access to housing, housing costs and housing affordability, if ever, are managed by the welfare departments of public administrations and operate largely independently from retrofitting policies. As a result, these policy areas are rarely aligned, with little political or operational overlap (Bricocoli et al. 2025). For instance, first data and qualitative insights on the uptake of the Superbonus scheme indicate that the instrument has not benefited those most in need of economic support and has instead favoured already economically well-off regions (as no positive discrimination mechanisms in favour of low-income groups or disadvantaged areas were implemented). Beyond the “spatially generic” approach of retrofitting bonuses, as identified by Daglio and Zanfi (2023), there is also a clear social blindness in the design and implementation of these policies. Overall, the impacts – both positive and negative – of retrofitting policies on housing (in)equalities in Italy remain largely unexplored, having only recently become a subject of academic interest, while still being largely absent from the policy sphere.

Overall, in Italy, horizontal governance remains a key challenge, with limited strategic alignment between housing, ecological transition, and welfare policies. This disconnect is visible in the lack of coordination between retrofit interventions and housing affordability policies, which are typically governed and implemented by separate institutional actors and without shared instruments. Moreover, cooperation between municipalities is largely voluntary and varies widely: while some cities (such as Milan and Reggio Emilia) have attempted to align their climate strategies through international frameworks like the Covenant of Mayors, others lack formal mechanisms of exchange.

Actor	Scale	Type	Role + Function
Ministero delle Infrastrutture e dei Trasporti (MIT)	National	Public (political + technical)	Defines, funds, and coordinates housing and retrofit policies and territorial planning framework; sets national legislative framework
Ministero dell'Ambiente e della Sicurezza Energetica (MASE)	National	Public (political + technical)	Responsible for environmental and energy policies; oversees National Energy and Climate Plan; oversees ENEA and GSE
ENEA (Agenzia Nazionale per le Nuove Tecnologie, l'Energia e lo Sviluppo Economico Sostenibile)	National	Public (research + implementation)	National point of reference for energy retrofitting, research and development, data collection, policy support to the government; manages SIAPE database; supports programme implementation
GSE (Gestore dei Servizi Energetici)	National	Public (state-owned company)	Manages incentives and funding (e.g. Superbonus, Conto Termico); promotes energy efficiency
Regional Governments with various setups (departments for housing policies, territorial governance, energy and environmental policies)	Regional	Public (political + technical)	Implementation of national laws and policies; stipulation of regional laws and policies in terms of housing, territorial governance, regeneration; design of regional programmes; programming and distribution of national and EU funds
Municipal Governments with various setups (departments for housing, urban planning, welfare)	Local	Public (political + technical)	Implementation of regional policies; urban planning; issuing of permits and ensuring of compliance; administration of welfare support; design of local policies and programmes; can join voluntary frameworks like Covenant of Mayors

Figure IT16. Key actors and tasks in the governance of housing retrofit, author's elaboration.

4.5 Achievements, assessments, and challenges

Over the past three decades, Italy has implemented various policies and programmes aimed at improving energy efficiency in the residential sector, with some positive results. While comprehensive data regarding the overall extent of interventions and investments during this period is not available, the fact that a substantial share of the country's residential stock is still in the lowest energy performance classes highlights that a lot remains to be done. As stated in the *Strategia per la Riqualificazione Energetica del Parco Immobiliare Nazionale* (Ministero

per lo Sviluppo Economico et al. 2020), the prospective annual retrofitting rate in the residential sector has been set for 1,2% for the period of 2030-2050 (an increase compared to 2020-2030, where it has been set at 0,8%). A substantial increase in the mid- to long-term is evidently required to ensure that decarbonisation targets can be achieved.

Concerning the various “bonus edilizi” (like the Ecobonus, Superbonus, etc.), Zanfi et al. (2021) have highlighted that while their implementation has overall produced some positive results, interventions funded through these bonuses have generally been small-scale and sporadic. Deep, comprehensive retrofitting, which could improve energy efficiency and contribute to broader sustainability goals more substantially, has been rare. The authors moreover stress that these programmes have been distributed indiscriminately, without consideration for setting priorities and for specific regional or local contexts. This has resulted in investments being concentrated in economically advantaged regions with robust real estate markets and more proactive recipients, which risks exacerbating territorial inequalities by failing to address disadvantaged areas and the more energy-inefficient housing stock. To address this shortcoming, Zanfi et al. (ibid.) suggest adopting a more territorialised and targeted approach to financing retrofitting instead of the current “spatially generic” approach, in order to guarantee a more efficient and rational way of allocating public resources. They moreover recommend integrating these schemes with policies aimed at addressing social, economic, and environmental inequalities.

This reflects one of the key elements of criticism of retrofitting schemes, namely that they perpetuate social inequity among the recipients. In line with this, researchers (Daglio and Zanfi 2023; Bricocoli et al. 2025) have pointed out that the available instruments have had a limited impact on the residential stock most in need of renovation, thus failing to address systemic issues effectively. More in general, this concerns the country’s public housing stock, a segment long neglected in terms of targeted and comprehensive retrofitting. Only in recent years, this issue has received growing attention at the political agenda, and some programmes have been set up accordingly (Wolfgring 2024) (for further details, see also chapter 6 on densification).

Other issues contributing to the limited success of retrofitting interventions on a broader scale stem from the lack of convergence and effectiveness of legislation and incentives, as highlighted by Daglio and Zanfi (2023). Moreover, small-scale governance issues, such as fragmented ownership within condominiums, have significantly hindered collective decision-making processes required for renovations (Bricocoli et al. 2025). The economic crisis further exacerbated the situation by discouraging long-term investments with delayed returns of 10–20 years (Daglio and Zanfi 2023).

When it comes to private actors, there is limited willingness to adopt new technologies and implement energy-saving measures, particularly in the context of deep renovation. This reluctance is due to various factors: difficulties in accessing credit – as deep renovations usually require significant financial investments – and the inconvenience such renovations cause for tenants, often for an extended period of time (Ministry for Ecological Transition 2021). Daglio and Zanfi (2023) as well as Gentili and Hoekstra (2019) moreover outline that territorial disparities in real estate values have a significant impact on renovation efforts. In less attractive areas (such as inner areas and parts of southern Italy), lower property values discourage owners to invest in retrofitting, as the limited potential for returns through rents undermines the

financial feasibility of such endeavours, further contributing to an increase in properties left vacant.

Another point of criticism regards the fragmentation of instruments and incentives in the retrofitting sector (Bricocoli et al. 2025). The effectiveness of public spending could be significantly improved through the adoption of an integrated, coordinated, and simplified regulatory framework, which would enhance both time and cost efficiency. This would enable to better use the “‘window of opportunity’, i.e. unavoidable or already scheduled extraordinary maintenance works to which energy efficiency or earthquake protection could be linked” (Ministry for Ecological Transition 2021, p. 48). In line with this, procedures should be simplified, and access to both information, tools, and funding should be improved to make it easier for both citizens and public actors to engage in retrofitting activities (ibid.).

Dimension	Measured Impacts	(Potential) Negative Effects	Opportunities
Territorial equity	Substantial investments through recent national schemes: PNRR, including Superbonus and PINQuA (where prioritisation of southern regions exists); PNC (including Sicuro, verde, sociale)	Concentration of interventions in wealthier regions with strong housing markets (Superbonus); potentially increasing regional inequalities	Introduce targeted funding criteria benefitting low-income groups and disadvantaged regions
Beneficiaries	Superbonus largely reaching middle-class owners; public housing retrofit through specific programmes	Superbonus: lack of prioritisation for vulnerable households, public housing stock remained largely excluded; low-income and tenant households not significantly reached	Integration of retrofitting schemes with social policies (e.g., income-based eligibility, support for renters and public housing)
Scale of renovation	Mostly small-scale interventions (increase of 2 energy performance classes)	deep retrofits are rare	Incentivise deep retrofits through tailored funding and support structures for access and implementation
Access to financing	High uptake among actors with large tax capacities, access to resources and information, governance capacities	Low-income and marginalised households face credit and liquidity barriers	Provision of public guarantees, targeted subsidies, and simplified access for low-income groups
Governance	Recent schemes at the national level (PNRR); additionally fragmented regional and local investments	Fragmentation of instruments; lack of vertical and horizontal governance	strengthen horizontal governance at all scales (housing, ecological transition, and social policies)
Market dynamics	Incentives (particularly Superbonus) triggered private market activities	distortive market effects; national debt increase; limited investments in low-demand areas	combination of retrofitting with broader regeneration, territorial governance and mobility strategies (e.g., in inner and southern areas)
Public housing retrofit	recent programmes linked to the PNRR (Sicuro, verde, sociale and PINQuA)	investments remain insufficient; no strategic perspective post-PNRR schemes	development of a medium- to long-term strategy at the national scale; strengthening of technical and financial capacities of public housing providers and municipalities
Information & accessibility	Creation of national databases (e.g. SIAPE), regional or metropolitan housing observatories	fragmentation, lack of data, information, and coordination between scales of governance	Streamlining of procedures, bundling of information at a central level, establishment of local information counters/one-stop-shops

Figure IT17. Summary table on impacts of and potential opportunities linked to energy retrofitting, author's elaboration.

5 Nature Based Solutions

5.1 The policy cycle: emergence of the issue and policy decisions

In the Italian policy context, the terminology associated with Nature-based Solutions has evolved gradually, reflecting broader European developments. Early planning instruments referred, rather generically, to “public green” (“verde pubblico”, as used in Decree 1444/1968), while later on, the concept of “green infrastructure” (“infrastrutture Verdi”) became increasingly widespread, particularly after the EU’s Green Infrastructure Strategy of 2013 – in its annual report from 2016, the Italian SNPA (Sistema Nazionale per la Protezione dell’Ambiente) dedicated a chapter to the topic (SNPA 2016). The reference to “ecosystem services” (“servizi ecosistemici”) emerged in scientific and technical documents – for instance, in a technical report published by the Ministero dell’Ambiente e della Tutela del Territorio e del Mare (2009) – rather than in legislation. The term “Nature-based Solutions” itself appeared in national strategic documents only from the late 2010s onward, including in the Strategia Nazionale del Verde Urbano (2018), the Piano per la Transizione Ecologica (2022), and the Strategia Nazionale per la Biodiversità al 2030 (2023), where NBS are presented as tools for increasing biodiversity and resilience, climate change adaptation, and air quality. This discursive progression – from public and urban green to ecosystem services and nature-based solutions – reflects a gradual shift in Italian policymaking from sectoral greening policies to a more integrated approach of environmental governance (OECD 2023).

Considering Nature-based Solutions (NBS) as actions to protect, manage, and restore natural and modified ecosystems in urban areas, the first key moment in Italy has been the adoption of **Ministerial Decree n. 1444/1968**. The decree, by setting legally binding standards of public services for urban neighbourhoods, states that residential settlements should have nine square meters of “green areas” (including, however, sports facilities) per inhabitant. Several scholars (Barbieri 2008; Moccia and Arena 2021, Laboratorio Standard 2021) have criticised the law for its purely quantitative approach, advocating for a more comprehensive perspective which also considers qualitative parameters. Standards were often applied in new developments, setting the conditions for the creation of large urban parks, especially in new peripheral residential areas, while their application remained largely unmet in existing neighbourhoods. Paradoxically, standards were mostly applied in greenfield developments, as land take figures have remained high throughout Italy in past decades. Between 1989 and 2018, an annual average of 260 square kilometres of green or agricultural land was sealed – as of 2018, 7,5% of the Italian surface is anthropised (Arcidiacono and Ronchi 2021). The annual progression of greenfield development (and thus land take) slowed down from the early 2000s onwards, mainly due to the economic crisis (ibid.).

Another early regulation of relevance has been adopted in 1987, when Italy introduced its first National Forestry Plan (*Piano Forestale Nazionale*), approved by the **Interministerial Committee for Economic Planning (CIPE) on December 2, 1987**, and developed in accordance with **law n. 752/1986** (“Multi-year law for the implementation of programmed interventions in agriculture”). The Forestry Plan was significant as it was the first national document to acknowledge the sector’s specific objectives and distinctiveness, separate from agricultural objectives (CNEL 2000). In 1992, moreover, **law 113/1992** (*Obbligo per il comune*

di residenza di porre a dimora un albero per ogni neonato, a seguito della registrazione anagrafica) stipulated that municipalities with a population of over 15.000 inhabitants must plant a tree for every child newly registered in the civil registry, intended to promote environmental awareness while linking the development of green spaces to demographic changes. While this in principle is a legally binding provision, it lacks effective enforcement mechanisms. The law was later amended with **law 10/2013** (*Norme per lo sviluppo degli spazi verdi urbani*), introducing additional provisions to encourage the development of public green areas. This included the creation of a Committee for the Development of Public Green Areas (the *Comitato per lo sviluppo del verde pubblico*), with the aim of monitoring and proposing measures and fostering the development of green belts. In 2018, the committee published the National Strategy for Urban Areas (*Strategia Nazionale del Verde Urbano*), a non-binding strategic document, stressing the importance of urban forestation and other nature-based solutions in a perspective of health and wellbeing of citizens (Ministero dell'Ambiente n.d.).

While, as demonstrated, environmental issues were on the country's political agenda already in the 1980s, they gained more explicit attention in the 1990s, following the adoption of legislation at the EU level. In 1997, Italy transposed Directive 92/43/EEC of the European Council (the Habitats Directive) into national law by **presidential decree 357/1997** (*Regolamento recante attuazione della direttiva 92/43/CEE relativa alla conservazione degli habitat naturali e seminaturali, nonché della flora e della fauna selvatiche*), stipulating the establishment of obligations for the conservation of natural and semi-natural habitats, as well as wild flora and fauna, leading to the creation of the Natura 2000 network of protected areas within Italy. Today, Italy has 2.646 Natura 2000 sites converging a land area of around 5,8 mio. hectares (19,4% of the national territory), and around 2,3 mio. hectares at sea (6,4% of the Italian water surface) (ISPRA n.d.c).

The early 21st century then introduced significant new legislation at the national level concerning the protection of landscapes and the environment, including **Legislative Decree n. 42/2004** (*Codice dei beni culturali e del paesaggio* – Code of Cultural Heritage and Landscape), which mandates regions to set up regional landscape plans (in which regions must identify areas of interest in terms of landscape and define measures for their protection, enhancement, and management), and **Legislative Decree n. 152/2006** (*Codice dell'Ambiente* – Code of the Environment), establishing binding national guidelines for environmental protection, including the sustainable management of natural resources and the promotion of green interventions. In 2010, the EU's Marine Strategy Framework Directive (2008/56/EC) was furthermore implemented in Italy through **Legislative Decree n. 190/2010**, which aimed to achieve and maintain a good environmental status of marine waters by 2020, promoting an ecosystem-based approach to the management of human activities impacting the marine environment.

In the past decade, a series of policy documents concerning environmental issues has been adopted in Italy, touching upon the topic of nature-based solutions. Explicit reference to “green infrastructures”, for instance, is made in the **2017 Bologna Charter for the Environment**, signed by Italian metropolitan cities, and inspired by the 2030 Agenda by the United Nations adopted in 2015 (Gasparrini and Terracciano 2021). Also in 2017, the **National Strategy for Sustainable Development** (*Strategia Nazionale per lo Sviluppo Sostenibile* – SNSvS) was adopted (and later, in 2022, updated), intended to establish a national reference framework for

the planning and evaluation of environmental and territorial matters (MASE 2022a). Another important strategic document is the **National Strategy for Biodiversity for 2030** (*Strategia Nazionale per la Biodiversità al 2030*), adopted by the Ministry for the Environment and Energy Security (MASE) with ministerial decree n. 252/2023. It defines objectives and actions for the safeguarding of biodiversity in Italy, emphasising the importance of ecosystem-based approaches and nature-based solutions to address environmental challenges (MASE 2025). **The National Plan for the Adaptation to Climate Change** (*Piano Nazionale di Adattamento ai Cambiamenti Climatici – PNACC*) was adopted by the MASE (2023) in the same year, a strategic plan promoting the adoption of NBS as well as ecosystem-based services as important tools of climate change adaptation and for the enhancement of territorial resilience. **The National Integrated Plan for Energy and Climate** (*Piano Nazionale Integrato per l'Energia e il Clima*), first introduced in 2020 in compliance with EU regulation 2018/1999, and revised in 2024 (MASE 2024c), promotes green infrastructure as carbon sinks and as an important part of the country's strategy for achieving carbon neutrality. Another significant development was the adoption of the **National Plan for the Ecological Transition** (*Piano per la Transizione Ecologica – PTE*) in 2022, aimed at coordinating national policies to guide Italy towards sustainable development, in alignment with the European Green Deal and the United Nations 2030 Agenda (MASE 2024a). The plan explicitly references NBS to enhance the natural character of urban areas, particularly through river and wetland restoration and measures to counter coastal erosion and sets the target of expanding protected green areas from 10,5% to 30% of the national territory and increasing areas under 'strict' protection from 3% to 10% by 2030.

While all these strategic documents are important for promoting environmental goals and tackling climate change, they have no binding legislative power. Hence, despite the existence of innovative national and regional frameworks and instruments, scholars have expressed dissatisfaction with greening policies in Italy, as will be further outlined in the following.

In late 2024, the EU's Nature Restoration Law was adopted, setting binding targets to restore degraded ecosystems with the aim to restore 20% of the EU's degraded ecosystems by 2030 and all by 2050 (European Commission n.d.b). As of February 2025, Italy is in the process of developing its National Restoration Plan (due by September 2026) to comply with the regulation. Moreover, in 2024, Italy created the Italian Network for Ecological Restoration (INER/RIRE) to support the implementation of the Nature Restoration Regulation, bringing together experts from academia, public institutions, businesses, and NGOs (SER Europe 2024).

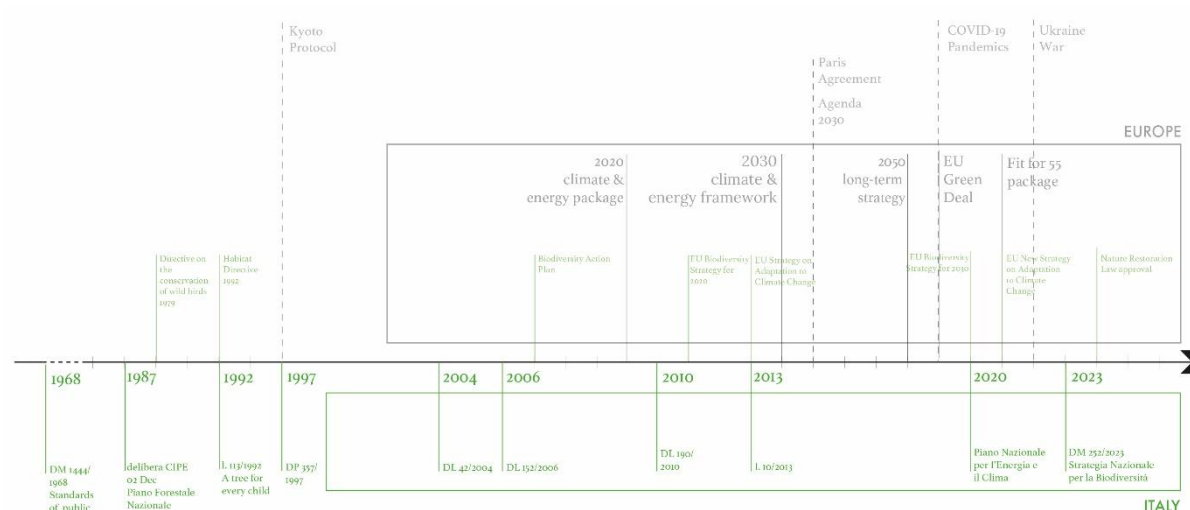


Figure IT18. Timeline illustrating key regulations in Italy affecting NBS, author's elaboration.

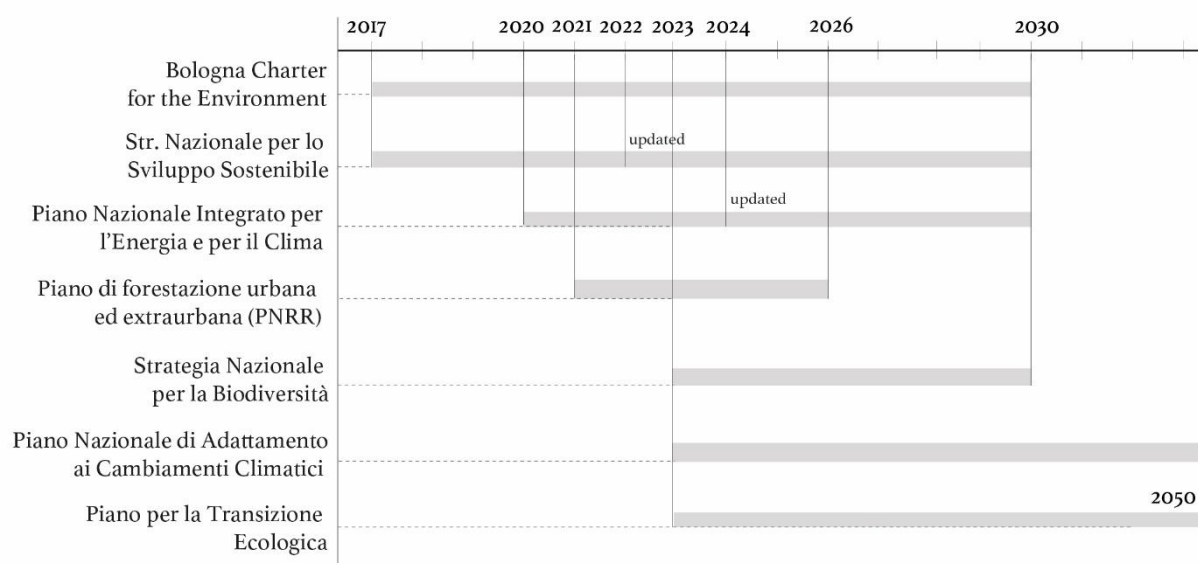


Figure IT19. Strategic documents including provisions on NBS, author's elaboration.

5.2 The implementation process

The implementation and governance of nature-based solutions in Italy is based on a mix of regulatory, financial, and support tools. Regulatory tools, as outlined earlier, are so far limited and fragmented: while planning standards entail the provision of green areas (understood in a broader sense, including also sports facilities), most references to NBS appear in non-binding strategic documents. Financial tools have recently been provided under the PNRR, which allocates substantial funding for urban forestation, ecological restoration, and the

enhancement of biodiversity. Support tools include national strategies (e.g. the *Strategia Nazionale per la Biodiversità al 2030*) and platforms like the NBS Italy Hub, which bundle, provide, and disseminate knowledge and link national policies to wider EU goals. NBS are not integrated into housing policies and thus do not differentiate between housing tenures, resulting in interventions that are tenure-neutral and often disconnected from broader questions of housing equity (Bricocoli et al. 2025).

The implementation of objectives set through strategic documents and plans – often driven by EU agreements, as outlined above – encounters challenges in Italy, especially regarding greening measures. Maggauda et al. (2020, p. 4) argue that “despite the expectations raised by greening as a tool to produce environmental public goods, their territorial allocation is a key problem in Italy. Greening measures have not significantly shaped the Italian context due to land ownership fragmentation and average size generally well below the 10-hectare threshold”. Moreover, as underlined by Arcidiacono and Ronchi (2021), the absence of a broader planning framework beyond the municipal level limits the integration of an ecosystem-service logic into the planning system, which often is only present in the form of recommendations. At the local level, **municipal climate adaptation plans** exist in most major cities – with Bologna having been the first Italian city to develop this document in 2015 (De Luca et al. 2021).

The past decades also saw the proliferation of **citizens’ and local initiatives** linked to greening and forestation (such as Alberitalia, Forestami, Mosaico verde, Forestiamo insieme l’Italia, Bosco del Molino, TreeTime, Think Forestry). The first pioneering experience of urban forestry – “Boscoincittà” – was promoted in Milan in 1974, initiated and implemented by thousands of volunteers coordinated by Italia Nostra, an NGO engaged in the protection, promotion and valorisation of cultural heritage (Italia Nostra 2023). “Forestami” is a project promoted by Politecnico di Milano in 2018, foreseeing partnerships with public administrations, private foundations and social cooperatives that so far have planted 45.000 trees covering 20 hectares across the metropolitan city of Milan (Forestami n.d.).

Most recently, the National Recovery and Resilience Plan (NRRP) has dedicated €1.69 billion to the launch of some pilot NBS measures to be completed by 2026 under Mission 2, Component 4 (*Tutela del territorio e della risorsa idrica*). The most relevant are: i) the digitalisation of national parks; ii) the renaturalisation, ecological restoration and reforestation of areas in the Po river valley and Delta; (iii) the conservation and promotion of urban biodiversity in Italy’s 14 metropolitan areas; and iv) the conversion to biological or agroecological agriculture of agricultural land in all protected areas. The pursuance of these objectives is supported by additional resources from other programmes (e.g. the “Life” programme) and is therefore expected to continue through 2030 and beyond. Regarding urban biodiversity, the PNRR mainly foresees the planting of between 4,5 and 6,6 million trees in urban forestation actions and the promotion of ecological corridors in the 14 metropolitan areas of the country, through Investment 3.1 – Protection and enhancement of urban and suburban greenery, with a funding of € 210 million (later increased to € 330 million). The **“Plan of Urban and Suburban Forestation”** (*Piano di forestazione urbana ed extraurbana*), dedicated to this objective, was approved in 2021. It includes an investigation of the metropolitan cities, stating that “The feasibility of the entire investment, as well as the feasibility of the objectives that emerged from the National Biodiversity Strategy 2030 and COP26 is evidently linked to the

availability of land” (MASE 2021, p. 62). The plan does not primarily focus on small-scale interventions (such as trees and greening on streets) but prioritises larger-scale afforestation efforts in contiguous areas within the territory of the metropolitan cities. In order to reach a broad territorial coverage (while earmarking 50% of the funds for southern regions, IFEL 2022) all metropolitan cities were strongly invited to submit a minimum of five project proposal foreseeing the afforestation of at least 150 hectares, while pursuing the following principles: the protection of biodiversity to ensure the full functionality of ecosystems; the increase of surface area and enhancement of the ecosystem functionality of green infrastructures within the built environment; and the improvement of citizens’ health and well-being. In 2020 and 2021, 72 projects have been admitted for funding, of which 24 in southern regions and islands, 15 in central regions, and 33 in northern regions, supporting the planting of a total of 365.049 trees and shrubs across the national territory (MASE 2021). While the forestation plan focuses on larger interventions, smaller- and medium-sized measures, to be proposed by municipalities, are eligible for funding within the wider framework of the PNRR. Medium-sized fundable public works include the securing of parts of territories at hydrogeological risk; the securing of roads, bridges and viaducts; structural safety and energy efficiency of buildings, with priority for school buildings and other facilities owned by the authority, and of the systems of public lighting. Small-sized fundable public works include the enhancement of energy efficiency of public lighting, publicly owned buildings and public housing, as well as the production of facilities for the production energy from renewable sources; “sustainable spatial development” including interventions in the areas of sustainable mobility, structural safety of schools and other public buildings, and the removal of architectural barriers. Interventions are proposed by municipalities.

While the focus in the provision and funding for and the implementation of NBS is on urban and peri-urban areas, some programmes touching upon NBS exist that target rural areas. One of these, included in the PNRR – under Mission 1, Digitalisation, Innovation, Competitiveness, Culture and Tourism – is the investment on the “Protection and Enhancement of Rural Architecture and Landscape” (*Tutela e valorizzazione dell'architettura e del paesaggio rurale*) (M1C3 – I.2.2), funded with €600 million. While not being directed explicitly at ecological recovery, it supports the improvement of rural landscapes, traditional agricultural structures, and the restoration and functional reuse of historic rural buildings. It provides funding for structural repairs, energy efficiency upgrades, and small-scale tourism infrastructure. The programme is open to public, private, and third-sector entities and foresees the completion of 3.900 interventions by 2025 (Ministero della Cultura 2025).

5.3 Size and role of the market

In many cases, new parks and green areas are provided by private developers based either on the requirements defined in the planning standards of Ministerial Decree n. 1444/1968 (as mentioned earlier) and – increasingly – on negotiated planning agreements (such as *accordi di programma* or *accordi urbanistici*) between developers or landowners and municipalities, which often include the production of private, public or semi-public green areas. In practice, the fulfilment of requirements determined through planning standards often falls short of the objective to produce public spaces, as green areas are often realised as semi-private enclaves

adjacent to new developments, typically used by residents only and thus offering little benefit to the wider public.

Overall, while the planning and implementation of NBS remains largely a responsibility of public actors, there is a growing market interest in the topic, accompanied by an increasing involvement by the private sector. A report by Etifor¹³¹ and the Università degli Studi di Padova (2024, 3) highlights that 45% of (71) surveyed Italian companies acknowledge the risks and opportunities related to climate change and biodiversity loss, indicating a growing corporate awareness for and economic interest in the topic: “The private sector plays a fundamental role in both the loss and protection of biodiversity: Companies contribute to biodiversity loss, but at the same time, they heavily rely on ecosystem services provided by nature. Since 55% of global GDP depends on nature, the private sector has a direct interest in adopting a ‘nature positive’ strategy”. In line with this, nature-based solutions and the incorporation of biodiversity into business planning, the authors stress, can be “a vital asset for long-term economic sustainability”, providing “new opportunities for growth and innovation” (ibid., 36). To capture this potential, the authors propose tax incentives, public-private partnerships, and clearer regulatory guidelines (ibid.).

Financial instruments in the field of sustainable business practices include **green bonds, sustainability-linked bonds, and biodiversity credits** (ibid.). Green bonds, designed to fund projects with an environmental focus (renewable energy, energy efficiency, sustainable mobility, waste management), have already gained significant traction in the Italian market, being also used to support Italy’s sustainability commitments within the framework of the EU Green Deal. Sustainability-linked bonds (SLBs) differ from green bonds in that their financial and structural characteristics, such as interest rates, are directly tied to specific sustainability performance targets. Companies issuing these bonds commit to measurable environmental or social objectives, and if they fail to meet their targets, they may face financial penalties. Biodiversity credits, which operate in a similar way as carbon credits, allow businesses and investors to fund projects that achieve measurable biodiversity improvements. While the concept is still emerging in Italy, there is a growing interest in using these credits as a mechanism to finance conservation efforts (ibid.).

The growing interest in nature-based solutions has been accompanied by the emergence of intermediary actors operating across research, consultancy, and policy (like Etifor, mentioned above) working with both private companies, public authorities, and academic institutions to advise on policy frameworks, promote business models, and advocate for fiscal incentives. Similarly, the Nature-based Solutions Hub (as will be further outlined below) is an intermediary actor bringing together municipalities, consultants, and researchers to exchange technical guidance, indicators, and implementation tools. While such actors do not intervene directly in legislation, they play an increasingly important role in shaping the conditions under which nature-based solutions are defined and integrated into policymaking.

¹³¹ Etifor is a spin-off company of the University of Padua, specialising in the economics of ecosystem services, sustainable land management, and nature-based solutions (NBS). It operates at the intersection of environmental consulting, applied research, and policy advisory.

5.4 The multi-level governance process

At the national level, the governance of the policy field of NBS involves various key actors: first and foremost, the **Ministry of the Environment and Energy Security** is responsible for environmental policies, including NBS, and their integration into strategic policy frameworks, in coordination with commitments determined at the EU level. The ministry moreover oversees the **Italian Institute for Environmental Protection and Research** (*Istituto Superiore per la Protezione e la Ricerca Ambientale – ISPRA*) – a public research body established by law 133/2008, tasked with the conduction of research and the provision of technical-scientific support on environmental protection, biodiversity conservation, and sustainable development (ISPRA n.d.a). It publishes regular reports on various topics, including the report on “Land Consumption, Territorial Dynamics, and Ecosystem Services”, which contains data on soil consumption and land use changes, informing policymakers and the wider public (ISPRA n.d.b). Other relevant institutional actors include the **Ministry of Agriculture, Food Sovereignty and Forests**, which oversees policies with potentially significant impacts on biodiversity, soil conservation, and water management, and the **Ministry of Infrastructure and Transport**, whose agendas touch upon NBS as well. Another key actor in terms of NBS is the **CNR** (*Consiglio Nazionale delle Ricerche*), the National Council for Research, which has established the country’s **Nature-based Solutions Hub** in 2024. This occurred upon initiative and co-financed by the European Commission, which encouraged the development of such hubs across the member states, with the objective to bring together various stakeholders (public administrations, researchers, businesses) to gather information and promote new initiatives focused on nature-based solutions (Network Nature 2023). Furthermore, the **National Biodiversity Future Center**, funded by the Ministry of Universities and Research with Next Generation EU funds, was established recently as a research and innovation hub dedicated to the conservation, restoration, monitoring, and enhancement of Italian and Mediterranean biodiversity. It bundles around 2.000 scientists from various institutions and provides a platform for research in six thematic categories, among which the sea, land, wetlands, and cities (NBFC 2023).

At the **regional level**, NBS – implicitly, as part of environmental policies more widely – are typically situated within departments responsible for environmental agendas. Several regions have developed strategic **policy documents** on sustainable territorial development, biodiversity, and climate change mitigation. An example is Lombardy, which has defined “smart and nature-based solutions for the urban environment” as a strategic focus and instrument to enhance both environmental and social well-being (Regione Lombardia 2021) and stresses the importance of forestation and NBS in fostering climate change mitigation in cities (Regione Lombardia 2022). As regards supralocal planning instruments, the situation varies between regions: differently from **regional landscape plans** (*Piani Paesaggistici Regionali, PPR*), the definition of **regional territorial plans** (*Piani Territoriali Regionali, PTR*) is not mandatory, as responsibilities for territorial planning largely fall within the competencies of the regions, while landscape, as part of the country’s cultural heritage, falls within national responsibility. This leads to a situation in which landscape plans in some cases compensate the absence of territorial plans as Marson (2019, p. 18) has underlined: “Practically, the void of recent regional planning tools going beyond purely functional schemes smooths the potential conflicts with

other recent plans, making landscape plans the new reference for spatial planning (*pianificazione territoriale*) at the regional scale”.

In addition to regional plans, territorial plans moreover exist, in many yet not all cases¹³², at the **metropolitan/provincial level**, with **Provincial Territorial Coordination Plans** (*Piani Territoriali di Coordinamento Provinciale, PTCP*). The metropolitan – as an intermediary – level, as highlighted by Moccia and Arena (2021, p. 103), would be “the most adequate to plan ecologic connections and to upgrade landscape because of the link between regional and municipal planning”, however, this potential so far remains largely unexploited. Thus, vertical governance is often weakened by missing links across tiers, both in terms of policymaking and implementation.

Specific actions and projects, however, are carried out at the **municipal level**, which is primarily responsible for planning and implementing territorial development. This occurs “within a planning system in which diverse territorial planning levels (provincial, metropolitan and regional) have never had the strength or efficacy to guide, coordinate or influence decisions on local land-use planning” (Arcidiacono and Ronchi 2021, p. 5). Alongside **Territorial Governance Plans (PGTs)**, the key tools of municipalities for managing green infrastructure include the **Green Census** (*Censimento del Verde*), the **Green Regulation** (*Regolamento del Verde*), and the **Green Plan** (*Piano del Verde*). While municipalities thus operate at the most concrete level of implementing NBS, horizontal governance across departments (urban planning, environmental issues, and mobility) is typically siloed and fragmented. Moreover, coordination between municipalities is often limited, despite the potential of inter-municipal or metropolitan planning.

Horizontal governance among non-institutional actors, on the other hand, appears to be more dynamic: national NGOs (e.g. Legambiente), research bodies and knowledge platforms (such as the NBS hub) play an increasingly important role in gathering and disseminating knowledge, experimentation, and advocacy.

¹³² The adoption of a PTCP is mandatory in some regions (where stipulated by regional law), including Lombardy and Emilia-Romagna.

Actor	Scale	Type	Role + Functions
Ministry of the Environment and Energy Security (MASE)	National	Public (political + technical)	Responsible for environmental, energy, and climate policies, including NBS; implementation of the National Energy and Climate Plan; oversees ENEA and GSE
Ministry of Agriculture, Food Sovereignty and Forests (MASAF)	National	Public (political + technical)	Oversees policies affecting land use, biodiversity, and forestry
Ministry of Infrastructure and Transport (MIT)	National	Public (political + technical)	Develops infrastructure policies with potential relevance to NBS
ISPRA (Istituto Superiore per la Protezione e la Ricerca Ambientale)	National	Public (technical + research)	Conducts research and technical-scientific support on environmental protection, biodiversity, conservation, and sustainable development; publishes annual reports
CNR – Consiglio Nazionale delle Ricerche	National	Public (research)	Established the NBS Italy Hub and related research and implementation on NBS; coordinates researchers; provides scientific foundations for NBS
National Biodiversity Future Center	National	Public (research)	Coordinates research and biodiversity monitoring, dedicated to conservation, restoration, enhancement of biodiversity; provides an innovation platform
Regional Governments (Environmental Departments)	Regional	Public (political + technical)	Implement national policies; develop own legislation, policies and strategic documents on environmental issues; regional landscape plans; regional territorial plans
Metropolitan Cities / Provinces	Supralocal	Public (political + technical)	Responsible for Provincial Coordination Plans (PTCP), intermediary between regions and municipalities, but little formal competencies; potential role in coordinating supralocal ecologic networks and urban-rural integration
Municipal Governments (Environmental Departments)	Local	Public (political + technical)	Implement regional policies; develop local policies (e.g., Climate Adaptation Plans); planning and implementation of local green infrastructure and forestation; instruments: PGT, censimento verde, regolamento del verde, piano del verde
Legambiente	National/local	Civil society	Environmental NGO promoting NBS, sustainability, and green policies; awareness raising and lobbying; publishes annual reports
Italia Nostra	National/local	Civil society	Promotes protection and enhancement of natural and cultural heritage

Figure IT20. Key actors and tasks in the governance of NBS, author's elaboration.

5.5 Achievements, assessments, and challenges

The current discourse on nature-based solutions (NBS) in Italy, as well as the most recent funding mechanisms, are predominantly focused on urban areas and metropolitan cities. However, NBS are also implemented in rural areas and smaller municipalities, albeit in less visible ways – these interventions tend to be underreported and often appear under more

specific labels (e.g., agroecology, water retention, ecological restoration, etc.) rather than being explicitly framed and communicated as NBS. Overall, little strategic documentation is available as to the factual achievements of NBS and other greening initiatives in a long-term perspective, and systematic national reporting remains limited. This changed somewhat with the first publication of the annual report of the Committee for the Development of Public Green Spaces (under the auspices of the MASE) in 2017. The edition from 2022 (MASE 2022b) shows that substantial achievements have been made in the past decade in terms of NBS and greening measures in urban areas, most likely linked to the adoption of relevant laws as mentioned earlier, specifically law 10/2013 (*Norme per lo sviluppo degli spazi verdi urbani* – Regulations for the Development of Urban Green Spaces). This regards, for instance, urban forestation interventions (see Figure IT21), which grew notably from 2013 onwards, especially in the core cities of metropolitan areas.

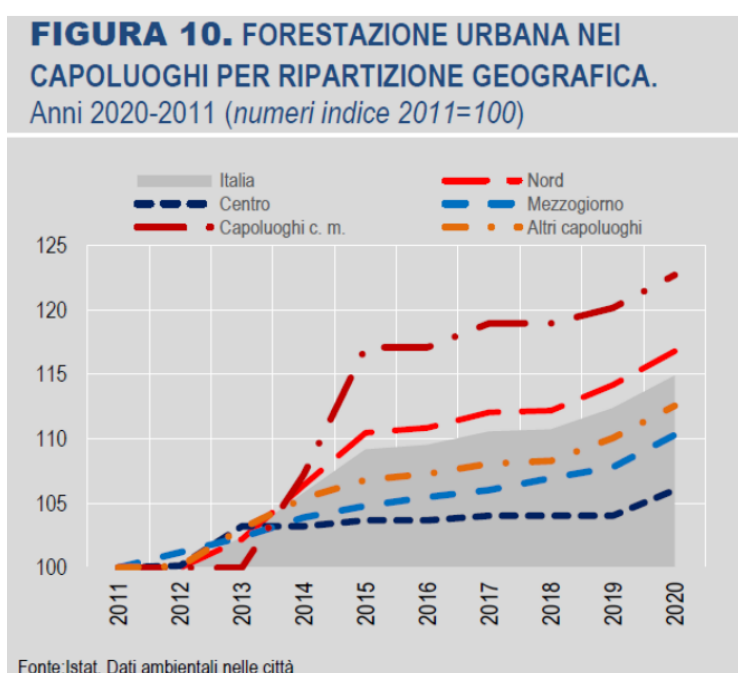


Figure IT21. Development of urban forestation interventions in core cities, 2011-2020 (ISTAT 2020).

Figure IT22 presents key indicators related to the implementation of law 10/2013 – referring to provincial capitals and capitals of metropolitan cities – in the years 2014, 2019, 2020, and 2021, which display notable increases throughout in most cases. This includes the participation of municipalities in the National Tree Day (Art. 1), which grew from 55,3% in 2014 to 75,2% in 2021. The number of trees planted for each newly born or adopted child (Art. 2) also shows a rising trend, with a significant increase from 27.923 in 2014 to 74.116 in 2019, and remaining high in 2021 at 69.029. The share of municipalities with balance sheets of trees (Art. 2-3) grew from 20,2% in 2014 to 55% in 2021. Other key indicators, such as the census of green areas, the share of municipalities with a green regulation, and adopted green plans, also show progressive increases, with census coverage reaching 92,7% in 2021 and green regulation reaching 66,1%, compared to 70,6% and 46,8% in 2014, respectively. Overall, the data indicate that the adoption of law 10/2013 has contributed to increasing municipal efforts in terms of urban greening and that local governments have been quite effective in enforcing the

required measures. However, while clearly a lot has been done in terms of local green governance, the expansion of urbanised green areas per 100 m² of urbanised space as well as the available green space per inhabitant have seen only modest increases over these years.

Year	Municipalities involved in the National Tree Day - Art.1 (% and n.)	Trees planted for each child - Art. 2 (% and no.)	Balance sheets of trees - Art. 2-3 (%)	Urbanized green areas - Art. 4 (m2 x 100 m2 /sup. urb.	Promotion of initiatives Art. 6 (%)	Census of green areas (%)	Green regulation (%)	Green plans adopted (no.)	Risks of Tree Fall (%)	Urban green space availability (m2 per inhabitant e)
2014	55,3 (%) 57 (n.)	28,4 (%) 27.923 (n.)	20,2 (%)	8,25	26,6 (%)	70,6 %	46,8 %	7	22,9 (%)	31,3
2019	69,7 (%) 76 (n.)	51,4 (%) 74.116 (n.)	45,9 (%)	8,47	49,5 (%)	90,8 (%)	57,8 %	8	73,4 (%)	31,8
2020	58,7 (%) 64 (n.)	41,3 (%) 80.968 (n.)	50,5 (%)	8,51	52,3 (%)	90,8 (%)	62,4 %	8	76,1 (%)	32,1
2021	75,2% 82 (n.)	50,5 (%) 69.029 (n.)	55,0 (%)	8,55	57,8 (%)	92,7 (%)	66,1 %	11	78 (%)	32,5

Figure IT22. Relevant indicators as stipulated in law 10/2013, years 2014, 2019, 2020, 2021, referring to capitals of provinces/metropolitan cities, modified by author (MASE 2022b).

Nevertheless, as Figure IT23 shows, the number of urban greening initiatives in existing and new buildings has increased significantly from less than 30 to over 60 between 2014 and 2021. Both the greening of existing buildings (*Rinverdimento aree verdi su edifici esistenti*) and the greening of newly constructed buildings (*Rinverdimento aree verdi nuova edificazione*) show a gradual increase, while vertical greening of buildings (*Rinverdimento verticale degli edifici*) and the transformation of roof terraces into green roofs (*Trasformazioni di lastrici solari in giardini pensili*) are interventions happening rarely, and displaying only slight fluctuations over the years.

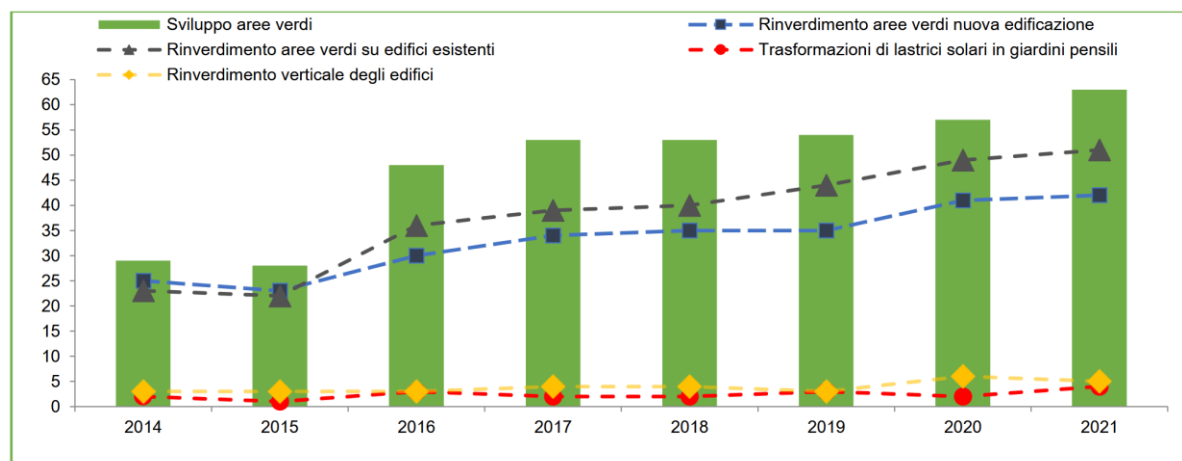


Figure IT23. Number and types of initiatives of urban green spaces (in existing and new buildings) in capitals of provinces/metropolitan cities (law 10/2013), 2014-2021 (MASE 2022b).

Further data show that by 2021, 93% of provincial and metropolitan capitals had carried out a Green Census (*censimento del verde*), however, only 55% of these covered the entire municipal territory, and only 68% contained georeferenced data (see Figure IT 24). Moreover, while two-thirds have adopted Green Regulations (*regolamento del verde*), only a minor share (7,3%) has established a Green Plan (*Piano del Verde*).

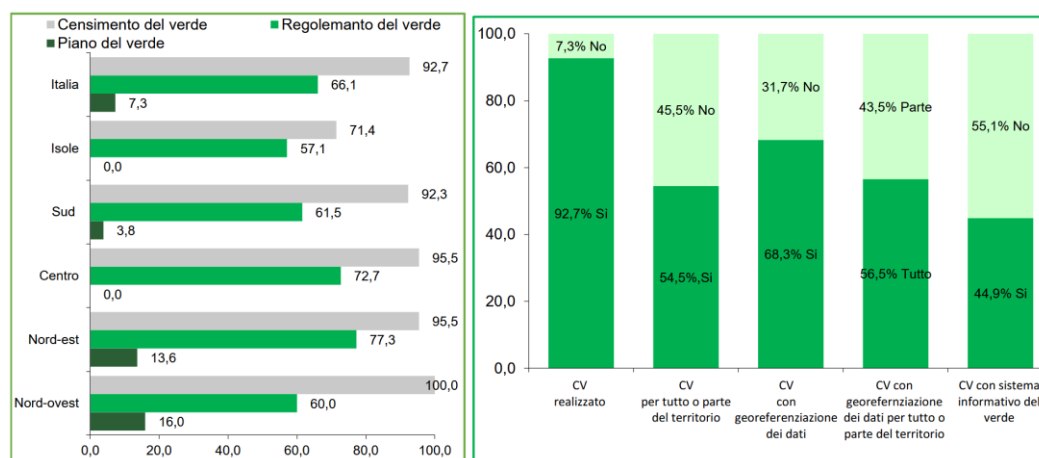


Figure IT 24: Instruments of green planning and governance in provincial/metropolitan capitals, 2021 (%) (left); Green census by characteristics in core cities, 2021 (%) (right) (Source: MASE 2022b)

Overall, housing policies and environmental policies in Italy are not strongly correlated, however, clearly some intersections exist. This started from the introduction of standards in residential areas, which mandated the establishment of green spaces. Urban regeneration – which typically involves also the rehabilitation of green areas – and housing regeneration often go hand in hand, as demonstrated by various integrated programmes adopted in Italy (on this, see also chapter 6). While these programmes reflect a growing alignment between environmental and housing policies overall, there is no direct link between environmental policies, including NBS, and housing affordability policies. This gap exists both at the regulatory and strategic levels, meaning that while sustainability considerations are

increasingly incorporated into urban planning, they are not yet considered in terms of their impacts on housing affordability and inequality.

Dimension	Measured Impacts	Potential Negative Effects	Opportunities
Urban forestation	Stronger growth in urban forestation in northern regions and metropolitan cities; growth below national average in southern, central and non-metropolitan core cities	Disparities between regions	Targeting support to underserved regions; identifying existing best practices
Law 10/2013	Trees planted more than doubled; participation in National Tree Day increased; urbanized green areas and urban green space availability almost stagnant; green census and green regulations increased significantly	stagnation in green space per inhabitant; potentially focus on administrative compliance rather than substantial improvements	Expanding engagement through targeted funding
Types of initiatives of urban green spaces	substantial increase in initiatives of urban green spaces on existing and new buildings; minor growth in vertical and rooftop greening	Limited uptake of vertical greening or green roofs	Supporting pilot projects; disseminating best practices
Green census coverage	Only 54.5% covered the full territory; 68.3% included georeferenced data	Incomplete and inconsistent data limits planning and monitoring	Enhancement of integration with GIS and planning tools to support strategic action
Links to housing and regeneration	Some alignment with regeneration projects, but no direct linkage to affordability or tenure differentiation	lack of integrated projects and programmes between housing, NBS, and social policies	Bridging environmental and housing policies with integrated urban development frameworks

Figure IT25. Summary table on measures impacts, potential negative effects, and opportunities of NBS, author's elaboration.

6 Densification projects

6.1 The policy cycle: emergence of the issue and policy decisions

The first interventions in Italy relevant in terms of urban densification have been experiences of the regeneration of historic centres which have resulted in increased urban densities, first as part of post-war reconstruction efforts, and later through dedicated programmes starting from the 1970s onwards, where the adaptation of buildings and housing to higher quality living standards has led to additive densification interventions. Urban renewal policies such as the *Piani di Recupero* (Recovery Plans) in the late 1970s (introduced by **law 457/1978**) and 1980s as well as the URBAN programme in the 1990s played a key role in this process, promoting regeneration while addressing housing needs and the functional adaptation of historic urban fabrics. More recently, the debate on the compact city and sustainability – shaped by European policies and reinforced by the widespread concept of the 15-minute city – has framed urban density as a strategic response to demographic growth and attractiveness while at the same time aiming to safeguard land consumption and curb urban sprawl. However, in Italy there exists no designated legislation nor a strategic framework on urban densification as such (neither at the national nor regional levels), and the term itself appears rarely. Despite this, it can be identified as an implicit policy objective in various legal and strategic documents that address urban regeneration (*rigenerazione urbana*) more widely, which promote the transformation of the urban fabric, the reuse and transformation of dismissed or underused

built-up urban areas or buildings (often non-residential stock into residential or mixed-used neighbourhoods), implying thus often urban densification measures. This connection is particularly relevant as several regions have integrated the objective of soil protection into their regional territorial laws – such as Emilia-Romagna (LR 24/2017), Lombardy (LR 31/2014), and Umbria (LR 1/2015)¹³³ – linking the reuse of urban land with strategies to limit further land take by promoting development within already urbanised perimeters. In the case of Emilia-Romagna and Lombardy, the provisions are legally binding: the former sets a cap on new land take at 3% of the urbanised surface as of 2017, with a progressive target of zero net land consumption by 2050; the latter establishes the goal of achieving net-zero soil sealing by 2050 and mandates an ecological balance mechanism, requiring new land consumption to be offset by regeneration measures.

Densification in urban areas is therefore typically achieved through large-scale urban redevelopment projects, often involving former industrial or other brownfield sites, such as dismissed military facilities or abandoned railway yards, implemented through the application of specific urban planning tools defined at the national, regional, and local levels (see next chapter). While urban regeneration in Italy has traditionally focused on larger cities, recent years have seen a growing interest in the regeneration of smaller municipalities and peripheral territories, reflected in the development of a National Strategy for Inner Areas (*Strategia Nazionale per le Aree Interne, SNAI*) in 2013. These areas, often in mountainous regions, are characterised by demographic decline, a poor provision of services, and vacancies in the building stock. However, in such contexts, regeneration rarely corresponds to densification, but interventions typically focus on qualitative reuse – for instance, the conversion of disused public buildings or the redevelopment of degraded areas – without significantly altering densities.

Overall, and in line with developments with many other European countries, the understanding of urban and regional planning has evolved substantially since the first national law was adopted in 1942 (**law 1150/1942** – the *Legge Urbanistica*, which is formally still in place, though it has undergone various modifications since then). The focus has gradually shifted from a connotation of urban planning and development as processes to design and implement the expansion of the built environment (prevailing in the first decades of the post-war era) to, more recently, the promotion of the regeneration and transformation of the existing built heritage in a perspective of sustainable land use and a reduction of soil consumption (Gorlani 2022). This has occurred in line with an acknowledgment of the fact that a relevant share of the post-war built heritage is reaching a state of obsolescence (Lanzani 2024). Today, *rigenerazione urbana* is a widely discussed term and concept in Italy both in academic, political, and everyday contexts, however, there is no clear definition or consensus on its objectives, scope, or methods of intervention. It remains a "blurred yet increasingly pervasive field", with "regeneration" largely replacing the term of "urban planning" (*urbanistica*) – a shift which becomes evident also in the renaming of public administration departments, aligning with this concept (Lanzani 2024). In recent years, efforts have been made to develop a national perspective on urban regeneration (Ombuen et al. 2016; Palazzo and Cappuccitti 2024) aimed at mitigating this conceptual vagueness and at establishing a shared framework on urban regeneration interventions. This was attempted at the regulatory level, with the proposal of a

¹³³ The regions in which the Italian case study cities of this project are situated.

bill (no. 1131) in 2019, which, however, in the first attempt did not pass and is said to be currently under preparation. Urban regeneration interventions are thus largely regulated at the regional scale, with provisions being either integrated into territorial governance legislation or through specific regional laws dedicated to the matter (as will be further outlined in chapter 6.4).

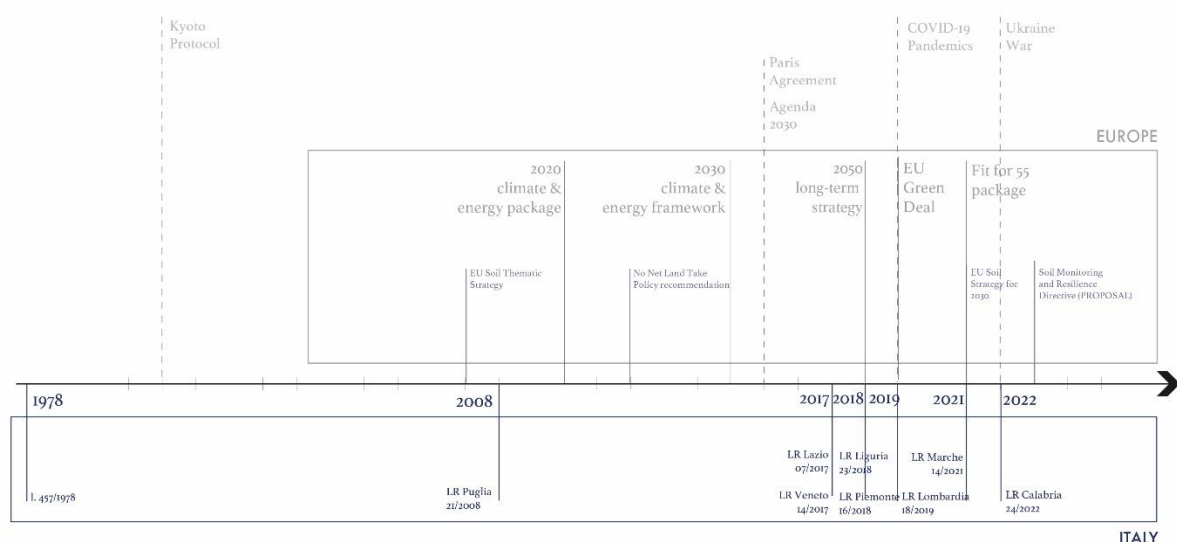


Figure IT26. Timeline illustrating key regulations in Italy and the EU affecting urban regeneration, author's elaboration.

6.2 The implementation process

In operational terms, various tools and strategies exist which result in urban densification. A widely used practice in Italy involves the redevelopment of vacant or underused urban areas, such as former railway yards – exemplified by the several yards undergoing redevelopment in Milan and several other cities. These projects typically result in the transformation into mixed-use neighbourhoods, integrating residential, office, commercial, and public spaces. It is noteworthy that in most cases, investment in housing has become a major driver of these market-led redevelopments. While there is no single national procedure regulating such interventions, they are often promoted through negotiated planning agreements between public authorities and private developers (based on instruments like *Programmi Integrati di Intervento*, *Accordi di Programma*), and financed through a mix of private and public (usually national or regional) contributions. Another common approach involves the demolition and reconstruction of residential buildings with increased volumes, regarding both the private and public housing stock. This is a “plot by plot” process, often implemented at the building level and without an overall planning framework which would ensuring public benefits or steer outcomes (Bricocoli et al. 2025).

Moreover, regeneration has been incentivised since the 1990s through (national) integrated programmes, such as the **Contratti di Quartiere (I and II)**, and, currently, the **PINQuA** (*Programma Innovativo per la Qualità dell’Abitare* – National Innovative Programme for the Quality of Housing). However, within the framework of most of these programmes,

densification was rarely explicitly foreseen (an exception is the PINQuA, as further outlined below). Instruments to implement urban densification measures thus include both ordinary urban planning tools and punctual programmes, as shall be briefly outlined in the following.

Urban planning tools that directly or indirectly impact on urban densification are defined in territorial governance legislation and specified in territorial governance plans and thus vary both between regions and municipalities. Territorial governance in Italy operates at multiple scales through respective plans, namely regional (*Piani Territoriali Regionali*), metropolitan or provincial (*Piani Territoriali Metropolitani/Provinciali*), and local ones (*Piani di Governo del Territorio, PGT*). While regional and metropolitan plans in some cases outline broader strategies for urban regeneration, the implementation of specific measures is primarily the responsibility of municipalities through the definition of **PGTs** (Cotella 2021). Local governance tools outlined in the PGT, which must align with the legislative framework stipulated at the regional level, thus play a key role in urban regeneration and densification processes. These tools include: the **change of use/destination** – municipalities can authorise changes in land use in order to enable residential densification, particularly where the construction of public or social housing is concerned; **volumetric increases** are foreseen in several cases where a social, environmental or other public benefit (including, but not limited to social housing) is generated through urban regeneration measures; several local planning provisions moreover foresee a **simplification and acceleration of administrative procedures and financial incentives** in the case of interventions resulting in urban regeneration (which may include a reduction of procedural costs, municipal taxes, and urbanisation fees – the *oneri di urbanizzazione*) (Bricocoli et al. 2025).

Furthermore, various **integrated programmes** to incentivise and implement urban regeneration (often entailing densification) have been launched in Italy in the early 1990s, inspired by similar policies at the European Union level (particularly the Urban Pilot Projects and the Urban I and II programmes). The season of these '**complex programmes**' (*programmi complessi*) started with the **PII** (*Programmi Integrati di Intervento*), to be promoted by municipalities "in order to upgrade the urban, building and environmental fabric" – thereby specifying for the first time the multidimensional nature of such programmes – and the **PRIU** – *Programmi di Riqualificazione Urbana*, both of which were introduced by the national law 179/1992 (Wolfgring 2024; Capriotti and Santangelo 2021). Important programmes that followed are the **PRU** – *Programmi di Recupero Urbano* (law 493/1993), and, focused on the regeneration of public housing neighbourhoods, the **Contratto di Quartiere (CdQ)** (neighbourhood contracts) programme, introduced in 1997 and extended for a second iteration in 2001. The programme explicitly provided for the possibility to use funds for the requalification and new construction of housing and services (Storto 2018), resulting thus not necessarily in residential densification, but in several cases (as has occurred, for instance, in the case of the CdQ Le Piagge in Florence, Wolfgring 2024). Public funding allocated through the programme amounted to over €300 million for the CdQ I (Storto 2018) and €800 million for the CdQ II (Camera dei Deputati 2017).

A currently ongoing programme funded through the PNRR is the **PINQuA**, the National Innovative Programme for the Quality of Housing, endowed with €2.8 billion. It addresses municipalities with more than 60.000 residents, metropolitan cities, and regions, and is aimed at enhancing the quality of housing and urban spaces. It focuses on the regeneration of

housing and furthermore specifies the increase of the public and social housing stock as a designated objective, aiming to achieve "a high strategic impact on the national territory" (Governo Italiano 2021, p. 214). Densification is explicitly mentioned as an objective of the programme, drawing on the 15-minute city model in pursuing the broader aim of reducing soil consumption as well as increasing resilience to climate change and the availability of green spaces, specifically in areas of high residential pressure (MIMS 2022). However, whether the programme will effectively produce the desired outcomes in terms of densification remains to be seen after its finalisation (scheduled for the end of 2026).

Overall, integrated programmes have typically entailed objectives of retrofitting as well as greening. For instance, both the Contratti di Quartiere and the PINQuA have funded interventions aimed at improving the energy efficiency of buildings through retrofitting measures, and have supported the inclusion of green public spaces, sustainable mobility, and the use of nature-based solutions. Integrated programmes of urban regeneration thus are frequently linked to broader environmental and energy policy goals.

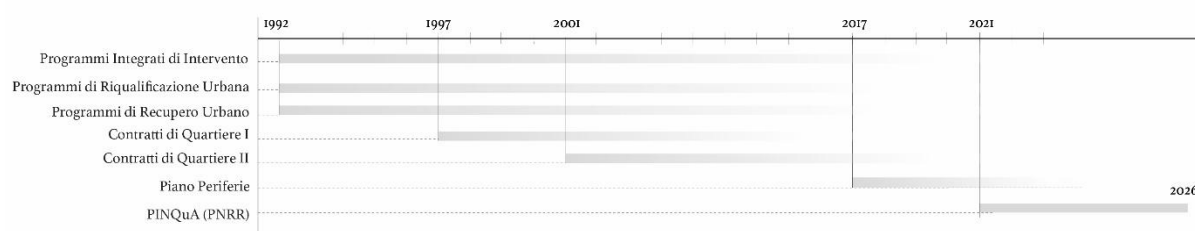


Figure IT27. Key programmes of urban regeneration in Italy, 1990s-today, author's elaboration.

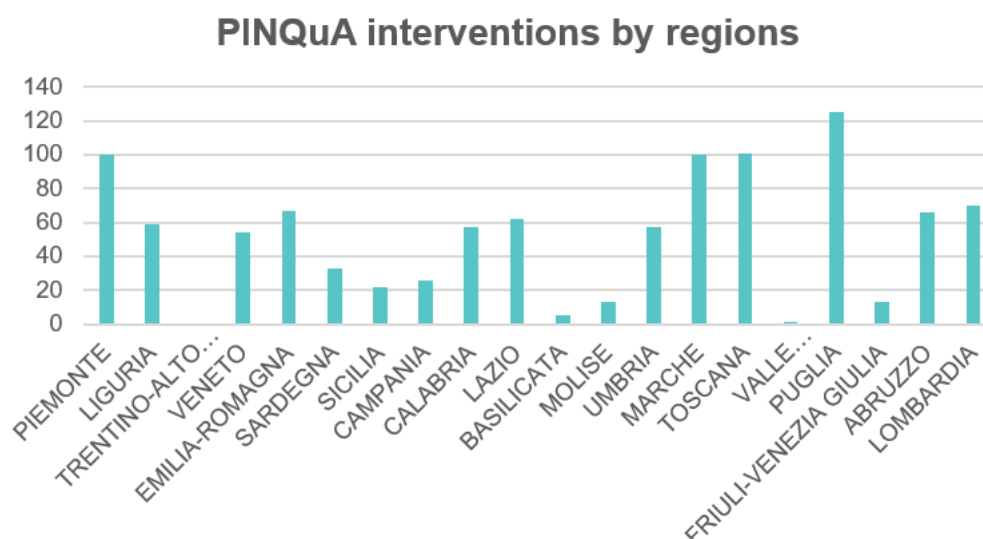


Figure IT28. PINQuA interventions by regions, author's calculation based on Italia Domani 2025.

6.3 Size and role of the market

Large-scale regeneration projects (e.g., on railway yards and brownfield sites) in Italy are typically market-oriented interventions, relying on private developers' initiative and substantial private investment, as large margins of return can be achieved. Such projects typically involve national as well as international real-estate developers, the mobilisation of capital through investment funds and investment companies. The role of finance has significantly changed the overall profile of urban regeneration projects in terms of the acquisition of properties as well as in terms of orienting and driving the timing and perspective of the redevelopment. The debate around private and public partnerships and the role of the public actor in urban planning has significantly been focusing on such major projects, in which private investors have often played a core role. While these interventions contribute to densification, they often lead to rising market prices, as they primarily address more affluent populations, especially in attractive cities (Bricocoli et al. 2025). Given that the residential dimension often constitutes a key function in these redevelopments, the proportion of social or public housing is generally low or non-existing, as developers usually prefer to pay the corresponding value to the city instead of integrating a variety of housing profiles. These dynamics are further reinforced by the role of real estate lobbies and business associations (such as ANCE – *Associazione Nazionale Costruttori Edili*), which aim to promote and achieve investor-friendly regulations. Such actors often engage in consultations and advocacy with political parties and ministries, pushing for legislative changes that streamline planning procedures, reduce obligations, or expand volumetric allowances in urban redevelopment. In several cases, the public has assumed the role of an “enabler in the financialization of real estate markets”, adopting “controversial market-led urban policies” (Bortolotti 2023, p.1). As Bortolotti further outlined (ibid.), local authorities tend to implement planning frameworks which facilitate direct investment by semi-public and public development companies. These entities, as well as semi-public firms, play a key role in large-scale urban projects. This has led to an increasing assetization of public land, while often incorporating provisions for public services or infrastructures (e.g., mobility or social housing). This approach reflects similar developments in other major global cities (Fainstein 2008; Tasan-Kok 2021), where public investment serves as a catalyst for attracting financial capital and enhancing global competitiveness.

6.4 The multi-level governance process

As mentioned, there is no national legislation on urban regeneration, and attempts to design a regulatory framework have so far proven unsuccessful. However, in terms of vertical governance, several institutional levels play distinct roles. At the national level, the **Ministero delle Infrastrutture e dei Trasporti (MIT)** (Ministry of Infrastructure and Transport) plays a key role in governing urban regeneration (and thus implicitly densification), specifically through the **subordinate General Directorate for Housing and Urban Redevelopment** (*Direzione generale per la casa e la riqualificazione urbana*). It oversees the development and implementation of policies related to infrastructure, transport, and housing, which are integral parts of regeneration projects. The ministry has, for instance, funded and been involved in various projects aimed at reducing social and physical deterioration of (public and other) housing neighbourhoods.

At the regional scale, there are broad divergencies in terms of urban regeneration legislation and policies: while most **regional governments** have (to some degree) integrated provisions on urban regeneration into their legislation on territorial and urban planning and governance, some – including Puglia (LR 21/2008), Lazio (07/2017), Veneto (14/2017), Liguria (23/2018), Piemonte (16/2018), Lombardy (18/2019), Marche (14/2021), and Calabria (24/2022) – have adopted specific **urban regeneration laws** (Cellamare 2020). In Lombardy, for instance LR 18/2019 (*Misure di semplificazione e incentivazione per la rigenerazione urbana*) supports urban regeneration processes through the reduction of urban planning fees and the simplification and acceleration of administrative procedures. However, also in regional laws, the term “densification” rarely appears. An exception is the law of Emilia-Romagna (LR 24/2017, *Disciplina Regionale sulla Tutela e l'Uso del Territorio*), where densification is explicitly named as a potential intervention for reuse and urban regeneration (Colavitti and Serra 2023), concerning both public and private spaces and buildings. As instruments for implementing urban regeneration, integrated programmes are defined in various laws, understood as coordinated sets of interventions aimed at addressing both physical and socio-economic shortcomings in a comprehensive way. Integrated programmes bundle multiple objectives, bringing together both various stakeholders – typically both public and private – as well as diverse sources of funding. In some of these programmes, such as the PINQuA, urban densification is explicitly incentivised. Some regional laws (like LR 21/2008 of Puglia, *Norme per la Rigenerazione Urbana*) impose a legal obligation on municipalities to establish programmatic documents on urban regeneration, which must identify areas where urban regeneration interventions are to be implemented and outline the types of interventions to be pursued, which may include densification measures.

At the **municipal level**, densification is governed through local planning instruments (which may have different terminologies according to the different regions (*Piano di Governo del Territorio*/Territorial Governance Plan (PGT) in Lombardia or *Piano Urbanistico Generale*/General Urban Plan (PUG) in Emilia Romagna), which in many cases entail provisions for urban regeneration, identifying areas in which densification is foreseen, defining regulations for increasing building densities, and stipulating conditions under which changes in land use are permitted for the reuse of dismissed or underutilised areas and buildings. While regeneration interventions generally take place within the broader framework set in these territorial planning instruments, the concrete project is typically an outcome of a negotiation process between the municipality and the developer. Here, divergencies exist between territorial contexts: while larger municipalities and metropolitan cities are more likely to have the administrative and financial capacity as well as the attractiveness to draw private investment and negotiate with private actors, smaller towns and inner areas often lack adequate resources, coherent strategies, and bargaining power to implement urban regeneration or densification interventions.

Actor	Scale	Type	Role + Function
Ministero delle Infrastrutture e dei Trasporti (MIT)	National	Public (political and technical)	Defines national priorities and allocates funding for infrastructure, transport, and housing; supports regeneration initiatives.
Direzione generale per la casa e la riqualificazione urbana (MIT)	National	public (technical, subordinated to the MIT)	Implements national policies for housing and regeneration; supports urban regeneration through specific projects and funding.
Regional governments with various setups (in some cases, regional commissary and department for urban regeneration)	Regional	Public (political and technical)	Development of legislation on land use and urban regeneration (urb. reg. laws in 8/20 regions); defines obligations for municipalities through regional laws; provides funding.
Municipalities with various setups (in some cases, deputy mayors and departments for urban regeneration)	Local	Public (political and technical)	Implements regeneration and densification measures; defines zoning and building regulations in local plans (PGT/PUG); authorises land use changes.

Figure IT29. Key actors and tasks in the governance of urban regeneration, author's elaboration.

6.5 Achievements, assessments, and challenges

There is no distinct agenda on urban densification in Italy; rather, it is implicitly included within the broader framework of the discourse and policies on “rigenerazione urbana” and the reduction of soil consumption, stipulated in several regional territorial governance laws. However, both the discourse and policies on urban regeneration display a clear bifurcation, with contrasting logics and narratives: on the one hand, urban regeneration revolves around peripheral and deteriorated urban areas, typically involving the public housing stock, where public intervention is deemed necessary in order to mitigate physical, social, and economic shortcomings (Wolfgring 2024). Such regeneration efforts are typically financed through public (European, national, or regional) funds and implemented via targeted programmes. In these contexts, residential densification is usually not an explicit policy objective – though in the more recent past, it has occurred incidentally –, but the emphasis is rather on managing and improving the existing built environment, enhancing infrastructure, and tackling socio-economic challenges. On the other hand, urban regeneration is pursued as a process of valorisation and financialisation, highlighting opportunities and potentials (instead of shortcomings), particularly where large-scale, market-driven redevelopment projects are concerned (as, for instance, in dismissed brownfield sites). In these cases, residential densification usually takes place, but it does not necessarily lead to increased housing accessibility or affordability. On the opposite, urban regeneration has often fuelled gentrification, contributing to the displacement of lower-income residents and intensifying pressures on local housing markets. As Arturo Lanzani (n.d., p.3, own translation) highlighted, “[...] what we have done is shift the geography of social distress – displacing it from areas where the real estate market has boomed to other parts of the city that have experienced a downturn, leading to a concentration of hardship”. Prominent recent examples underline how

market-oriented densification has primarily benefited affluent populations, reinforcing socio-spatial inequalities instead of alleviating them. Lanzani (2024) moreover criticises the often ambiguous and superficial ecological framing of urban regeneration, highlighting that vague references to sustainability may contribute to greenwashing. While acknowledging that ecological concerns are (and should remain) central to regeneration efforts, he emphasises that many regeneration policies have demonstrated to be inadequate, adopting approaches which neglect the social implications of interventions.

7 Summary and discussion of results

Over the past two decades, Italy has undergone significant transformations in its environmental and energy policy (EEP) landscape, shaped by both supranational frameworks (EU directives, Green Deal, and the Recovery and Resilience Facility) and domestic economic and policy developments.

At the national level, the EEP framework has been driven primarily by economic incentives, fiscal mechanisms, and European directives. Italy's policies supporting building renovation began in the late 1990s with nationally driven tax incentives aimed at stimulating the construction sector and reducing tax evasion, without explicit reference to energy efficiency. Law 449/1997 marked the first such intervention, and while the 2007 Ecobonus introduced support for energy-saving measures, it did so without imposing specific performance targets. The European Union's influence became decisive starting with the Energy Performance of Buildings Directive (2002/91/EC), which required member states to implement energy performance measures. This led to a gradual evolution (starting from the adoption of Legislative Decree 192/2005) towards aligning national policies with EU energy efficiency goals. From that point on, successive EU directives were transposed through national legislation, introducing binding national targets, renewable energy quotas for buildings, and energy savings obligations. So, while Italy initiated renovation incentives independently, the EU became a key driver in directing the scope, ambition, and regulatory framework of energy retrofitting policy in the following decades.

In past years, legal and policy frameworks have been influenced by an increasing emphasis on sustainability, soil protection, and urban regeneration instead of new construction. Several regions have adopted legislation aimed at reducing soil consumption, introducing binding targets or caps, and promoting the reuse of already urbanised land. While "urban densification" as a term is neither used nor clearly defined in Italy, it has implicitly emerged as part of the broader discourse on urban regeneration. Urban regeneration is being promoted and implemented by both private actors (in the form of market-led valorisation strategies) and public actors (through targeted programmes aimed at regenerating deteriorated neighbourhoods, often characterised by a substantial presence of public housing), with a variety of effects that need to be locally and contextually analysed and evaluated (Bricocoli et al. 2025).

On an institutional level, environmental, energy, housing, and regeneration objectives are operationalised through a complex multilevel governance framework. The Ministry of Infrastructure and Transport (MIT), through its Directorate for Housing and Urban Regeneration, plays a key role in the areas of housing and urban regeneration more narrowly,

particularly through national programmes such as the PINQuA. The Ministry of the Environment and Energy Security (MASE), on the other hand, is responsible for environmental, energy, and climate policies, including nature-based solutions (NBS). Significant challenges exist in both the horizontal and vertical levels of governance, encompassing the fragmentation of competencies, siloed logics and limited cooperation in policymaking and, even more so, at the operational level, and at times diverging institutional priorities and interests. The actual implementation of the policy fields investigated – housing retrofit, nature-based solutions, and densification/urban regeneration – takes place largely at the regional and municipal levels, where capacity and institutional strength vary considerably, producing thus very different outcomes.

Furthermore, contextual factors such as a highly outdated and fragmented housing stock, widespread vacancies in inner areas, and regional disparities in administrative and technical capacities significantly influence both the necessity for and the implementation of environmental and energy policies (EEPs) and interventions. The legacy of disinvestment over the last decades – particularly concerning the public housing sector, as a result of policy decisions and austerity measures – further amplifies both the need for and the challenges of applying EEPs in a targeted and context-sensitive way.

Concludingly, Italy's EEP trajectories reflect a complex interplay of economic stimulus, normative framing around land protection and sustainability, institutional fragmentation, and spatial inequalities. These dynamics result in ambitious but uneven policy outcomes, with significant implications for housing quality, accessibility, and territorial cohesion.

As regards relations and trade-offs between EEPs and housing policies, the Italian case demonstrates that while EEPs have – particularly in the recent past, linked to the EU Recovery and Resilience Facility – increased in relevance and mobilised substantial public and private resources, their impacts remain uneven and often regressive (Bricocoli et al. 2025). Most recently, the Superbonus 110% (introduced in 2020 as part of the National Recovery and Resilience Plan) provided ample tax deductions for energy retrofitting in residential buildings. While resulting in the renovation of a substantial number of residential (particularly, privately owned) buildings, the scheme displayed uneven effects and revealed socio-spatial disparities, disproportionately favouring middle- and high-income homeowners with sufficient tax capacity and access to finances. In contrast, public housing tenants and low-income households have been largely excluded, due both to economic barriers (such as a lack of upfront capital or insufficient tax capacity) and informational or procedural obstacles. The unequal distribution of benefits has also manifested spatially, reflected in a stronger uptake and implementation in wealthier northern regions and urban areas with higher institutional and technical capacities. Smaller municipalities often lack the administrative expertise or human resources required to manage complex, large-scale programmes. Moreover, the short timeframes of recent programmes – linked to the availability of post-pandemic recovery funding – have exacerbated existing governance inequalities, favouring actors with a pre-existing capacity to navigate complex procedures and resources for developing projects at short notice.

Urban regeneration is typically achieved either through market-led projects (often on former industrial or railway sites), targeting real estate valorisation, or through public programmes aimed at regenerating deteriorated neighbourhoods, often characterised by a large presence of public housing. While the first model often comes at the expense of affordability, public-led

interventions in neighbourhoods with low-income and otherwise disadvantaged groups can promote the redistribution of the positive effects of EEPs and regeneration more widely.

Overall, the analysis demonstrates that while Italy has developed a wide range of instruments and programmes encompassing housing retrofit, nature-based solutions, and urban regeneration policies, these are not yet aligned with a coherent housing strategy that includes the objectives of territorial and social justice. Further investigating this misalignment will be central to the ReHousIn project's ongoing comparative work.

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Annex

Policy Labs

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3 April 2025, Assisi, town hall

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- Lina Scavuzzo, Lendlease, Development Director
- Sara Travaglini, DAR Casa – housing cooperative, President
- Federico Zanfi, DASTU Politecnico di Milano

Interviews

- Davide Bedogni, Centro Cooperativo di Progettazione, Reggio Emilia, 16 June 2025
- Marco Corradi, ACER Reggio Emilia, Reggio Emilia, 17 July 2025
- Giulia Datola, DASTU Politecnico di Milano, Milan, 29 April 2025
- Alessandra Oppio, DASTU Politecnico di Milano, Milan, 29 April 2025
- Marta dell'Ovo, DASTU Politecnico di Milano, Milan, 29 April 2025
- Mariachiara Pastore, DASTU Politecnico di Milano, Milan, 28 February 2025

NATIONAL REPORT ON THE REGULATORY SYSTEM OF EEPs IN NORWAY

1 Executive Summary

This national report explores the evolution and governance of environmental and energy policies (EEPs) in Norway, with a specific focus on their intersections with housing policies. It is part of the ReHousIn project, which investigates how green and digital transitions affect housing inequalities across European contexts. Focusing on three major policy domains—retrofitting, densification, and nature-based solutions (NBS)—the report assesses policy frameworks, implementation mechanisms, and potential social impacts, particularly in relation to housing affordability and inclusion.

The analysis draws on a combination of desk research, six in-depth interviews with public and private stakeholders, and a Policy Lab. The report highlights significant variation in how the three domains have evolved and are governed, revealing uneven institutional maturity, fragmented multilevel coordination, and weak integration with housing policy objectives.

Energy retrofitting is the least developed among the three domains. Despite Norway's participation in EU climate frameworks, national retrofitting policy remains weak and fragmented. Most support relies on voluntary financial incentives provided by Enova and Husbanken, with limited redistributive capacity. Grants typically cover residual parts of the costs, making retrofitting accessible mainly to middle- and high-income households. No legal obligation currently exists for energy retrofitting of private housing, and the adoption of relevant EU directives remains uncertain following recent political developments.

NBS have gained increasing relevance in Norwegian spatial planning, particularly after the adoption of the 2018 and 2024 national planning guidelines. These promote ecosystem-based approaches for climate adaptation and flood management. However, NBS implementation remains uneven across municipalities due to territorial disparities in technical capacity, financial resources, and administrative coordination. There is also a lack of formal mechanisms to prevent green gentrification, as green infrastructure can raise property values and reduce housing affordability in central areas.

Densification emerges as the most institutionalised strategy, developed well before the influence of EU directives and embedded in national planning law since the 1980s. It is strongly supported by national sustainability goals and urban development policies but is heavily shaped by private market dynamics. Municipalities retain planning authority, yet their bargaining power has diminished due to declining public land ownership. Consequently—also due to their typical implementation in centrally located, high-value areas—densification interventions are often associated with limited housing affordability, particularly in high-demand urban contexts such as Oslo.

The report identifies major governance challenges, including siloed policy design, limited horizontal coordination between environmental and housing strategies, and deepening

territorial inequalities. Affordability and equity concerns are largely absent from current EEP frameworks, particularly in retrofitting. Vulnerable groups—such as tenants, first-time buyers, and those in rural municipalities—face the greatest barriers to benefiting from the green transition.

2 Introduction and methodology

This national report explores frameworks, actors, and the multi-level governance of environmental and energy policies in Norway, with a particular focus on housing retrofitting, densification, and nature-based solutions (NBS). Prepared within the framework of the *ReHousIn* project, the report further examines how climate and energy transition policies might impact housing inequalities.

As Norway intensifies efforts to reduce emissions and improve energy efficiency, the built environment has become a central arena for intervention. Retrofitting existing buildings, promoting compact urban development, and integrating NBS into planning processes have emerged as key strategies to meet environmental goals. Yet, the social impacts of these transitions remain underexplored. This report addresses this gap by critically assessing the governance structures, financial mechanisms, and regulatory frameworks that shape these interventions, while paying close attention to their effects on housing affordability, accessibility, and social equity.

This report is based on a qualitative research approach that includes policy document analysis, a policy lab and key informant interviews conducted with public and private actors. These methods allowed for an in-depth understanding of policy gaps in the Norwegian framework, particularly the synergies and tensions between environmental, energy, and housing policies, and their potential implications for housing inequalities.

Document Analysis. The analysis of environmental and energy policies in Norway began with extensive desk research, centered on a close examination of key policy documents related to the three selected policy areas. This included a detailed review of regulatory frameworks—such as planning regulations and building standards—as well as strategic documents like Climate Action Plans and Energy Efficiency Action Plans. Particular attention was given to both overarching policy goals and the concrete instruments used for implementation.

Policy Lab. A policy lab was held in Oslo in April 2025, bringing together key stakeholders from public agencies, housing associations, and energy and environmental institutions. The lab was designed as a participatory and exploratory setting to foster dialogue across policy domains that are often siloed in practice. Its aim was to interrogate how environmental and energy goals interact with housing inequalities, particularly in relation to disadvantaged groups. The lab facilitated collective reflection on emerging trade-offs, institutional constraints, and possibilities for more integrated approaches. It served both as a methodological tool and a knowledge-sharing platform, grounding the analysis in concrete policy debates and practice-oriented insights.

The Policy Lab created a space for the co-identification of barriers, tensions, and potential solutions related to environmental and energy policies in the Norwegian context. It combined presentations, group discussions, and a concluding plenary session. Participants were divided into thematic groups—densification, retrofitting, and nature-based solutions—to explore challenges and opportunities at the intersection of green policies and housing inequalities. Each group included representatives from the housing sector, ensuring that diverse and practice-based perspectives were brought into the discussion. The plenary session enabled cross-group dialogue and collective reflection.

Insights from the Policy Lab were instrumental in identifying policy gaps and understanding the broader implications of environmental and energy policies on housing inequalities. Moreover, the event played a key role in mapping relevant stakeholders for follow-up in-depth interviews.

Interviews. In total, we conducted six semi-structured interviews with seven key informants, including representatives from municipal administrations, housing organizations, and energy agencies (see Table 1). The interviews, each lasting approximately one hour, aimed to deepen the understanding of how environmental and energy policies interact with housing policy and practice in Norway.

Interview discussions covered a range of themes, including governance structures, inter-agency coordination, and the design and implementation of policy tools and financial mechanisms. Informants provided insights into how EU directives are shaping Norwegian policies, as well as the degree of national adaptation and contestation surrounding their implementation. Interviews further explored how municipal actors navigate trade-offs between environmental goals and housing affordability in the context of densification and NBS projects, particularly in disadvantaged areas. Others focused on funding structures and policy instruments supporting retrofitting, and their implications for different segments of the housing sector (e.g., student, municipal, and cooperative housing). Across interviews, participants highlighted the fragmented responsibilities between housing and environmental sectors and the challenges of aligning climate adaptation and mitigation strategies with inclusive and equitable housing policies.

Interview	Key informant/Institution	Date and place	Duration	Focus
Interview 1	Representative from the Tenants' Association (Leieboerforeningen)	19 May 2025. Online	1h	Energy retrofitting and inequalities in the rental market
Interview 2	Expert from research institution	19 May 2025. Online	1h	Energy retrofitting
Interview 3	Representative from Enova	21 May 2025. Online	1h	Energy retrofitting
Interview 4	Representative from Husbanken	21 May 2025. Online	1h	Energy retrofitting
Interview 5	Two representatives from the municipality of Oslo	27 May 2025. Online	1,15 h	Nature-based solutions and densification
Interview 6	Representative from the cooperative Housing Federation (NBBL)	27 May 2025. Online	1h	Energy retrofitting and cooperative housing

Table NO1. List of interviews

This multi-source approach offers a holistic view of how national strategies are translated into operational practices, how financial tools are deployed, and how different segments of the population (especially in relation to different tenures) can be affected by different green initiatives.

Limitations of the methodological approach

A noteworthy limitation of the methodological approach is the disproportionate focus on energy retrofitting in the interview material: five out of the six interviews conducted addressed this topic. This imbalance reflects, in part, the general knowledge and, more specifically, the research team's pre-existing in-depth knowledge of nature-based solutions (NBS) and densification policies in the Norwegian context. In contrast, energy retrofitting represents a relatively underexplored area within this policy landscape. As such, targeted interviews were deemed necessary to address this knowledge gap and to complement the available documentary sources with more contextualised, practice-based insights

3 General governance system

Norway's governance system is characterized by a three-tier structure involving national, regional, and local levels. As of 2024¹³⁴, the country is administratively divided into 15 counties (*fylker*) and 357 municipalities (*kommuner*). While municipalities are the core units of local government, responsible for delivering a wide range of public services, counties provide regional coordination, particularly in education, transport, and business development. Both levels operate under the oversight of state-appointed governors who ensure compliance with national laws. Despite this formal division of responsibilities, Norwegian governance operates through a multilevel framework that often requires collaboration across tiers, especially in sectors such as environmental planning, infrastructure, and social services. Although not a member of the European Union, Norway is closely integrated into EU policymaking through the European Economic Area (EEA). This arrangement entails the implementation of a significant portion of EU legislation at the national and subnational levels, notably in areas such as climate policy, procurement, and regional development. Local and regional authorities thus play a critical role in interpreting and applying EU/EEA regulations, adding a further layer of complexity to multilevel governance. It is within this institutional context that Norway's approach to sustainable urban development unfolds.

Norway's approach to sustainable urban development is shaped by a complex multilevel governance structure involving national, regional, and local authorities, each playing distinct roles in planning, regulation, funding, and implementation. Despite clear national commitments to climate mitigation and sustainability, the implementation of these strategies reveals substantial fragmentation and uneven capacities across levels of government. Notably, a siloed approach persists between environmental and housing policies—a key issue that this report will explore in greater depth.

¹³⁴ <https://www.regjeringen.no/no/tema/kommuner-og-regioner/kommunestruktur/fylkesinndelingen-fra-2024/id2922222/>

Housing

Housing governance in Norway is highly centralized. The Ministry of Local Government and Modernisation serves as the national housing authority, setting housing policy and promoting the political objective of widespread homeownership (eierlinja). Regions (fylkeskommuner) play a supportive and coordinating role, rather than holding direct responsibility for housing provision. Regions are not mandated to ensure sufficient housing construction, a responsibility that remains with the municipalities. However, they are seen as key actors in fostering regional coordination, especially in cases where housing needs and urban development transcend municipal boundaries (Asplan Viak, 2023). As for municipalities, while they can develop local housing strategies and recommendations—such as measures to enhance housing affordability—their policy capacity is significantly constrained by binding national regulations, particularly in the areas of land use and housing.

A key governance tension in the provision of affordable housing, especially in the context of urban densification, stems from the national Planning and Building Act. This legislation allows zoning plans to include provisions regarding the number of dwellings in an area, minimum and maximum dwelling sizes, and requirements related to accessibility and special-needs design. However, it does not include any requirements related to housing affordability or specific tenure forms (Cavicchia, 2023a). As a result, decisions about the number and typology of dwellings remain the primary instruments available to shape a more diverse and inclusive housing supply.

Housing retrofitting

Housing retrofitting in Norway is characterized by centralized governance, with key decisions and funding mechanisms largely controlled at the national level. The national government, through the Ministry of Local Government and Regional Development and the Ministry of Climate and Environment, defines the regulatory framework and allocates financial resources. Implementation relies heavily on financial incentives, primarily through two national bodies: Enova and Husbanken. Enova, operating under the Ministry of Climate and Environment, promotes technological innovation and energy savings but offers modest support for deep renovations. Husbanken, under the Ministry of Local Government and Modernization, provides low-interest loans, especially for municipalities upgrading public rental housing or private homeowners conducting comprehensive upgrades.

At the local level, municipalities have limited regulatory authority over retrofitting unless they own the building stock. Most housing remains privately owned, so the decision to retrofit lies with homeowners or housing cooperatives. Municipalities may apply for state grants for municipal housing and offer local incentives. Financial constraints—especially in smaller municipalities—further limit their ability to engage in retrofitting governance beyond accessing national funds.

NBS

In Norway, the implementation and governance of nature-based solutions (NBS) follow a multilevel framework involving national, regional, and local authorities. At the national level, multiple ministries—especially Climate and Environment, Local Government, Agriculture, Transport, and Energy—collaborate to integrate NBS across sectors and fund related



programs. Regional authorities coordinate planning and support municipalities, with Rogaland being a leader in NBS-based climate adaptation. Municipalities, however, hold primary responsibility for land-use planning and NBS implementation through zoning and local development plans. Despite national guidelines and financial support, many municipalities face technical and fiscal challenges, leading to fragmented implementation. Environmental NGOs advocate for stronger NBS policies, but their influence varies. A critical governance gap exists between green infrastructure and housing strategies, where green upgrades may inflate property values or constrain affordable housing development. While local autonomy enables context-sensitive planning, it also creates inconsistencies and dependency on national funding for sustaining large-scale NBS projects.

Densification

Densification is one of the most long-standing and institutionalized strategies in Norwegian urban planning, originating in the 1980s and embedded in national spatial and climate policies. The Planning and Building Act forms the legal backbone for land use decisions, promoting compact city development to reduce car dependency and preserve agricultural and recreational land. Yet, the implementation of densification is primarily a local responsibility. Municipalities hold planning authority and design their masterplans and zoning regulations accordingly.

This decentralized framework grants municipalities formal autonomy, but in practice, private developers wield significant influence. Developers initiate most zoning proposals, which municipalities approve through political processes in the city council (E. I. Falleth et al., 2010). Since the 1980s, declining public land ownership has weakened municipal bargaining power, making densification projects heavily market-driven. Consequently, although densification increases housing supply, it seldom aligns with affordability goals. The absence of strong national requirements for affordable housing or inclusionary zoning amplifies this issue, especially in high-demand cities like Oslo, where densification contributes to rising housing costs and micro-apartment proliferation.

Regional authorities (fylkeskommune) play a limited role, primarily offering technical support and ensuring that local plans align with national objectives, in particular about densifying around transportation hubs.

Governance Level	Housing	Housing Retrofitting	Nature-Based Solutions (NBS)	Densification
National level	Highly centralized. The Ministry of Local Government and Modernisation sets housing policy.	Centralized governance. The Ministry of Local Government and Regional Development and the Ministry of Climate and Environment define the framework. Enova promotes innovation and energy savings; Husbanken provides	Different Ministries and National Agencies Integrate NBS into urban development and land-use planning, ensuring green infrastructure is included in zoning regulations	Planning and Building Act promotes compact development.

		loans for comprehensive upgrades.		
Sub-national level 1 (Regions / fylkeskommuner)	Supportive and coordinating role; not directly responsible for housing provision.	Limited role. May offer technical support to municipalities but hold no direct authority over retrofitting efforts.	Coordinate planning efforts across municipalities, ensure compliance with national objectives, provide guidance, and support to municipalities	Provide technical support and ensure local plans align with national goals.
Sub-national level 2 (Municipalities)	Responsible for local housing provision. Can develop local housing strategies, but constrained by national regulations, especially on land use.	Limited authority unless owning the housing stock. Can apply for national grants and offer local incentives. Financial constraints affect capacity.	Primary implementers of NBS and are supposed to incorporate NBS into zoning regulations, pilot projects, and community engagement initiatives	Hold planning authority. Develop masterplans and zoning regulations, but heavily influenced by private developers. Affordability often not prioritized.

Table NO2. Multilevel governance of housing, energy retrofitting, NBS and densification in Norway

4 Housing retrofitting

4.1 The policy cycle: emergence of the issue and policy decisions

Legal requirements

In Norway, separate and targeted regulations or laws on energetic retrofitting of the existing building stock do not exist. Indeed, the building requirements comprised in the national regulations primarily apply to new construction (which accounts for about 2% of the total building stock every year)(Nakstad & Engebakken, 2019). The lack of specific regulations on existing buildings highlights a remarkable shortcoming as in the facts, most of the building activity in Norway concerns interventions on existing buildings. There have been substantial discussions about the need for separate regulations concerning the existing building mass, but as of today, this still does not exist (Nakstad & Engebakken, 2019). This generates problems because it is not always easy to adapt existing buildings to the technical requirements that concern the new ones.

The main national regulation relevant for interventions on existing buildings is the national Planning and Building Act (PBL), which is the national planning law. The first version of the law dates back to 1985 and the second and last version refers to 2008, even though several updates have been made along the years. It is crucial to note that PBL does not explicitly address energy efficiency or energetic retrofitting for existing buildings within this chapter. While it allows municipalities to set requirements for building modifications, the sections focus on structural and safety aspects rather than energy performance or sustainability measures.

PBL is supplemented by two levels of regulations: TEK (Regulations on technical requirements for construction works) and SAK (the building matters regulations). TEK are the main regulatory framework for energetic retrofitting at the national level and contain requirements for energy efficiency in buildings.

The first TEK regulations were promulgated in 1997 (Norwegian Ministry of Local Government and modernization, 1997) and were followed by new regulations in 2010 (TEK10) and in 2017 (TEK17), the latter being the ones currently in place. The building regulations for the Norwegian construction industry (TEK10) underwent a major revision in 2015 (Lunke et al., 2016) and were updated to match an EU directive¹³⁵ regarding energy performance in buildings (European Parliament, Council of the European Union, 2010). Furthermore, they introduced the goal of passive house standard in 2015, and near-zero houses in 2020.

National strategies and visions

When it comes to national strategies, a few plans are relevant in addressing the energy retrofitting of the existing building stock.

Worth mentioning is the Økobygg program¹³⁶ (1998-2002), supported by the Ministry of Local Government and Regional Development, which contributed to increase the environmental commitment within the construction sector, while boosting knowledge exchange through environmental networks. While relevant to increase attention to the environmental performances of buildings, the document primarily emphasizes sustainable practices, standards, and pilot projects for new construction rather than existing buildings.

The first document with a more focused attention on existing buildings is the **2005-2008_Miljøhandlingsplan for bolig- og byggsektoren. “Environmental action plan for the housing and construction sector”** (Norwegian Ministry of Local Government and Regional Development, 2005). The document was elaborated under the Stoltenberg II government (2005-2013), a coalition of the Norwegian Labor Party (Ap), the Socialist Left Party (SV) and the Center Party (Sp). The Miljøhandlingsplan 2005-2008 emphasizes energy efficiency and environmental sustainability across Norway's housing and building sectors and it identifies specific goals and initiatives for retrofitting existing buildings, both commercial and residential. Specifically, new financial support tools are introduced (they will be explored in the next section), new methods to calculate energy performance are explored and energy labeling of homes is adopted, following the EED (Energy Efficiency Directive).

¹³⁵ Directive 2010/31/EU of the European Parliament and of the Council

¹³⁶ https://www.byggemiljo.no/wp-content/uploads/2014/10/Prosjektkatalog_Okobygg.pdf

Another relevant national strategy is the **2009-2012_ Bygg for framtida. “Build for the future: Environmental action plan for the housing and construction sector 2009–2012”** (Norwegian Ministry of Local Government and Regional Development, 2009). As the previous, also this document was elaborated under the Stoltenberg II government. A significant part of the action plan underscores the need for **increasing environmental efforts in the existing building stock**. The document stresses that most Norwegian buildings, especially those built in the 1960s-1980s, are still in use and do not meet current energy standards. Consequently, there is a significant potential for environmental improvements in these structures, with a major focus on retrofitting to improve insulation and reduce energy consumption. Retrofitting is highlighted as essential for achieving both environmental and cost-effective energy improvements.

Worth mentioning in relation to retrofitting, is also the launch of the program "Fremtidens Byer" (Future Cities) in 2008. This program is a collaboration between the state and Norway's largest cities, aimed at creating sustainable urban development to reduce greenhouse gas emissions and enhance climate resilience. The program was divided in 4 focus areas, one of which is energy in buildings. The efforts around this priority area largely revolved around the program **Future Built**, which involves the 13 largest municipalities in Norway and has the goal of completing 100 pilot projects that cut carbon emissions by at least 50% compared to current regulations and common practice. By 2025, the program will have 80 pilots (both public and commercial), including housing. Husbanken (the State Housing Bank) provides financial support for these projects, contributing up to 5 million NOK annually to stimulate urban environmental improvements. The idea is that improving the energy efficiency of public buildings will influence also the other building sectors.

The last relevant action plan to discuss is the **2023 Action plan for energy efficiency in all parts of the Norwegian economy** (Norwegian Ministry of Petroleum and Energy, 2023). One section of the plan is dedicated to energy reduction in the building sector and has an important focus on existing buildings. The plan addresses that the government has increased subsidies for municipal building upgrades, raising the budget from NOK 263 million in 2023 to NOK 300 million in 2024 (of these NOK 50 million is earmarked for municipal buildings, while NOK 250 million is for general work on energy efficiency). These funds target projects such as additional wall insulation, window replacements, and geothermal heat pumps, addressing energy deficiencies in municipal rental housing, where only 5% of units meet satisfactory energy standards. Rural municipalities, in particular, report the worst conditions. Even though no specific retrofitting goals have been set for social housing, Husbanken provides grants for the renovation of municipal rental housing and distributes two-thirds of the available budget to municipally owned rental housing. 2025 budget is NOK 400 million. Furthermore, the plan highlights the strengthening of supports from Enova including an additional NOK 180 million allocation for 2024 for comprehensive energy upgrading of buildings. Energy labelling regulations are under review to address the gap in older buildings, which comprise the majority of Norway's building stock and hold the greatest potential for energy efficiency improvements.

Influences of EU directives

Norway is not a member of the European Union, but it participates in the EU internal market through the EEA agreement. As a result, the implementation of EU directives follows a more

independent and selective path, with Norway typically incorporating aspects of the directives at a later stage. EU directives are not automatically binding in the Norwegian context; they must be individually assessed and transposed into national law, often involving political negotiations and contextual adaptations. Annex 1 provides an overview of the EU directives relevant to retrofitting, while this section examines how, and to what extent, these directives have been integrated into Norwegian policies and practices.

While Norway participates in the EU Emission Trading System (EU ETS) since 2008, in 2019 it entered into an agreement with EU to intensify its climate cooperation by also aligning its actions to reduce emissions outside of the EU ETS and specifically agriculture, transport, waste management and **buildings** (see table NO 3 for an overview of the national objectives in relation to the relevant EU directives). Under this agreement, Norway has started to apply the Effort Sharing Regulation by committing to binding annual greenhouse gas emission targets for the period 2021–2030 for the mentioned sectors. Under the terms of the climate agreement with the EU, Norway is to cut emissions from all the mentioned sectors by 40 % by 2030 compared with the 2005 level (Norwegian Ministry & of Climate and Environment, 2021).

It is important to highlight that on January 29, 2025, the Norwegian Government collapsed. The Centre Party (Senterpartiet) withdrew its support for Prime Minister Jonas Gahr Støre of the Labour Party, triggering the crisis. The dispute centers on the adoption of three European directives concerning environmental and energy policies. While the Labour Party advocates for incorporating the directives on renewable energy, energy performance of buildings, and energy efficiency into the Norwegian law, the euroskeptic Centre Party opposed their implementation. As a result, the political landscape regarding EU energy directives remains highly uncertain. The following considerations pertain to the situation as it stood before the current government crisis.

Norway does not currently have a specific target for reducing its total energy consumption (absolute reduction). Instead, the country has set a national goal to improve **energy intensity**¹³⁷ in the mainland economy by 30% between 2015 and 2030. In the action plan for energy efficiency from 2023, the government has proposed a revised target of 10 TWh reduced electricity consumption in the entire building stock by 2030 compared to 2015 (The Norwegian Government, 2023). The potential for energy saving in Norway is enormous, especially in the building stock, and meeting the established target for emission reduction in both new and existing buildings could cost approximately 18 billion NOK annually, with over half of this investment needed for detached houses (SINTEF, 2023). Significant financial support may be required to make retrofitting feasible¹³⁸ and appealing for private and commercial property owners.

As of today, and given the contested political context, the future implementation of the Energy Performance of Buildings Directive (EPBD) in Norway remains uncertain (Interviews). While discussions are ongoing across various housing and energy institutions, they largely remain at a theoretical level rather than translating into concrete policy directions (interviews). So far,

¹³⁷ **Energy intensity** refers to the amount of energy consumed relative to the economic output (usually measured as energy use per unit of GDP). Improving energy intensity means making the economy more energy-efficient—producing the same or greater economic output with less energy.

¹³⁸ <https://www.sintef.no/en/latest-news/2023/energy-saving-measures-in-buildings-can-turn-them-into-norways-biggest-power-plant/>

the EPBD has influenced the design of loans and grants available to both private actors and public institutions, including those responsible for student and municipal housing (interviews). There are also plans to simplify eligibility criteria. Additionally, the directive has contributed to the development of energy certification systems and inspection protocols in Norway, shaping the policies and programs administered by organizations such as Enova and the Norwegian Water Resources and Energy Directorate. (The Norwegian Government, 2023).

The **EU Energy Efficiency Directive (EED)** complements the EPBD by setting binding measures to improve energy efficiency in member states, including public buildings. In Norway, the EED has influenced public buildings to adopt higher energy efficiency standards, serving as examples for the rest of the sector (see for example the Future Built Program). Additionally, residential retrofitting projects are encouraged through financial incentives and technical support, with programs designed to meet the directive's energy-saving targets (Enova and Husbanken grants).

The Renewable Energy Directive (RED) has also played a significant role by setting targets for renewable energy usage in buildings and encouraging the integration of renewable systems in retrofitting projects. In Norway, this has translated into the promotion of renewable energy technologies such as solar panels, heat pumps, and district heating systems in residential and commercial buildings. These efforts are supported by grants, loans, and technical assistance, aligning national policies with the EU's renewable energy goals (Farstad, 2022).

The broader influence of EU directives is evident in Norway's retrofitting strategies, which include financial subsidies, technical guidelines, and certification programs. Collaborative projects under EU programs such as Horizon 2020 have enabled the exchange of best practices and innovative solutions between Norway and EU member states. As a result, energy certification, lifecycle energy management, and the training of energy consultants are now integral parts of Norway's approach to energy efficiency in buildings (Farstad, 2022).

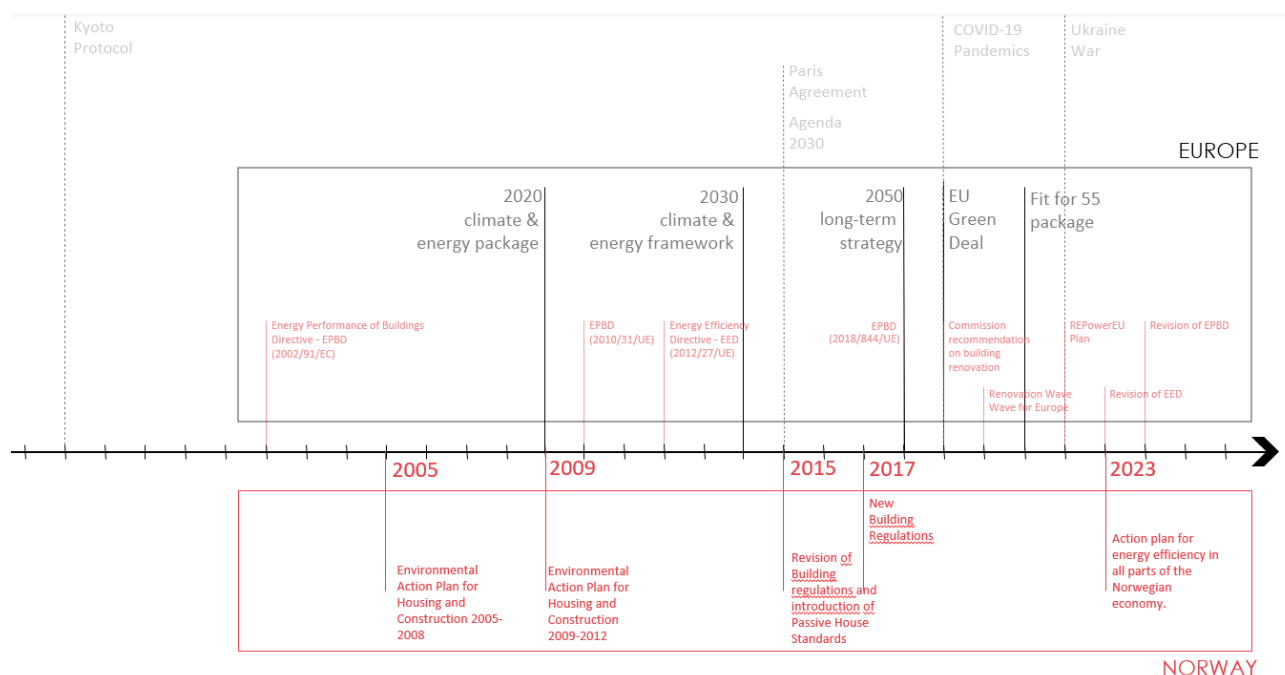


Figure NO1. Timeline illustrating key policies and regulations in Norway (bottom part) and EU (upper part) affecting housing retrofitting (in red)

4.2 The implementation process

Currently, the majority of housing retrofitting expenses in Norway are borne by homeowners, who also play a central role in initiating retrofitting projects. As previously mentioned, there is no legal mandate requiring retrofitting in Norway, making such interventions largely a matter of private choice.

Financial tools

At the national level, various support schemes are available to encourage retrofitting efforts. Public initiatives for energy retrofitting in Norway include financial support mechanisms, regulatory frameworks, and other measures designed to promote building upgrades and enhance energy efficiency. It should be noted that these support mechanisms are universal and do not vary according to income brackets.

At the **national level**, two main actors shall be considered:

Enova plays a central role in providing financial support for energy retrofitting. Established in 2001, Enova is from 2018 under the Ministry of Climate and Environment and offers grants aimed at reducing energy consumption and CO₂ emissions. Importantly, the limitations of available grants, which will be discussed also in the next sessions, are also tied to Enova's primary mandate, which is to support the development and market introduction of new technologies rather than to fund large-scale energy renovations of existing buildings. Enova grants are available for projects that involve transitioning from electric heating to renewable alternatives, such as district heating or biofuels, and for implementing energy-saving

measures, including improved insulation and energy-efficient systems. Enova also supports pilot and demonstration projects to encourage innovative retrofitting technologies. There is an agreement, running between the 1st of January 2021 and 31st of December 2024¹³⁹, between the Climate and Energy Fund and Enova SF to contribute with about 3 billion Norwegian kroner (approximately 3 mln euros) per year (see, https://snl.no/Klima-og_energifondet). The Climate and Energy Fund, which is a state fund whose purpose is to promote energy efficiency and an environmentally friendly transformation of energy use and production, provides grants for climate and energy measures in housing associations and condominiums, businesses and private homes and it is an important tool also to boost growth and climate-friendly technology. There are different support schemes that can be granted to both housing cooperatives as well as private owners, and the entity of the support changes according to the typology of intervention to implement. The main schemes for private homes concern replacement of doors and windows, insulation of the building envelope, systems for water management and use of wind energy. For buildings built before the 80s, where re-insulation might be needed, there is no support grant (research should clarify the extent of this building mass in low energy class). For condominiums, the main support schemes concern the installation of solar energy systems and interventions on the building finishes (windows, doors and structural improvements, including insulation upgrade). The grants from Enova SF have specific thresholds for each kind of interventions (they may not cover the whole expense) and, in the case of condominiums, depend on the number of housing units¹⁴⁰. All subsidies are funded by a tax on Norwegian electricity bills, known as the “Enova-fee”¹⁴¹. Typically, Enova grants cover around 20% of retrofit costs, leaving homeowners responsible for the remaining 80% (interviews). This gap is often financed through loans, such as those provided by Husbanken, which will be described in the next section. While private banks also offer loans, green loan schemes are currently more developed for new construction than for energy upgrades. Obtaining loans for retrofitting is more challenging, partly because banks lack clear and accessible indicators to define what qualifies as a “green” renovation project. However, there are signs of progress: starting from 2026, Norway’s energy performance certification system is expected to be revised, which may help improve clarity and support the development of green financing for upgrades (interviews). Another key actor is **Husbanken**, which provides financial incentives to facilitate retrofitting. The Housing Bank can provide loans for housing quality to individuals, companies, municipalities and county authorities. For privates, the housing bank requires, as a general rule, that the upgrade work must include measures that improve both energy efficiency and accessibility. Husbanken offers low-interest loans and grants that can cover up to 90% of project costs for high-ambition initiatives, such as meeting passive house standards or comprehensive energy upgrades (the general rule for private individuals is that the loan can cover 85% of the renovation cost, and the left 15% has to be paid out as equity). For municipalities to upgrade municipal rental housing, the subsidy paid cannot exceed 50 percent¹⁴² of the actual costs of the measures. Municipalities that received

¹³⁹ Soon, there will be a new Enova agreement 2025-2028

¹⁴⁰ In the case of energy retrofitting of condominiums, the support from Enova can cover up to 30 percent, and a maximum of NOK 10,000,000, of the project's costs. <https://www.enova.no/bedrift/bygg-og-eiendom/stotte-til-forbedring-av-energitilstand-i-borettslag-og-boligsameier/>

¹⁴¹ The ENOVA fee goes to the Climate and Energy Fund, and is intended to contribute to an environmentally friendly transformation of the use and production of energy <https://www.elvia.no/nettleie/alt-om-nettleie/statlige-avgifter-inngar-i-nettleien/>.

¹⁴² <https://www.husbanken.no/kommune/lan-og-tilskudd/tilskudd-energitiltak/>

approval for a subsidy in 2024 must normally complete the measures so that the subsidy can be paid out within one year of the approval being given. Husbanken provides loans for improving energy efficiency also to developers and housing associations¹⁴³.

At the local level, some municipalities promote initiatives to support the improvement of the energy efficiency level of existing housing. The municipality of Oslo¹⁴⁴, for example, has a support scheme for the installation of solar panels in housing cooperatives and condominiums, which covers 20% of the total expenses, and a support for replacing of windows and doors.¹⁴⁵

Support and Networking Tools

Support and knowledge exchange around housing renovation and energy efficiency in Norway are facilitated through various structures. Husbanken plays a central role, not only through financing tools but also via its advisory function with municipalities and other actors, including participation in the development of new loan criteria (interviews). Knowledge sharing also occurs through inter-organizational cooperation, such as collaboration with the Directorate for Building Quality and meetings with Enova to coordinate support schemes and avoid overlap (interviews). Platforms like *Energi Nettverket* provide additional arenas for dialogue among municipalities, state actors, and energy experts, fostering policy learning and coordination (interviews). NGOs are also part of this ecosystem, contributing perspectives on equity and the implications of energy measures for disadvantaged groups (interviews). Despite these efforts, limitations exist in capacity and clarity about available tools, especially at the municipal level.

Name	Typology	Actor	Description
Enova Grants	Financial	Enova	Grants for energy-saving measures (e.g., insulation, heating systems); support for pilot projects and new technologies; typically cover about 20% of retrofit costs.
Husbanken Loans and Grants	Financial	Husbanken	Low-interest loans and grants for energy and accessibility upgrades; up to 90% coverage for high-ambition retrofits.
Municipal Support (e.g., Oslo)	Financial	Local Municipalities (e.g., Oslo Kommune)	Local schemes for energy improvements, including 20% subsidies for solar panels and

¹⁴³ <https://www.husbanken.no/bransje/lan-og-tilskudd/boligkvalitet/oppgradering/>

¹⁴⁴ [Solar energy subsidy - Klimaetaten](#)

¹⁴⁵ [Oslo kommune støtter energieffektive vinduer og dører - Klimaetaten](#)

			window/door replacement in cooperatives.
Husbanken Advisory Services	Support	Husbanken	Provides technical and financial advice to municipalities and housing actors; contributes to defining new loan criteria.
Energi Nettverket	Networking	Municipalities, State Agencies, Energy Experts, NGOs	Platform for policy learning and coordination around energy efficiency across governance levels.

Table NO3. Policy tools for implementing energetic retrofitting in Norway

4.3 Size and role of the market

Energy price settings

Norway's energy market is integrated into the Nordic power market, where electricity prices are determined by supply and demand dynamics. The Norwegian Energy Act is based on the principle that electricity production and trading should be market-based. A significant portion of Norway's electricity is generated from renewable hydropower, ensuring competitive and relatively stable energy prices. However, market fluctuations can occur during dry periods or when demand surges in connected European markets. Global events like the COVID-19 pandemic triggered a surge in energy demand, initiating a steep price rise. This trend was further intensified by the European energy crisis and the Russian invasion of Ukraine in 2022, which led to natural gas shortages across Europe. It should be noted that, in order to support households to mitigate high electricity costs, in september 2023 a support model (Strømstøttemodell) was introduced in Norway. The support is calculated hourly based on the spot price of electricity rather than a monthly average. If the spot price exceeds a threshold of 91.25 øre per kilowatt-hour (73 øre/kWh excluding VAT) during any given hour, the government covers 90% of the cost above this threshold. The support is automatically deducted from household electricity bills, reducing the amount payable. It applies to monthly consumption up to 5,000 kWh, with any usage beyond this limit excluded. While the scheme is available to all households, it does not cover holiday homes.

Furthermore, it should be noted that this situation is evolving rapidly in light of the ongoing government crisis. The debate surrounding the energy market and electricity pricing schemes remains highly contentious, with intense discussions on their potential impact. One of the most recent government proposals is the so-called *Norgespris* (Norwegian Price) for electricity, which would offer all consumers a fixed rate of 40 øre per kWh, excluding VAT. This measure



was discussed in the Policy Lab as a potential factor that could further discourage investment in energy retrofitting interventions.

Energy obligation schemes

While Norway does not have a specific Energy Efficiency Obligation Scheme (EEOS) targeting housing retrofitting, Enova's programs described above serve a similar purpose by encouraging energy-efficient renovations through financial support and guidance. These efforts align with broader national goals to reduce energy consumption and greenhouse gas emissions in the residential sector.

4.4 The multilevel governance process

The governance of retrofitting in Norway is highly centralized, with both normative and financial responsibilities primarily managed at the national level.

In terms of the normative framework, the Ministry of Local Government and Regional Development and its subordinate agency, the Directorate for Building Quality (DiBK), are the key actors. They set energy requirements for existing buildings and establish building regulations (TEK). EU directives, particularly the Energy Performance of Buildings Directive (EPBD) and the Energy Efficiency Directive (EED), significantly influence Norway's national retrofitting framework by introducing stricter standards for energy efficiency and building energy labeling. However, Norway has not yet adopted a law mandating energy retrofitting for residential buildings with low energy standards, leaving the long-term effects of these directives uncertain.

Regarding the financial framework, two national entities play central roles in supporting building renovations: Enova, under the Ministry of Climate and Environment, and Husbanken, under the Ministry of Local Government and Regional Development. These organizations provide grants and financial incentives to encourage energy-efficient retrofitting.

At the current stage of research, no specific responsibilities for retrofitting seems to concern the regional level, and municipalities mainly have the role to apply for fundings for renovating municipal rental units (which constitute only the 3% of the overall Norwegian housing stock). For private buildings, the decision to retrofit, secure funding, and apply for national grants remains largely with individual property owners or housing associations.

Overall, Norwegian municipalities rely on national funding for housing retrofitting projects, highlighting their financial dependence. However, they appear to maintain some autonomy in regulatory matters, as there is no regulatory mandate for retrofitting non-public buildings, creating a nuanced balance between national oversight and local implementation.

	National level	Local level
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Responsible political actors	Ministry of Local Government and regional development: responsible for the Planning and Building Act Ministry of Climate and Environment: Coordinates Enova work Directorate for Building Quality (DiBK): responsible for developing and managing the building regulations known as TEK17, provides guidance on achieving energy efficiency in buildings The Norwegian Water Resource and Energy Directorate (NVE): coordinating role in energy matters including energy labelling of buildings and housing	
Responsible Financial actors	Enova: provides grants for retrofitting to individuals and cooperatives Husbanken: provides loans for retrofitting to private and public housing (social rental stock and student housing) Banks: provide green loans to support energy-efficient measures, though these are currently more common for new construction than for retrofitting existing buildings.	
Key regulatory tools	TEK 17: Regulations on technical requirements for construction works	
Key Financial tools	Enova grants and Husbanken loans	Municipalities are responsible of applying for grants for the renovation of municipal rental housing from Husbanken. Furthermore, municipalities promote local grants for energy efficiency (e.g. installation of solar panels)
Key policies	Actions plans for energy reduction in the building sector: • Environmental Action Plan 2005–2008 • Build for the future: Environmental action plan for the housing and construction sector 2009–2012 • Action plan for energy efficiency in all parts of the Norwegian economy 2023	

Table NO4. Governance structure of retrofitting in Norway

The synergies between retrofitting and housing affordability policies in Norway appear to be minimal. Firstly, Norway lacks a comprehensive housing affordability policy. National housing strategies focus primarily on homeownership and municipal housing, the latter representing only the 3% of the total stock and being limited to the most disadvantaged populations. While

some housing affordability initiatives have been undertaken by developers or specific municipalities, no clear connection to retrofitting policies has been observed.

Secondly, financial support for retrofitting is limited. Further research is needed to better understand the gap between the available grants and the actual costs borne by private property owners, which may act as a barrier to widespread retrofitting efforts. Additionally, the absence of a rent control law in Norway means there are no mechanisms in place to regulate rent increases linked to retrofitting interventions, potentially leading to higher rents.

Finally, the primary measure implemented to address household housing costs appears to be national support for electricity bills, rather than measures directly targeting the affordability of housing or the integration of retrofitting into broader affordability strategies.

4.5 Achievements, assessments, and challenges

Literature analysing the relationship between housing retrofitting and housing inequalities in Norway is, to our knowledge, extremely limited. At this stage, only one academic study was identified—Fyhn et al. (2019)—which highlights the challenges homeowners face when accessing Enova grants for retrofitting. Given this knowledge gap, the following analysis draws on informed hypotheses grounded in the institutional characteristics of Norwegian retrofitting and housing policies, complemented by empirical insights gathered through expert interviews and discussions conducted during the Policy Lab.

A central issue emerging from this material is the lack of integration between retrofitting and housing policy. Norway has no comprehensive housing affordability strategy, and existing retrofitting instruments do not account for affordability—for instance, through income-targeted subsidies. Public grants for retrofitting are relatively modest, with households typically required to cover up to 80% of the total cost (interviews). This financial structure poses a substantial barrier to broader uptake and risks deepening inequalities between those who can afford to invest in retrofitting and those who cannot. As one interviewee noted, current schemes are designed primarily to stimulate market activity—encouraging the adoption of new technologies and fostering demand—rather than to ensure accessibility for lower-income groups (interviews).

This dynamic is particularly problematic in the rental sector, where tenants are significantly more exposed to energy poverty and substandard housing conditions than homeowners. In Norway's highly commodified rental market, energy efficiency improvements depend entirely on the initiative of property owners. No direct support is available to tenants, and existing grants do little to incentivise landlords—whether private or public—to invest in upgrading the housing stock (interviews). The core vulnerability for tenants lies not so much in the risk of renoviction, but in the structural imbalance between landlords and tenants, particularly when it comes to negotiating for adequate energy standards. Many tenants are reluctant to report poor housing conditions due to fears of eviction or lease non-renewal (interviews). This problem is compounded by the common practice of separating energy costs from rent, which further weakens landlords' incentives to improve energy performance.

Access to Enova support also presents a number of structural and procedural challenges. Fyhn et al. (2019) describe how homeowners are often deterred by complex application procedures, extensive documentation requirements, and the relatively limited financial support offered. These administrative burdens disproportionately affect less resourceful households, such as those lacking digital literacy, language proficiency, or time to navigate bureaucratic processes. Several interviewees pointed out that this creates a polarisation in both energy costs and housing quality, particularly disadvantaging elderly residents, single parents, or low-income homeowners without the capacity to engage in lengthy application processes.

The cooperative housing sector is another area where affordability concerns and retrofitting efforts intersect in particularly complex ways. When building maintenance or energy upgrades are financed through collective loans, the associated debt burden can place significant financial pressure on individual residents, in some cases forcing them to sell their homes (interviews). Yet these same debt levels may reduce the market value of the property, making resale more difficult and potentially limiting sellers' ability to purchase a comparable home in the same neighbourhood. According to interviewees and Policy Lab participants, tensions within cooperatives are common, though rarely discussed publicly. Decisions around retrofitting are often politically and socially negotiated. In several cases, board members expressed hesitation to proceed with renovations if the costs risk displacing vulnerable residents—even when the majority supports the investment. Without formal mechanisms or mandates to ensure equitable decision-making, action depends on consensus, and disagreement or discomfort can stall necessary upgrades. As such, the cooperative model illustrates how retrofitting decisions are shaped not only by economic constraints, but also by internal social dynamics, timing, and shared norms.

Territorial disparities further reinforce these patterns of uneven retrofitting outcomes. Larger cities such as Oslo and Bergen are better positioned to access national funding, launch pilot projects, and coordinate multi-stakeholder efforts. Smaller municipalities, by contrast, often face resource constraints, limited administrative capacity, and difficulties meeting co-financing requirements. As several interviewees noted, some municipalities lack the institutional capacity to pursue retrofitting efforts, even when there is political support or evident local need (interviews). Without mechanisms for redistribution or inter-municipal support, retrofitting risks reinforcing spatial inequalities, with the greatest progress concentrated in already well-resourced areas.

	Potential Impacts
Affordability and Access to Grants	Deepening inequalities between those who can and cannot afford retrofitting; increased polarization of housing quality.
Rental Sector Vulnerabilities	Increased energy poverty in rental housing; risk of hidden evictions and deterioration of rental stock.
Administrative Barriers	Widening gaps in housing standards and energy efficiency between well-connected and vulnerable households.

Cooperative Housing Sector	Reduced housing stability; internal conflicts delaying or blocking retrofitting efforts.
Territorial Disparities	Fragmented national retrofitting landscape; reinforcement of urban-rural inequality.

Table NO5. Potential impacts of retrofitting policies on housing inequalities.

5 Nature-Based Solutions

5.1 The Policy Cycle: Emergence of the Issue and Policy Decisions

Legal Requirements

In Norway, Nature-Based Solutions (NBS) are defined in accordance with the UNEA 5.2 definition (UNEP United Nations Environment Programme, 2022) which states that NBS are ‘actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits.’

NBS are increasingly central to Norway’s climate adaptation and biodiversity policies, shaped by global agreements like the Paris Agreement (United Nations, 2015) and the UN Global Biodiversity Framework (United Nations, 2022). These have promoted ecosystem-based approaches, reinforcing NBS in areas such as stormwater management and biodiversity conservation through national frameworks and local experimentation (Nordic Council of Ministers, 2019).

Today, there is an explicit legal requirement to consider NBS in spatial planning guidelines in Norway. A key milestone for reaching this has been the adoption of the **State Planning Guidelines for Climate and Energy Planning and Climate Adaptation (henceforth, SPR Klima)** published in 2018 (Kommunal- og distriktsdepartementet, 2018). The SPR Klima states that the preservation, restoration, or establishment of NBS (such as existing wetlands and natural streams, or new green roofs and walls, artificial streams, and pools) should be considered. SPR Klima requires municipalities and regional authorities to assess the use of NBS in climate adaptation planning. If alternative solutions are chosen, planners must justify why NBS are not selected (Kommunal- og distriktsdepartementet, 2018). While not legally binding for private actors, the guidelines must be incorporated into zoning plans for legal effect. Non-compliance may trigger objections from relevant authorities under the Planning and Building Act (2008). (Di Marino et al., 2025)

These guidelines, built upon earlier 2009 strategies, place a stronger emphasis on climate adaptation and ecosystem services, and their implications are particularly evident in two national policy documents shaping spatial planning in Norway: The **National Expectations regarding Regional and Municipal Planning** published in 2019 and 2023. The most recent version (Ministry of Local Government & and Regional Development, 2023) is the main

planning instrument for implementing NBS (Di Marino et al., 2025). These guidelines recall the key message of SPR Klima (2018), by highlighting the relevance of NBS as a climate mitigation tool in spatial planning, including water management (Di Marino et al., 2025). The National expectations are updated every four years.

Additionally, in 2022, the Norwegian Ministry of Climate and Environment published a white paper (Meld. St. 26, 2022–2023), stating that NBS should be used to reduce flooding or stormwater, thus stabilising the ground and preventing landslides, while preserving or improving the conditions for biodiversity. The meaning is that “changing climate and natural hazards are better addressed in risk and vulnerability analyses in connection with specific building applications and when land-use plans are updated” (Ministry of Environment and Climate 2020, p.46). An important principle is that the municipalities might be allowed to charge a separate fee to the residents in order to fund NBS measures, such as stormwater measures, and the opportunity to extend this is under consideration by the Government (Ministry of Environment and Climate 2020).

Finally, in **2024**, the Norwegian Government adopted the new **State Planning Guidelines for Climate and Energy** in which there is a small change - compared to the SPR Klima, 2018 - in the purpose regarding climate adaptation (see *objective d*: society and ecosystems are prepared for and adapted to climate change, in which NBS are also included). In addition, the flood and landslide report that was recently adopted in the Storting (Kommunal- og distriktsdepartementet, 2024) also mentions NBS as a crucial asset (chapter 7.2.4)

These updates reflect a broader shift toward embedding NBS more systematically into Norwegian spatial planning and climate adaptation strategies. However, local governments remain responsible for implementation, and approaches vary across municipalities (Furuseth, Ingvild Skumlien et al., 2024).

Influence of World, Nordic and EU Directives

Over the last few years, there has been increasing awareness and implementation of NBS in the Nordic countries. International and Nordic policies on NBS have given relevant impulses to the national policy making, while the EU's policies have contributed to a limited extent to the debate and Norwegian agenda.

The reports/programs from i) the International Union for the Conservation of Nature (IUCN, 2016), ii) the Intergovernmental Science-Policy Platform on Biodiversity and Climate change (Pörtner et al., 2021), and iii) the United Nations Environment Programme (2022) have increased the awareness about the implementation of NBS in Norway. These key policies are fundamental to achieve global targets for both biodiversity, as well as for climate change mitigation and adaptation. In 2022, by joining the Nordic ministerial declaration on NBS in 2022 (Sandin et al., 2023), Norway was committed to “actively promote the full potential of nature-based solutions, while ensuring their social and environmental safeguards and enhancing their multiple benefits”.

Norway's commitment to the EU Water Framework Directive (2000/60/EC) and the UN Sustainable Development Goals results in the River Basin Management Plans (RBMPs, 2016). Through the RBMPs, the regional water authorities (*vannregionmyndigheter*) have

recognised the importance of the NBS in water planning (Di Marino et al., 2025). Consequently, the RBMPs have been implemented in the regional plan and by the municipalities (Di Marino et al., 2025). The objectives of the RBMPs are legally binding. This means that all public authorities should implement measures for protecting all water and groundwater surfaces (Di Marino et al., 2025) referring to (Larsen & Solli, 2022).

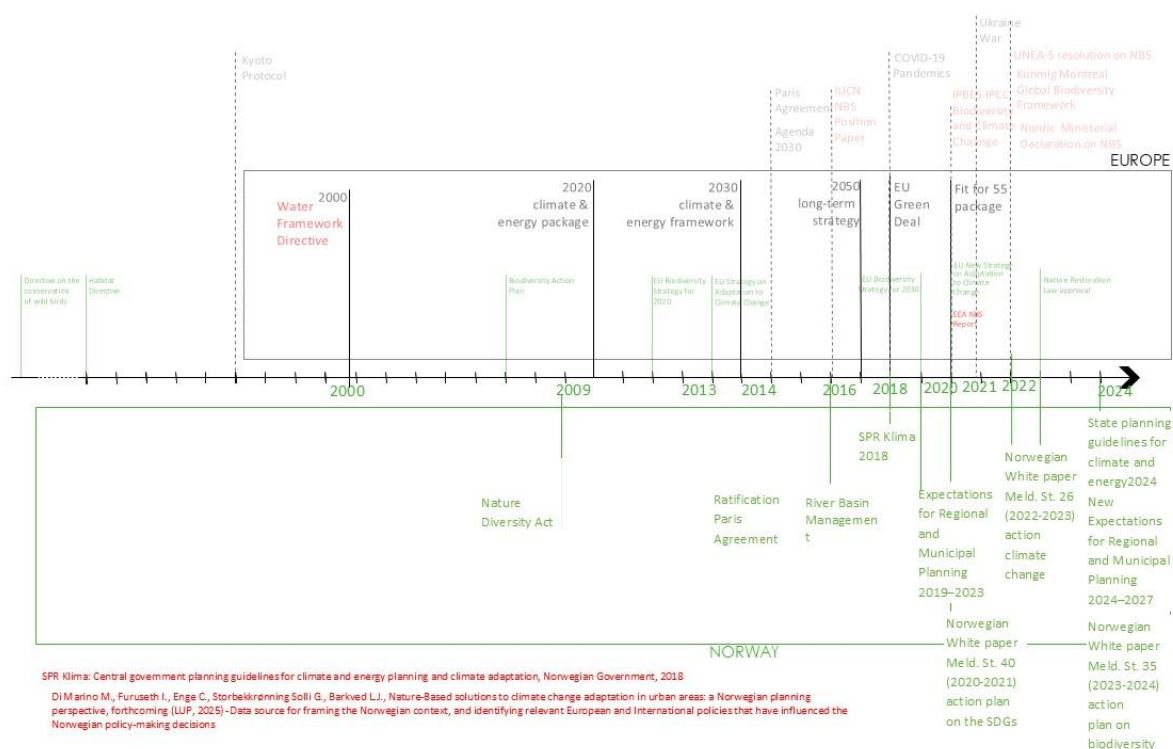


Figure NO2. Timeline illustrating key policies and regulations in Norway (bottom part), internationally and EU (upper part) affecting NBS (in green)

5.2 The implementation process

The implementation of NBS in Norway reflects a multi-faceted approach combining regulatory measures, financial incentives, and collaborative strategies (Furuseth, Ingvald Skumlien et al., 2024).

Municipalities often incorporate incremental deadlines into their planning cycles, such as five-year reviews of climate adaptation plans (Furuseth, Ingvald Skumlien et al., 2024). The implementation of NBS should be regulated in land use planning. This means that there should be recognized as a legal basis if obligations are to be imposed on **private parties, and thus affecting property rights** (Di Marino et al., 2025). As mentioned in Section 2.1.1, the SPR Klima (2018) is not a legally binding tool that can impose the use of NBS on private parties (Di Marino et al., 2025). Therefore, the instructions of the SPR Klima (2018) should be

implemented into existing legally binding zoning plans (Di Marino et al., 2025). On the contrary, the implementation of NBS on **public properties** is typically a local policy question. The municipalities can decide which criteria to adopt for determining and using NBS – and the result is related to local finances, practical conditions, or other factors (Di Marino et al., 2025, referring to (Junker, 2024). A key challenge in the implementation process concerns territorial disparities, particularly between urban and rural areas. Smaller and rural municipalities appear to be adapting more slowly to the national guidelines, largely due to limited administrative capacity, technical expertise, and human resources. In contrast, larger cities often have more robust institutional frameworks and dedicated staff, which allow them to respond more efficiently and proactively to policy changes (Furuset, Ingvild Skumlien et al., 2024). This uneven pace of adaptation is further exacerbated by disparities in access to financial and technical support mechanisms. As detailed below, smaller municipalities often face greater obstacles in navigating and benefiting from the available support schemes, which further hinders their ability to implement national directives effectively and equitably. As reported by Di Marino et al. (2025), in 2023, 70% of Norwegian zoning plans were initiated by private developers (Minde, 2023). The financial tools reported below mainly target public properties in municipalities and do not have different implications for different housing tenures. In the same way, regulatory frameworks developed by municipalities concerning green roofs and other NBS for stormwater management in new developments can indirectly affect housing costs in all housing tenures.

Financial Tools

The main aim of the **Government** is to support the implementation of NBS in **spatial planning practices**. Additional national instruments are in force for the NBS implementation, such as **grant schemes offered by the Norwegian Environment Agency** (*Miljødirektoratet*) (Di Marino et al., 2025). This allows municipalities and other local authorities to develop NBS - among the tools for climate change adaptation, as well as networks among different actors involved in climate adaptation strategies (Di Marino et al., 2025). The Norwegian Environment Agency provides guidance to the municipalities for implementing NBS for climate adaptation in spatial planning (such as a web-based guide, guidelines on how to work with NBS, referencing several reports, examples and webinars) (Di Marino et al., 2025).

The municipal practitioners interviewed by Furuset et al. (2024) stated that having the option to apply for government grants is important for supporting the implementation of NBS. All Norwegian municipalities can apply to the above-mentioned grant schemes. The national guidelines, fees and tools can be implemented in both urban and rural contexts.

In addition to the public grants for NBS mentioned above, there are direct funds for restoration and nature protection projects, urban climate change adaptation, stormwater treatment and water quality improvement (Nordic Council of Ministers, 2022). However, most of these funding opportunities have not been tagged with NBS, but used other terms such as storm water management, green structure, etc.

In addition to these grants, which directly target the implementation of NBS, there are also complementary support schemes provided by various government bodies and agencies. While not specifically designed for NBS, these schemes can indirectly facilitate their implementation

by offering funding, technical assistance, or capacity-building opportunities that align with broader environmental or planning goals. In the agricultural sector, the **Nasjonalt miljøprogram** (National Environmental Program), introduced in 2004, offers financial incentives to farmers and landowners to implement practices that preserve biodiversity and enhance ecosystem services. Grants are available for maintaining and restoring agricultural landscapes, promoting sustainable farming practices, and establishing buffer zones along waterways to reduce nutrient runoff. Additionally, the Norwegian Water Resources and Energy Directorate (**NVE**) provides funding for projects related to flood and landslide risk management and supports initiatives that incorporate solutions like floodplain restoration and the enhancement of natural water retention areas. These projects aim to utilise natural systems to absorb and manage water flow, thereby reducing the impact of extreme weather events.

Regulatory Tools

Several municipalities in Norway have implemented regulatory measures to integrate NBS into urban planning and development. Municipal zoning policies (Furuset, Ingvild Skumlien et al., 2024) often mandate a minimum percentage of green areas in new developments, utilising tools like the **Blue-Green Factor (BGF)** to quantitatively assess and promote the integration of green and blue elements. In some municipalities, **tree planting obligations** require the replacement of removed trees with new plantings to maintain urban canopy cover. In others, **green roof and wall** requirements encourage or mandate the installation of green roofs to manage stormwater and reduce heat islands. The concept of **area neutrality** is also gaining traction, aiming to balance land development with the preservation of natural areas to maintain ecological functions and services.

Support and Networking Tools

To facilitate the implementation of NBS, Norway has developed various support and networking tools. Workshops and **training** programs equip municipal planners with the skills to design and implement NBS effectively. **Public awareness campaigns** and collaborative networks, facilitate knowledge sharing among municipalities. (SINTEF, 2022). It is important to highlight that Norway's active participation in numerous **EU research-funded projects** has fostered the development of living labs, **pilot experiments**, and extensive networking opportunities, thereby enhancing innovation and collaborative efforts across various sectors.

iFont is a network that was established in 2015, consisting originally of 11 cities and coordinated by the Norwegian Environment Agency. The network has been contributing to increasing and sharing knowledge and competence across the municipalities and regions, as well as testing and developing climate adaptation measures. iFont is also a reference group for several national processes, such as the assessment of the BGF, as well as some research and **development initiatives related to green roofs** (Di Marino et al., 2025)

Criticalities

The implementation of NBS is facing several barriers and important criticalities. At the national level, guidelines from 2018 and 2024 provide strategic direction, but **enforcement mechanisms remain limited**, making municipal implementation highly dependent on local

political and financial conditions (Barkved, L. J. et al., 2024). First, in terms of financial constraints, the **high upfront costs** of NBS often deter municipalities and developers. Smaller municipalities, in particular, struggle to allocate resources for NBS projects. A second important challenge is related to the **resistance from developers** since frequently they argue that NBS requirements, such as green roofs, increase project costs and complexity (Furuseth, Ingvild Skumlien et al., 2024). Additionally, there are **knowledge gaps**. Limited expertise among municipal planners hinders the effective evaluation and implementation of NBS. Finally, there are **conflicts between urban priorities**. Indeed, balancing NBS with urban densification and affordable housing goals remains a persistent challenge, particularly in high-demand urban areas like Oslo and Trondheim (Cucca et al., 2024).

Name	Tipology	Actors	Description
Klimasats and other granting schemes	Financial	Environmental Directorate	Support schemes: Municipalities and county authorities can apply for funds for knowledge building and studies on specific climate adaptation measures. Klimasats schemes for NBS in flood-prone areas (green roofs, urban wetlands, and the restoration of natural waterways to manage stormwater and mitigate flooding risks)
National environmental Program	Financial	Agriculture Directorate	Maintaining and restoring agricultural landscapes along waterways.
Support scheme	Financial	Norwegian Water Resources and Energy Directorate	Projects related to flood and landslide risk management and supports initiatives that incorporate solutions like floodplain restoration and the enhancement of natural water retention areas
BGF	Regulatory	Municipalities	Tools that aim to increase the impact of various blue-green qualities in outdoor spaces, such as open stormwater management initiatives, and conservation and planting of trees . It is a method to ensure the provision of sufficient blue-green areas, together with the management of their water and vegetation. The idea behind them is to plan infill developments more sustainably by providing more permeable surfaces and vegetation. This approach is being used for new construction projects
No-net loss 'area neutrality' Municipalities	Regulatory	Municipalities	An approach with the goal of 'net zero loss' of nature, based on the principles of a hierarchy of measures to avoid natural consequences, then mitigate, then restore, and possibly, as a last resort, compensate by implementing natural interventions.

Green structure Municipalities	Regulatory	Municipalities	It aims to manage biological diversity in a sustainable way and to protect cultural landscapes and cultural heritage for future generations. Is has a regulatory role. It has been introduced as a land-use category, including its sub-categories of land use nature areas, open spaces, parks and green areas for walking
IFont	Networking	Norwegian Environment Agency	Arena coordination cities efforts in NBS

Table NO6. Tools for NBS in Norway

5.3 Size and role of the market

A combination of public, private, and civil society contributions defines the market framework for NBSs in Norway. While the public sector remains central to initiating and supporting NBS projects, the private market has increasingly taken on a role in scaling up and innovating these solutions. However, **purely market-driven NBS** interventions remain still **limited** (Wilbers et al., 2022).

Public-private partnerships are fundamental to Norway’s NBS market (Barton et al., 2015). Government bodies, such as the Norwegian Environment Agency, provide funding and regulatory guidance, while private actors contribute expertise and resources for implementation. For example, urban green infrastructure projects like rain gardens and green roofs in Oslo are frequently developed through such partnerships, where municipalities offer incentives, and private developers handle construction and maintenance (Wilbers et al., 2022). However, many large-scale NBS projects, such as urban park development or riverbank restoration, depend on significant public funding, while most of the micro-scale interventions are initiated by private developers in the zoning plans (Furuset, Ingild Skumlien et al., 2024).

Anyway, the professional private sector’s role in NBS is expanding, especially in urban areas. Companies specialising in green infrastructure, landscaping, and architecture increasingly include NBS in their portfolios, driven by demand for eco-certified developments and sustainable solutions. However, many developers still do not expect to gain particular economic benefits from the implementation of NBS, unless these interventions overlap with other specific contextual elements of the projects (central location, proximity to blue infrastructures, public transportation, etc) (Barton et al., 2015; Cucca et al., 2024)

Regulatory frameworks are pivotal in shaping the NBS market. Requirements like zoning regulations and tools such as the Blue-Green Factor (BGF) promote the integration of NBS into urban planning, creating demand for private services in design and installation (Di Marino et al., 2024). Additionally, knowledge transfer from publicly funded pilot projects has helped in building professional expertise, reducing barriers for private actors to participate in NBS implementation (Furuset, Ingild Skumlien et al., 2024)

Examples of market-driven NBS in Norway include **eco-certified developments**, where real estate projects integrate green roofs, energy-efficient landscaping, and stormwater management systems to meet **certification standards like BREEAM** (Wiik et al., 2023). Companies specialising in green infrastructure also lead urban NBS implementation, such as permeable pavements and bioretention systems, often under contract with municipalities. Furthermore, corporate social responsibility (CSR) initiatives see businesses investing in NBS to **enhance their environmental branding**, such as sponsoring urban tree planting or biodiversity projects in collaboration with local governments (Time, 2023). However, high upfront costs and long-term economic returns deter purely market-based interventions (Barton et al., 2015). The willingness for immediate profitability indeed limits private sector contributions, as many benefits of NBS—such as reduced flood damage or increased property values—accrue over time (Barton et al., 2015; Cucca et al., 2024).

In conclusion, regulatory frameworks and public funding remain essential in shaping market dynamics, providing the necessary incentives for the implementation of NBS. Some of the municipal practitioners interviewed by Furuset et al. (2024) stated that developers should pay and maintain the NBS, while some government grants to which the developers can also apply (see Section 2.2.1) should support the municipalities to develop and maintain NBS. At the same time, according to the municipal managers, there is a common perception among the private developers that the implementation of NBS is costly, and some developers believe that the implementation of these measures may block new housing construction (Di Marino et al., 2015, p.X). Additionally, the financial support for developing and maintaining NBS is often originated from different public agencies, thus there is not a unique budget but fragmented financial sources (Di Marino et al., 2015). „At the moment, municipalities cannot fund NBS, such as a rain bed or open ditch/stream, through income from water supply fees“ (Di Marino et al., 2015, p. 14). The municipal planners are also aware that not all developers are familiar enough with the concept of NBS and the use of NBS can be perceived as increasing the cost of the process (Furuset et al. 2024). Additionally, the use of NBS also often means that area must be set aside for green areas that could otherwise be residential space with a greater prospect of profit (Furuset et al., 2024). In the context of ongoing housing shortages in major cities, this trade-off can significantly influence political decision-making processes and the dynamics of negotiation between public authorities and private developers. It may also place pressure on local regulatory frameworks, as municipalities attempt to balance environmental objectives with housing demand and market interests. Regulatory frameworks are pivotal in shaping the NBS market. Requirements like zoning regulations and tools such as the Blue-Green Factor (BGF) can be used to promote the integration of NBS into the land use, creating demand for private services in design and installation (Di Marino et al., 2024). Additionally, knowledge transfer from publicly funded pilot projects should help in building professional expertise, reducing barriers for private actors to participate in NBS implementation (Furuset et al., 2024).

5.4 The multilevel governance process

The implementation and governance of NBS in Norway operate within a **multilevel framework** (Gundersen Enge et al., 2024) that includes the national, regional and local levels and

generally relies on the principles of ministerial responsibility and local self-governance (Christensen & Lægreid, 2020).

At the **national level**, the regulation and implementation of NBS involve multiple ministries, reflecting their relevance across environmental, urban, agricultural, and infrastructural sectors. The **Ministry of Climate and Environment** plays a central role by developing policies, funding programs, and overseeing environmental agencies such as the **Norwegian Environment Agency** (Miljødirektoratet), which supports the practical implementation of NBS. The **Ministry of Local Government and Regional Planning** integrates NBS into urban development and land-use planning, ensuring green infrastructure is included in zoning regulations. The **Ministry of Agriculture and Food** promotes NBS through sustainable land management and biodiversity conservation in rural areas. The **Ministry of Transport** incorporates NBS into infrastructure projects, while the **Ministry of Petroleum and Energy, through the Norwegian Water Resources and Energy Directorate (NVE)**, funds projects related to flood risk management and ecosystem restoration. These ministries collaborate to ensure that NBS contribute effectively to climate adaptation, biodiversity, and sustainable urban development.

The responsibility for land use planning in Norway is decentralised, with regional and local authorities playing pivotal roles as authorized by the national **Planning and Building Act**. At the **regional level**, the **county authorities** (Fylkeskommune) are supposed to coordinate planning efforts across municipalities, ensure compliance with national objectives, provide guidance, and support to municipalities. This tier is particularly important for disseminating best practices and addressing regional climate adaptation challenges. The Region of Rogaland, however, stands out as the only region with an explicit climate adaptation plan prioritising NBS (Rogaland Region, 2020), setting ambitious goals for green, multi-functional solutions (COWI, 2024).

Locally, **municipalities** (Kommune) hold the primary authority for detailed land use planning within their jurisdictions. They are responsible for developing municipal master plans (kommuneplan), zoning plans (områdeplan), and detailed zoning plans (detaljregulering), which guide the development and use of land following both local needs and national policies. They are the primary implementers of NBS and are supposed to incorporate NBS into zoning regulations, pilot projects, and community engagement initiatives (Furuseth, Ingvild Skumlien et al., 2024).

The national government provides a range of guidelines to support municipalities in the implementation of nature-based solutions (NBS), with the stated aim of strengthening knowledge, skills, and institutional capacity among local authorities and stakeholders. Despite these efforts, many municipalities continue to face significant technical and financial challenges in translating NBS strategies into practice. Environmental NGOs, such as Naturvernforbundet, actively promote stronger and more ambitious NBS policies. However, their influence on local planning processes tends to vary widely, depending on the political priorities, institutional openness, and resource constraints of individual municipalities. The decentralised governance system, while allowing for tailored solutions, has however led to fragmentation of responsibilities. Smaller municipalities, in particular, struggle with the technical and financial demands of implementing NBS strategies. Environmental NGOs, such

as Naturvernforbundet, advocate for stronger NBS policies, but their influence varies depending on local political priorities.

A notable **gap in coordination exists between NBS policies and housing strategies**. While both should aim to enhance urban livability, investments in green infrastructure can inadvertently contribute to increasing housing costs. For instance, new or revitalised green spaces may drive up property values. Furthermore, in densely populated urban areas, the prioritisation of green infrastructure can reduce available land for affordable housing developments, creating competing priorities.

Municipalities' regulatory autonomy allows them to tailor NBS strategies to local contexts, but this discretion also leads to inconsistencies in how these solutions are prioritised and executed. Additionally, municipalities may rely on national grants and subsidies to fund large-scale NBS projects, such as riverbank restoration or stormwater management systems. This financial dependency limits their ability to independently sustain or expand NBS initiatives.

	National level	Regional Level	Local level
Responsible political actors	Norwegian Government Main actor: Ministry of Climate and Environment Other actors: Ministry of Local Government and regional development Ministry of Agriculture and Food Ministry of Transport Ministry of Petroleum and Energy	Counties coordinate and support municipalities, according to national recommendations	Municipalities develop masterplans and area zoning plans, while developers propose detailed zoning plans
Responsible Technical actors	Norwegian Environment Agency		Municipal Planning Departments Private Developers propose detailed zoning plans
Key regulatory tools	SPR Klima Planning and Building Act, Land Act, Nature Diversity Act, National Climate Strategies	Regional Land-Use Plans, Environmental and Transport Guidelines	Municipal Masterplan (land use element), Zoning plans (area zoning and detailed zoning)
Key policies	National Climate Plans (since the 1990s)		Local climate Plans and Municipal Masterplans

Table NO7. Governance structure of NBS in Norway

5.5 Achievements, assessments, and challenges

Local experimentations with NBS have proven effective in enhancing climate resilience and mitigating environmental risks (SINTEF, 2022). Urban biodiversity has also benefited from NBS initiatives, supporting greater species diversity and strengthening ecosystem services. Investments in urban parks and green infrastructure have revitalised public spaces, improved recreational opportunities and contributed to residents' mental well-being (Time, 2023).

However, critical evaluations of NBS implementation highlight challenges and unintended consequences that need attention.

Despite the emphasis on NBS in various Norwegian guidelines and norms, the **availability of green spaces has been decreasing** in several urban areas due to densification, notably in Oslo (Næss et al., 2020). Moreover, the distribution of green and blue infrastructures is often inequitable, leading to disparities in access among different communities (Venter et al., 2023). To address spatial inequalities, the government has, over the past two decades, implemented large-scale area-based policies aimed at improving the quality of green spaces in socioeconomically disadvantaged districts (Områdesatsinger). While comprehensive empirical evidence on the effects of these initiatives on housing values is still lacking, insights from key informants suggest that their implications vary significantly depending on the degree of vulnerability to gentrification in different neighbourhoods. In areas already experiencing market pressure and demographic shifts, investments in green infrastructure may contribute to rising property values and the risk of displacement, whereas in more stable or marginalized districts, such improvements may just enhance quality of life (Cucca et al., 2024). Enhanced green spaces can increase property values, making neighborhoods more desirable but also raising the risk of **green gentrification** (Cucca et al., 2024). The effects of NBS on housing costs appear to be highly context-dependent. Price increases following the implementation of NBS are more likely to affect specific neighbourhoods with pre-existing socio-economic and spatial characteristics that make them susceptible to market-driven pressures (Barton et al., 2015).

The **policy capacity** (Cucca & Ranci, 2022) of municipalities to prevent rising housing costs related to NBS implementation remains uncertain, due to lack of coordination between housing and planning policies in the multilevel governance framework (Di Marino et al., 2023). In Norway, housing affordability policies and tools are relatively **weak**, complicating the integration of NBS without exacerbating housing pressures. Additionally, a lack of alignment between NBS and housing policies may result in **competing priorities**, particularly in high-density urban areas where space for green infrastructure and housing are in direct competition (Cavicchia, 2021a). Policies aimed at preserving carbon-rich areas, wetlands, and forests—while essential for biodiversity and climate mitigation—could further limit land availability for housing, driving up demand and property prices. Moreover, integrating NBS into development plans may **increase construction and maintenance costs**, which could ultimately be passed on to residents, reducing affordability even further.

Establishing robust **monitoring** systems would enable policymakers to better understand how NBS contribute to social and environmental goals and ensure that their benefits are distributed equitably.

		Potential Impacts
Private Owned Market		High maintenance costs can increase monthly fees; high production costs of NBS can increase housing price; available land for development can be reduced
Rental Sector	Vulnerabilities	In some central, dense areas, NBS can increase direct and indirect displacement due to the higher attractiveness of the neighbourhood

Cooperative Housing Sector	High maintenance costs can increase monthly fees; high production costs of NBS can increase housing prices
Territorial Disparities	Can increase territorial disparities in housing prices following greening or risk adaptation, if it is not implemented in an equitable way

Table NO8. Potential impacts of NBS on housing inequalities.

6 Densification

6.1 The policy cycle: emergence of the issue and policy decisions

The concept of densification gained currency in Norway already from the Brundtland report (WCED, 1987). The "Nature and Environmentally Friendly Urban Development" (NAMIT) project, which ran from 1988 to 1992, introduced in Norway the principle of densification as a strategy to **counteract undesirable consequences of urban sprawl**. The findings from NAMIT have been foundational for subsequent research on sustainable urbanization in Norway. Since those years, the concept was explicitly tied to climate action and sustainability goals, with the strong rationales of contrasting urban sprawl, protecting green and agricultural areas and promoting mixed development. Another key justification was the imperative to reduce emissions contributing to climate change. The principles of compact urban development, deeply rooted in environmental rationales, have gained widespread acceptance in Norway and have been systematically institutionalized. From the early 1990s onward, these principles were integrated into national policies and regulations, reflecting a proactive approach to sustainable urban planning. In the latest years, the relevance of densification for sustainable development has been further emphasized in Norway in connection to the expansion of the second-home phenomenon, often referred to as "recreational sprawl." Notably, densification has emerged as a prominent planning and land-use concept in Norway well before European directives began to influence its adoption, underscoring the country's early commitment to aligning urban development with environmental sustainability.

Legal requirements

As mentioned above, the **Planning and Building Act** is the Norwegian national planning law. Even though there is no national law imposing densification directly, densification is emphasized in the Act as the most sustainable urban development strategy and expectations for sustainable land-use are established at the national level for both regional and local levels. In the Planning and Building Act it is stated that "More compact cities and places make it easier for people to walk, cycle and use public transport. This improves access to jobs, services and cultural offerings. At the same time, transformation and higher utilisation of already developed areas will reduce the need to reduce agricultural land and land that sequesters carbon.". Furthermore, the Planning and Building Act represent the legal framework for coordinated housing, spatial and transport planning, the main principle of the Norwegian national planning

law for sustainable development. The support for densification is also linked to the zero-traffic growth goal, which was first stated in the 2012 Parliament's climate agreement and then incorporated in the subsequent national transport plans (IPAC & OECD, 2021). Densification, indeed, is deemed to reduce the use of cars by increasing proximity and mixed-use development. Furthermore, densification is indirectly affected by other sectoral legislations, which affect urban development and land use in different ways:

- **The Land Act (1995)**, which regulates land use to ensure sustainable management of agricultural and natural resources. Its primary objective is to protect and preserve farmland. The protection of outdoor recreational spaces is a huge topic in the Norwegian Planning. As noted in Hanssen and Hofstad (2013), almost every urban settlement in Norway is characterized by one or more recreational areas, mainly forests called "Marka". These, as in the case of Oslo, usually set the urban growth boundaries.
- **The Nature Diversity Act (2009)**, which protects biological, geological and landscape diversity.
- **The Cultural Heritage Act (1978)**, which protects archeological and architectural monuments and sites and applies for urban areas.

Among these, the legislations concerning the protection of agricultural and recreational areas are considered to be those influencing densification most significantly (Hanssen & Hofstad, 2013).

National climate plans, since the 1990s, have included the following principle as guiding Norway's pathway towards densification:

- Redevelopment of brownfield,
- Development around transportation hub and reduction of car traffic
- Protection of green areas
- Increase housing supply, especially in growing areas

State planning guidelines for land use and mobility assume that the growth in passenger transport in metropolitan areas should be taken by public transport, cycling and walking (Norwegian Government, 2025). The guidelines state that in urban and rural areas and around public transport hubs, special emphasis should be placed on high land use, densification and transformation with quality. At the same time, emphasis should be placed on the cultural environment, site qualities, good outdoor areas, quality of life and access to green structures and natural areas.

Influence of EU Directives

When it comes to the effects of EU regulations, as mentioned, Norway, has been focused on densification well before joining the EU Emission Trading System. However, worth mentioning is that being Norway an EEA member, it is aligned with LULUCF regulations, which are under the "ready for 55" package and focus on achieving a carbon-neutral land use sector by 2035. Norway is required to set and achieve a national net carbon uptake target for its land use sector. Due to an aging forest population, deforestation, and increased logging, Norway's forests have seen declining carbon uptake levels since 2009. To meet the EU-aligned goals,

Norway must focus on limiting deforestation, controlling logging activities, and enhancing reforestation efforts (Farstad, 2022). This might indirectly affect densification, but it should be verified with further research.

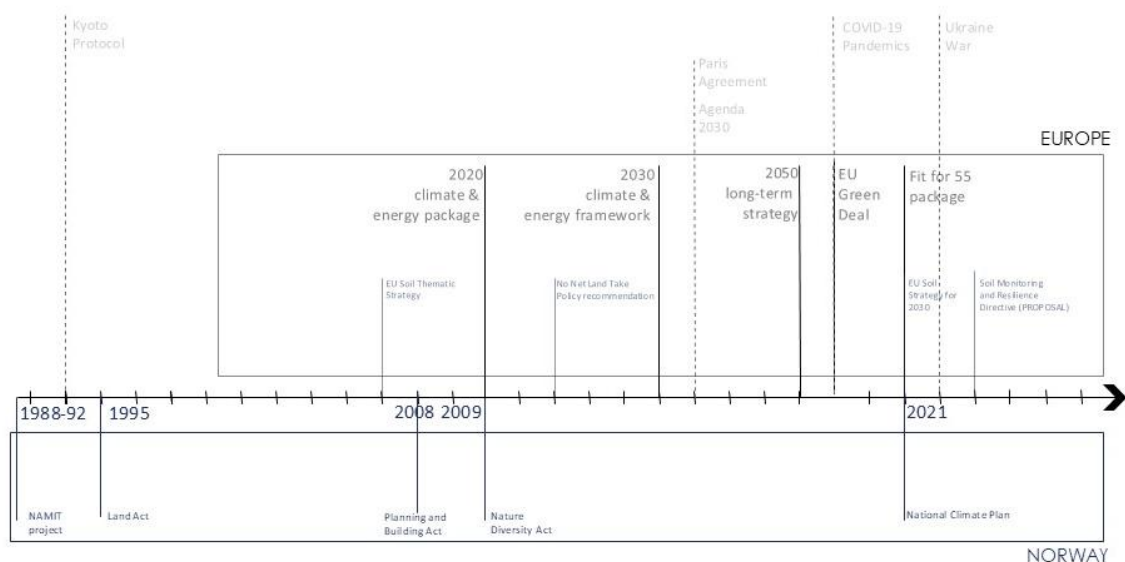


Figure NO3. Timeline illustrating key policies and regulations in Norway (bottom part) and EU (upper part) affecting densification

6.2 The implementation process

Regulatory tools

As already mentioned, there are various national regulatory tools that affect, more or less directly, the implementation of densification (see previous section). It should be noted that Norwegian municipalities have large autonomy when it comes to land use and thus play a central role for the implementation of densification interventions. At the local level, the most important tool is the municipal masterplan, which sets development objective and regulates land-use. **Municipalities have also significant freedom** when it comes to zoning plans and deciding what to build where. According to the Planning and Building Act, zoning plans might contain provisions on 'the number of dwellings in an area, largest and smallest dwelling size, and further requirements for accessibility and the design of the dwelling where it is appropriate for special needs' (*Plan- og bygningsloven – pbl* 2008, § 12.7). The city council serves as the primary planning authority, responsible for approving or rejecting zoning plans, most of which are submitted by **private developers** (Nordahl, 2014). As Hanssen and Hofstad (2013) observed, the Planning and Building Act Reform of 1985 marked the end of the public planning monopoly by allowing private entities to initiate detailed and area-based zoning plans. These plans are then submitted to the local government for political approval. While this change was

originally intended to enhance democratic participation by involving civil society, it has increasingly become a tool for market-driven actors, with densification efforts often motivated by profitability (Cavicchia, 2023b).

6.3 Size and role of the market

Urban planning in Norway has been significantly shaped by neoliberal policies, where private developers play a dominant role despite the public sector's extensive legal authority and oversight. Although municipalities have considerable regulatory tools, it is private developers who effectively implement urban plans (E. Falleth et al., 2011). Developers are responsible for initiating zoning proposals, financing developments, managing land assembly, and driving housing production. Municipalities generally approve income-generating projects on the condition that developers also invest in public infrastructure, such as roads, green spaces, and bike paths (Eika, 2020).

A critical factor in the influential role of private actors is **land ownership**. Since the 1980s, public land ownership in Norway has declined significantly, weakening municipalities' bargaining power in development negotiations. While municipalities can acquire land through pre-emption rights, they must do so at market value.

Land expropriation is permitted by law for 55 specified purposes, including public buildings, infrastructure, housing, and certain commercial projects. Although expropriation rights are available to all levels of government, their use has become rare for local governments, with national transport authorities now being the primary users of this mechanism (OECD, 2017).

This shift in land ownership dynamics, coupled with the reliance on private developers, highlights a market-driven approach to land-use planning in Norway, where the public sector's regulatory oversight is tempered by its reduced control over land resources.

6.4 The multilevel governance process

At the national level, the Planning and Building Act, alongside other sectoral laws like the Land Act and the Nature Diversity Act, provides the legal foundation for sustainable urban development. National climate and transport policies emphasize densification as a means to combat urban sprawl, reduce car dependency, and protect agricultural and green spaces. While these policies establish clear guidelines, municipalities have considerable autonomy in their implementation, reflecting a decentralized approach to land-use governance.

Regions contribute through regional planning instruments such as regional plans and plan strategies, and they facilitate knowledge-building and analytical support to municipalities. This role is particularly important in enabling a shared understanding of housing needs, aligning development goals, and supporting densification strategies where regional infrastructure and mobility planning are involved (Asplan Viak, 2023). Housing, land use, and transport planning (*bolig-, areal- og transportplanlegging*, BATP) plays a key role in ensuring coordinated regional development, especially in areas facing urban growth and densification pressures. Regions contribute by developing regional plans that integrate housing provision with land use and

transport infrastructure. National planning guidelines emphasize the importance of cross-municipal collaboration to achieve efficient land use, reduced car dependency, and socially sustainable housing development. While BATP provides a strong framework for aligning housing with mobility and spatial planning, its implementation varies, highlighting the need for stronger coordination between regional and local planning levels (Asplan Viak, 2023).

Local governments, particularly municipalities, are the primary actors responsible for executing densification policies. Municipal masterplans and zoning regulations serve as the key tools for shaping land use and determining where and how densification occurs. City councils act as political decision-making bodies, approving or rejecting zoning proposals, many of which are submitted by private developers. As mentioned, the significant role of private developers in densification is further reinforced by the decline in public land ownership since the 1980s' governments.

Despite efforts to coordinate national and local priorities, densification policies face a fundamental trade-off between environmental sustainability and housing affordability. Market-driven development is often prioritized, as Norway's neoliberal housing system lacks strong policy mechanisms to promote affordable housing (Cavicchia, 2021b). As a result, while densification increases housing supply and supports sustainability goals, it does not inherently address affordability concerns. The absence of targeted affordable housing initiatives means that densification projects are largely shaped by market forces, often catering to higher-income segments rather than providing inclusive housing solutions.

	National level	Regional Level	Local level
Responsible political actors	Norwegian Government, Ministry of Local Government and regional development define national policies and laws		Municipalities develop masterplans, zoning regulations, and negotiate with developers
Responsible Technical actors			Municipal Planning Departments Private Developers propose zoning plans, finance housing and infrastructure
Key regulatory tools	Planning and Building Act, Land Act, Nature Diversity Act, National Climate Strategies	Regional Land-Use Plans, Environmental and Transport Guidelines	Municipal Masterplans, Zoning Regulations
Key policies	National Climate Plans (since the 1990s)		Local climate Plans and Municipal Masterplans

Table NO6. Table NO 3. Governance structure of densification in Norway

6.5 Achievements, assessments, and challenges

The discourse surrounding urban densification in Norway has primarily been framed within the context of environmental sustainability but is increasingly intertwined with housing provision. Especially in larger Norwegian cities facing significant housing pressure, politicians and developers often argue that densification can help lower housing prices by increasing supply compared to low-density development. However, scholars have identified several challenges that complicate this assumption, highlighting how densification can contribute to housing inequalities. Much of this research has focused on Oslo, where the impacts of densification are particularly pronounced.

One major concern is the effect of densification on housing quality, particularly in terms of dwelling size and access to natural light—an especially critical factor in Nordic countries, where daylight is scarce for much of the year (Schmidt, 2014). In Oslo, this debate has centered around the increasing prevalence of “**hyblification**”, a term derived from the Norwegian word *hybel*, meaning small studio apartments typically ranging from 15 to 20 square meters. The proliferation of such micro-units raises concerns about livability, as densification efforts often prioritize maximizing the number of housing units over ensuring adequate living conditions. Furthermore, developers often justify the construction of small apartments as a way to provide more affordable housing, particularly for young people entering the market. However, these units typically have a higher price per square meter than larger ones, ultimately serving as a strategy for developers to maximize profits.

Densification also has significant implications for housing affordability. Norway’s housing policies have followed a neoliberal trajectory since the 1980s, with limited public intervention to guarantee affordable housing. Unlike many other European cities that implement inclusionary zoning policies—requiring developers to allocate a share of new units as affordable housing—Norwegian municipalities lack strong regulatory mechanisms to enforce affordability requirements (Cavicchia, 2023b). As a result, densification projects often align with market profitability rather than social equity, contributing to rising housing costs and the exclusion of lower-income groups from newly developed areas.

Moreover, densification is increasingly linked to **gentrification dynamics** (Andersen & Røe, 2017). While traditional gentrification, as seen in cities with lower homeownership rates, may be less evident in Norway due to the high levels of property ownership, research has identified **exclusionary pressures** associated with densification. This refers to the spillover effect where the creation of attractive, high-density residential areas drives up property values in surrounding neighborhoods, making housing less accessible to lower-income populations over time (Cavicchia, 2023c). These dynamics suggest that while densification may contribute to urban sustainability, without targeted policies to address affordability and inclusivity, it risks exacerbating housing inequalities rather than alleviating them.

Finally, another critical trade-off to consider is the impact of densification strategies on the reduction of urban green spaces. In several densification areas across Oslo, this issue has sparked protests against further development.

Potential Impacts	Description
Housing Quality and Livability	Proliferation of micro-apartments ('hyblification') reduces livability and access to daylight; compromises housing standards.
Affordability and Market Pressures	Densification aligns with market profitability rather than social equity; limited public tools to ensure affordable housing.
Gentrification and Exclusion	Spillover effects of high-end developments increase surrounding property values, displacing low-income groups.
Regulatory Limitations	Lack of inclusionary zoning and affordability mandates in Norwegian planning weakens equity outcomes of densification.
Reduction of Urban Green Spaces	Densification can lead to loss of green areas, sparking public opposition and reducing environmental quality.

Table NO7. Potential impacts of densification policies on housing inequalities.

7 Summary and discussion of results

7.1 Summary of changes in EEP

Over the past few decades, Norway has progressively integrated environmental and energy objectives into national and urban policies, although the trajectory and maturity of these policies vary significantly across domains. Nature-based solutions (NBS) and densification strategies were institutionalised well before the emergence of EU environmental directives on the matter, whereas energy retrofitting lags behind, both in policy coherence and implementation. This temporal misalignment contributes to uneven integration across levels of governance and complicates the alignment of green transition measures with housing objectives.

National environmental policy is strongly oriented towards sustainability, biodiversity protection, and compact urban development. Densification policies, originating in the 1980s and rooted in national climate strategies, were codified in the Planning and Building Act, enabling local governments to prioritise compact urban form, limit sprawl, and reduce car dependency. Similarly, NBS have gained increasing traction in national and municipal planning frameworks, especially following the 2018 SPR Klima guidelines, which introduced requirements to consider ecosystem-based measures in land-use planning. However, the implementation of these strategies—particularly NBS—remains highly uneven, with stronger uptake in larger municipalities and urban regions that have greater technical and institutional capacity.

In contrast, the development of energy retrofitting policies has been slower and more fragmented. Norway has no legal obligation for private building retrofits, and national strategies have largely relied on voluntary incentives rather than mandates. Financial tools, such as

Enova grants and Husbanken loans, are the primary levers used to promote retrofitting; however, they typically cover only a fraction of the total costs and are not income-differentiated. The lack of a clear regulatory mandate or targeted social criteria for retrofitting reflects a policy gap that limits the reach of green transition measures to those who can afford them.

From a governance perspective, territorial disparities emerge as a central challenge across all three policy areas. In NBS and retrofitting, the capacity to plan, fund, and implement projects is highly dependent on local resources and administrative capacity. While national agencies provide technical guidance and some financial support, smaller or rural municipalities often lack the capacity to apply for funding, coordinate across departments, or engage with private actors. In densification, the dominant role of private developers—who initiate most zoning proposals—has led to increasingly market-driven urban development, often at odds with affordability and inclusion goals.

The fragmented distribution of authority and resources across governance levels, combined with the lack of strong horizontal coordination between housing and environmental policies, reinforces these disparities. As a result, the multilevel governance structure remains marked by vertical inconsistencies (between national policy ambitions and local implementation capacity) and horizontal silos (between housing and environmental domains).

7.2 Relations and Trade-Offs Between EEPs and Housing Policies

The integration of environmental, energy, and housing policies in Norway remains weak. This is particularly evident in retrofitting, where affordability concerns are largely absent from existing policy tools. Enova and Husbanken schemes are not designed to address social disparities: they provide the same incentives regardless of income, tenure, or vulnerability. This design limits their redistributive potential and risks exacerbating housing inequalities by privileging owner-occupiers with sufficient capital or credit access. Interviewees and Policy Lab participants repeatedly stressed that current schemes are designed more to stimulate market demand for energy technologies than to address affordability gaps or social needs.

In the rental sector, this results in stark vulnerabilities. Tenants have no access to retrofitting subsidies and are reliant on landlords to initiate energy upgrades. Yet landlords, particularly in profit-driven private rental markets, face little incentive to invest in costly renovations they cannot directly capitalise on through energy savings. Moreover, the absence of rent regulation potentially allows any improvement to be passed on to tenants in the form of higher rents, further compounding the problem.

In the cooperative housing sector, affordability is equally precarious. Retrofitting initiatives must be agreed collectively and are often financed through joint debt. This can generate internal tensions and risks of financial overburdening, particularly for residents with lower incomes or higher vulnerability. In practice, decisions to proceed with retrofitting are shaped as much by social negotiation and internal politics as by technical considerations.

NBS present another set of trade-offs. While they contribute positively to climate resilience, they can also generate indirect socio-spatial effects. In some areas, the introduction of green amenities—urban parks, green roofs, restored waterways—can increase property values,

triggering gentrification dynamics and putting pressure on low-income residents. In Oslo and other high-demand cities, the prioritisation of green infrastructure in urban planning has sometimes led to increased housing costs, especially when land reserved for NBS reduces the space available for affordable housing. Moreover, local governments often lack the tools to manage these trade-offs effectively, given the absence of integrated planning frameworks that align environmental goals with housing needs.

Densification is the most institutionalised and mature among the three domains, but its implementation is also marked by strong market orientation and weak affordability safeguards. In fact, in many cities, densification has coincided with a proliferation of small, high-priced units and has been linked to exclusionary pressures. Without robust inclusionary zoning mechanisms or affordability requirements, the housing outcomes of densification remain shaped by market logics rather than social objectives.

In sum, the three environmental and energy policy domains analysed in this report—retrofitting, NBS, and densification—present different levels of maturity, institutionalisation, and alignment with housing goals. Densification is the most embedded in national policy, with a long-standing legal and planning framework, but also the most captured by private interests. NBS are increasingly present in national guidance and legal instruments but uneven in implementation due to local capacity gaps. Retrofitting is the least developed, with fragmented governance, limited affordability considerations, and contested political support, particularly in the current context of political instability and uncertainty around the implementation of EU directives.

Across all three areas, a common challenge lies in the lack of integrated policy design that considers the intersection between environmental transitions and housing inequalities.

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9 Annex

Annex 1

EUROPEAN LEVEL		
2002	Energy Performance of Buildings Directive (EPBD) https://eur-lex.europa.eu/eli/dir/2002/91/oj/eng	The 2002 EPBD did not impose common, precise numerical targets. It required each Member State to develop a national methodology for calculating the energy performance of buildings. It required members states to set national minimum requirements on the energy performance of new buildings and only existing buildings with a total useful floor area over 1000 m² that are undergo major renovation¹⁴⁶. Member States may decide not to set or apply the requirements for the residential buildings (new and existing) which are intended to be used less than four months of the year.
2010	EPBD revision https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32010L0031	The 2010 EPBD did not impose common, precise numerical targets but it included some changes with respect to the 2002 version. It established mandatory national minimum requirements on the energy performance of new buildings and only existing buildings that are undergo major renovation, regardless of their surface area. Mandatory national minimum requirements have to be updated every five years and are set with a view to achieving cost-optimal levels Member States shall ensure that: by 31 December 2020, all new buildings are nearly zero-energy buildings; and after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings Member States may decide not to set or apply the requirements for “<i>residential buildings which are used or intended to be used for either less than four months of the year or, alternatively, for a limited annual time of use and with an expected energy consumption of less than 25 % of what would be the result of all-year use</i>”.
2012	Energy Efficiency Directive (EED)	The 2012 EED set out a number of energy efficiency targets, referring not only to the residential or building sector but more broadly to all sectors.

¹⁴⁶ According to the Directive: “Major renovations are cases such as those where the total cost of the renovation related to the building shell and/or energy installations such as heating, hot water supply, air-conditioning, ventilation and lighting is higher than 25 % of the value of the building, excluding the value of the land upon which the building is situated, or those where more than 25 % of the building shell undergoes renovation”

	https://eur-lex.europa.eu/eli/dir/2012/27/oj/eng	The EU aimed to reduce energy consumption by 20% by 2020. Each Member State was required to set indicative national energy efficiency targets. Member States also had to renovate each year at least 3% of the total floor area of centrally owned public buildings.
2018	EPBD revision https://eur-lex.europa.eu/eli/dir/2018/844/oj/eng	Each Member State shall establish a long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, into a highly energy efficient and decarbonised building stock by 2050, facilitating the cost-effective transformation of existing buildings into nearly zero-energy buildings, in particular by an increase in deep renovations. The long-term renovation strategy shall include indicative milestones for 2030, 2040 and 2050, and specify how they contribute to achieving the Union's energy efficiency targets in accordance with Directive 2012/27/EU.
2023	EED revision https://eur-lex.europa.eu/eli/dir/2023/1791/oj/eng	2023 EED defines higher targets for energy efficiency and introduces the “Energy-efficient first principle” as a key element, meaning that energy efficiency must be prioritised by member states across all policy and investment decisions Public bodies at national, regional and local level should fulfil an exemplary role as regards energy efficiency. Each Member State shall ensure that at least 3 % of the total floor area of heated and/or cooled buildings that are owned by public bodies is renovated each year to be transformed into at least nearly zero-energy buildings or zero-emission buildings Member States shall establish and achieve a share of the required amount of cumulative end-use energy savings among people affected by energy poverty, vulnerable customers, people in low-income households and, where applicable, people living in social housing
2024	EPBD revision https://eur-lex.europa.eu/eli/dir/2024/1275/oj/eng	2024 EPBD objective is the reduction of greenhouse gas emissions from buildings within the Union, with a view to achieving a zero-emission building stock by 2050 Member States shall establish a national building renovation plans that also includes a roadmap with targets and indicators, including the reduction of the number of people affected by energy poverty. Member states must implement measures to reduce average primary energy consumption of the national residential building stock by at least 16% compared to 2020

		by 2030; and by at least 20-22% compared to 2020 by 2035. Member States shall ensure that at least 55 % of the decrease in the average primary energy use referred to in the third subparagraph is achieved through the renovation of the 43 % worst-performing residential buildings
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NATIONAL REPORT ON THE REGULATORY SYSTEM OF EEPs IN POLAND

1 Executive Summary

The main objective of this report is to provide a national assessment of the regulatory systems of Energy and Environmental Policies (EEPs) in Poland. The report specifically addresses housing retrofitting, nature-based solutions, and densification policies, all considered within the broader framework of national climate change mitigation and adaptation strategies. It explores the three core themes of the ReHousIn project: retrofitting residential buildings, implementing nature-based solutions (NBS) in urban areas, and promoting densification in and around urban centers. Each theme is addressed in a dedicated chapter, further divided into subchapters that examine the policy cycle, implementation processes, market dynamics, and multi-level governance.

The report highlights the significant progress and ongoing challenges in improving energy efficiency and living standards in the country's residential sector. The retrofitting initiatives, largely driven by EU funding and national programs such as Clean Air and Thermomodernization, have led to measurable reductions in energy consumption and substantial decreases in CO₂ emissions. Many buildings have undergone various degrees of modernization since 2018, including window replacement, insulation upgrades, and heating system improvements. Despite these successes, the report identifies persistent barriers, including limited outreach in rural areas, financing gaps for low-income households, and fragmented implementation. Strengthening coordination, simplifying procedures, and promoting integrated solutions are key recommendations to accelerate progress toward national and EU climate goals.

The report outlines the growing adoption of sustainable, ecosystem-driven approaches to urban and environmental challenges, with a focus on enhancing climate resilience, biodiversity, and quality of life. Key initiatives include the revitalization of urban green spaces, the restoration of riverbanks and wetlands, and the implementation of green roofs and rain gardens in cities. However, gaps remain in long-term financing, policy integration, and monitoring. Strategic scaling and mainstreaming of NBS into urban planning and climate adaptation strategies are recommended for maximizing impact.

In context of development densification in Poland the report examines national and local efforts to promote more compact urban growth as a response to urban sprawl and inefficient land use. Densification policies aim to improve the use of existing infrastructure, reduce environmental impact, and support more sustainable city development.

2 Introduction and methodology

This report attempts to understand how energy and environmental policies implemented in Poland affect housing inequalities. The starting point was an analysis of existing regulations and strategies, conducted from a multi-level governance perspective, considering actions at national, regional and local levels. As a Member State of the European Union (EU), Poland is committed to implementing common climate goals. Although the framework of these commitments is defined at the EU level, specific instruments and actions are taken by national and local governments, with local authorities playing a key role in implementing the strategy on the ground. There is a common consensus on the direction of energy transformation in Poland, but specific solutions are often met with resistance, which is reflected in numerous public discourses and disputes around individual actions.

The report focuses on three areas that are particularly important from the point of view of climate policy: housing retrofitting, implementation of nature-based solutions and densification of development, and which can support both adaptation and mitigation actions. Poland faces the challenge of massively improving the energy efficiency of buildings, especially in the residential sector. The current regulations and programs, such as "Clean Air", "My Electricity" or "Thermal Modernization Relief", create a framework for support for property owners, but their availability is uneven across different social groups. The problem remains the lack of real possibilities for their implementation by local governments and households, and the related limited availability of financing, especially for municipal and social resources.

In recent years, there has been growing interest in the use of nature-based solutions in cities, especially in the context of adaptation to climate change (e.g. stormwater management or counteracting heat islands). Despite this, NBS are still treated as optional measures, not standard elements of public investments. There is a lack of both a systemic approach in national policies and tools supporting long-term maintenance of green infrastructure at the local level.

Although spatial policies promote the idea of "compact cities", in practice, densification often takes place haphazardly and without appropriate infrastructure support. Legal conditions (e.g. lack of effective planning tools or too fragmented ownership structure) make it difficult for municipalities to act effectively in this area. At the same time, development pressure means that densification, instead of improving the quality of life, may lead to social conflicts and deepening territorial inequalities.

The report is based on the analysis of secondary data, including information, thematic studies, statistical data and evaluation reports available prepared by relevant public institutions, such as the Ministry of Development and Technology, the Ministry of Climate and Environment, the Central Statistical Office, and the National Fund for Environmental Protection and Water Management.

Poland's Energy and Environmental Policies have evolved through EU directives, national plans (National Environmental Policy 2030, NEP2030, Energy Policy of Poland until 2040, EPP2040), and subsidy programs like 'Clean Air', 'My Electricity', and 'Stop Smog'. EEPs are partially aligned with housing policy, but integration is weak. Retrofitting efforts support energy-

poor households, but affordability and access issues remain, especially for large-scale or multi-unit retrofits. Programs target individual owners more than rental or social housing.

The review also used information on the applicable legal framework for energy transformation and environmental protection and spatial policy, both at the national and lower levels. Analyses of the mechanisms for implementing public policies were also included with an emphasis on the role of local governments, which in Poland bear a large responsibility for the implementation of many activities. The degree and manner of implementing policies differs significantly depending on local conditions, such as the financial situation of local governments, the availability of technical and human resources, local political priorities and the level of involvement of residents.

The study also considers available scientific literature focusing on the relationships between environmental and energy policies and housing inequalities. However, there are still relatively few studies of this type in Poland. The most attention is paid to the impact of thermal modernisation and revitalisation processes on the availability of housing stock, while issues related to the densification of development, or the implementation of nature-based solutions are less frequently analysed. Studies linking NBS with the issue of housing inclusiveness are exceptional and in most cases are limited to projects implemented under European grants.

While the study provides valuable insights into the regulatory systems of Energy and Environmental Policies in Poland, several methodological limitations should be acknowledged. First, the report is primarily based on desk research, relying on publicly accessible datasets, national legislation, and strategic documents. As such, the analysis is constrained by the availability, timeliness, and completeness of publicly available information. Important aspects of policy implementation, enforcement, or informal governance practices may not be fully captured in official documents. It is further informed by scientific assessments as well as the authors' own research and consultancy experience within the Polish context. Moreover, the research was complemented by the focus group Policy Lab #1, as well as free-form interviews with experts and policymakers.

Policy Lab #1 also made a valuable contribution to the report. They were conducted in two meetings - one in Łódź and one in Warsaw, to accommodate the geographical spread of the case studies and maximize stakeholder participation. The format combined plenary presentations with breakout group work. Each meeting began with an introduction to the ReHousIn project, covering its objectives, partners, and preliminary findings. Participants were then divided into mixed stakeholder groups (4–6 people) for three discussion rounds focused on key challenges related to retrofitting, urban densification, and NBS. Each round was introduced with a short presentation on the topic, followed by group work and a final plenary discussion where teams shared insights and engaged in collective reflection.

For the Polish case, a series of free-form interviews were conducted with key stakeholders from local government to explore the complex relationship between housing and environmental policies (Table PL1). These open-ended conversations, each lasting between 15 minutes to 1 hour, allowed for a flexible discussion of governance practices, inter-sectoral collaboration, and the use of policy tools and funding schemes.

Interview	Key informant/Institution	Focus
Interview 1	Nine representatives from the municipality of Pabianice	Energy retrofitting, nature-based solutions, densification and housing policy
Interview 2	One representative from the municipality of Radomsko	Energy retrofitting, nature-based solutions, densification
Interview 3	Four representatives from the municipality of Warsaw	Energy retrofitting, nature-based solutions, densification and housing policy

Table PL1. List of conducted interviews

Source: own elaboration.

The qualitative data collected through free-form interviews with experts and policymakers and focus group provide valuable context and stakeholder perspectives. However, these engagements were limited in number and scope, meaning that the findings may not fully reflect the diversity of opinions or experiences across all governance levels and regions in Poland. These limitations highlight the need for further empirical research, stakeholder engagement, and longitudinal studies to complement this assessment and support evidence-based policy development in Poland's energy and environmental governance landscape.

The report opens with an executive summary. Chapter 2 outlines the methodological framework, based on desk research using publicly available data, national legislation, and strategic documents, complemented by scientific assessments and the authors' own research and consultancy experience in Poland. Chapter 3 describes the general governance system, offering an overview of the institutional setup, key actors, and regulatory mechanisms that shape environmental and energy-related policymaking. Chapters 4 to 6 explore three core policy domains in detail:

- Chapter 4 focuses on housing retrofitting, assessing the policy cycle, implementation mechanisms, market dynamics, governance arrangements, and the outcomes achieved,
- Chapter 5 addresses NBS projects, examining how these initiatives emerge, are governed, and implemented across various administrative levels,
- Chapter 6 investigates densification projects, analyzing urban planning responses aimed at increasing spatial efficiency and the associated governance and market frameworks.

Each of these chapters is structured into 5 recurring sub-sections: (1) the emergence of the issue and policy decisions; (2) implementation processes; (3) the size and role of the market; (4) multilevel governance processes; and (5) achievements, evaluations, and challenges.

Finally, Chapter 7 provides a synthesis of findings, including a summary of changes in the EEP landscape and an analysis of the interactions, synergies, and trade-offs between EEPs and housing policies in Poland.

3 General governance system

Poland (Polska) is a democratic republic with a parliamentary system of government, which means that power is exercised by representatives elected by the citizens, and the parliament plays a key role in the governance process. This system is based on the principle of the separation of powers, which involves the division and mutual balancing of the three main branches of government: the executive, the legislative, and the judiciary.

When analysing the general governance system in Poland from a spatial perspective, it is essential to consider the profound political and socio-economic changes that began in 1989. This period marked a major shift from a centrally planned economy to a market-oriented one, significantly influencing the approach to spatial and land development (Bański, 2007). The post-1989 transformation was characterized by several critical developments: the decentralization of political authority and the revival of local self-governance; the privatization and decentralization of the economy; the alignment of spatial planning legislation with European Union standards; and, following EU accession, access to structural and agricultural funding (Węclawowicz et al., 2006).

A key milestone in this transformation was the administrative reform implemented on January 1, 1999, which replaced 49 smaller provinces with 16 larger voivodeships, further subdivided into counties (powiat) and municipalities (gmina). This reform aimed to establish a clearer allocation of responsibilities between central and local government, reserving national-level administration for matters of overarching state policy (Wendt, 2007).

During the 1990s, Poland also began receiving significant foreign investment and development aid, with a notable focus on regional development. The importance of these resources increased substantially after joining the European Union in 2004. Over the past decade, the country has experienced marked demographic concentration in major urban centres, improvements in technical infrastructure, and a relative decline in the industrial sector's prominence within the national economy. These trends have been accompanied by the adoption of numerous strategic documents shaping spatial development and regional policy at the national level (Bański, 2007; Borowska-Stefańska et al., 2018).

As of January 1, 2025, the administrative division of Poland comprised: 16 voivodeships (provinces), 314 counties (powiats) and 66 cities with county rights, and 2,479 municipalities, including 302 urban, 718 urban-rural, and 1,459 rural municipalities¹⁴⁷.

The foundations of Poland's political and legal system are defined by the *Constitution of the Republic of Poland* (1997), which is the highest legal act in the country. The Constitution not only guarantees democratic principles of governance but also ensures civil rights and freedoms, the independence of the judiciary, and mechanisms of checks and balances between the various organs of the state. It outlines, among other things, the procedures for appointing top state officials, their competencies, and the relationships between state institutions, thereby ensuring transparency and stability in the political system.

¹⁴⁷ <https://stat.gov.pl/statystyka-regionalna/jednostki-terytorialne/podzial-administracyjny-polski/> [Last accessed on 31.05.2025]

In practice, this means that no single branch of power can dominate the others. The executive branch (the President of the Republic and the Council of Ministers) is responsible for directing the state and implementing internal and foreign policy. The legislative branch (the Parliament, composed of the Sejm and the Senate) creates laws, adopts the budget, and supervises the activities of the government. Meanwhile, the judiciary (courts and tribunals) safeguard the law and the constitutionality of state actions, ensuring the protection of citizens' rights (Grabowski, 2021). This system of government is designed to maintain a balance of power and protect against its abuse, which forms the foundation of the rule of law and a civil society.

The multi-level governance framework in Poland is based on a decentralized system of public administration, which ensures that powers and responsibilities are shared between the national, regional (voivodeship), county, and local/municipal levels. This system was reformed significantly in 1999 and reflects the principles of subsidiarity, decentralization, and partnership (Stec et al., 2018).

In Poland, the competences for ecological transitions, particularly in housing retrofitting, urban densification, and nature-based solutions (NBSs), as well as broader housing policies, are distributed across four main levels of governance: national, regional (voivodeship), county (powiat), and local/municipal (*gmina*). Each level plays a distinct role, shaped by its legal competences, administrative capacity, and proximity to local needs (Table PL2).

Level	Housing	Housing retrofitting	NBS	Densification
National level	Formulating national housing policy and strategy, including housing support programs Coordinating state-funded programs for social housing, rent subsidies, and energy efficiency in buildings Allocating EU funds and national grants to regional and local governments for housing projects Supervising state-owned housing institutions	Develops national programs and strategies for energy efficiency, climate action, and housing quality Sets national regulations and standards for building energy performance and retrofitting practices Allocates national budget funds and coordinates EU funding (e.g., from the Cohesion Fund, Recovery and Resilience Facility) Oversees grant and loan programs for individuals, housing cooperatives, and local governments	Formulates national environmental including climate adaptation and biodiversity strategies Implements EU directives related to environment and nature protection Establishes legal frameworks promoting ecosystem restoration, green infrastructure, and sustainable land use	Develops national spatial planning policies that encourage sustainable urban development and densification. Implements national strategies related to urbanization, housing, and infrastructure development Supports national programs for urban renewal and brownfield redevelopment Allocates funding for infrastructure projects supporting densification (e.g., transport, utilities)

Level	Housing	Housing retrofitting	NBS	Densification
Regional level (województwo)	Planning and coordinating regional housing development strategies, often linked to regional development and spatial planning Managing EU structural funds for housing renovation, energy efficiency, and social inclusion projects (especially in urban regeneration) Supporting and coordinating projects involving multiple counties or municipalities Conducting spatial analysis and regional forecasts to guide housing policy decisions	Allocates and manages regional Operational Programs, including ERDF funds for energy-efficient renovation of buildings Supports municipal projects and housing cooperatives applying for funding Incorporates retrofitting into regional development strategies and low-emission economy plans Coordinates regional-scale initiatives in collaboration with multiple municipalities	Integrates NBS into regional development strategies and environmental protection plans Coordinates ecosystem restoration, green infrastructure, and sustainable agriculture at the regional scale Oversees the implementation of protected areas (like Natura 2000) and compliance with environmental standards	Develops and implements regional spatial development plans that identify areas for urban densification Coordinates between counties and municipalities to ensure coherent regional development patterns
County level (powiat)	Limited direct role Managing housing support through social welfare institutions, including temporary accommodation or assisted housing	Limited direct role May retrofit housing units in social care or educational institutions	Limited direct role Provides technical support for environmental initiatives in schools, social institutions, and local infrastructure	Limited direct role Supports municipalities in managing secondary roads and services linked to densification
Local/municipal level (gmina)	Primary responsibility for housing provision and management Managing municipal housing stock Allocating social housing and setting rent levels based on income criteria	Retrofitting and energy modernization of municipal housing stock Applying for national or regional funding to finance projects Developing local energy plans, low-emission development programs, and spatial policies that prioritize	Establishes and maintains urban green spaces, parks, community gardens, and natural flood defenses Implements local flood prevention and water management solutions based on	Develops local spatial development plans or issues zoning decisions that regulate building density, land use, and redevelopment Grants building permits and controls compliance with urban planning rules Promotes infill development,

Level	Housing	Housing retrofitting	NBS	Densification
	Maintaining and renovating public housing units Creating local spatial development plans that determine where residential buildings can be constructed Cooperating with NGOs and private developers for affordable housing projects Managing housing subsidies and allowances for low-income residents	sustainable retrofitting Informing and assisting residents and housing cooperatives in accessing grants or loans (e.g., Stop Smog program)	natural ecosystems Manages local biodiversity, supports pollinator habitats, and tree planting initiatives Incorporates green infrastructure and NBS into local land-use plans and building regulations	brownfield redevelopment, and multi-family housing projects Ensures adequate local infrastructure (water, sewage, roads, public transport) to support higher densities. Engages in community consultation

Table PL2. Multilevel governance in housing, retrofitting, NBS and densification in Poland

Source: own elaboration.

The national level is responsible for setting the overall legal and policy frameworks, including building codes, energy efficiency standards, and strategic programs (e.g., “Clean Air” or the National Housing Program). It allocates national and EU funds, oversees implementation through state agencies, and ensures compliance with EU directives on climate and biodiversity.

The regional level adapts national policies to regional conditions by incorporating housing and ecological goals into development strategies, managing EU Operational Programs (e.g., for retrofitting or environmental protection), and coordinating projects involving multiple municipalities. Regions also play a role in spatial planning and environmental monitoring.

The county level in Poland has limited but supportive functions. It often acts through social welfare institutions and may engage in small-scale retrofitting or infrastructure maintenance. Counties can also assist in coordinating efforts among municipalities, especially in areas like public transport or secondary infrastructure relevant to densification.

The local/municipal level has the most direct implementation role. Municipalities manage public housing, develop local spatial plans, issue building permits, and lead on-the-ground retrofitting projects. They also maintain urban green spaces, apply NBSs in flood management or biodiversity support, and ensure infrastructure is in place to accommodate higher urban density. Their proximity to residents allows them to tailor solutions to local needs and engage communities in planning and decision-making processes.

One of the key challenges in Poland's governance framework for ecological transition and housing policy is the fragmentation of institutional responsibilities. Various ministries and agencies are involved in related area, such as the Ministry of Climate and Environment, the Ministry of Development and Technology, and the Ministry of Infrastructure, often with overlapping or poorly delineated mandates. The absence of a strong, central coordinating authority or an integrated governance mechanism for ecological transition results in limited policy coherence across sectors. This fragmentation complicates efforts to design and implement cross-cutting initiatives such as housing retrofitting or NBS, which require collaboration across environmental, energy, and housing domains.

A significant governance challenge in Poland is the weak horizontal integration between sectors and policy areas, particularly at the national and local levels. Policies related to housing, energy efficiency, climate adaptation, urban planning, and environmental protection are often developed and implemented with limited coordination among responsible departments and agencies. As a result, initiatives such as densification or housing retrofitting are frequently planned without full consideration of ecological goals, NBS may be treated as stand-alone environmental projects rather than being integrated into broader urban development strategies.

4 Housing retrofitting

4.1 The policy cycle: emergence of the issue and policy decisions

Housing retrofitting in Poland has gained increasing importance due to the country's energy dependency, poor air quality, and aging housing stock, much of which is energy-inefficient. Poland has been a signatory to the *United Nations Framework Convention on Climate Change* (UNFCCC) since 1994 and the *Kyoto Protocol* (KP) since 2002, thereby participating in efforts undertaken by the international community to mitigate climate change. In the first commitment period following Polish ratification of the KP, Poland committed to reducing greenhouse gas emissions by 6% between 2008 and 2012 compared to the baseline year (1988). Poland achieved this reduction target with a significant surplus (Bebkiewicz et al., 2023). In 2016, Poland ratified the so-called Paris Agreement. This agreement is the next stage in international climate policy, following the KP, and engages all parties to the UNFCCC in actions aimed at protecting the climate. Air protection in Poland improved significantly after the fall of communism in 1989/1990 due to economic reforms and heavy industry closures but disappeared from public focus for over a decade. It reemerged around 2008 as a household emissions issue from solid-fuel heating, sparking public debate and responses from various actors (Matczak et al., 2023).

Over time, several national policies in Poland directly or indirectly impact housing retrofitting (Figure PL1). These policies aim to address energy efficiency, air quality, and greenhouse gas emissions while supporting the social and economic needs of households. The most important regulations within the EU's climate policy are the new EU regulations from the 'Fit for 55' package and the EU energy transformation plan 'REPowerEU'.

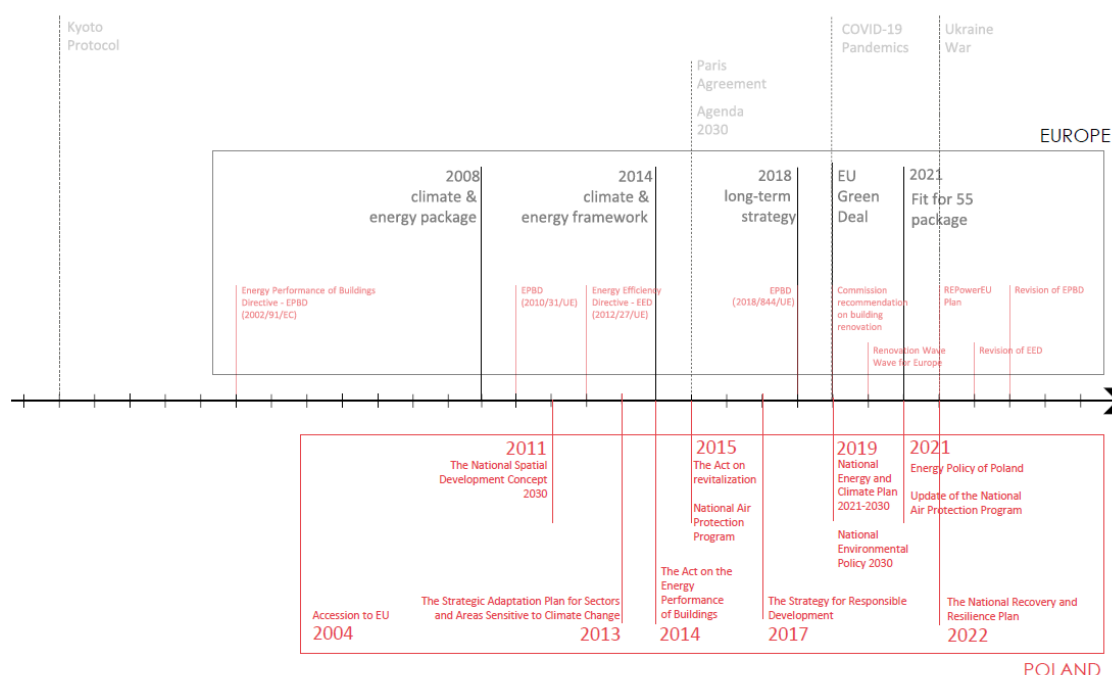


Figure PL18. Timeline with milestones for introducing housing retrofitting in Poland

Source: own elaboration.

In the case of Poland, the initial impetus for action to improve energy efficiency and air quality came largely from the European Union. It was EU directives, such as the Energy Performance of Buildings Directive (EPBD – first version in 2002 and updates in 2010 and 2018) and the 2020 and 2030 climate and energy packages, that established the legal and directional framework for the modernization of building stocks. Poland transposed these regulations gradually and often with delay, which translated into delayed implementation of national measures. The EU therefore played not only the role of initiator, but also of active corrector – through monitoring mechanisms, fund conditionality and proceedings before the Court of Justice of the EU. As a result, it is the European Union that remains the key driver for national modernization policy, both through regulatory pressure and financial support.

The **Act on the Energy Performance of Buildings** (2014) is Poland's key legal instrument implementing EU directives on building energy efficiency. It establishes national standards for calculating energy performance, defines requirements for nearly zero-energy buildings, and mandates energy performance certificates (EPCs) for new, sold, or rented buildings. The Act also introduces a central register of EPCs and inspections and regulates the control of heating and cooling systems. It supports both compliance with EU law and national climate goals by enabling oversight, improving building performance, and linking retrofitting projects to funding schemes.

Until 2014, Polish cities underwent intensive renovations and modernization. Their appearance improved, and the quality of life was enhanced. Since 2004, infrastructural changes began to be referred to as revitalizations. This shift in terminology resulted from changing conditions - EU funds were allocated for revitalization, so local authorities started using this term for their renovation efforts. The Polish government closely monitored local governments' activities and

achievements in the field of revitalization. Evaluating successes and failures led to the development of a series of solutions aimed at improving the process. A key tool in this effort was the adoption of the revitalization law. In 2015, the **Act on Revitalization** was introduced, establishing a legal framework to regulate the entire process. For the first time in Polish law, it defined revitalization as an initiative aimed at restoring degraded urban areas from crisis conditions. These areas are identified by severe socio-economic challenges, including high unemployment, poverty, and low entrepreneurial activity. The concentration of these issues within specific territories leads to social segregation, stigmatization, and the perpetuation of poverty across generations (Hughes et al., 2024; Popławska, 2019).

In Poland, **revitalization** applies to municipal areas facing crises due to social, economic, and environmental issues. The policy focuses on comprehensive interventions through integrated projects addressing local challenges holistically. Actions are concentrated in specific areas, ensuring complementarity in spatial and problem-solving terms while aligning with strategic programs. Additionally, revitalization efforts are co-financed through EU funds to enhance their effectiveness (Ciesiółka, 2018; Hajduga & Mempel-Śnieżyk, 2023; Kucharska & Piwowarczyk, 2023). Although retrofitting is not the primary objective of the Act on Revitalization, it may be supported indirectly, if it contributes to the implementation of revitalization objectives, especially by improving the quality of life and functionality of buildings in the areas covered by the activities. The period 2015–2019 was crucial for the implementation of the Act, which was the phase of its most intensive application, and the implementation of activities was often linked to the use of EU funds from the 2014–2020 financial perspective. EU cohesion policy funds were the main source of support for investments in urban renewal, including building modernization, especially when it was in line with social objectives, such as combating energy poverty or improving housing conditions.

An interesting example of revitalization efforts is Łódź. The degraded area undergoing revitalization is highly diverse in terms of spatial organization, consisting of residential, industrial, and storage areas, as well as parks and urban green spaces. Additionally, it includes a zone with architectural monuments and 19th-century urban heritage, such as the original land plots and morphogenetic units corresponding to early craft settlements established during the city's initial industrial development. Revitalization efforts in Łódź are carried out by both the public sector (municipal authorities and their designated agencies) and private capital (Kaczmarek, 2024).

In 2015, the **National Air Protection Program until 2020** was adopted. The program recommended the development and dissemination of technologies to improve air quality and increasing the energy efficiency of residential and public buildings through deep thermal modernization. The document aims to coordinate actions within the national air quality policy framework, linking it to sectors such as housing and municipal services, clean energy, heating, renewable energy sources, and transportation. In December 2021, an updated version of the **National Air Protection Program until 2025 (with a perspective extending to 2030 and 2040)** was published. This updated document continues to align air quality policies with key areas, including the residential and municipal sectors, clean energy, heating, renewable energy sources, and transportation.

In 2016, Poland adopted the **Act on Energy Efficiency**. The Act introduced regulatory changes beneficial to both economic development and citizens. Its purpose is to allow anyone who meets specific requirements - such as conducting an energy efficiency audit for a particular investment - to receive benefits in the form of property rights derived from energy efficiency certificates, commonly known as white certificates.

In 2019, the Ministry of Environment published the **National Environmental Policy 2030** (NEP2030) strategy. The strategic goals of NEP2030 include eliminating sources of air pollution or significantly reducing their impact, managing geological resources through the development and implementation of a national raw materials policy, supporting eco-innovation, adapting to climate change, and managing disaster risks. NEP2030 serves as the foundation for investing European funds from the 2021–2027 financial perspective. The strategy also supports Poland's national and international commitments, including those at the EU and UN levels, particularly in the context of the EU's climate and energy policy goals for 2030 and the sustainable development goals outlined in the 2030 Agenda.

In 2019, Poland adopted the **National Energy and Climate Plan for 2021–2030**. The plan outlines measures to adapt to climate change by promoting sustainable management of environmental resources and ensuring the economy and society function effectively under evolving climate conditions, as detailed in the *National Environmental Policy 2030*. It also defines key assumptions, objectives, policies, and actions in areas such as energy security, the internal energy market, energy efficiency, decarbonization, and research, innovation, and competitiveness. However, since 2020, the plan's implementation has faced significant disruptions due to unforeseen crises.

In 2021, Poland adopted the **Energy Policy of Poland until 2040** (EPP2040). The policy aims to ensure energy security while maintaining economic competitiveness, improving energy efficiency, and minimizing the environmental impact of the energy sector, all while optimizing the use of domestic energy resources. Key strategic directions for implementation in Poland include the optimal use of domestic energy resources, expansion of electricity generation and grid infrastructure, diversification of supply sources and expansion of network infrastructure for natural gas, crude oil, and liquid fuels, development of energy markets, implementation of nuclear energy, growth of renewable energy sources, advancement of heating and cogeneration, and improvement of the economy's overall energy efficiency.

The **Energy Policy of Poland until 2040** and the **National Energy and Climate Plan 2021-2030** determine the timeline for Poland's transition away from coal mining and its use in conventional energy production by 2049, as established by the signatories of the social agreement regarding the transformation of the hard coal mining sector. In 2022, **The National Recovery and Resilience Plan** was adopted. Due to the climate considerations, the expected outcomes of the interventions outlined in a plan include: an increase in the share of energy from renewable sources in total gross energy consumption, a reduction in exposure to air pollution from particulate matter (PM_{2.5} and PM₁₀).

4.2 The implementation process

In Poland, several tools have been developed to support housing retrofitting, aimed at improving energy efficiency and reducing environmental impact. These tools include financial incentives and technical guidelines that facilitate the modernization of residential buildings while promoting sustainability and compliance with EU standards (Table PL3).

Tool	Structures of Implementation	Time Horizon
'Clean Air' Program <i>[Program 'Czyste Powietrze']</i>	Poland's first subsidy program aims to replace old furnaces and insulate single-family homes to improve air quality and reduce greenhouse gas emissions. The program co-finances projects covering tasks like replacing heating sources, insulating buildings, upgrading windows and doors, and installing renewable energy systems. The building must already exist, not be under construction, to qualify for the subsidy. Eligibility criteria: homeowners or co-owners of existing single-family houses; the building must not be under construction Targeting: strong income differentiation: three subsidy levels based on income brackets; not available to renters or multi-family buildings¹⁴⁸.	2018-2029
Thermal Modernization Relief	The thermal modernization relief is a financial support program that encourages single-family homeowners to improve energy efficiency. Taxpayers can deduct the costs of thermal modernization projects from their tax base, with the relief available. Eligibility criteria: owners/co-owners of existing single-family homes; capped at PLN 53,000 (12 550 EUR) per taxpayer. Targeting: no direct income targeting (available to all taxpayers), but those with higher tax base benefit more; only applicable to owner-occupied housing (not rentals); no support for tenants or social housing¹⁴⁹.	From 2019
'My Electricity' Program <i>[Program 'Mój prąd']</i>	Program supports prosumer energy development by providing subsidies for photovoltaic installations and energy efficiency devices. It targets owners of single-family homes planning to install photovoltaic systems. Since 2022, the program has also subsidized energy storage, heat storage, and energy management systems (HEMS/EMS). Eligibility criteria: residential building owners who register as prosumers. Targeting: no income differentiation; owner-occupiers only; excludes tenants and social housing¹⁵⁰.	From 2019
'Warm Apartment' Program <i>[Program 'Ciepłe mieszkanie']</i>	The program aims to improve air quality and reduce emissions by replacing heat sources and enhancing energy efficiency in multi-family residential buildings. It is directed at municipalities, which then recruit individuals with legal ownership or property rights to residential premises	2022-2026

¹⁴⁸ <https://czystepowietrze.gov.pl/> [Last accessed on 28.05.2025]

¹⁴⁹ <https://www.podatki.gov.pl/pit/ulgi-odliczenia-i-zwolnienia/ulga-termomodernizacyjna/> [Last accessed on 28.05.2025]

¹⁵⁰ <https://mojprad.gov.pl/> [Last accessed on 28.05.2025]

Tool	Structures of Implementation	Time Horizon
	Eligibility criteria: owners of flats in multi-family buildings; via local government call. Targeting: income-based co-financing (up to 90%); includes rental units and potentially social housing; accessible to individuals with legal property rights¹⁵¹.	
'My Heat' Program [Program 'Moje ciepło']	The program aims to support the development of individual heating and prosumer energy through the installation of air, water, and ground heat pumps in new single-family homes. It provides co-financing for the purchase and installation of these heat pumps for heating or hot water purposes. The grant covers up to 30% or 45% of eligible costs, with a maximum of PLN 21,000 (4 970 EUR) per investment. Eligibility criteria: owners/co-owners of new buildings (constructed after 2021) meeting energy standards. Targeting: only for owner-occupied housing; not available for rental or social housing; higher co-financing rate (45%) for holders of the Large Family Card (a support program for large families in Poland, which provides discounts and reliefs on various services and products)¹⁵².	2022-2026
'Stop Smog' Program	Program helps replace or eliminate high-emission heat sources and modernize thermal systems in single-family homes. It is managed by municipalities that apply for funding from the National Fund for Environmental Protection and Water Management. The program aims to reduce pollution, improve air quality, and increase energy efficiency, particularly for low-income households. Key actions include replacing high-emission heat sources, thermal modernization, connecting to heating or gas networks, and providing access to renewable energy sources Eligibility criteria: households in energy poverty; property must be in a municipality that signed a cooperation agreement. Targeting: strong income targeting: focuses on the poorest households; housing tenure must be owner-occupied; does not include tenants or institutional landlords¹⁵³.	2019-2024
Energy Advisory System	Project, run by Provincial Funds for Environmental Protection and Water Management, employs Energy Advisors to promote and raise awareness about low-emission practices, energy efficiency, renewable energy, and circular economy principles. The Advisors' tasks include educational outreach, informational and promotional activities, training, investment advice, energy audit verification, and guidance on available funding sources for energy-related investments Eligibility criteria: Open to all interested citizens, municipalities, and SMEs.	From 2016

¹⁵¹ <https://mojprad.gov.pl/> [Last accessed on 28.05.2025]

¹⁵² <https://mojecieplo.gov.pl/> [Last accessed on 28.05.2025]

¹⁵³ <https://czystepowietrze.gov.pl/inne-programy/stop-smog> [Last accessed on 28.05.2025]

Tool	Structures of Implementation	Time Horizon
	Targeting: No formal eligibility criteria; primarily serves homeowners, public buildings, and SMEs; not specific to social groups or tenure types ¹⁵⁴ .	

Table PL3. Tools used in the introduction of housing retrofitting in Poland

Source: own elaboration.

Many entities at different levels of administration are involved in implementing instruments supporting building retrofits in Poland. The largest public institution established to finance environmental protection in Poland is the National Fund for Environmental Protection and Water Management. At the regional level, its functions are supplemented by Provincial Funds for Environmental Protection and Water Management operate which not only implement nationwide programs such as "Clean Air", "Mój Prąd" or "Moje Ciepło", but also provide direct service to beneficiaries and conduct activities adapted to local conditions (Burchard-Dziubińska & Burzyńska, 2023). EU requirements promoting the implementation of environmental protection principles across all sectors of the economy, including construction, implement a model aimed at eliminating non-renewable raw materials, particularly coal, natural gas, and crude oil, used for energy production, replacing them with energy from nuclear power plants and renewable sources like wind, solar, and water (Kempista & Gołębska, 2024).

The Ministry of Climate and Environment is responsible for shaping the policy and is in charge of the support system, while the Ministry of Finance is responsible for managing tax instruments, such as the thermal modernization relief.

In the case of programs aimed at low-income households, such as "Stop Smog" or "Warm Apartment", local governments play a key role as intermediaries - they prepare applications, conduct recruitment and implement investments in cooperation with residents. Additionally, technical and advisory support is provided by Energy Advisors, who support citizens, housing communities and companies in preparing investments, analyzing profitability and obtaining funding. Installation companies, energy auditors and tax advisors are also involved in the implementation of individual activities, supporting beneficiaries in meeting technical and formal requirements (Błasiak-Nowak & Rajczewska, 2015).

4.3 Size and role of the market

In Poland, the process of creating the energy market began with the enactment of the **Energy Law** in 1997. It included the demonopolization of the sector, dividing it into subsectors of generation, transmission, distribution, and energy trading, as well as market liberalization, which allowed independent companies to cooperate commercially. Additionally, the privatization of the energy sector involved transforming state-owned enterprises into state treasury companies, which were then sold to domestic or foreign investors. An important role in shaping the Polish energy market at this stage was assigned to the Energy Regulatory Office, established in 1997. The legal basis for the functioning of the energy market in Poland

¹⁵⁴ <https://doradztwo-energetyczne.gov.pl/> [Last accessed on 28.05.2025]

is the *Energy Law* and related executive acts (regulations), mainly from the Minister of Economy and the Minister of the Environment. With Poland's accession to the EU, Polish legislation on the energy market was aligned with European legislation, primarily the EU Directive on the rules for the common electricity market. From the consumer's perspective, an important milestone was 2007, when every individual consumer (household) gained the right to purchase energy from their chosen supplier¹⁵⁵.

In 2007, the electricity market was liberalized. Since then, every consumer has been able to purchase electricity from a supplier (trading company) of their choice. The liberalization of the electricity market aimed to strengthen competition, which was expected to lead to lower prices. According to the principles of a free market, electricity suppliers are expected to compete for customers by reducing costs and offering electricity at optimal prices. The liberalization of the electricity market is associated with the introduction of the Third-Party Access (TPA) principle. TPA involves granting access to the electricity network infrastructure by the owner of the infrastructure to energy companies engaged in electricity trading, allowing them to deliver electricity to consumers¹⁵⁶.

The Government Solidarity Shield was introduced in Poland in 2023 as an umbrella protecting all individual customers from record-breaking electricity prices. Energy prices for individual consumers have been frozen at 2022 levels within specific electricity consumption limits. The energy voucher is a benefit that, in 2024, was due to every household meeting the income criterion, i.e., where the average monthly income for 2023 did not exceed PLN 2,500 (590 EUR), and for multi-person households, PLN 1,700 (400 EUR) per person. The energy voucher is a support measure introduced in response to rising energy prices, aimed at helping households, especially those in difficult financial situations, to cover energy costs. The energy voucher was part of a government support package that also included other forms of assistance, such as subsidies on energy bills (Figure PL2).

¹⁵⁵ <https://www.gov.pl/web/gov/zloz-wniosek-o-wyplate-bonu-energetycznego> [Last accessed on 20.01.2025]

¹⁵⁶ <https://www.gov.pl/web/klimat/taryfowanie-energii-elektrycznej> [Last accessed on 20.01.2025]

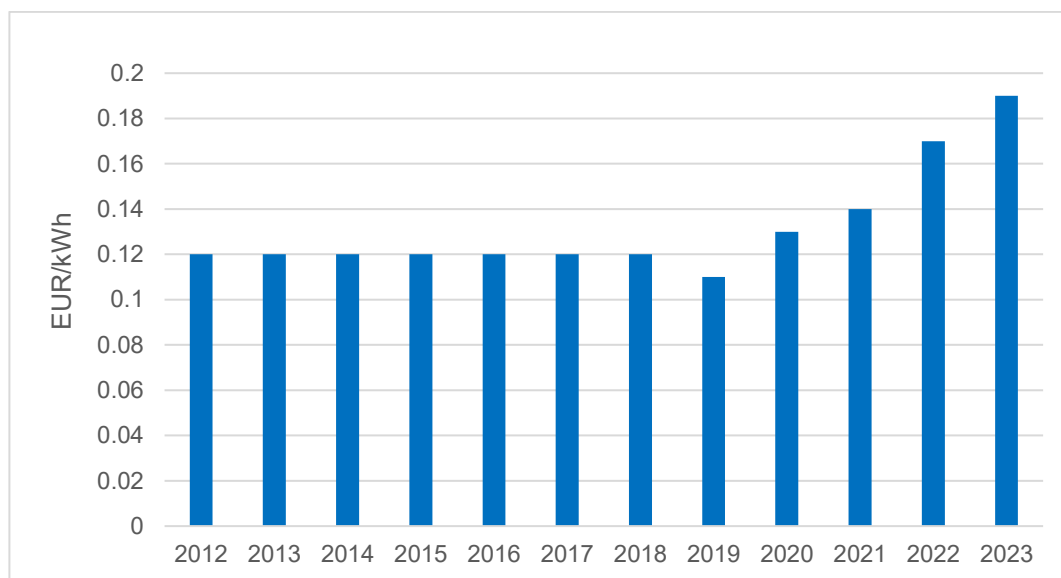


Figure PL 19. The price of electricity for a household consumer in Poland between 2012-2023

Source: Energy Regulatory Office¹⁵⁷.

It is worth mentioning that, in 2022, the share of energy from renewable sources in Poland's gross final energy consumption was 16.81%, an increase of 1.2 percentage points compared to 2021. Coal accounted for 69.2% of electricity generation in Poland. Although the share of coal in Poland's energy mix decreased by 19.4 percentage points (from 98.4%) between 2000 and 2022, it remained the second highest in the European Union in 2022. While the share of coal in electricity production in Poland is currently among the highest in the EU, maintaining coal-based power plants is the least economically efficient solution in the long term¹⁵⁸.

Since the 1990s, the electricity market in Poland has undergone liberalization aimed at increasing market competition and creating better conditions for end consumers. Pro-environmental policies have led to a rise in electricity production from renewable energy sources. Several programs have been introduced to support renewables, reduce greenhouse gas emissions, modernize power grids, and promote the development of electromobility. Despite this progress, the Polish electricity market still faces numerous challenges, including the urgent need to modernize infrastructure, improve energy efficiency, and expand energy storage capacity (Sekula et al., 2023).

The electricity market in Poland is a complex and evolving system influenced by national energy policy, EU regulations, and growing market liberalization. It includes the production, transmission, distribution, and trade of electrical energy. The key players in Poland's electricity market include a mix of state-owned energy groups, private investors, and regulatory bodies. The largest electricity producers and distributors are state-controlled companies such as PGE, Enea, Tauron, and Energa (now part of the Orlen Group), which dominate both the generation and distribution segments. The Energy Regulatory Office (URE) serves as the national authority responsible for overseeing the market, issuing licenses, and approving tariffs,

¹⁵⁷ <https://www.ure.gov.pl/pl/energia-elektryczna/ceny-wskazniki/7853,Srednia-cena-energii-elektrycznej-dla-gospodarstw-domowych.html> [Last accessed on 20.01.2025]

¹⁵⁸ <https://ozzzprc.pl/2023/11/18/miks-energetyczny-w-polsce-raport/> [Last accessed on 20.01.2025]

particularly for household consumers. Together, these actors shape the structure, pricing, and future development of Poland's electricity sector (Thlon et al., 2024).

4.4 The multilevel governance process

Poland has an extensive system of institutions and programmes supporting activities for environmental protection, energy efficiency and sustainable development. At various levels, the activities are carried out by bodies and institutions that share a common goal (Table PL4). They consistently implement the sustainable development strategy, striving to improve air quality, reduce pollutant emissions and increase the energy efficiency of buildings.

Actor	Type	Level	Roles	Effects	Coordination Dynamics
Ministry of Climate and Environment	Public	National	Developing and implementing national environmental policies and programs and overseeing funding coordination.	Publishes key programs (e.g. "Clean Air"), oversees strategic documents and EU fund programming.	Coordination with local governments improving but still inconsistent.
Banks and Investment Funds	Financial Institutions	National/ Regional/ Local	Offering loans, financial instruments, and co-financing for retrofitting and energy-efficient projects.	Support financing under programs. Some barriers to access for low-income groups.	Aligned with developers; weak formal coordination with public policy goals.
Operators	Public	Regional/ Local	Identifying beneficiaries, encouraging heat source replacement or thermal modernization, and guiding them through the subsidy application, implementation, and settlement process.	Key role in delivering projects. Efficiency depends on local capacity and clarity of regulations.	Strong collaboration with municipalities and energy advisors, though capacity varies by region.
Energy Advisors	Public	Local	Providing advice and guidance to households, businesses, and municipalities on energy efficiency, retrofitting, and renewable energy solutions	Often first point of contact for citizens. Crucial in improving local programs.	Frequently underfunded and undertrained. Limited integration into wider planning processes. Coordination with NGOs and municipalities often ad hoc.
National Fund for Environmental Protection	Public	National	The key institution financing environmental protection and water	Central in financing programs.	Good cooperation with Provincial Fund for Environmental

Actor	Type	Level	Roles	Effects	Coordination Dynamics
and Water Management			management projects in Poland, offering loans, grants, and co-financing to local governments, enterprises, and individuals.		Protection and Water Management; tensions may arise with local governments over fund allocation and administrative burdens.
Provincial Fund for Environmental Protection and Water Management	Public	Regional	A strategic partner for local governments and others, providing financial support for environmental protection and sustainable development projects.	Ensure regional relevance of national programs; key interface for local beneficiaries. Effectiveness varies by voivodeship.	Generally positive cooperation with municipalities; capacity to advise applicants still under development in some regions.
Agency for Restructuring and Modernization of Agriculture	Public	Regional/Local	Providing funding and support for rural environmental projects, including clean energy, retrofitting, and sustainable agricultural practices	Key funder in rural transition to low-emission systems (solar, biomass, insulation). Often underused due to procedural complexity.	Weak link to regional energy and spatial planning; coordination challenges with municipalities and advisors.
Main Office of Construction Supervision	Public	National/Regional	Supervising construction activities; ensuring compliance with energy efficiency regulations and standards in new and retrofitted buildings.	Helps enforce energy regulations in new construction and retrofits. Limited role in proactive promotion of efficiency.	Works in isolation from planning offices. Reactive role; could be better integrated into regional strategies.
Municipalities	Public	Local	Implementing environmental programs at the local level; enforcing regulations and projects; engaging communities; promoting modernization and clean energy projects; coordinating consultation points	Critical implementers of programs. Differences in capacity between large and small municipalities.	Key interface for citizens but often lack staff and technical capacity. Increasing partnerships with NGOs and advisors. Coordination with regional and national actors inconsistent.
NGOs	Civil society	National/Local	Increasing awareness of the need to take actions to support the improvement of the	Active in education and lobbying (e.g. Polish Green Network). Push for	Often fill coordination and outreach gaps. Limited formal role,

Actor	Type	Level	Roles	Effects	Coordination Dynamics
			quality of the environment	better access for energy-poor households.	but growing influence through campaigns and local partnerships.

Table PL4. Actors involved in housing retrofitting governance in Poland

Source: own elaboration.

The governance of housing retrofitting in Poland involves a range of actors, including government institutions, local authorities, and private investors, who collaborate to improve energy efficiency and sustainability in buildings. Their roles focus on policy development, funding, technical implementation, and ensuring alignment with environmental and economic goals.

However, while modernisation efforts are primarily aimed at improving energy efficiency and reducing emissions, they also intersect with broader societal challenges. One of the most pressing is energy poverty, which continues to shape household needs and vulnerabilities, particularly in the context of recent economic and geopolitical shocks.

Energy poverty has become increasingly visible in Polish political discourse, especially since 2022. Although the 2022 Russian invasion contributed to a spike in income-based energy poverty rates, this did not reverse the long-term downward trend. Instead, it reinforced the upward trend that began with the economic impoverishment of Polish society because of the COVID-19 pandemic. Energy poverty in Poland manifests unevenly across different types of regions, reflecting deep-rooted spatial and socio-economic disparities (Figure PL3).

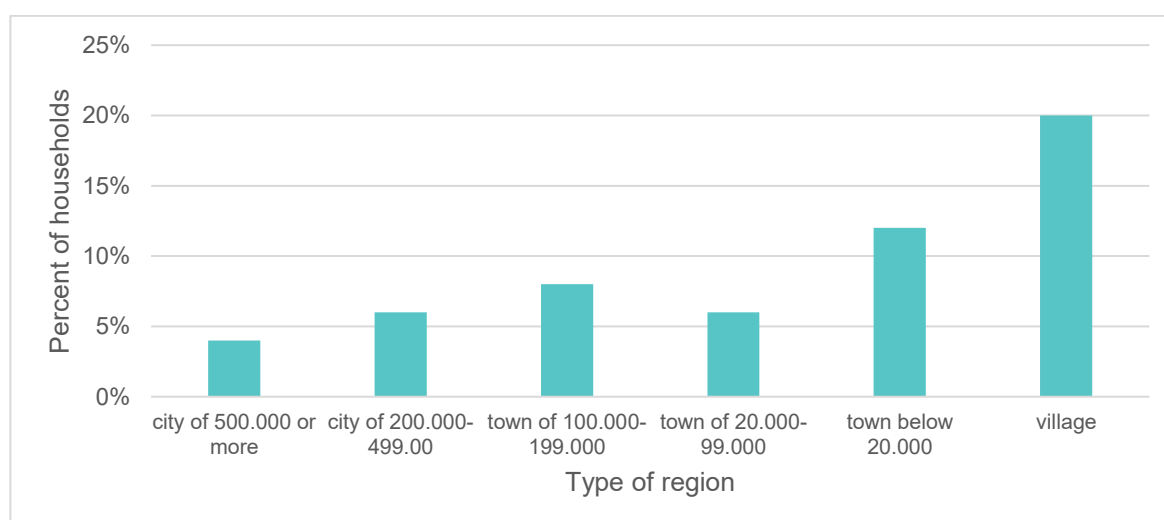


Figure PL20. The energy poor by type of region

Source: own elaboration based on *Lipiński & Juszcak (2023)*

In its research, the Polish Economic Institute (2023) has identified four main forms of energy poverty:

1. Fuel poverty (income poverty) – this form is defined by a high share of energy expenditure in the household budget. Depending on the adopted threshold (ranging from 10% to 25% of household income), it affects between 16% and 30% of households in Poland,
2. Structural poverty – affecting 8% to 12% of households, this type arises where energy-related costs deepen existing economic poverty. It results from both high energy expenditures and relatively low incomes,
3. Municipal poverty – this form impacts 3% to 5% of households that are unable to meet their energy needs due to infrastructural deficiencies or because they reside in energy-inefficient buildings,
4. Hidden energy poverty – affecting 13% to 16% of households, this occurs where energy expenditure is artificially low due to extreme limitation of energy use, often at the expense of health and comfort.

A key structural factor behind these challenges is the poor technical condition of Poland's housing stock. Widespread infrastructural deficiencies – especially the lack or poor quality of thermal insulation and outdated, inefficient heating systems – result in significant heat loss and high maintenance costs. These issues are particularly burdensome for low-income households, where energy bills consume a substantial portion of the household budget. It is estimated that as many as 70% of single-family houses in Poland lack any form of thermal insulation (Lipiński & Juszczak, 2023).

The issue of energy poverty has been acknowledged in several strategic national documents. *The National Energy and Climate Plan for 2021–2030* (2019) calls for the development of a comprehensive policy to address energy poverty, including efforts to expand heating networks and support thermal modernization of residential buildings. Similarly, the *Energy Policy of Poland until 2040* (2021) sets the goal of reducing energy poverty to 6% by 2030. Both documents emphasize the need for a clear and consistent definition of energy poverty, a task that was partially undertaken in 2022.

In response to these challenges, in December 2022, the *Act amending certain acts supporting the improvement of housing conditions* came into force. It introduced new financial support mechanisms and expanded existing tools for thermal modernization and the development of renewable energy sources in the housing sector – with particular emphasis on supporting households most at risk of energy poverty.

Vertical governance is essential in retrofitting in Poland because it links European vision, national strategy, and local action. Without strong coordination across these levels, retrofitting policies risk being underfunded, poorly implemented, or misaligned with broader climate goals.

A clear example of this is the City of Kraków, which has gone beyond national requirements by introducing a local ban on coal and wood in households in 2019, ahead of national deadlines, and actively supports retrofitting through local funding schemes and information centers. This demonstrates how local governments can translate national and EU policies into place-specific actions. In fuel combustion installations, only high-methane or nitrogen-rich

natural gas is permitted. Additionally, the use of permanently installed heavy garden grills, such as brick grills permanently fixed to the ground or large grills operating continuously in one location, is prohibited¹⁵⁹.

4.5 Achievements, assessments, and challenges

Housing retrofitting in Poland has emerged over the past few decades as a response to several challenges (Table PL5). A large proportion of residential buildings were constructed before the 1990s, many of which lack modern insulation, energy-efficient windows, or advanced heating systems. This results in high energy consumption and high costs for homeowners and tenants.

Impact Area	Measured impacts	Potential impacts
Energy Efficiency	There is a decrease in the annual primary energy demand index in residential buildings (Table PL6), as well as an increase in the share of renewable energy sources in the energy balance (Figure PL4)	Further reduction of energy consumption and CO ₂ emissions on a regional and national scale; increase of the share of renewable energy sources in powering buildings
Environmental Impact	Reducing greenhouse gas emissions because of activities related to improving energy efficiency and thermal modernization (Figure PL5) The effect of the first recruitment in 2019: Niepołomice, Pszczyna, Rybnik, Skawina, Sosnowiec, Sucha Beskidzka and Tuchów. Currently 26 municipalities, including Warsaw and Łódź and 11 cities of the Upper Silesian Industrial Region, where pollution in Poland is considered the highest	Long-term improvement of the quality of the natural environment, reduction of low emissions and pollution; adaptation of buildings to climate change and energy standards
Economic Impact	Creation of local jobs in construction and HVAC sectors; increased demand for certified installers and energy auditors	Development of the energy efficiency sector (construction industry, renewable energy technologies)
Social Impact	Increased household comfort and reduced energy poverty in targeted retrofitting schemes	Raising public awareness of sustainable energy consumption; better living conditions for lower-income households
Policy and Regulations	Strengthened monitoring and evaluation via EPC registry	The potential to increase the effectiveness of policies by increasing subsidy opportunities and introducing regulations that support the sustainable development of buildings, achieving national climate goals

Table PL5. Impacts of housing retrofitting policies on housing inequalities in Poland

Source: own elaboration.

Poland has some of the highest levels of air pollution in Europe, particularly in urban areas where coal-based heating is common in residential buildings. Retrofits that replace coal-based

¹⁵⁹ <https://powietrze.malopolska.pl/antysmogowa/krakow/> [Last access on 4.06.2025]

heating systems with more energy-efficient and cleaner alternatives are seen as critical for reducing emissions and improving air quality¹⁶⁰.

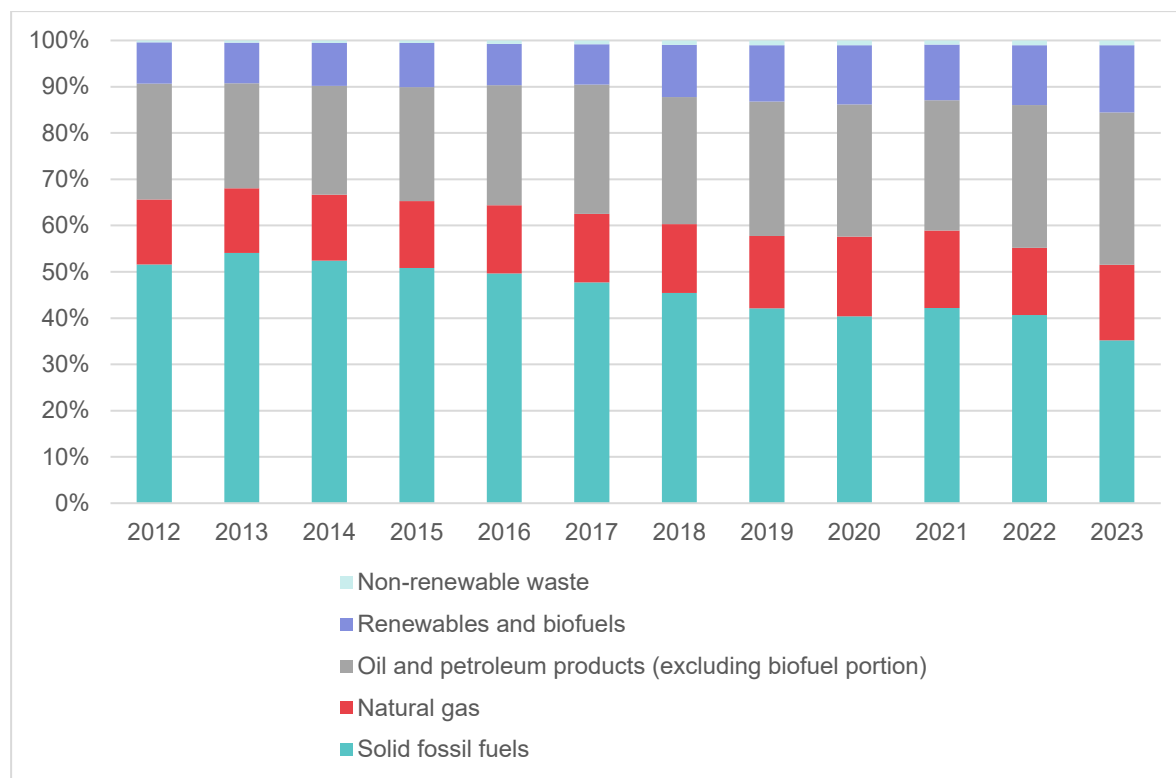


Figure PL21. Total energy supply by product in Poland between 2012 and 2023

Source: Eurostat.

The table no. PL6 presents the median values of EP indicators for buildings of different categories, determined based on energy performance certificates prepared using the Central Register of Energy Performance of Buildings.

	<1994	1994-1998	1999-2008	2009-2013	2014-2016	2017-2018	2019-2020
single-family building	263,7	147,9	143,5	126,3	109,1	94	89,3
multi-family building	258,9	139	110	142,7	97,5	87	84,9

The shades of the table fields correspond to the levels of the indicator: from the highest (red) to the lowest (blue).

Table PL6. Median value of the annual primary energy demand indicator for residential buildings depending on the purpose of the building and the year of commissioning [kWh/(m² year)]

Source: own elaboration based on Central Register of Energy Performance of Buildings

The inefficiency of residential buildings contributes to health risks, particularly in terms of poor indoor air quality and exposure to cold in winter. Housing retrofitting can improve living conditions, reduce fuel poverty, and enhance overall public health. It also addresses economic and social dimensions, as many low-income households are especially vulnerable to energy

¹⁶⁰ <https://powietrze.malopolska.pl/baza/jakosc-powietrza-w-polsce-na-tle-unii-europejskiej/> [Last accessed on 25.01.2025]

poverty due to high heating costs. Retrofitting programs can help alleviate this issue, especially in the context of rising energy prices. Housing retrofitting policies in Poland have generally contributed to reducing housing inequalities by improving living conditions and reducing energy costs for vulnerable populations.

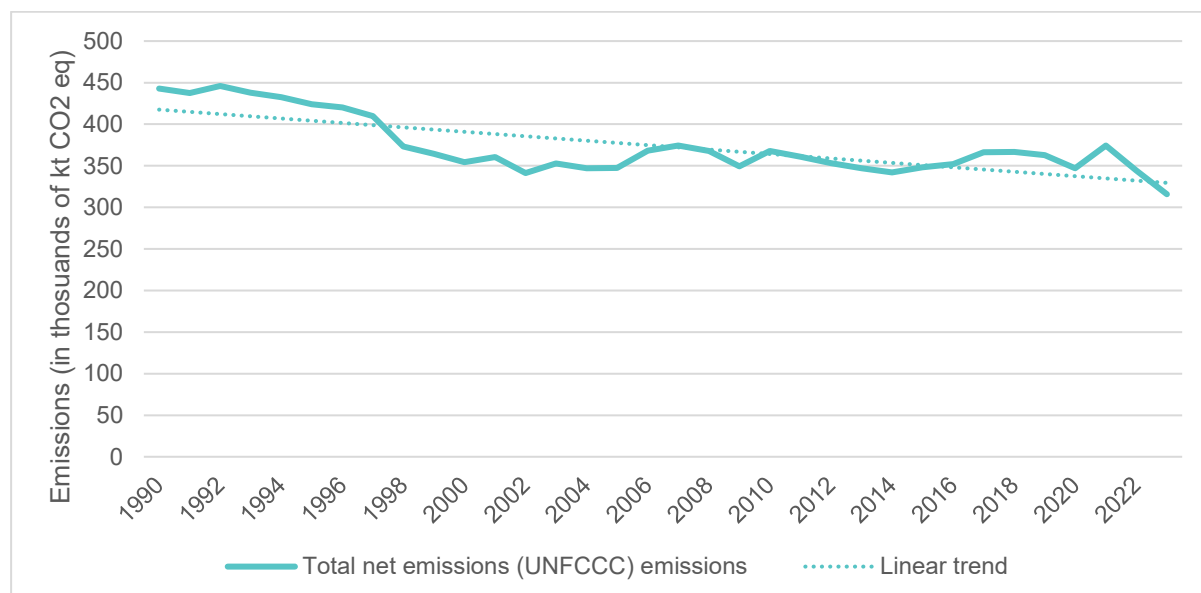


Figure PL22: Emission of greenhouses gases in Poland

Source: based on <https://www.eea.europa.eu/en/analysis/maps-and-charts/greenhouse-gases-viewer-data-viewers> [Last access on: 02.06.2025].

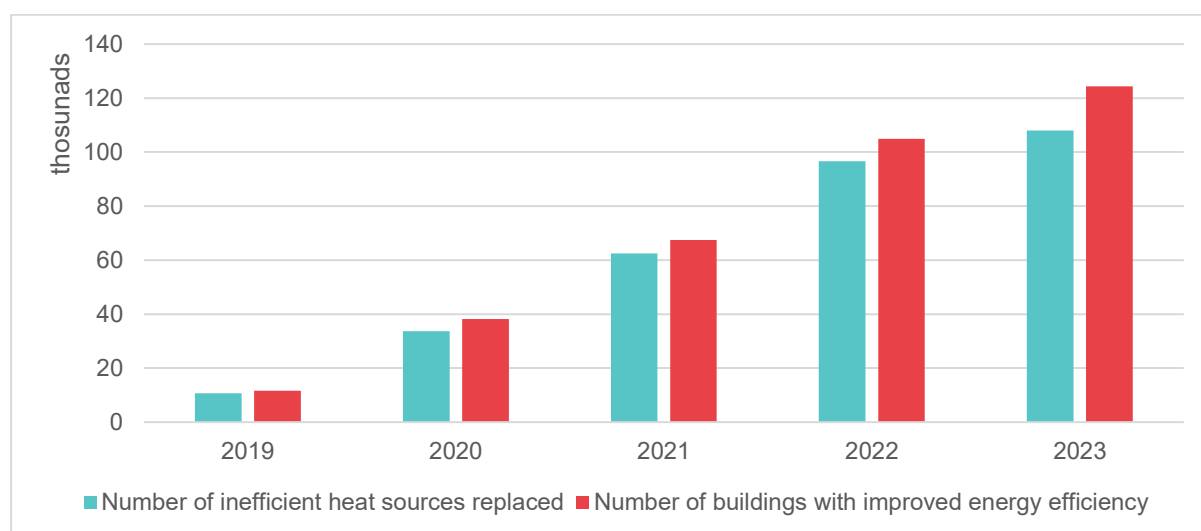


Figure PL23. Effects within priority programmes

Source: Statistics Poland (2025).

In the context of retrofitting in Poland, several corrective public policies have been designed to mitigate social and economic inequalities, particularly by ensuring that low-income households can access financial tools and benefit from energy efficiency upgrades. These policies use income-based eligibility criteria, targeted subsidies, and simplified procedures to support vulnerable groups.

The **Clean Air Programme** and the **Stop Smog Programme** are two key corrective public policies in Poland that aim to reduce energy poverty and environmental inequality through targeted support for building retrofits. The Clean Air Programme provides financial assistance for homeowners to replace outdated heating systems and insulate buildings, with subsidy levels adjusted based on household income. The Stop Smog Programme complements this by focusing on the most vulnerable groups in highly polluted municipalities, offering 100% financing for retrofitting projects such as thermal insulation and boiler replacement. Eligibility is strictly income-based and includes property value limits, ensuring that aid reaches those most in need. Both programs exemplify how public policy can promote fair access to clean energy solutions, helping to mitigate inequalities, reduce household energy bills, and improve living conditions for economically disadvantaged populations.

It is worth mentioning that rural Poland faces entrenched housing and energy inequalities, which are both shaped and perpetuated by the uneven rollout and accessibility of EEP. While energy efficiency is a national priority, rural areas often lack the resources and infrastructure to benefit from these policies in practice. Rural areas in Poland typically have older, poorly insulated buildings, many constructed before modern energy standards. These homes often rely on inefficient coal or wood-burning stoves for heating, contributing to higher energy consumption and air pollution. Despite this, they are less likely to be targeted by retrofitting programs due to logistical and economic challenges.

Most EEPs, such as the Clean Air Programme, offer partial subsidies that still require co-financing, which is unaffordable for many rural residents. Moreover, many residents do not have the technical capacity or support to meet the eligibility criteria (e.g., legal property ownership, building standards, tax documentation). Rural populations in Poland are often older, lower-income, and more reliant on subsistence agriculture or pensions. These groups are less resilient to climate and policy shocks, and without targeted interventions, they are systematically left behind in the green transition.

5 Nature-Based Solutions

One of the actions for adapting to climate change involves physical transformations in space, such as increasing the number of green areas. Such actions are recommended by the EU, the UN, the International Union for Conservation of Nature, and other leading international organizations. In this context, particular emphasis is placed on so-called nature-based solutions (Ćwiklińska & Dudzińska-Jarmolińska, 2020).

5.1 The policy cycle: emergence of the issue and policy decisions

The emergence and implementation of Nature-Based Solutions (NBS) in Poland reflect the complex interplay between national policy-making and European Union directives. This chapter examines the governance processes that have shaped Poland's approach to NBS, with a focus on how EU policies influenced national agendas. By analyzing the dynamics of these processes, the chapter sheds light on the evolution of goals and coalitions that underpin Poland's commitment to NBS (Figure PL7).

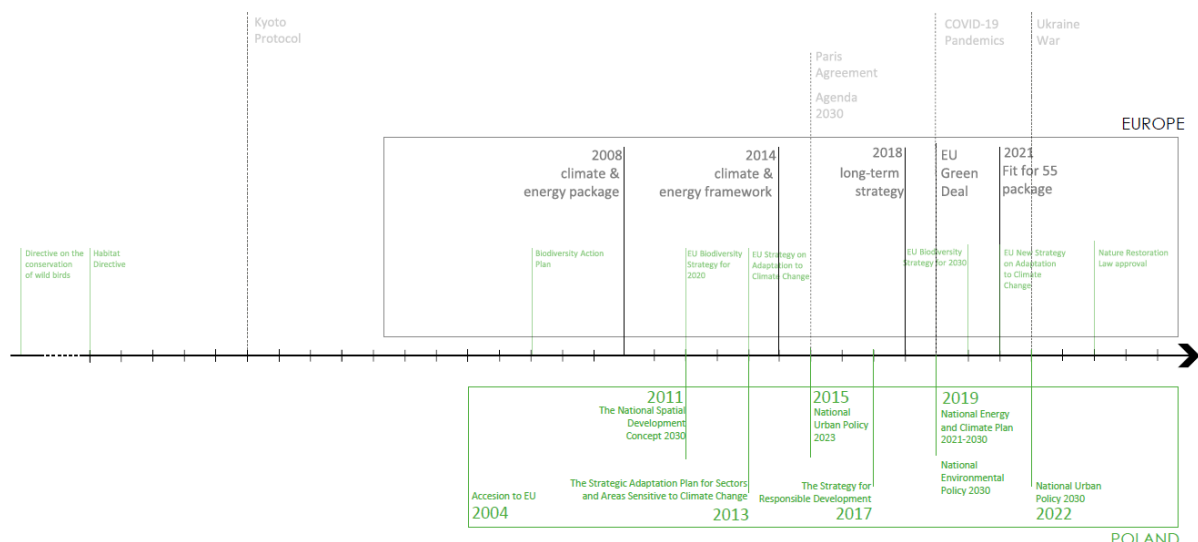


Figure PL24. Timeline with main milestones for introducing NBS in Poland

Source: own elaboration.

Since 1999, at the municipal level, tasks related to broadly understood environmental issues have been carried out by the municipal council, the head of the commune, the mayor, or the city president. The obligations of municipal bodies performing tasks in the field of environmental protection arise primarily from the **Environmental Protection Law** (2001) and the **Nature Conservation Act** (2004). In the area of environmental protection, the executive body of the commune prepares local legal acts, including the commune environmental protection program. In Poland, environmental protection programming at the municipal level takes place in many municipalities, particularly those located in areas with environmental threats (Dumieński et al., 2019).

In the Polish policy context, NBS are most often associated with green areas. However, their conceptual scope is gradually broadening. While many local and regional planning documents still identify NBS with urban parks, green corridors or rain gardens, the more comprehensive understanding promoted by the European Union – including blue infrastructure, ecosystem-based adaptation and multifunctional land use – is only partially integrated into national policy frameworks. In earlier policy and planning discourses, the concept of green infrastructure dominated and was widely used in spatial planning and urban regeneration programmes (Surma, 2015). In contrast, the term ecosystem services were mainly used in scientific research and environmental assessments, especially in the context of strategic environmental assessments. The concept of nature-based solutions is a relatively recent addition, introduced mainly through international policy programmes, and has not yet been fully institutionalised in Polish governance structures.

Since around 2017, NBS has started to appear more systematically in national discussions, especially in relation to climate change adaptation strategies (e.g. Urban climate change adaptation plans) and in scientific papers (Kronenberg et al., 2017). However, the concept is still not binding in the current Polish legal and regulatory framework. NBS often get equated with urban greening due to their visibility and easier policy framing.

In 2011, some recommendations to NBS were included in ***The National Spatial Development Concept 2030*** which planned to introduce an obligation to retain rainwater in agglomeration areas in order to reduce flood surges in densely built-up areas, and to use the obtained resource to maintain the green infrastructure of urbanized areas and – as the value of water abstracted for the living needs of the population increases – for other uses.

In 2013, Poland adopted ***The Strategic Adaptation Plan for Sectors and Areas Sensitive to Climate Change by 2020, with a Perspective to 2030*** developed by the Ministry of the Environment. Incorporating climate change considerations into urban spatial policy was identified as one of the plan's key actions. It was the first strategic document to directly address the issue of adaptation to ongoing climate change. The plan's main objective is to ensure sustainable development and the effective functioning of the economy and society in the context of a changing climate. The document identifies priority areas for adaptation actions, focusing on sectors most sensitive to climate change, such as water management, agriculture, forestry, biodiversity, health, energy, construction and spatial management, urban areas, transport, mountainous regions, and coastal zones. Financing for climate adaptation measures is sourced from national public funds, such as the National Fund for Environmental Protection and Water Management (NFEPWM), provincial environmental and water management funds, the state budget, revenue from the sale of Assigned Amount Units (AAUs), and local government budgets. Local governments are also encouraged to leverage EU funds under the New Financial Perspective, which supports instruments for sustainable urban development. The document emphasizes the inclusion of green and water areas, ventilation corridors, and sustainable heating methods in urban development plans, along with stormwater management and natural revitalization initiatives. Key recommendations include restoring degraded green areas and water reservoirs, enhancing small retention in cities, and replacing impermeable surfaces with permeable ones to support climate adaptation.

In 2019, the Ministry of Environment published the strategy called the ***National Environmental Policy 2030*** (NEP2030). The strategic projects of *NEP2030* include clean air, landscape audits, the development and implementation of a coherent and comprehensive State Raw Materials Policy, a green technology accelerator, forest coal farms, wooden construction, adaptation to climate change, a comprehensive program for the adaptation of forests and forestry to climate change, and water for agriculture. *NEP2030* serves as the basis for investing European funds from the financial perspective for 2021–2027. The strategy also supports the implementation of Poland's goals and commitments at the international level, including at the EU and UN level, particularly in the context of the EU's climate and energy policy goals until 2030 and the sustainable development goals outlined in the 2030 Agenda.

Poland developed the ***National Urban Policy 2023*** (NUP2023) as a strategic document for urban development. NUP defined the framework and indicated key directions and areas of urban development. As the newest of public policies, urban policy has moved away from a sectoral approach towards an integrated and interdisciplinary approach (Rzeńca & Sobol, 2020). In 2022 new ***National Urban Policy 2030*** (NUP2030) was introduced. In principle, the essence of conducting national urban policy is to face development challenges and create conditions for strengthening the capacity of cities and urban functional areas for sustainable development, improving the quality of life of residents and building resilience to observed climate change. A green city is defined in NUP2030 as opposing the deepening climate crisis,

counteracting the effects of climate change, reducing air pollution emissions and rebuilding ecosystems in urban areas (increasing green areas and the continuity of ecosystems interpenetrating urban areas).

The term "Nature-Based Solutions" in Poland is increasingly present but still unevenly adopted across sectors and institutions. The term is more common in English-language materials (EU reports, academic publications) than in Polish-language documents. In Polish, it is often translated very loosely or kept as the acronym NBS in technical texts. At local level only municipal departments in cities involved in EU projects, dealing with climate adaptation, green infrastructure, and urban development may reference NBS in strategies and tenders. Smaller towns and rural municipalities rarely use the term, even if they implement NBS-like practices (e.g., wetland restoration, tree planting).

5.2 The implementation process

The need to implement actions to adapt to the effects of climate change and, consequently, the use of NBS has two reasons: the lack of sufficient and effective steps to stop climate change and the increasingly rapid emergence of the negative effects of this process (Karaczun et al., 2022). Tools that implement NBS in Poland are crucial for addressing climate change and urbanization challenges by integrating natural processes into urban planning and development (Table PL7).

Tool	Structures of Implementation	Time Horizon
Urban climate change adaptation plans	Prepare climate change adaptation plans for the 44 largest urban centres in Poland. Plans are based on climate vulnerability assessments, including risk mapping (e.g., heat islands, flooding). Criteria include population density, land sealing, and exposure to climate risks. Identification priority zones used GIS analyses.	2017-2019
Water Retention Project	The "My Water" Project has funded 20,000 home retention installations. The 2021-2027 Retention Development Program, with a perspective to 2030, focuses on rebuilding and expanding land improvement systems, constructing new retention reservoirs, desludging and maintaining existing reservoirs, and creating local small retention systems. Priority areas identified based on hydrological risk, agricultural needs, and infrastructure capacity. Criteria include flood and drought exposure¹⁶¹.	2020-2027
Urban greening	The National Fund for Environmental Protection and Water Management will transfer funds from the European Funds for	2024-2027

¹⁶¹ <https://www.gov.pl/web/nfosiaw/moja-woda--wsparcie-dzialan-realizowanych-przez-wfosiaw> [Last accessed on 2.06.2025]

Tool	Structures of Implementation	Time Horizon
	Infrastructure, Climate, Environment 2021-2027 program for the "deconcreting" of areas in cities. Calls for projects encourage targeting highly sealed areas and urban heat islands. Municipalities are expected to provide justification based on environmental data. Pilot projects in Łódź and Poznań aim to restore natural soil functions in overbuilt districts. Project selection based on environmental audits.	
Forestation Initiatives	Strategic Plan for the Common Agricultural Policy for 2023-2027 - The intervention is dedicated to agricultural land characterized by low suitability for agriculture, constituting a potential area for establishing forest plantations, as well as shaping the landscape structure of rural areas. Focus on agricultural lands with low production potential. Priority given to degraded areas and regions with low forest cover.	2023-2027
Cities adaptation to climate change and Green-Blue Infrastructure	In 2024 change of the act – Environmental Protection Law was adopted. The Act provides that cities with more than 20,000 inhabitants will develop municipal plans for adaptation to climate change. Municipalities required to assess vulnerability and propose location-specific adaptation measures. Guidelines encourage the use of spatial data and participatory tools.	2024-2028
Clean Transport Zone	A clean transport zone is an area designated in the city center that is accessible only to vehicles that meet the required emission standards. The possibility of establishing such zones was introduced by the amendment to the Act of January 11, 2018 on electromobility and alternative fuels. Priority areas are high-density, high-traffic city centers with poor air quality. Assessment based on emissions monitoring and health risk Warsaw introduced Poland's first clean transport zone on July 1, 2024.	From 2024

Table PL7: Tools used in introduction of NBS in Poland

Source: own elaboration.

In connection with *The Strategic Adaptation Plan for Sectors and Areas Sensitive to Climate Change by 2020, with a Perspective to 2030* (2013), the Ministry of the Environment decided to prepare climate change adaptation plans for the 44 largest urban centres in Poland. The aim of the preparation of *Municipal Climate Change Adaptation Plans* for cities with more than 100 thousand inhabitants was to increase the resilience of cities to climate threats, and thus to prepare these cities for modern shaping of local policy in response to the identified and predicted negative consequences related to climate change (Dumieński et al., 2019; Sachanbińska-Dobrzyńska, 2024).

Between 2018-2020 the project called '*Climate Mitigation Through Nature-Based-Solutions in Urban Poland - Fostering Awareness and Capacity (ClimateNBS Polska)*' was introduced. Its aim was to build awareness of how NBS can contribute to mitigating climate change in the city and to increase the knowledge and skills of city officials, local government employees, planners and landscape architects in the design and implementation of NBS in Polish cities. Based on the developed materials, an original training program was created, addressed to city officials and designers of blue-green infrastructure. The project was financed by the European Climate Initiative¹⁶². The adaptation plans developed in 2019 for the largest Polish cities – Warsaw, Krakow, Wroclaw, Poznan, Gdansk, Szczecin, Bydgoszcz or Białystok – highlight the potential of greenery in helping cities adapt to climate change. Particular emphasis is placed on blue-green infrastructure, including greening walls (Ćwiklińska & Dudzińska-Jarmolińska, 2020).

The National Energy and Climate Plan 2021-2030 (2019) focuses on enhancing climate resilience and improving urban ecosystem functioning in Poland. It aims to increase the percentage of city residents covered by urban adaptation plans and raise the country's forestation level. The concept of green-blue infrastructure is to be integrated into urban spatial development plans to strengthen ecosystem resilience. Additionally, the plan emphasizes natural revitalization, including the restoration of degraded green areas and water reservoirs to their original functions, with a particular focus on small-scale water retention in cities. It also highlights the importance of replacing impermeable ground surfaces with permeable ones to improve water management and mitigate climate impacts.

The National Urban Policy 2030 (NUP2030) adopted in 2022 emphasizes the need to integrate NBS into urban development, specifically through the protection and expansion of greenery. It recommends the implementation of legal standards to assess and compensate for ecosystem service losses using blue-green infrastructure of equal or greater value. The policy advocates for preserving existing trees during construction, ensuring their long-term protection, and requiring detailed tree inventories in building permit applications. Tree removal in urban areas should be restricted, only permitted when unavoidable, and compensated by planting new trees that provide equivalent environmental benefits.

In Poland's spatial planning system, up until September 2023, the standard measure for biologically active areas was defined as the percentage of biologically active land relative to the total surface area of a building plot. These requirements were specified in local spatial development plans established by cities or municipalities. In areas without such plans, the indicator was determined through administrative decisions on building and land development conditions issued by municipal authorities. However, as of autumn 2023, new regulations have been introduced. These regulations require biologically active areas to feature surfaces that support natural plant growth and facilitate rainwater retention, broadening the definition to include surfaces beyond native soil (Michalik-Śnieżek et al., 2024).

NBS are increasingly referenced in national and regional water strategies, particularly in the context of flood risk reduction, retention, and stormwater management. However, the terminology varies, many documents refer to 'natural retention' or 'blue-green infrastructure'.

¹⁶² <https://www.ecologic.eu/16115> [Last accessed on 10.01.2025]

In Poland, there is currently no national standardized framework for identifying priority areas for Nature-Based Solutions implementation. While several cities and regions have begun incorporating spatial criteria, such as flood risk, heat island intensity, or tree canopy deficits, into their local planning processes, these efforts remain fragmented and context-specific, often shaped by the availability of EU funding or participation in international pilot projects. As a result, the selection of NBS intervention areas tends to vary significantly across municipalities, depending on local expertise, technical capacity, and access to environmental data. The absence of a unified national approach or toolkit limits the broader scalability and comparability of NBS planning across Polish cities and territories.

5.3 Size and role of the market

The market framework for NBS in Poland is shaped by a combination of public funding, private sector engagement, and EU-driven initiatives. NBS are promoted within national frameworks like the *National Energy and Climate Plan* (2021–2030), urban adaptation strategies, and EU, which encourage integration of NBS in spatial planning and climate resilience measures. Growing awareness of climate challenges has increased demand for sustainable urban solutions, such as green infrastructure, permeable surfaces, and biodiversity conservation. Financial support comes from a mix of EU funds, national environmental programs, and local budgets. Private investments are incentivized through subsidies and public-private partnerships. NBS are increasingly embedded in urban spatial development plans, with a focus on green-blue infrastructure, water management, and ecosystem restoration.

The National Fund for Environmental Protection and Water Management operates under the Environmental Protection Law, playing a key role in financing environmental protection in Poland. In 2024 *Action Strategy of the National Fund for Environmental Protection and Water Management for 2025-2028* was elaborated. Due to this document NBS initiatives can be financed from various types of financial sources supported by National Fund for Environmental Protection and Water Management (Figure PL8).

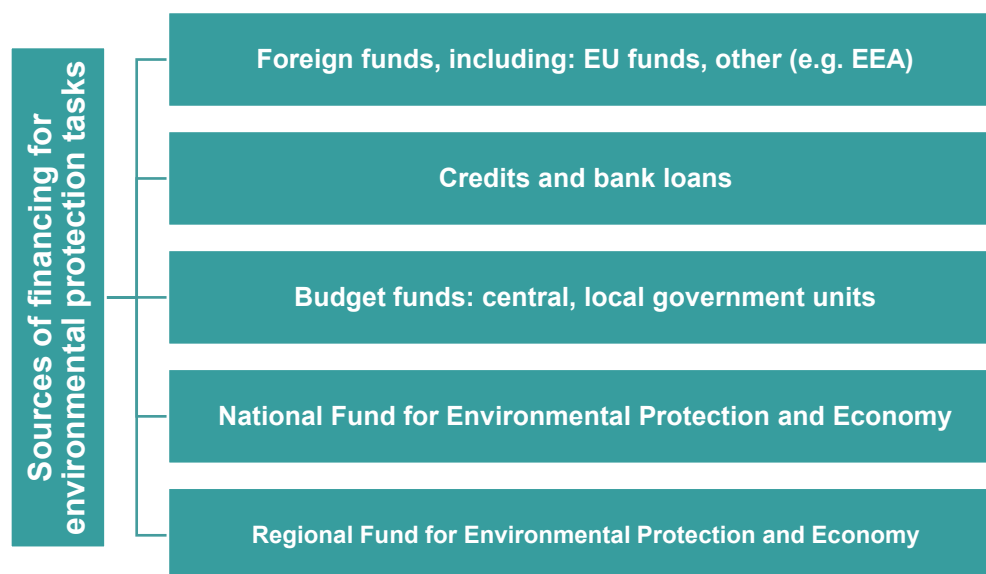


Figure PL25: NBS funding sources by The National Fund for Environmental Protection and Water Management

Source: own elaboration based on *Action Strategy of the National Fund for Environmental Protection and Water Management for 2025-2028, (2024)*.

An example of the method of financing NBS in Poland can be the “Kłodzko NBS” project financed from the EEA funds and from the state budget, under the “Environment, Energy and Climate Change” Programme, the “Climate Change” programme area. In 2021, the Municipality of Kłodzko, in partnership with the International Development Norway, started implementing a 3-year project. The aim of the project was to prepare the city and its inhabitants for changing climatic conditions by mitigating climate change and adapting to its effects. The tasks completed included: introducing new plantings of plants resistant to climatic conditions, tidying up the accompanying infrastructure, greening the “concreted” market square, supplementing the plantings of plants resistant to climate change, including droughts, introducing pocket green areas in built-up areas, greening the courtyards, creating urban vegetable gardens, introducing a rainwater collection system in market square to water the urban greenery, creating a rainy playground, building absorption basins in city parks, introducing an electric bicycle system, introducing air pollution measurements in educational institutions together with an air purifier system¹⁶³.

In Poland private actors, particularly in the construction, real estate, and water management sectors, promote NBS-compatible practices such as green roofs, retention systems, and landscape-integrated infrastructure, often in response to EU regulations, investor pressure, or certification schemes. These interests are represented by urban development chambers, architecture and planning associations, and environmental consultancies, which serve as intermediaries between the private sector and the state, advocating for regulatory reforms that facilitate green infrastructure integration in planning codes. In parallel, environmental NGOs and think tanks, such as the Sendzimir Foundation or Polish Green Network, function as both watchdogs and facilitators, mediating between civil society, municipalities, and businesses.

¹⁶³ <http://nbs.klodzko.pl/> [Last accessed on 20.01.2025]

5.4 The multilevel governance process

The multilevel governance of NBS policies and strategies in Poland involves a collaborative approach between national, regional, and local levels of government, with various actors playing complementary roles. Below is an analysis of the division of roles, resources, and coordination between these levels (Table PL8).

Actor	Type	Level	Roles	Effects	Coordination System
Ministry of Climate and Environment	Public	National	Leads national climate policy, oversees biodiversity conservation, and coordinates NBS-related strategies and programs.	Coordinates national NBS efforts, influences environmental regulations and funding allocation.	Works with other ministries, regional authorities, and EU institutions to align climate and biodiversity goals with NBS strategies.
Ministry of Agriculture and Rural Development	Public	National	Oversees sustainable land use, agroforestry, and initiatives promoting ecosystem services in rural areas.	Shapes urban development policies that integrate NBS, contributing to sustainable urban growth.	Coordinates with agricultural advisory services, rural stakeholders, and EU CAP programs to promote NBS-aligned practices.
Ministry of Development and Technology	Public	National	Responsible for urban planning and development policies, including green and blue infrastructure in cities	Promotes rural NBS applications such as agroforestry, supporting ecosystem services in rural landscapes.	Interfaces with municipalities, developers, and urban planning bodies to implement NBS in spatial planning.
General Directorate for Environmental Protection	Public	National	Manages Natura 2000 sites and supports NBS implementation in protected areas	Enforces biodiversity conservation through NBS, promotes ecosystem protection in designated sites.	Cooperates with environmental agencies, local governments, and NGOs in managing protected areas.
National Fund for Environmental Protection and Water Management (NFOŚiGW)	Public	National	Provides funding for NBS projects, such as flood management, wetland restoration, and urban greening.	Finances NBS projects, enabling implementation of environmental protection and climate adaptation measures.	Collaborates with ministries, municipalities, and project implementers to disburse funds and monitor outcomes.

Actor	Type	Level	Roles	Effects	Coordination System
Voivodeships Offices	Public	Regional	Oversees regional planning, sustainable development, and implementation of NBS policies.	Implements NBS policies at the regional level, supports the integration of green infrastructure in regional plans.	Coordinate with municipalities, regional planning boards, and national ministries to align strategies.
Municipalities	Public	Local	Responsible for urban planning, integration of NBS in public spaces, and environmental governance.	Directly implements NBS in cities, improving urban resilience, air quality, and biodiversity in urban areas.	Engage with residents, private developers, and national programs to co-finance and deploy local NBS.
Ecological NGOs	Civil Society	National/ Local	Advocate for environmental protection, green infrastructure, and policy reform on NBS	Raises public awareness, influences policy, and supports grassroots NBS initiatives.	Collaborate with local communities, schools, municipalities, and EU-funded projects to advance NBS.
Construction and Development Companies	Private investors	National/ Local	Incorporate NBS into new development projects (e.g., green roofs, rain gardens).	Advances urban NBS integration, promotes green building practices in urban development.	Coordinate with municipalities and planners, often through public-private partnerships.
Community-Based Organizations/ Citizens and local communities	Civil Society	Local	Implement grassroots NBS projects like tree planting and river clean-ups.	Directly contributes to local NBS projects, fostering community engagement in environmental protection.	Collaborate with NGOs, local authorities, and schools through participatory planning and volunteering.
Banks and Investment Funds	Financial Institution	National/ Regional/ Local	Provide green financing options for NBS projects, including sustainable urban development.	Support private sector investment in NBS, helping to scale up green infrastructure initiatives.	Work with developers, municipalities, and international donors to structure financing and de-risk NBS investment.

Table PL8. Actors involved in NBS governance in Poland

Source: own elaboration.

NBS and housing affordability policies are not always fully coordinated, as these two areas typically fall under different ministries with distinct priorities. Housing affordability is primarily managed by the Ministry of Development and Technology, focusing on affordable housing construction and urban renewal, while NBS policies are often driven by environmental and climate ministries like the Ministry of Climate and Environment.

In Poland, the governance of Nature-Based Solutions (NBS) operates through a mix of vertical and horizontal coordination mechanisms, although these remain uneven and often project-driven. Vertical governance connects the national level (e.g. Ministry of Climate and Environment, National Fund for Environmental Protection) with regional (Voivodeship Offices) and local authorities (municipalities), mainly through the implementation of EU-funded programs, national climate strategies, or urban adaptation plans. For instance, Lublin’s Green City Action Plan aligns with national climate goals and EU financing criteria, illustrating how local planning integrates upward policy frameworks. However, gaps persist due to unclear mandates or limited capacity at lower levels. Horizontal governance, on the other hand, is increasingly visible among municipalities, NGOs, and the private sector, particularly in co-designed urban greening and stormwater management projects.

5.5 Achievements, assessments, and challenges

During the socialist period in Poland, Nature-Based Solutions were implemented through ecological corridors designed to improve air exchange in cities. Green spaces were also used for noise and pollution isolation, particularly around hospitals and schools. Despite efforts to protect these areas, they faced constant pressure from urban expansion, which intensified after the fall of socialism and the weakening of urban spatial planning due to deregulatory activities (Kronenberg et al., 2017).

The main achievements of NBS policy in Poland include the successful utilization of EU funding mechanisms to support NBS projects, such as small-scale water retention systems and reforestation efforts. Additionally, NBS policies have contributed to raising public awareness about the importance of nature-based solutions in addressing climate challenges, fostering collaboration between local governments, the private sector, and civil society (Table PL9). The adoption of NBS in Poland often requires significant public sector involvement, as market forces alone typically do not provide sufficient incentives for large-scale implementation. Private sector participation is still developing and often depends on subsidies or regulatory requirements. Market-based tools, such as subsidies, incentives for eco-friendly infrastructure, and funding for small retention systems, are essential to attracting private actors, highlighting the need for public financial support.

Impact Area	Measured Impacts	Potential Impacts
Improved Access to Green Spaces	Many cities are implementing "deconcreting" programmes, often using EU funds. Examples: Łódź has become an example of integrating deconcreting into broader urban revitalization, especially in the historic central district.	NBS could significantly improve access to green spaces in underserved urban areas, especially for low-income housing.

Impact Area	Measured Impacts	Potential Impacts
	City is transforming over-paved courtyards, streets, and squares into green, permeable, and socially inclusive spaces.	
Air Quality	In Warsaw and Krakow, projects involving green belts along streets and pocket parks were implemented, which reduced the concentration of suspended dust in the vicinity of communication artillery.	In the future, widespread implementation of NBS could significantly lower air pollution, benefitting low-income neighbourhoods that often face poor air quality.
Flood Risk Reduction	Rain gardens and permeable surfaces were used in housing estates, which reduced local flooding after heavy rains (e.g. Gdańsk, Katowice)	NBS like rain gardens, permeable surfaces, and restored wetlands could provide significant flood risk reduction in vulnerable housing areas.
Community Engagement	In larger cities (e.g. Łódź, Katowice, Gdańsk), "green civic budgets" have been introduced, and projects chosen by residents include initiatives such as planting trees, creating community gardens, and managing greenery.	Future NBS policies could increase social cohesion by encouraging community-led green space initiatives, which could improve neighbourhood relations in marginalized housing areas.
Aesthetic Value	The transformation of urban space using NBS improved the aesthetics and attractiveness of the space (e.g. revitalization of Łódź, Gdańsk, Radomsko).	In the future, NBS could transform neglected areas, potentially leading to a rise in property values.
Housing Affordability	There are pilot programs with green roofs in municipal buildings (e.g. Krakow).	Future policies could incorporate NBS in affordable housing development, improving living conditions without raising rent prices.

Table PL9. Impacts of NBS policies on housing inequalities in Poland

Source: own elaboration.

Changes introduced at the local level must be the result of close cooperation of all entities responsible for creating and implementing urban policies related to climate, directly and indirectly. An important actor in this cooperation should be residents. The process of implementing climate change adaptation activities must be continuous, not sporadic, to be effective. Both climate change and adaptation activities are subject to constant transformation, so conclusions developed once may cease to be relevant in the shorter or longer term. Therefore, it is worth repeating activities aimed at learning opinions and developing recommendations and solutions for adaptation to climate change (Rzeńca et al., 2024).

Due to the *National Urban Policy 2030* (2022) one of the key challenges is increasing water retention. In urban areas and their functional zones, it is essential to gradually expand the share of permeable surfaces, particularly biologically active ones. To manage rainwater safely and economically while enhancing retention, the development of blue-green infrastructure is crucial.

Polish cities face worsening environmental problems due to spatial policies that fail to support climate change adaptation strategies. This has weakened their climate resilience. Key issues include insufficient monitoring of urban surface sealing, neglect of resilience-building in urban planning and construction decisions, downplaying climate change risks amidst growing investment pressures and exclusion of climate change adaptation in spatial policy models. These shortcomings hinder the cities' ability to cope with climate challenges (Rynio et al., 2023; Sobol, 2023).

In the context of NBS in Poland, there have been several corrective public policies that have aimed, with varying degrees of success, to mitigate socio-spatial inequalities, especially those related to the geographical distribution of green spaces and their associated benefits. EU-funded urban regeneration programs have supported revitalization efforts in post-industrial cities by integrating green infrastructure into socially deprived areas. The National Urban Policy promotes sustainable development and equity by encouraging integrated revitalisation strategies that combine housing improvements with the creation of green spaces.

At the municipal level, cities like Warsaw, Wrocław, and Poznań have adopted green infrastructure strategies that prioritize interventions in underserved districts, while participatory budgeting has empowered residents, especially in marginalized communities, to propose and vote for small-scale greening projects. These efforts have helped narrow environmental disparities, but challenges remain, including uneven implementation, limited long-term funding, and the risk of green gentrification. Ensuring more equitable outcomes will require stronger coordination between housing policy, environmental planning, and social protection measures.

6 Densification

Urbanization is a global phenomenon that poses significant challenges to cities seeking to increase density through sustainable development. In Poland, these challenges are exacerbated by suburbanization processes and the lack of a comprehensive spatial development policy. Densification, a key strategy for achieving sustainable urban development, has become a critical objective in addressing these challenges. This approach aims to optimize land use, limit urban sprawl, and create more compact, efficient, and environmentally friendly cities. However, its implementation requires careful consideration of social, economic, and environmental factors, as well as alignment with broader policy frameworks.

This chapter examines the policy cycle surrounding densification projects in Poland, exploring how the problem emerged, the policy decisions taken, and the interplay between EU and national policies. It highlights the importance of strategic planning and legal frameworks in achieving a sustainable spatial order.

6.1 The policy cycle: emergence of the issue and policy decisions

Densification projects in Poland, as well as in many other countries, are a response to growing urban populations, the need for sustainable development, and the efficient use of land. The

main challenge in Poland is the lack of a coherent spatial development policy and clear principles for shaping development. Urban policy and development are shaped by interconnected EU and national policies, with EU guidelines often acting as a catalyst for national reforms, while local adaptations reflect the unique needs of urban development in Poland. With the growing importance of spatial order and sustainable development and following Poland's accession to the EU and the adoption of EU documents, there was a need to take action to adopt or update legal and strategic documents (Figure PL9).

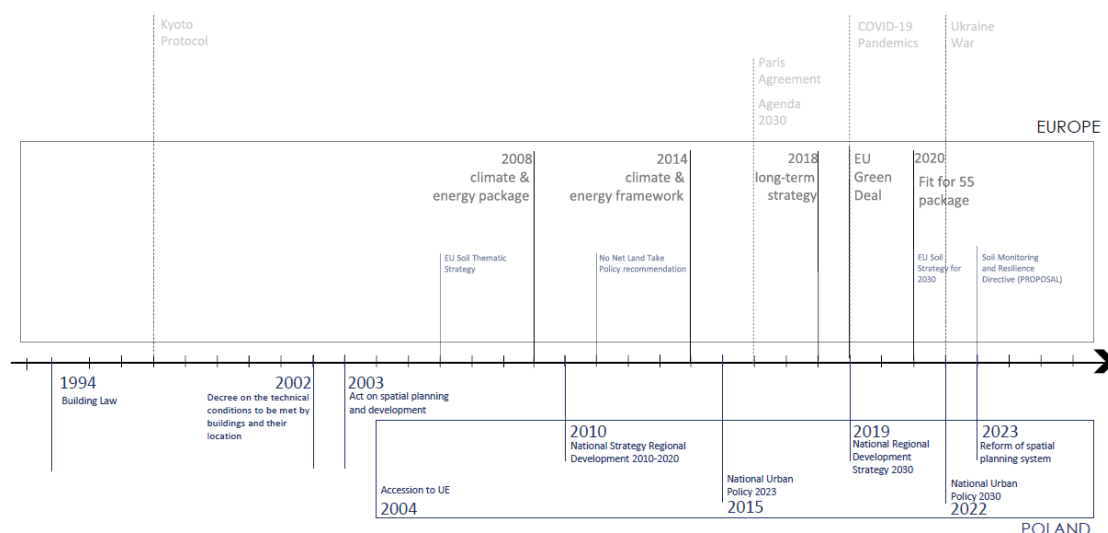


Figure PL26. Timeline with main milestones for development of policies related to densification projects in Poland

Source: own elaboration.

EU cohesion and spatial policies have significantly influenced urban development in Poland, especially through financial support (European Regional Development Fund, Cohesion Fund) as well as strategic frameworks. The 2023 national planning reforms, including revisions to zoning laws and the introduction of integrated planning instruments, have aimed to streamline urban development and support revitalization, but implementation remains uneven across regions. In practice, municipal-level initiatives, such as city-led revitalization programs and changes to local zoning plans, are often the most immediate drivers of densification. However, a strong private developer presence, combined with a weak public housing sector, has raised concerns about gentrification and affordability.

The legal status of densification projects is regulated primarily by the **Act on spatial planning and development** (2003), as well as **the Act of Building Law** (1994) and regulations issued for this act. The particular importance in the implementation of the investment is the **Decree of the Minister of Infrastructure on the technical conditions to be met by buildings and their location** (2002). It should be noted that these acts are constantly being amended, also for the purposes of adapting them to EU law, in particular these changes were visible after Poland's accession to the EU in 2004.

Issues concerning the role of urban areas at the European level have appeared in the European Commission's communications since the 1990s. Several EU initiatives have had an impact on cities and development. Also, the last dozen or so years of meetings of EU countries

have resulted in many adopted documents defining the vision, priorities and framework for creating urban policies in the Member States for sustainable development. The need to strengthen the role of cities in shaping future EU policies is emphasised specially by: The Urban Agenda for the European Union, The New Leipzig Charter (November 2020).

The **Act on the principles of development policy** (2006) is a key legal act that regulates the planning, coordination and implementation of development policy in Poland. It provides a legal framework for the integration of various political and financial activities at the national, regional and local levels. Based on this act, two documents at the national level were adopted: **National Urban Policy 2023** (NUP2023) in 2015 and updated in 2022 – **National Urban Policy 2030** (NUP2030). In relation to the current NUP2030, it is indicated that sectoral policies relating to cities and their functional areas should be coordinated. The discrepancies still result from the lack of correlation between policy actions taken after the political transformation at the end of the 20th century and Poland's accession to the EU in 2004. European Union policy towards cities focuses on the role of cities in economic development as well as in achieving sustainable development. Therefore, to adapt the administration at the national level to the European level, Poland has implemented many actions aimed at improving the condition of Polish cities. In relation to Polish legal acts and the implementation of policy in this area, the above-mentioned National Urban Policy is of particular importance. The preparation of this document indicates the challenges that Polish cities face in various aspects, but considering the issue of densification projects, it is in this document that one can find information and principles regarding these projects. One of the main assumptions of urban policy is to strive to develop urban areas (in structural compactness) in a sustainable and responsible manner and to rationally use space and available resources within the concept of a compact city.

In 2011 some recommendations supporting the densification process were included in the now-defunct **The National Spatial Development Concept 2030**. The document argued that settlement trends resulting from lifestyle changes – such as spontaneous suburbanisation, dispersal of development in rural areas, development of second-home colonies functionally disconnected from existing settlements, and anthropopressure in coastal zones – threaten the spatial order and require intervention through integrated spatial planning.

In 2019, the **National Strategy for Regional Development 2030** was adopted. The main assumption of the document is the effective use of the internal potentials of territories and their specializations to achieve sustainable development of the country, which will create conditions for the growth of incomes of Polish residents while achieving cohesion in the social, economic, environmental and spatial dimensions. The main objective of regional policy is implemented based on three complementary specific objectives: a) increasing the cohesion of the country's development in the social, economic, environmental and spatial dimensions, b) strengthening regional competitive advantages, c) improving the quality of management and implementation of territorially oriented policies. These actions will result in a more coherent development of regions and an increased level of urbanization, including urban centres.

In 2023, an **Act amending the Act on Spatial Planning and Development and certain other acts** was adopted. The document regulates: a) changes in the regulations concerning building law, environmental protection, and spatial development; b) the organisation of the system of spatial planning acts; c) the limitation of suburbanisation by more precisely regulating decisions

on development conditions and introducing the possibility of a development supplement area; d) support for better use of urbanised areas and investment areas in accordance with the principles of sustainable development; and e) linking planning documents with public and private investment planning to enable more coherent local development. EU influence has been crucial, driving regulatory harmonization and providing financing mechanisms in line with policy priorities. The 2023 Act represents a significant milestone, streamlining planning tools, limiting suburban sprawl and optimizing existing urban areas. This comprehensive and adaptive policy approach underlines Poland’s long-term commitment to creating resilient and competitive urban environments.

The evolution of spatial planning and urban development policy in Poland illustrates the continuous adaptation to EU standards and commitment to sustainable development. Key legal acts and strategies have gradually improved the planning framework, improved the management of urban density, influenced the implementation of densification projects and addressed environmental and infrastructure challenges. This evolution reflects Poland’s response to both domestic needs and international frameworks. Early reforms prioritized the establishment of spatial order and sustainable development principles, laying the foundation for integrated urban management. Later strategies introduced more advanced urban renewal instruments and compact city models, emphasizing cooperation, efficient land use and coordinated investment planning.

Despite many strategic documents, significant gaps in policy coordination remain. While national strategies such as the National Urban Policy 2030 (NUP2030) advocate territorial integration, they often lack effective enforcement mechanisms. Provincial spatial development plans are often inconsistent with local spatial development plans prepared by municipalities. Furthermore, although Functional Urban Areas (FUAs) are formally recognized, they still lack a solid institutional framework to support integrated spatial planning – especially in rapidly growing peri-urban zones, where coordination challenges are most evident.

6.2 The implementation process

In Poland, densification is not a clearly defined goal of spatial policy, but is indirectly implied by spatial planning, revitalization activities and guidelines related to the protection of agricultural land. There are differences in the available tools and methods of their implementation depending on the territorial level and type of area.

Public interventions in densification projects involve legislative, financial, and operational strategies at multiple governance levels. Each category represents a set of tools and approaches designed to manage urban space more efficiently and promote sustainable growth. The nature of individual tools and their importance for implementing densification policy is presented in this section (Table PL10).

Tool	Structures of Implementation	Time Horizon
Local plans of development	Municipalities introduce local development plans regulating the intensity of development for individual areas. Specific indicators of land development and development shaping	From 2003

Tool	Structures of Implementation	Time Horizon
	have an impact on the implemented densification projects and investments. Universal tool applied across all territorial types.	
Revitalizations programmes	Revitalization projects are of key importance for degraded areas. Thanks to the Local Revitalization Program, local governments can use urban space more effectively, improving the technical condition of buildings and multifunctionality. Such actions improve the quality of life, influence urban processes and contribute to the revitalization of historical areas. Revitalization projects are often co-financed from EU funds. Predominantly used in medium and large urban centres. Less prevalent in rural municipalities due to limited administrative capacity and fewer degraded zones.	From 2015
The Apartment Plus ['Mieszkanie Plus']	This program focuses on building apartments for rent at moderate prices, particularly aimed at low- and middle-income groups. It supports the creation of affordable housing in urban areas, mainly on city centres. Targeted mostly at urban/metropolitan contexts.	2016-2019
Special Housing Act	The special housing act, known as "lex developer", became an effective tool for cooperation between city authorities and developers. It was intended to simplify and speed up the implementation of housing investments in areas that, according to the Local Spatial Development Plans (MPZP), were designated for another purpose - e.g. industrial or service. For investors, the most valuable areas are those in cities, which contributed to an increase in the number of investments in larger cities in areas that had not been developed until then. Mainly implemented in larger cities, where market demand is strong, and land is scarce. Limited applicability in rural areas.	2018-2025
National Urban Policy 2030	It is the key document at the national level shaping the vision and directions of urban development in Poland. The challenges in NUP are primarily taking care of spatial order and leveling the processes of chaotic suburbanization. Conceptually relevant to all settlement types, but implementation varies.	2022-2030
Supplementary Development Area	This area is designated in the General Plans of Communes according to a strictly defined procedure, based on an analysis of the existing development. In practice, the concept of the development supplementation area is based on the intensification of construction within already partially developed zones, instead of expansion onto green or agricultural areas. The designation of such an area must be	From 2023

Tool	Structures of Implementation	Time Horizon
	supported by an urban analysis that demonstrates the spatial and economic justification for the investment - primarily through location in the vicinity of existing development. This area cannot include areas devoid of appropriate types of development or be spatially separated from the designated zone. Any changes to its area are verified at the stage of preparing the draft plan, and exceeding certain parameters prevents the creation of the project. This approach supports planning oriented towards intensification, not expansion, and promotes more efficient use of existing infrastructure. Universal tool applied across all territorial types. Targeted at medium-sized and growing suburban municipalities where infill development is more feasible.	
Downtown Development Area	The Downtown Development Area is a special type of area designated in the General Plan of the Commune, corresponding to the city center or other high-intensity areas. Its purpose is to support compact, intensive development of development by using more flexible planning parameters that favor investment and reurbanization. The designation of this area is associated with lower standard requirements for biologically active area, the possibility of increasing the intensity of development and simplified technical standards. The Downtown Development Area is used primarily in large and medium-sized cities.	From 2023
Urban Development Agreements	Urban development agreements are a tool for regulating the relationship between the investor and the commune in the case of investments implemented under Integrated Investment Plans – a new form of local plans, prepared at the investor's request. They are a mandatory civil law agreement, concluded before adoption and specifying, among other things, the scope of public investments (e.g. construction of roads, schools, technical networks), the investor's obligations in terms of their implementation or co-financing, as well as deadlines for completion and conditions for withdrawal from the agreement. This instrument replaces the expiring so-called lex developer, offering a more transparent and predictable planning procedure. Urban development agreements allow for balancing public and private interests in the investment process, while at the same time enabling communes to plan social and technical infrastructure more effectively. They can also be a tool for negotiating the implementation of green infrastructure, such as parks, woodlots or retention systems, provided that they are included in the investor's obligations. Universal tool – Primarily used in urban/metropolitan areas with active development pressure	From 2023

Table PL10. Tools used in development of compaction densification projects in Poland

Source: own elaboration.

The Act on spatial planning and development (2003) is the basic legal act concerning spatial development. In 2023, there was a reform of the spatial planning system in Poland, which introduced a new act of local law - the *General Plan of the Commune*, which is developed for the entire commune. This act is an important element in shaping the spatial policy of the commune, dividing the commune into planning zones for which urban standards and access to social infrastructure are determined. It is important that during the reform, the possibility of designating the *Supplementary Development Area and the Downtown Development Area* was also introduced, which is of particular importance in the case of densification projects. Other tools regulated by the Act are:

- a) *Local spatial development plan* - is a planning act that specifies in detail the purpose of land, the principles of its development and the conditions of development. The plan includes functions and purpose of land, building lines (they define the area where a plot can be located), height and dimensions of buildings, protection of green areas, cultural heritage objects and the environment. In Poland, in 2023, local spatial development plans were created for 32.3% of the country's area¹⁶⁴,
- b) *Decision on building conditions* - is a planning instrument used in the absence of a local spatial development plan, which specifies the parameters for the planned building (mainly for residential buildings) and land development. It allows for the implementation of the investment while meeting specific conditions in relation to the existing neighbourhood,
- c) *Permission for special public investment* - serves to determine the conditions for locating investments related to the implementation of public purposes, and its issuance is associated with the determination of technical and environmental conditions.

Each of these tools plays an important role in the spatial planning system, enabling the balancing of private and public interests and ensuring control over urbanisation processes and development density, while protecting the environment and cultural heritage.

The Act on Building Law (1994) is a fundamental regulation in Poland governing construction activities, including urban densification projects. It provides a framework for the design, construction, and maintenance of buildings, setting procedures for obtaining permits and defining technical and safety standards. Recent amendments have simplified permitting processes for smaller housing units and mixed-use developments, accelerating urban densification while aligning with EU sustainable building directives. The Act specifies requirements like building height, setbacks, and land use, influencing the feasibility of high-density projects. Together with related decrees, it ensures compliance with energy efficiency, safety, and sustainable design standards, promoting the quality and safety of urban environments.

The Decree of the Minister of Infrastructure on the technical conditions (2002) to be met by buildings and their location is one of the most critical legal regulations in Poland governing construction standards. It establishes detailed requirements for the safety, functionality and location of buildings to ensure the orderly development of construction. This regulation plays a key role in densification policy, influencing the way new developments integrate with existing

¹⁶⁴ <https://bdl.stat.gov.pl/> [Last accessed on 20.01.2025]

urban environments, in terms of the daytime sunlight of apartments, as well as specifies minimum distances between buildings and plot boundaries, streets, and neighbouring structures. Updates to this regulation are often due to technological progress, changes in urban policy or adaptation to EU directives on sustainable construction and energy efficiency.

The Act on Revitalization (2015) plays a key role in projects targeting the renewal and reconstruction of urban areas. It provides a legal framework for comprehensive revitalization actions aimed at improving the quality of urban spaces, enhancing city functionality, and addressing socio-economic issues in degraded areas. The Act establishes clear guidelines for the preparation and implementation of local revitalization programs, often incorporating densification strategies. By focusing on degraded urban areas, revitalization projects can increase urban density by transforming old industrial, railway, or brownfield sites into residential or mixed-use spaces (Stangel, 2013). The Act supports public-private partnerships (PPPs) and fosters collaboration between public authorities, private investors, and local communities, while also aligning with EU-funded regeneration programs focused on sustainable urban development. It enables municipalities to provide financial incentives and subsidies for revitalization actions consistent with densification objectives, integrating effectively with broader planning regulations, building codes, and national urban policy goals.

The Act on facilitating the preparation and implementation of housing investments and accompanying investments (2018), known as the "special housing act", significantly influenced densification processes in Polish cities by simplifying and accelerating procedures for constructing new apartments. It facilitated housing projects on previously unregulated areas, including post-industrial and abandoned urban spaces, making less attractive locations more desirable for developers. These investments improved city aesthetics, revitalized neglected areas, and increased service availability in city centres. The act supported the intensification of urban development, particularly through multi-family housing projects (Szlachetko et al., 2021). Initially set to remain in force until 2028, the act has been replaced by new spatial planning tools, such as urban planning agreements and Integrated Investment Plans, as part of broader reforms. These new tools aim to continue supporting urban densification and sustainable city development.

6.3 Size and role of the market

The market framework of densification involves interactions between planning systems, private sector actors, and market-based mechanisms. The degree to which purely market-based interventions dominate densification efforts depends on the legal, economic, and social context of a given city or commune. Depending on the specifics of the project and local conditions, project can be financed in various models.

In Poland, property law is strongly protected by the Constitution and other regulations, which means that densification of buildings requires the consent of the owners. However, in the centres of large cities, there is fragmentation of ownership, which makes it difficult to implement larger densification projects. This often requires lengthy negotiations or land purchases by investors.

The real estate market mechanism and densification projects can be implemented using practices:

- Local authorities develop local spatial development plans, setting development limits and intensification,
- Local governments issue decisions on development conditions in places without local spatial development plans, which provides great flexibility but also leads to chaotic development,
- Urban development agreements – as part of the spatial planning reform, the urban planning agreement tool was introduced – an agreement between the commune and the investor that allows for the expansion of public infrastructure (e.g. schools, greenery, communication) as part of a private investment. Many cities still lack examples of signed and implemented agreements – the tool is new and requires refinement of procedures. Cities fear legal conflicts and difficulties in enforcing conditions. The urban planning agreement can counteract the negative effects of densification by including investors in the costs of social infrastructure, but it provides an opportunity for better integration of housing development with public services – if it is effectively implemented,
- Commercial investments in public-private partnership (PPP) – this is a formula thanks to which local governments and other public entities can implement investments. Commercial investors see the opportunity to generate profits by developing plots of land in central locations. It allows for the effective delivery of public services, based on the infrastructure created as part of the project.

In Poland, densification processes are most often initiated by the real estate market, not by a coherent, long-term planning policy. They are particularly visible in the largest cities, where the increase in land value stimulates investment pressure. Market dominance is balanced by the participation of local governments and public funds.

Over the last two decades, the real estate market in Poland has undergone significant changes, closely linked to the processes of gentrification and densification of development, which is particularly visible in large cities.

Gentrification is visible in Warsaw, Łódź and Gdańsk, among others. This phenomenon leads to changes in their character, social structure and local infrastructure. Investments in revitalization and development of infrastructure play a key role here, but this process often results in an increase in real estate prices and living costs, leading to the displacement of previous residents with lower incomes (Jakóbczyk-Gryszkiewicz et al., 2017).

Densification of development is another trend in Polish cities. It particularly concerns estates built in previous decades, which are subject to modernization and densification. The aim of these activities is to use urban space more effectively, but without proper planning they can disrupt the original urban layout and social ties. These processes are part of broader urban changes in Central and Eastern Europe. Research shows that the pace and nature of gentrification depend not only on globalization and liberalization of the economy, but also on local conditions - historical development and state policy. In post-communist cities/countries, the so-called gentrification of newly built housing estates often occurs, which differs from

classic gentrification. This is a specific mechanism driving the growth of real estate values and profits on the housing market, closely linked to the development of financial and credit markets. State actions are of key importance in this process (Holm et al., 2015).

The development of the real estate market in Poland is strongly linked to the financial situation. The increase in the availability of mortgage loans in 2004-2008, driven by low interest rates and the liberalization of the banking sector, contributed to the dynamic growth of housing prices. The financial crisis in 2008 caused a slowdown, but in 2014-2020 a strong increase in real estate prices was noted again, which was the effect of, among others: low interest rate policy, which increased the availability of mortgage loans, foreign investment and speculative purchases of real estate, development of the rental market, including the so-called "flipping" of apartments, i.e. their quick purchase, renovation and sale at a profit (Adamkiewicz, 2016; Czerniak et al., 2021).

In the Polish context, urban regeneration processes are increasingly shaped by the strong influence of private investors, especially developers who play a key role in defining development priorities and shaping urban space. Urban development is no longer understood as a process of rebuilding local potential and adapting to new civilization challenges but is increasingly becoming a mechanism for "reclaiming" land with high investment potential (Markowski, 2023). The strong position of developers on the housing market translates into a significant influence on shaping spatial policy and densification processes. Through relations with political parties and participation in legislative work on spatial planning and development, the developer lobby often pushes for solutions that facilitate investment. As a result, planned changes to regulations may limit the tools for protecting the public interest and reduce the availability of housing due to cooperation with banks.

Market-led densification in Poland exerts influence on national legislation through well-organized developer, that advocate for streamlined administrative decisions and reduced regulatory constraints. These groups fund research and commission policy papers urging amendments to spatial planning law, framing looser regulations as necessary to alleviate Poland's persistent housing shortage. In turn, Poland adopted these proposals, enacting *lex specialis* laws that relax zoning and procedural requirements, often bypassing detailed local spatial plans. Consequently, Poland's spatial-planning framework increasingly reflects market-led priorities, tilting the balance of power toward developers at the expense of local comprehensive planning (Havel, 2022; Havel & Zaborowski, 2025; Polanska, 2014).

The processes of gentrification, densification of buildings and financial policy interpenetrate each other, influencing the shape of the real estate market in Poland. On the one hand, they support the modernization of cities and the growth of real estate values, but on the other hand, they lead to an increase in the cost of living and speculation on the housing market. State policy, including regulations on loans, the rental market and spatial planning, will be of key importance in the coming years.

6.4 The multilevel governance process

The governance of densification policy in Poland involves a complex, multi-level framework, in which roles and resources are shared between national, regional and local levels. These levels

coordinate different strategies, with potential trade-offs between densification and housing availability. The nature of densification processes in Poland reflects interactions between authorities as well as different stakeholders, including private investors, citizens and urban planners. Policy management is carried out by different actors who have specific goals at different levels and types (Table PL11).

Actor	Type	Level	Roles	Effects	Coordination Dynamics
Ministry of Development and Technology	Public	National	Regulations of policy frames.	Initiated major spatial planning reform in 2023, enabling better land-use planning and densification.	Often poorly coordinated with sectoral ministries. Top-down approach with limited feedback from local level.
Voivodeships Offices	Public	Regional	Develops regional spatial development plans.	Limited influence on densification due to weak enforcement of regional plans.	Weak vertical coordination with municipalities.
Local authorities	Public	Local	Responsibility for local urban planning - determination of development conditions and preparation of local spatial documents Implementation of housing strategies, public space projects, and implementation of infrastructural investments.	Direct impact on urban planning, development conditions, and investment approval; local tax revenues; public-private partnerships (PPP); and urban development agreements	Often under pressure from developers; dependent on fiscal income from property tax.
Social housing managers	Public	Local	Management of social housing projects and municipal housing resources.	Implemented limited densification in degraded areas (e.g. via SIMs), but small-scale and underfunded.	Weak integration with spatial planning; lack of long-term coordination with private developers or regeneration programmes.
Private developers	Private	National/ Regional/ Local	Invest in residential and commercial real estate projects.	Strong driver of high-density housing (e.g. in Warsaw's Wola). Prioritize profit over urban quality and affordability.	Often dominate local planning processes; exert influence via land ownership and lobbying. Conflict

Actor	Type	Level	Roles	Effects	Coordination Dynamics
					with social housing goals.
Banks and financial institutes	Private	National/ Regional/ Local	Provide financing for construction and buyers.	Support densification by financing large residential projects.	Aligned with developers; no strong coordination with public policy goals (e.g. affordable housing).
NGOs	Civil Society	Local	Monitor policy impacts and lobby for inclusive urban policies.	Active in bigger cities like Warsaw (Miasto Jest Nasze); lobby against over-densification and gentrification.	Often in conflict with developers or passive municipalities. Limited formal role but increasing visibility.
Citizens and local communities	Civil Society	Local	Participate in public consultations.	Protest against high-density projects; low trust in planning system.	Often excluded from real influence; participation frequently symbolic. Conflictual relations with both public and private actors.

Table PL11. Actors involved in densification governance in Poland

Source: own elaboration.

Multilevel governance of densification strategies in Poland aims to balance economic, environmental and social priorities. However, the tensions between financial benefits for key players and compact urban growth require careful coordination of policies and cooperation between actors at all levels.

Horizontal governance involves collaboration among municipalities, sectors, or stakeholders at the same administrative level to ensure cohesive planning and resource sharing. In practice, densification in Poland is challenged by weak vertical integration, national goals promoting compact development are not always supported by local land-use plans or administrative capacity. For example, some municipalities continue issuing permits for scattered housing despite national policies advocating for containment of sprawl. Meanwhile, horizontal coordination is limited.

6.5 Achievements, assessments, and challenges

Among the main achievements of densification in Poland are the reform of the spatial planning system in 2023, which implemented new regulations supporting densification projects. The adoption of the **National Urban Policy 2030** focused on addressing problems with inefficient use of urban spaces and proposing programs to reduce issues in cities. Additionally, revitalization projects have been implemented in post-railway and post-industrial areas in degraded parts of cities, supporting the renewal of urban spaces by creating multifunctional areas that enhance the quality of life and functionality (Table PL12).

Impact area	Measured Impacts	Potential impacts
Efficient use of space	Rational use of already built-up urban areas through the revitalization of degraded post-industrial areas. Examples: New Center of Łódź, revitalization of post-mining areas in Katowice	The National Urban Policy encourages the efficient use of urban land, helping to maximize space in already developed urban areas through the strategies contained in this document. Regeneration projects aim to reuse abandoned or underutilized land, promoting a more efficient urban layout.
Multifunctionality	Examples of revitalization of the post-shipyard areas show that spaces combining housing, services and recreation are being created there. Examples: "Young City" [Młode miasto] – revitalization of approx. 73 ha of post-shipyard areas in Gdańsk	Regeneration of post-industrial and post-rail areas focuses on creating multifunctional spaces with improved quality of life.
Quality of life	As a result of densification projects with multi-family housing and services in cities, access to housing, work and public spaces in city centres has improved Examples: Powiśle Power Plant [Elektrownia Powiśle] in Warsaw, Fusion Complex in Łódź	Densification through mixed-use development can improve the quality of life in city centres by offering better access to housing, jobs, public spaces and amenities.
Increasing financialization	The "Apartment Plus", "Apartment for Young" and other programmes have led to an increase in the number of rental apartments targeted at middle- and low-income groups as a result of increased investment pressure. Results: A total of 3,468 premises were built in 18 cities, most of them in Katowice (513) and Kraków (481) ¹⁶⁵ .	The Apartment Plus ['Mieszkanie Plus'] project aims to increase the number of apartments for rent at moderate rents, focusing on low- and middle-income groups. The reform of the spatial planning system encourages higher-density development on public land, potentially improving affordability through new opportunities for financing and implementing public investments.
Green space availability	Urban Policy points to the need for better management of urban spaces, which can be seen, for example, in projects to revitalize parks and create green public spaces in many Polish cities.	The National Urban Policy proposes better management of urban spaces, encouraging a balance between green areas and development zones.

¹⁶⁵ <https://bank.pl/mieszkanie-plus-ile-udalo-sie-wybudowac-przez-7-lat/> [Last access on: 03.06.2025]

Impact area	Measured Impacts	Potential impacts
		Revitalization projects include greening urban spaces, mitigating the loss of public green areas in degraded zones.

Table PL12. Impacts of densification policies on housing inequalities in Poland

Source: own elaboration.

Densification policies in Poland, as elsewhere, present both opportunities and challenges. Measured effects show that densification has improved the quality of space but also led to higher housing prices and reduced green areas. Potential future effects suggest that densification may either mitigate or exacerbate housing inequalities, depending on how policies are designed and implemented. In recent years, growing disparities in access to and affordability of housing have prompted policymakers in Poland to seek remedies that promote greater spatial and social equity. While market-driven development has dominated urban development since the early 1990s (Ogrodowczyk & Marcińczak, 2021), several public policy instruments have emerged to counteract its exclusionary effects. These policies aim to moderate land speculation, expand access to affordable housing, and ensure more efficient urban regeneration (Table PL13).

Instrument	Type	Description	Potential for Reducing Inequality
TBS (Social Housing Associations)	Social rental housing	Public-private model delivering below-market rental units for middle-income groups.	Moderate to high – offers tenure stability for non-wealthy households.
Housing Cooperatives (pilot initiatives)	Cooperative housing	Community-based models offering shared ownership or long-term leases.	High, if legal and financial barriers are addressed.
Municipal revitalization programs	Integrated urban policy	EU-funded revitalization combining building upgrades with social services.	Moderate – needs strong social safeguards to protect vulnerable residents.
SIM (Social Housing Initiatives)	Public-Private Partnerships	Affordable housing developments on public land led by local governments and BGK.	High – good potential if kept affordable and insulated from market pressures.
Local plan of developments	Land Use Regulation	Local land of developments that set development rules, limit building intensity, and protect public spaces.	Can support spatial equity if used to protect affordable areas and promote mixed-income neighbourhoods.
Land Value Capture [Opłata Planistyczna]	Fiscal Tool	Captures part of increased land value after zoning changes for public reinvestment.	High if revenues are used for affordable housing or community facilities.

Table PL13. Policies and tools to correct housing inequalities in Poland

Source: own elaboration.

Although the housing system in Poland is still largely based on market mechanisms, selected public policies, such as social housing programmes, cooperative initiatives and regulatory tools, show the potential to mitigate spatial and socio-economic inequalities. However, to ensure that these reforms effectively balance the goals of density with housing affordability and social integration, careful planning and ongoing coordination at local, regional, and national levels will be necessary.

Densification in rural Poland is a promising but under-implemented approach to sustainable rural development. While national strategies promote more compact rural settlement forms, structural barriers, such as weak planning capacity, fragmented land ownership, and demographic decline, limit practical achievements. In many rural areas, especially in eastern and northern Poland, population decline results in vacant or underused buildings, making densification less urgent or economically viable. For densification to succeed, targeted incentives, enhanced local planning capacity, and community engagement are essential.

7 Summary and discussion of results

7.1 Summary of changes in EEP

Environmental and energy policies (EEPs) in Poland have evolved significantly in recent years, driven by EU directives, environmental concerns, and energy security goals. Initially focused on meeting EU energy targets, Poland has gradually shifted toward more comprehensive policies aimed at reducing carbon emissions and improving energy efficiency across residential, industrial, and public sectors.

The changes introduced from 2016 by the *Act on energy efficiency* are aimed at optimizing energy consumption and improving conditions for the development of new energy services. They are therefore consistent with the assumptions of climate and energy policy. Environmental objectives and projected energy deficits related to the growing demand for energy in Poland translate into the need to both optimise energy consumption and introduce measures aimed at maximising energy savings. The new regulations allow obligated entities to implement non-repayable subsidy programs to co-finance projects involving the connection of end users to the heating network or the replacement of heat sources. This solution also speeds up the process of modernizing individual heat sources.

In Poland, around 10% of the population consists of energy-poor households that are unable to properly heat and light their homes or use electrical appliances. The most common causes of energy poverty include low energy efficiency of buildings and heating systems, high energy costs, and low incomes (Sokołowski & Frankowski, 2021).

The Polish energy sector is undergoing a significant and dynamic transformation. There is a noticeable disparity between the expectations of stakeholders, current industry practices, and regulatory requirements, highlighting the challenges and complexities of this transition. Poland shall update its energy efficiency policies for the residential building sector and increase all relevant stakeholders' preparedness. The *Directive on the energy performance of*

buildings recast in 2024 promotes equal access to financing for energy-poor citizens and social housing while considering affordability (Attia et al., 2022).

Key changes include the introduction of programs like "*Clean Air*" to subsidize building retrofits, stricter energy performance standards for new constructions, and expanded use of renewable energy sources. Poland has serious international obligations in the field of environmental protection, including combating climate change and limiting emissions of pollutants that can travel long distances into the air, which require it to systematically and significantly reduce emissions of carbon dioxide, nitrogen oxides, dust and other substances characteristic of energy using fossil fuel resources.

Due to the *Energy Policy of Poland until 2040 (2021)* in 2040, more than half of the installed capacity will be zero-emission sources. A special role in this process will be played by the implementation of offshore wind energy into the Polish power system and the launch of a nuclear power plant. In parallel to large-scale energy, distributed and civic energy will develop – based on local capital. The transformation also requires increasing the use of renewable energy technologies in heat generation and increasing the use of alternative fuels in transport, also through the development of electromobility and hydromobility.

In Poland, economic factors such as the availability of EU funding and national subsidies (e.g., the Clean Air Programme) significantly shape the design and implementation of EEPs, often prioritizing cost-effectiveness over social equity. Normative influences, including growing public awareness of air pollution and climate change, have increased pressure on policymakers to adopt greener solutions, although uptake remains uneven across regions. Institutionally, a fragmented governance system, where responsibilities are split between national ministries and under-resourced local governments, often hampers coherent policy execution. Contextual factors such as the legacy of coal dependence, aging housing stock, and regional disparities further complicate the local adaptation of national EEPs. As a result, while Poland has made progress in formalizing energy efficiency goals, actual outcomes vary widely depending on local capacity, infrastructure, and socio-economic conditions.

The evolution of EEP in Poland has been shaped by complex socio-economic and institutional dynamics, influencing housing inequalities across the country. A delicate balance exists between market forces and institutional interventions within Poland's housing and energy sectors. While the market largely dictates housing supply and demand, public policy tools such as subsidies, grants, and incentive programs aim to mitigate inequalities by making energy efficiency retrofitting more affordable. However, these tools have uneven reach and impact, highlighting ongoing tensions between profit-driven housing provision and socially oriented policy goals.

Local authorities occupy a pivotal position in translating national EEP goals into practice. Nevertheless, their role is constrained by insufficient financial resources, reducing their capacity to effectively address housing inequalities rooted in energy inefficiency. Enhancing empowerment and support for local governments is critical to improving policy outcomes at the ground level. Coordination challenges remain a persistent obstacle. There is often a misalignment between national objectives for energy efficiency and local implementation capacities, compounded by weak integration between energy policies and affordable housing

strategies. These contradictions and sectoral conflicts reduce the effectiveness of both housing and energy programs, particularly when governance structures fail to provide clear coordination mechanisms. While national-level evidence on such conflicts may be limited, local case studies reveal tangible struggles in harmonizing goals.

Spatially, the impact of EEPs and housing policies varies across territorial scales. Urban areas often face rising housing costs linked to retrofitting requirements, potentially exacerbating affordability problems. Conversely, rural areas struggle with limited access to energy efficiency programs and financial support, deepening regional inequalities. More detailed spatial analysis is needed to understand these differential effects fully. In response, Poland has begun adopting corrective and innovative measures aimed at reducing housing inequalities. These include energy performance labeling, targeted retrofitting grants, and programs specifically focused on disadvantaged communities. Despite their promise, these initiatives still face challenges in reaching the most vulnerable groups, particularly low-income households who may lack the resources or knowledge to benefit fully.

In summary, while Poland's EEP landscape reflects growing recognition of the need for energy-efficient and equitable housing, significant gaps persist in balancing economic, institutional, and spatial factors. Strengthening local governance, improving policy coordination, and tailoring interventions to vulnerable populations are essential steps toward achieving more inclusive and effective energy efficiency outcomes in housing.

7.2 Relations and trade-offs between EEPs and housing policies

In Poland, the relations and trade-offs between EEP and housing policies are shaped by the need to balance energy efficiency improvements with housing affordability and accessibility. EEPs focus on reducing energy consumption and carbon emissions, often through retrofitting initiatives supported by government programs. The trade-offs arise from the tension between implementing ambitious EEPs and addressing social concerns like energy poverty and housing quality. While retrofitting programs aim to lower long-term energy costs, they often require subsidies or financial incentives to avoid excluding vulnerable populations. Balancing these priorities requires coordinated policies that align energy efficiency goals with broader housing and social welfare objectives.

In Poland housing policies increasingly support the integration of renewable energy technologies like solar panels, heat pumps, and electric vehicle charging stations, aligning with broader EEP goals. Moreover, housing policies intersect with EEPs in addressing energy affordability. Subsidies or incentives for energy efficiency upgrades help households, especially low-income ones, reduce energy bills.

While retrofitting existing settlements to meet EEP goals may be environmentally preferable, it can be more expensive than demolishing, and rebuilding, especially in areas rich in industrial buildings, creating challenges for policymakers balancing costs and sustainability. Subsidies for energy-efficient housing can encourage green development but may distort housing markets, driving up costs in certain areas. Additionally, housing policies focused on expanding supply sometimes prioritize quantity over quality, resulting in energy-inefficient developments

that conflict with EEP goals. Balancing these policies requires coordinated planning to ensure that energy efficiency improvements do not inadvertently exacerbate housing inequalities.

Improving housing conditions is a necessary condition for a just transformation of the energy sector in Poland. Reducing energy consumption and emissions without losing the quality of living conditions should be the overarching assumption of decarbonizing the economy. It is reasonable to maintain or increase funds earmarked for renovation of municipal housing stock, as well as to provide compensation for higher energy expenditure among the poor (Sokołowski & Frankowski, 2021).

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10 List of abbreviations

AUUs	Assigned Amount Units
EEA	European Economic Area
EEPs	Environmental and Energy Policies
EPBD	Energy Performance of Buildings Directive
EPP2040	Energy Policy of Poland until 2040
EU	European Union
HEMS	Home Energy Management System
EMS	Energy Management System
ERDF	European Regional Development Fund
KP	Kyoto Protocol
NBS	Nature Based Solutions
NEP2030	National Environmental Policy 2030
NFEPWM	National Fund for Environmental Protection and Water Management
NUP2023	National Urban Policy 2023
NUP2030	National Urban Policy 2030
PLN	Polish Zloty
PPP	Public-Private Partnership
PV	Photovoltaics
TPA	Third Party Access
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change

11 Annex

EUROPEAN LEVEL		
2002	Energy Performance of Buildings Directive (EPBD) https://eur-lex.europa.eu/eli/dir/2002/91/oj/eng	The 2002 EPBD did not impose common, precise numerical targets. It required each Member State to develop a national methodology for calculating the energy performance of buildings. It required members states to set national minimum requirements on the energy performance of new buildings and only existing buildings with a total useful floor area over 1000 m² that are undergo major renovation¹⁶⁶. Member States may decide not to set or apply the requirements for the residential buildings (new and existing) which are intended to be used less than four months of the year.
2010	EPBD revision https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32010L0031	The 2010 EPBD did not impose common, precise numerical targets but it included some changes with respect to the 2002 version. It established mandatory national minimum requirements on the energy performance of new buildings and only existing buildings that are undergo major renovation, regardless of their surface area. Mandatory national minimum requirements have to be updated every five years and are set with a view to achieving cost-optimal levels Member States shall ensure that: by 31 December 2020, all new buildings are nearly zero-energy buildings; and after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings Member States may decide not to set or apply the requirements for “<i>residential buildings which are used or intended to be used for either less than four months of the year or, alternatively, for a limited annual time of use and with an expected energy consumption of less than 25 % of what would be the result of all-year use</i>”.
2012	Energy Efficiency Directive (EED) https://eur-lex.europa.eu/eli/dir/2012/27/oj/eng	The 2012 EED set out a number of energy efficiency targets, referring not only to the residential or building sector but more broadly to all sectors.

¹⁶⁶ According to the Directive: “Major renovations are cases such as those where the total cost of the renovation related to the building shell and/or energy installations such as heating, hot water supply, air-conditioning, ventilation and lighting is higher than 25 % of the value of the building, excluding the value of the land upon which the building is situated, or those where more than 25 % of the building shell undergoes renovation”

		The EU aimed to reduce energy consumption by 20% by 2020. Each Member State was required to set indicative national energy efficiency targets. Member States also had to renovate each year at least 3% of the total floor area of centrally owned public buildings.
2018	EPBD revision https://eur-lex.europa.eu/eli/dir/2018/844/oj/eng	Each Member State shall establish a long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, into a highly energy efficient and decarbonised building stock by 2050, facilitating the cost-effective transformation of existing buildings into nearly zero-energy buildings, in particular by an increase in deep renovations. The long-term renovation strategy shall include indicative milestones for 2030, 2040 and 2050, and specify how they contribute to achieving the Union's energy efficiency targets in accordance with Directive 2012/27/EU.
2023	EED revision https://eur-lex.europa.eu/eli/dir/2023/1791/oj/eng	2023 EED defines higher targets for energy efficiency and introduces the "Energy-efficient first principle" as a key element, meaning that energy efficiency must be prioritised by member states across all policy and investment decisions Public bodies at national, regional and local level should fulfil an exemplary role as regards energy efficiency. Each Member State shall ensure that at least 3 % of the total floor area of heated and/or cooled buildings that are owned by public bodies is renovated each year to be transformed into at least nearly zero-energy buildings or zero-emission buildings Member States shall establish and achieve a share of the required amount of cumulative end-use energy savings among people affected by energy poverty, vulnerable customers, people in low-income households and, where applicable, people living in social housing
2024	EPBD revision https://eur-lex.europa.eu/eli/dir/2024/1275/oj/eng	2024 EPBD objective is the reduction of greenhouse gas emissions from buildings within the Union, with a view to achieving a zero-emission building stock by 2050 Member States shall establish a national building renovation plans that also includes a roadmap with targets and indicators, including the reduction of the number of people affected by energy poverty. Member states must implement measures to reduce average primary energy consumption of the national residential building stock by at least 16% compared to 2020

		by 2030; and by at least 20-22% compared to 2020 by 2035. Member States shall ensure that at least 55 % of the decrease in the average primary energy use referred to in the third subparagraph is achieved through the renovation of the 43 % worst-performing residential buildings
NATIONAL LEVEL - POLAND		
2014	Act on the Energy Performance of Buildings	It introduces the obligation to issue energy performance certificates for buildings and requirements for energy standards, including nearly zero-energy buildings. It establishes a central register of energy certificates. The aim is to improve the energy efficiency of buildings and reduce CO ₂ emissions.
2016	Act on Energy Efficiency	It introduces a system of white certificates, which allow entities meeting certain requirements (e.g. conducting an energy audit) to obtain property rights. It supports investments in energy efficiency, improving both economic development and benefits for citizens.
2019	National Energy and Climate Plan	It sets out Poland's goals for reducing greenhouse gas emissions, increasing the share of renewable energy sources and improving energy efficiency by 2030. The plan is the basis for the national climate and energy policy and contains measures to achieve these goals.
2021	Energy Policy of Poland until 2040 (EPP2040)	Long-term strategy defining the directions of Poland's energy transformation, including increasing energy efficiency, developing renewable energy sources and reducing emissions. It indicates actions aimed at adapting the construction and energy sectors to EU requirements.

NATIONAL REPORT ON THE REGULATORY SYSTEM OF EEPs IN SPAIN

1 Executive summary

Spain's retrofitting initiatives have been heavily influenced by EU regulations, particularly the Energy Performance of Buildings Directive (EPBD) and the Energy Efficiency Directive (EED). The introduction of the Technical Building Code (CTE) and Climate Change and Energy Transition Law (2021) set minimum energy performance standards, while programs such as PREE (Programa de Rehabilitación Energética de Edificios) and tax incentives have provided financial support for energy renovations. However, disparities persist in regional implementation, and there is evidence that retrofitting can contribute to gentrification, making housing less affordable for lower-income residents.

Spain's adoption of NBS has evolved through a combination of national legislative frameworks, municipal initiatives, and EU funding. Key regulatory drivers include Law 33/2015 on Natural Heritage and Biodiversity and the National Strategy for Green Infrastructure, Connectivity, and Ecological Restoration (ENIVCRE). Funding is primarily sourced from EU mechanisms such as the European Regional Development Fund (ERDF), Next Generation EU, and LIFE program. Cities like Barcelona and Vitoria-Gasteiz have implemented ambitious greening initiatives, improving biodiversity, reducing the urban heat island effect, and enhancing stormwater management. However, green gentrification has been a growing concern, as these projects often lead to increased property values and displacement of lower-income residents.

Densification policies in Spain have been framed by the Urban Planning Law (2000), the Climate Change and Energy Transition Law (2019), and the Strategic Urban Agenda 2030. These efforts aim to curb urban sprawl, optimize land use, and improve public transit accessibility through transit-oriented developments (TODs) and compact city models. Financial incentives such as tax reductions, public-private partnerships (PPPs), and EU structural funds have been leveraged to promote high-density development. While densification has revitalized urban centers and improved environmental sustainability, challenges include rising property values, socio-economic displacement, and regulatory barriers at regional and municipal levels.

Spain employs a **multilevel governance** framework, with national ministries setting policy objectives, regional governments adapting strategies to local needs, and municipalities implementing projects. However, **fragmentation in governance, bureaucratic inefficiencies, and uneven regional capacities** have led to inconsistent policy implementation. In addition, while EU funding has been critical for these initiatives, its **distribution has been uneven**, favoring wealthier regions and well-funded municipalities.

Spain has made notable strides in environmental and energy policy through retrofitting, NBS, and densification policies. However, the **social consequences** of these initiatives, particularly

regarding affordability and displacement, require further attention. To enhance policy effectiveness and equity, Spain must improve governance coordination, expand financial support mechanisms for vulnerable populations, and ensure that sustainability efforts do not exacerbate socio-economic inequalities.

2 Introduction and methodology

As environmental and energy transitions accelerate under mounting ecological and geopolitical pressure, the question is no longer if transformation will happen – but how, for whom, and at what cost. Spain, like other EU member states, faces binding obligations to decarbonize its building stock, expand green urban infrastructure, and contain urban sprawl. This report aims to trace how climate and environmental policies – often designed at EU or national levels – take shape within the specific institutional, territorial, and housing context of Spain. It looks at how policies travel, adapt, and collide with existing systems of tenure, governance, and inequality.

The report draws on a structured document analysis of Spanish and European energy and environmental policy frameworks, focusing on how these intersect with housing systems. The research approach centers on identifying and interpreting the institutional logics, policy tools, and governance arrangements shaping three core domains – energy retrofitting, nature-based solutions (NBS), and urban densification.

The analysis draws on official documents across multiple levels, including EU directives (e.g., EPBD, EED), national frameworks (e.g., NECP 2021–2030, Climate Change and Energy Transition Law, CTE and Royal Decrees), and municipal strategies (e.g., Barcelona’s Nature Plan, Valencia’s Smart City strategy). These were complemented by implementation guidelines (such as PREE criteria and IDAE reports), as well as selected academic literature and civil society publications.

To supplement the document analysis, the research also incorporated qualitative data from 10 semi-structured expert interviews (see table 1) and one multi-stakeholder policy lab (see table 2). Interviews were conducted with professionals from public administration, housing agencies, NGOs, and research institutions, each lasting approximately one hour. Interviews were recorded, transcribed, and analyzed using an open coding process to identify emerging themes aligned with the five framing dimensions. The policy lab brought together actors from government, academia, and civil society to discuss barriers and enablers to climate-oriented housing policy, and provided insights into the dynamics of implementation, collaboration, and contestation at the urban level.

The analysis followed a qualitative thematic approach (Clarke & Braun, 2014; Bowen 2006) guided by five framing dimensions – the policy cycle, implementation mechanisms, market dynamics, multilevel governance, and socio-spatial impacts. Documents were read and annotated to identify how institutional actors, tools, and funding aligned with these dimensions, drawing on principles of document analysis and interpretive policy research (Yanow, 2000). timelines were constructed to trace the institutionalization of policies and their transposition from EU to national and local levels. Descriptive quantitative data (e.g., energy savings targets,

investment levels, housing stock characteristics) were used to support interpretation, but no formal modelling was undertaken. The document-based approach allows for a detailed mapping of institutional developments and policy instruments. However, the analysis is limited by the uneven availability of disaggregated socio-economic data, particularly at the regional and local levels.

This mixed-method approach enabled a grounded understanding of institutional developments, while also bringing in the perspectives of stakeholders involved in policy design and implementation. However, the analysis remains limited by the small number of interviews and regional scope of the policy lab, which may not capture the diversity of experiences across Spain. Findings are therefore interpretive and exploratory, but enriched by direct insights into institutional dynamics, coordination challenges, and on-the-ground realities.

Institution Represented	Date and place	Time and duration of interview
Ecodes - Fundación Ecología y Desarrollo	7 th March 2025,	16h00, 1 hour 45 minutes
Instituto de Investigación Tecnológica, Universidad Pontificia Comillas	26 th March, 2025	12h00, 1 hour
Alianza contra la Pobreza Energética	2 nd April, 2025	16h30, 1 hour
Ecoserveis	16 April 2025,	12h30, 1 hour
Generalitat de Catalunya, Departament de Drets Socials i inclusió, Programa de suport a l'abordatge integral de la pobresa energètica	16 th April, 2025	10h00, 1 hour
Institute for Human Rights and Business	16 th April, 2025	17h00, 1 hour
Incasól - Institut Català del Sòl	11 th April, 2025	12h00, 1 hour
Ajuntament de Barcelona	11 th April, 2025	10h00, 1 hour
Plan Estratégico Metropolitano de Barcelona	25 May, 2025	13h00, 1 hour
Diputació Barcelona	4 th June, 2025	10h00, 1 hour

Table ES1. Information of interviewees for semi-structured interviews.

Institution Represented
NASUVINSA, empresa pública de suelo industrial, vivienda y cohesión territorial del Gobierno de Navarra
Instituto Municipal de la Vivienda y Rehabilitación de Barcelona
Institute for Human Rights and Business
Plan Estratégico Metropolitano de Barcelona (PEMB)
Celobert (cooperative)

Hidra, Institut de Recerca Urbana de Barcelona
Incasól - Institut Català del Sòl
asesor del Ministerio de Vivienda y Agenda Urbana (MIVAU)

Table ES2. Institutions represented in policy lab.

3 General governance system

Spain is a high-income country with a GDP of approximately €1.5 trillion, making it the fourth-largest economy in the European Union. The country has a population of around 47 million, with major urban centers such as Madrid, Barcelona, Valencia, and Seville experiencing rapid growth and housing pressures. Spain's housing market is characterized by high rates of homeownership (around 75%) but significant affordability challenges, particularly in urban areas where rental prices have surged due to demand-driven gentrification and short-term rental markets.

The Spanish governance system is a decentralized parliamentary democracy, where power is distributed across national, regional (autonomous communities), and local levels. The national government, led by the Prime Minister, is responsible for setting overarching policy objectives, particularly in energy efficiency, urban planning, and environmental sustainability. Spain's 17 autonomous communities have significant regulatory control over housing, urban development, and environmental policy, allowing for regionally tailored approaches to retrofitting, NBS, and densification. However, disparities in financial capacity between regions have led to unequal implementation of sustainability initiatives.

At the municipal level, city governments play a critical role in implementing housing retrofitting programs, green infrastructure projects, and urban density strategies. However, bureaucratic inefficiencies, governance fragmentation, and limited financial resources in some municipalities have hindered policy effectiveness. EU funding mechanisms, including the European Regional Development Fund (ERDF) and NextGenerationEU, have played a crucial role in supporting urban sustainability projects but have also been criticized for favoring wealthier, better-connected cities over smaller, economically weaker regions.

Governance Level	Housing Policy	Retrofitting	Densification	Nature-Based Solutions (NBS)
EU	Sets broad principles on housing rights (via social policy), provides funding (e.g., NextGenEU), but housing policy largely national.	Defines binding energy performance directives (EPBD, EED), co-finances retrofitting (e.g., ERDF, RRF).	Provides urban planning frameworks through cohesion policy; promotes compact cities via Green Deal.	Drives NBS via biodiversity strategies, Urban Greening Plans, and funding mechanisms (e.g., Horizon Europe).
National (Spain)	Defines legal housing frameworks (Ley de Vivienda), finances programs (e.g., Plan Estatal de Vivienda), sets rental subsidies.	Implements EU directives through Royal Decrees, manages PREE & NextGenEU funding, sets technical standards (CTE).	Coordinates national planning strategy (e.g., Urban Agenda), enables tax and zoning tools, guides TOD.	Sets national climate goals (e.g., NECP, PNACC), funds NBS through urban regeneration programs.

Regional (Autonomous Communities)	Manage housing stock, co-design housing programs with central gov, administer subsidies.	Adapt national frameworks to local context, administer retrofitting grants (PREE), engage technical staff.	Coordinate regional land-use planning, apply zoning incentives, support TOD via regional mobility strategies.	Support green space design in urban plans, align with biodiversity strategies, fund local green infrastructure.
Local (Municipalities)	Implement and manage public housing, issue building permits, enforce housing standards, collaborate with CSOs.	Coordinate applications for retrofitting, provide technical assistance to residents, run municipal schemes.	Issue local zoning plans, develop urban redevelopment projects, coordinate PPPs.	Design and maintain parks, green roofs, street trees; engage community in co-design; pilot Superblocks.

Table ES3. Governance competencies summary table (Spain)

4 Housing retrofitting

This section outlines the evolution of Spain's housing retrofitting policy, driven largely by EU directives such as the EPBD and EED. It traces a clear policy timeline and examines the layered implementation process, including financial instruments like PREE and tax incentives, regulatory mechanisms such as the Technical Building Code (CTE), and support tools like one-stop shops. The section also explores the role of multilevel governance and public-private partnerships in driving retrofitting, while acknowledging uneven market engagement and regional disparities. While the overall ambition has increased, especially since the NECP 2021–2030 and the post-COVID recovery plan, implementation remains uneven across regions and housing tenures. Wealthier autonomous communities and municipalities with stronger technical and institutional capacity have benefited more from funding and program access, while others face barriers to uptake. Retrofitting policies in Spain reflect both an expanding environmental agenda and persistent socio-territorial inequalities in how support is delivered and who receives it.

4.1 The policy cycle: emergence of the issue and policy decisions

Spain's approach to building energy efficiency and retrofitting has evolved through a series of national policies and the transposition of European Union (EU) directives. Below is a timeline, followed by a table, highlighting key milestones, actors, documents, and the influence of EU interventions on Spain's policy development in this area.

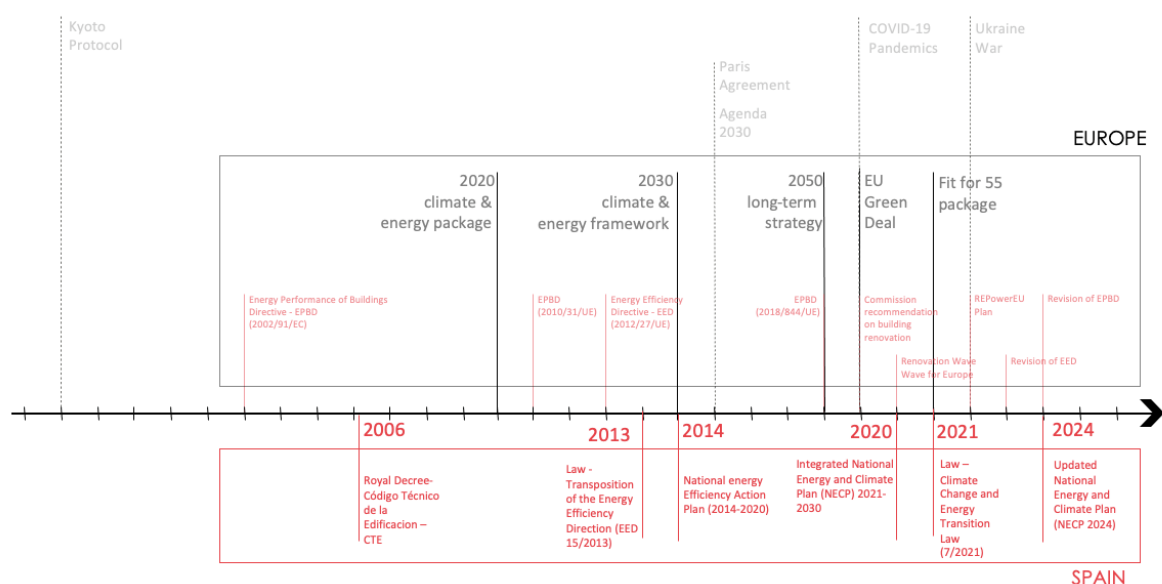


Figure ES1: timeline illustrating key policies and regulations in Spain (bottom part) and EU (upper part) affecting housing retrofitting (in red)

YEAR	MILESTONE / EVENT	ACTORS	KEY DOCUMENTS	EU INFLUENCE
2002	Adoption of the Energy Performance of Buildings Directive (EPBD) 2002/91/EC	EU	EPBD 2002/91/ec	Initiated EU-wide standards for building energy performance
2006	Implementation of the Technical Building Code (Código Técnico de la Edificación - CTE)	Spanish Government	Royal decree 314/2006	Transposed EPBD 2002/91/EC into national law, setting energy efficiency standards for new and renovated buildings.
2010	Recast of the EPBD (Directive 2010/31/EU)	EU	EPBD 2010/31/EU	Strengthened requirements for nearly zero-energy buildings and cost-optimal levels.
2013	Transposition of the Energy Efficiency Directive (EED) 2012/27/EU	Spanish government	Law 15/2013	Established measures to achieve energy savings across sectors, including buildings.
2014	Submission of the National Energy Efficiency Action Plan 2014-2020	Spanish government	National Energy Efficiency Action Plan 2014-2020	Outlined strategies to meet EU energy efficiency targets, focusing on building renovations.
2018	Amendment of the EPBD (Directive 2018/844/EU)	EU	EPBD 2018/844/EU	Emphasized long-term renovation strategies and smart

				technologies in buildings.
2020	Approval of the Integrated National Energy and Climate Plan (NECP) 2021-2030	Spanish government	NECP 2021-2030	Set national targets for energy efficiency and building renovations in line with EU goals.
2021	Enactment of the Climate Change and Energy Transition Law	Spanish Government	Law 7/2021	Aimed for carbon neutrality by 2050, with specific measures for building energy efficiency.
2023	Publication of the revised Energy Efficiency Directive (EU) (Directive 2023/1791)	EU	EED 2023/1791	Raised the EU's energy efficiency target, requiring member states to achieve an additional 11.7% reduction in energy consumption by 2030.
2024	Spain's updated National Energy and Climate Plan	Spanish Government	Updated NECP 2024	Increased targets for green hydrogen production and energy storage, reflecting ongoing commitment to EU energy efficiency objectives.

Table ES4. Table summarizing EU regulations transposed at national level (retrofit)

While national legislation defines the core regulatory framework, many implementation responsibilities—especially for grant programs like PREE—are delegated to Spain's autonomous communities. This decentralization has led to notable regional variation in uptake, administrative capacity, and retrofit outcomes (Agencia de l'Habitatge de Catalunya, n.d.; Ajuntament de Barcelona, n.d.).

The adoption of the Energy Performance of Buildings Directive (EPBD) 2002/91/EC by the European Union in 2002 marked a significant milestone in the drive to improve the energy performance of buildings across Europe. The directive required Member States to set minimum energy performance standards for new and existing buildings, laying the groundwork for future legislation aimed at reducing the carbon footprint of buildings and aligning with broader EU sustainability goals (European Parliament, 2000). In Spain, the EU's EPBD influenced the development of national legislation, notably through Royal Decree 314/2006, which set energy performance standards for buildings. This was Spain's direct response to EU-level pressures, marking the beginning of a strategic shift towards energy efficiency in buildings. The EU influence was strong, ensuring that energy-saving measures were integrated across Member States, creating a common framework for energy performance standards. A prime example of the directive's impact was seen in Spain's early energy efficiency renovations in public

buildings, where energy assessments and retrofitting measures were implemented to comply with the new regulations, improving insulation, heating, and cooling systems.

In 2006, Spain's government implemented the Technical Building Code (CTE), a national initiative heavily influenced by the EU's EPBD. This code set energy efficiency standards for new buildings and major renovations, ensuring that energy conservation measures were incorporated into the design, construction, and operation of buildings (BOE, 2021). The Spanish government adapted the EU framework to suit national needs, introducing detailed requirements for building insulation, heating, ventilation, and air conditioning systems. The CTE influenced various urban projects across Spain, particularly in Madrid and Barcelona, where new housing projects adhered to these energy performance standards, ensuring more sustainable development in line with EU guidelines (Ajuntament de Barcelona, n.d.).

The recast of the EPBD (Directive 2010/31/EU) in 2010 introduced stronger measures, including nearly zero-energy buildings (nZEB) and cost-optimal levels for energy efficiency in buildings. It required Member States to ensure that new buildings were nearly zero-energy by 2020, a directive that placed additional pressure on Spain to enhance its energy efficiency standards for both new constructions and renovations (European Parliament, 2020). Spain transposed these strengthened requirements into national legislation, particularly through updates to the CTE, further improving energy efficiency and the integration of renewable energy systems. This recast of the directive not only reinforced the EU's commitment to a greener future but also accelerated Spain's efforts toward achieving carbon neutrality.

In 2013, the Energy Efficiency Directive (EED) 2012/27/EU was transposed into Spanish law through Law 15/2013. The directive aimed to reduce energy consumption across all sectors by 20% by 2020, with a specific focus on improving energy efficiency in buildings. Spain's national energy efficiency action plan was shaped by this directive, outlining a clear strategy for retrofitting existing buildings and improving energy performance standards for new constructions. The EED influenced Spain's building sector by encouraging long-term energy savings, through measures such as the adoption of more energy-efficient heating systems, better insulation, and more sustainable energy sources. This included urban projects in Madrid and Seville, where old buildings were renovated to meet energy-saving requirements set out in the law. These measures applied not only to residential buildings but also to commercial and industrial sectors, ensuring widespread improvements in energy efficiency across various types of infrastructure.

In 2014, Spain submitted its National Energy Efficiency Action Plan (NEEAP) 2014-2020, detailing strategies to meet the EU's energy efficiency targets. This plan focused on reducing energy consumption in buildings, especially in the residential and public sectors, through targeted renovation programs and the introduction of new energy performance standards. The plan incorporated the guidelines provided by the EED, which influenced Spain's national policies on energy-saving measures in buildings. It also provided incentives for private sector retrofitting initiatives, helping Spain meet its ambitious energy-saving goals.

In 2020, Spain approved its Integrated National Energy and Climate Plan (NECP), aligning with the EU's Green Deal and the broader European climate and energy strategy. The NECP 2021-2030 set ambitious energy efficiency targets for Spain, including a 39% reduction in

energy consumption by 2030. This plan aimed to ensure that Spain's building sector was aligned with the EU's climate and energy goals by promoting energy-efficient renovations and integrating renewable energy systems into the building stock. The Spanish government's adoption of the NECP was a direct response to EU climate strategies and reinforced Spain's commitment to sustainability. Cities like Seville implemented renovation projects in line with the NECP, ensuring that both public and private buildings met the new energy efficiency standards.

The Climate Change and Energy Transition Law enacted by the Spanish government in 2021 reinforced these objectives, aiming for carbon neutrality by 2050. This law included specific measures for improving energy efficiency in buildings, especially in the context of renovations and the integration of renewable energy. It was heavily influenced by EU policies, such as the Green Deal and previous directives, particularly the EPBD and the EED. This law not only reflected Spain's commitment to the EU's energy and climate goals but also set national objectives for reducing the carbon footprint of the building sector. Real-world applications of the law were seen in Madrid, where public housing was retrofitted with renewable energy sources, energy-efficient technologies, and enhanced insulation to reduce carbon emissions and meet national and EU climate targets.

The revised Energy Efficiency Directive (EED 2023/1791) published by the EU in 2023 raised the energy efficiency target, requiring Member States to achieve an additional 11.7% reduction in energy consumption by 2030. While Spain is still adapting its policies to align with this revised directive, it signals the continued evolution of EU energy efficiency goals, pushing Spain to update its strategies and regulations to meet these more ambitious targets. As part of Spain's ongoing commitment to EU climate strategies, it will likely enhance its renovation efforts and energy performance standards to ensure compliance with the revised EED.

While retrofit policy in Spain is primarily structured around national frameworks such as PREE, it includes limited dedicated provisions for the public or social housing sector. Public housing represents a small portion of Spain's overall housing stock – having risen from only 2.5% to 3.4% according to the Minister for Housing and Urban Agenda, Isabel Rodriguez (La Moncloa, 2025) – and most retrofit incentives target privately owned dwellings or homeowners associations. Some regional and municipal actors – such as INCASOL in Catalonia or EMVS in Madrid – do implemented retrofit programs in public housing, but these efforts are not uniformly distributed and often depend on regional capacity, local priorities, and EU funding opportunities.

4.2 The implementation process

Spain's implementation of building energy efficiency policies has involved a multifaceted approach, incorporating legislative measures, financial incentives, and supportive programs. This process has been characterized by various tools, implementation structures, timelines, beneficiaries, territorial considerations, deadlines, and assessment mechanisms. Furthermore, this journey has encountered frictions, experiments, controversies, and conflicts as the country navigates its path toward a more sustainable building sector.



Regulatory tools

A central legislative tool driving Spain's building retrofit strategy is the **Climate Change and Energy Transition Law (Law 7/2021)**. This law establishes ambitious targets for carbon neutrality by 2050 and emphasizes the critical role of improving energy efficiency in the building sector. In practice, the law requires substantial investments in energy-saving measures and promotes the use of renewable energy sources within the built environment. The Spanish government has increasingly sought to align national laws with broader European Union goals, ensuring that energy retrofits are not just an internal policy focus but part of Spain's broader contribution to the EU Green Deal.

The Technical Building Code (CTE), established in 2006 and updated periodically, sets minimum energy performance standards for new and renovated buildings. This code enforces stringent guidelines on improving energy efficiency through insulation, heating systems, and the integration of renewable energy technologies. Over the years, these regulations have driven the construction of energy-efficient buildings and encouraged the retrofit of existing structures, aligning Spain's built environment with EU standards.

The Integrated National Energy and Climate Plan (NECP) 2021-2030 provides a decade-long roadmap for Spain's energy efficiency goals, including detailed strategies for building energy retrofiting. Regular assessment mechanisms are employed to monitor progress toward energy efficiency targets. These assessments include data collection and performance reviews to gauge the success of energy retrofiting projects and identify areas where further efforts are needed. Such reviews, primarily conducted by national bodies such as the Ministry for the Ecological Transition and Demographic Challenge (MITECO), the Spanish Office for Climate Change (OECC), the Institute for Energy Diversification and Saving (IDEA), and the National Statistics Institute (INE), have been particularly useful in adjusting policies to address emerging challenges and ensuring that Spain remains on track to meet its carbon neutrality targets.

Spain has also introduced extensive training and certification programs to ensure that professionals in the building sector are equipped with the skills necessary for implementing energy-efficient renovations. These programs focus on the latest energy-saving technologies, construction techniques, and the regulatory requirements set forth in the CTE and the Climate Change and Energy Transition Law. By certifying energy performance and ensuring that building professionals adhere to these standards, Spain is creating a skilled workforce capable of driving the energy efficiency agenda. One example of this is the growing demand for BREEAM and LEED certified professionals, who are increasingly sought after to ensure that retrofiting projects meet both energy and environmental standards.

Tool / Regulation	Type	Level	Objective
EPBD 2002/91/EC	EU Directive	EU	Establish minimum energy performance standards

Royal Decree 314/2006 (CTE)	National Code	National	Set national building energy standards
EPBD 2010/31/EU (Recast)	EU Directive	EU	Mandate nearly zero-energy buildings (nZEB)
Law 15/2013	National Law	National	Transposition of Energy Efficiency Directive (EED)
NECP 2021–2030	National Strategy	National	Align energy/climate actions with EU Green Deal
Law 7/2021	National Law	National	Establish long-term decarbonization goals
EED 2023/1791	EU Directive	EU	Raise efficiency target (11.7%) by 2030
Updated NECP 2024	National Strategy	National	Expand on renovation/digital energy management targets

Table ES5. Key Regulatory Tools

Financial tools

For instance, the **PREE (Programa de Rehabilitación Energética de Edificios) program**, which offers subsidies for energy renovation projects, has been instrumental in advancing retrofits across Spain. Co-funded by both national and EU funds, the program specifically targets residential and commercial buildings, providing financial incentives for property owners to undertake energy-efficient renovations. This initiative is particularly significant in areas with aging housing stocks, such as Barcelona and Madrid, where retrofitting efforts aim to reduce energy consumption while improving the overall comfort and sustainability of buildings. The PREE program reflects Spain's commitment to EU policies, demonstrating a clear alignment with the EU's objectives of achieving carbon neutrality and reducing energy consumption in the building sector.

Alongside direct financial support, **tax incentives** also play a critical role in encouraging building owners to invest in energy efficiency improvements. These tax deductions incentivize both private and public sector actors to undertake energy-saving renovations, further driving the energy retrofit agenda. In cities like Madrid, where the real estate market is dynamic, developers are encouraged to retrofit existing buildings to meet contemporary energy performance standards, leveraging tax benefits that lower renovation costs. These incentives help make energy-efficient retrofitting more attractive, particularly in an urban market

characterized by rising property values and limited space for new construction. However, critics point out that these tax incentives may disproportionately benefit wealthier property owners and developers, exacerbating inequalities if low-income communities lack the necessary capital to take advantage of these incentives.

Regional initiatives, particularly those driven by autonomous communities, further enhance the scope and impact of retrofitting efforts. In regions like Asturias, regional governments have established their own **subsidy programs** tailored to local needs, targeting energy efficiency improvements in both residential and commercial buildings. These regional initiatives are vital in addressing specific local challenges, such as housing inequalities and regional climate goals, while supporting national energy efficiency targets. Moreover, the decentralization of such programs allows for more effective and localized implementation, ensuring that subsidies reach areas where energy poverty and housing inequalities are most pressing.

EU funding mechanisms, such as the **European Regional Development Fund (ERDF)** and **NextGenerationEU**, have played a crucial role in supporting Spain's retrofitting initiatives, co-financing renovation projects and providing additional financial stability. These EU funds have been pivotal in assisting municipalities and regional governments to undertake large-scale energy retrofitting efforts, further reinforcing Spain's alignment with EU goals. However, critics argue that the distribution of these funds has not always been equitable, with wealthier regions often receiving a larger share, leaving poorer areas with fewer resources to invest in energy-efficient building renovations (Venner et al., 2024). As one respondent notes, who works as a regional implementation consultant, "muchos tecnicos de ayuntamientos pequenos ni se enteran de cuando salen las convocatorias," highlighting a procedural failure of communication between levels of government leading to a gap in knowledge-sharing and coordination.

Program / Tool	Type	Year Created	Funding Size	Level	Target / Purpose
PREE	National subsidy (EU-funded)	2020	€300M per call	National (via regions)	Retrofit 1.2M dwellings by 2030; building envelope and thermal systems
PREE 5000	National / EU-funded	2021	€50M	Small municipalities (<5,000 residents)	≥75% cost coverage for rural renovations; support in depopulated areas
NextGenEU – Component 2 (PRTR Housing)	EU Recovery Mechanism	2021	€6.8B (housing/urban)	National regional →	Renovate 1.2–1.4M dwellings; improve energy efficiency and comfort

DUS 5000	National / EU-funded	2021	€75M	Local	Support sustainable urban regeneration in small municipalities
IRPF Tax Deduction	National tax incentive	2021	Variable (individual-based)	National	20–60% deduction for retrofit works achieving target energy savings

Table ES6. Key Financial Tools

Support and information tools

To ensure the retrofitting process is as efficient as possible, Spain has established **one-stop shops**—dedicated centers where property owners can access **guidance, technical assistance, and information about available financial support**. These hubs aim to streamline the complex process of retrofitting by offering a centralized service for advice and funding applications. These one-stop shops have been essential in simplifying the retrofit process, making it more accessible to property owners and speeding up the uptake of energy-efficient renovation (Biere-Arenas and Marmolejo-Duarte, 2023).

Spain has also introduced **extensive training and certification programs** to ensure that professionals in the building sector are equipped with the skills necessary for implementing energy-efficient renovations. These programs focus on the latest energy-saving technologies, construction techniques, and the regulatory requirements set forth in the **CTE and the Climate Change and Energy Transition Law**. By certifying energy performance and ensuring that building professionals adhere to these standards, Spain is creating a skilled workforce capable of driving the energy efficiency agenda.

Another significant challenge is **public awareness and engagement with retrofit programs**. Despite the existence of robust financial support schemes and incentive programs, participation in these initiatives has often been lower than expected. This issue is compounded by a lack of outreach and communication strategies to inform property owners about the potential benefits of retrofitting. To overcome this, the Spanish government has launched **public awareness campaigns and information services** aimed at engaging citizens and encouraging greater participation in energy-saving programs since 2017. Nonetheless, ensuring broad public participation remains a critical challenge for Spain's retrofit strategy, as many homeowners are still unfamiliar with the process or may perceive the investment as too costly.

Regular **assessment mechanisms** are employed to monitor progress toward energy efficiency targets. These assessments include **data collection and performance reviews** to gauge the success of energy retrofitting projects and identify areas where further efforts are needed. Such reviews, primarily conducted by national bodies such as the **Ministry for the Ecological Transition and Demographic Challenge (MITECO)**, the **Spanish Office for Climate Change (OECC)**, the **Institute for Energy Diversification and Saving (IDEA)**, and

the National Statistics Institute (INE), have been particularly useful in adjusting policies to address emerging challenges and ensuring that Spain remains on track to meet its carbon neutrality targets.

Initiative / Platform	Level	Role	Target Group
Barcelona One-Stop Shop (Oficina de la Rehabilitació)	Municipal	Provide residents technical guidance and contractor access	Homeowners and homeowner associations
Municipal Technical Offices (various cities)	Municipal	Offer in-person assistance on subsidy access and eligibility	Citizens seeking retrofit support
National Housing Portal (Ministerio de Vivienda)	National	Centralized platform for policy info and funding opportunities	General public and applicants
Local Public Awareness Campaigns	Municipal / Regional	Disseminate info on energy retrofitting, rights, and support	Low-income and vulnerable residents

Table ES7. Support and Information Tools for energy retrofit

4.3 Size and role of the market

Spain's retrofitting market operates within a complex framework shaped by a blend of regulatory frameworks, financial mechanisms, and market-based interventions that collectively aim to enhance energy efficiency in buildings. This multi-faceted approach involves a combination of government-driven policies and private sector initiatives, providing a diverse array of tools and mechanisms to support the renovation of existing buildings and the promotion of energy-efficient technologies. Key elements of Spain's retrofitting market include **energy price regulation, financial support mechanisms, and market-based interventions** that encourage private sector participation and innovation.

In most cases, energy retrofitting works are delivered by **small and medium-sized enterprises (SMEs)**, typically local construction firms, installers, and energy service companies contracted by homeowners or building communities. The retrofit market remains **highly fragmented**, with uneven capacity across regions and no centralized delivery structure. This leads to variability in costs, timelines, and technical quality. While large firms occasionally lead public projects, **most renovation efforts rely on small-scale providers** working under time-limited aid schemes or local tender processes.

The Energy Service Companies (ESCOs) form a material part of the retrofit market in Spain, embedded within a broader €3 billion European ESCO sector generated through performance-based contracts. While Spain does not dominate this space, national assessments note a small but growing network of ESCOs providing retrofit services—particularly in the public sector and multi-unit buildings. However, data transparency on contract volume, firm capacity, and measurable energy outcomes remains limited (UNEP-DTU 2019).

In principle, ESCOs in Spain operate under the Energy Performance Contracting (EPC) model: they conduct energy audits, finance upgrades, and implement renovation works in exchange for a share of energy savings over time. This structure reduces upfront costs for clients while aligning incentives with long-term efficiency gains. Yet in practice, challenges remain—particularly the lack of standardised contract templates, barriers to third-party finance, and weak monitoring and verification systems (European Commission 2020).

A deeper structural barrier lies in Spain's **housing ownership model**, where a large share of the population lives in multi-unit buildings governed by **homeowners' associations** (*comunidades de propietarios*). These associations require a majority or qualified vote to approve renovations, making retrofit decisions slow and politically difficult — especially in buildings with mixed tenure, elderly residents, or financial disparities among owners. This collective governance structure discourages timely action and **complicates the business case** for retrofit companies, who face uncertainty in project approvals and payment timelines.

Energy price regulation

Energy Price Setting and Obligation Schemes play a key role in shaping the economic environment for retrofitting efforts. Spain's electricity market underwent significant reforms aimed at decoupling gas prices from electricity prices, reducing the volatility of energy costs and facilitating the integration of renewable energy sources. This reform became particularly important in 2022 when Spain and Portugal secured approval from the European Commission to cap gas prices at €50/MWh for one year, mitigating the impact of fluctuating gas prices on electricity costs. This intervention helped stabilize the energy market, making it more predictable for both consumers and companies investing in energy efficiency measures, such as retrofitting.

Energy obligation schemes

Alongside these reforms, Spain has implemented Energy Obligation Schemes, which require energy companies to meet specific energy savings targets. These obligations compel energy providers to invest in or promote energy-saving measures among consumers, including retrofitting residential and commercial buildings. By requiring energy companies to take responsibility for reducing energy consumption, Spain aligns with EU directives that mandate energy savings across various sectors, including the building sector. This creates a financial incentive for companies to engage in retrofitting initiatives that reduce energy use and promote (urban) sustainability.

Market-based interventions

Market-based interventions complement Spain's regulatory framework and financial incentives. One such mechanism is the Energy Efficiency Certificates (EECs) system, which allows energy providers and other obligated parties to meet their energy-saving targets by purchasing certificates representing verified energy savings. This market-based solution offers flexibility in how energy savings are achieved, incentivizing investment in energy-efficient technologies, including those used in building retrofitting. The EEC system promotes transparency and accountability, encouraging businesses to engage in retrofitting projects that generate verifiable energy savings. This market-driven approach is seen as an effective tool for meeting Spain's ambitious energy efficiency targets, contributing to the overall reduction in energy consumption.

In addition, Public-Private Partnerships (PPPs) have been instrumental in financing and implementing large-scale retrofitting projects in Spain. These collaborations allow the public sector to leverage private sector expertise and capital, driving the renovation of large numbers of buildings while ensuring that energy efficiency targets are met. Spain has seen notable successes in PPPs, particularly in the urban regeneration and retrofitting of old residential areas in cities like Madrid and Barcelona. These partnerships enable municipalities to take on ambitious retrofitting projects while mitigating financial risks, ensuring that both energy savings and social objectives, such as affordable housing, are prioritized.

Public-private collaboration in retrofit delivery remains limited, though some **Autonomous Communities and municipalities** have developed platforms or programs that engage private actors. For example, **Barcelona's "One-Stop Shop" (Oficina de la Rehabilitació)** offers residents technical assistance and connects them with certified companies, acting as a bridge between public subsidies and market implementation. These types of intermediaries are more common in wealthier regions with greater administrative capacity. However, Spain still lacks a **national strategy to professionalize or coordinate the retrofit market**, and efforts remain uneven and pilot-based rather than systemic.

Despite the importance of market-based interventions, Spain's retrofitting market is still largely driven by government initiatives and regulatory frameworks. Programs like subsidies, tax incentives, and obligation schemes remain dominant, providing the essential financial support and legal framework needed to stimulate energy efficiency improvements. However, the growing role of ESCOs and the introduction of mechanisms like the EEC system indicate a shift towards greater market involvement in Spain's energy efficiency goals.

4.4 The multi-level governance process

Spain's approach to building energy retrofitting is shaped by a multilevel governance framework that involves coordination between national, regional, and local authorities, as well as a diverse range of stakeholders from both the public and private sectors. This collaborative structure is designed to enhance energy efficiency in buildings, promote sustainability, and address the interconnected issues of housing affordability and environmental performance.

At the national level, the Ministry for the Ecological Transition and the Demographic Challenge (MITECO) is the central body responsible for formulating Spain's national energy policies, including those related to building energy retrofitting. MITECO is tasked with the development of strategic plans, most notably the Integrated National Energy and Climate Plan (NECP) 2021-2030, which outlines clear energy efficiency targets and measures for achieving sustainability goals. The NECP plays a critical role in guiding Spain's energy transition by setting a long-term vision for reducing carbon emissions, improving energy performance in buildings, and integrating renewable energy sources.

Alongside MITECO, the Instituto para la Diversificación y Ahorro de la Energía (IDAE), an agency under the ministry, promotes energy efficiency and renewable energy. IDAE's role in supporting building retrofitting is multifaceted, encompassing the provision of technical assistance, funding programs, and public awareness campaigns. Through its financial programs, IDAE facilitates the implementation of retrofitting projects by **offering grants and low-interest loans to homeowners, businesses, and municipalities**. This technical and financial support is essential in making retrofitting projects more accessible, ensuring that energy efficiency measures are adopted at scale. The agency's role extends beyond funding by raising awareness of the benefits of retrofitting and encouraging the widespread adoption of energy-saving practices.

At the regional level, Spain's 17 autonomous communities exercise significant authority over housing and urban development. These regions adapt national policies to meet local needs and manage the allocation of funding for retrofitting programs. For example, Asturias has introduced specific subsidy programs to enhance building energy efficiency, reflecting the region's unique housing stock and climate conditions. Regional authorities also have the flexibility to design programs that address local priorities, such as improving the energy performance of public buildings or incentivizing the renovation of historical structures to meet modern energy efficiency standards. This level of autonomy ensures that retrofitting efforts are tailored to the particular challenges and opportunities of each region, which can vary greatly across Spain.

At the local level, municipalities are the key actors in the implementation of building retrofitting policies. Local governments are responsible for urban planning, issuing building permits, and enforcing energy efficiency regulations. They also play a crucial role in community engagement, ensuring that residents and local stakeholders are informed about available programs and encouraged to participate in retrofitting initiatives. Municipalities often collaborate with regional and national authorities to execute energy efficiency programs, ensuring that local projects align with broader strategic goals set at the national level. Additionally, local authorities often work with developers, energy service companies (ESCOs), and other private sector entities to facilitate retrofitting projects and ensure that building renovations comply with energy performance standards.

Effective coordination among these different levels of governance is critical to the success of Spain's energy retrofitting policies. However, challenges can arise due to overlapping responsibilities and varying regional capacities. For example, while national policies such as the NECP provide overarching frameworks, the regional and local governments often have to adjust these policies to their specific contexts, which can lead to variations in implementation.

These discrepancies can cause inconsistencies in how retrofitting projects are carried out, as local governments might prioritize different objectives or face difficulties in accessing the necessary funding or resources to meet energy efficiency targets.

Moreover, while energy retrofitting and housing affordability are inherently interconnected, policies aimed at improving building energy performance may inadvertently lead to trade-offs. For example, stringent energy efficiency requirements could drive up the cost of renovations, potentially making retrofitting projects unaffordable for low-income households. This situation is particularly evident in older buildings that require extensive renovations to meet modern energy standards. Balancing energy performance goals with affordability is a significant challenge for local governments, which must weigh the environmental benefits of energy-efficient retrofits against the potential economic strain they could place on residents.

The Energy Service Companies (ESCOs), which provide financing, design, and implementation services, are central to the market-based aspects of retrofitting. By offering performance-based contracts, ESCOs help reduce financial risks for property owners, making energy retrofitting more attractive. Similarly, housing associations and financial institutions facilitate community participation and offer the necessary capital for large-scale renovations, aiming for retrofitting projects to be accessible to homeowners and developers alike.

While autonomous communities in Spain have substantial regulatory autonomy over housing and urban development, they remain highly dependent on national funding and EU grants for large-scale retrofitting programs. This financial dependency can sometimes affect the priorities and implementation capacities of regional authorities. For example, regions that are less economically developed may face challenges in securing sufficient funding to carry out energy retrofitting projects at the scale required. At the same time, the allocation of financial resources from national and EU sources often comes with conditions, such as specific energy-saving targets or sustainability criteria, which must be met to qualify for funding. This dynamic can shape the kinds of retrofitting projects that are prioritized in different regions, depending on local financial capabilities and the availability of external funds.

While vertical coordination between EU, national, and subnational authorities forms the backbone of Spain’s retrofit governance, horizontal governance relationships are increasingly critical to implementation. Public-private partnerships (PPPs), particularly in cities like Barcelona and Valencia, facilitate collaboration between municipal authorities, private firms (e.g. construction companies, ESCOs), and community-level actors such as homeowners’ associations. These horizontal arrangements enable shared financing, bundled procurement, and localized technical assistance. Likewise, collaboration between civil society organizations and local governments—such as ECODES supporting outreach to vulnerable households—illustrates the growing role of civic actors in bridging policy and practice at the neighborhood scale.

Actor	Type	Role in Governance
European Commission (DG ENER, DG CLIMA)	Public - EU Level	Sets binding EU directives and funding frameworks for climate and energy policy

Spanish Ministry for the Ecological Transition (MITECO)	Public - National Level	Transposes EU policy into national law and oversees national energy strategy
IDAE (Institute for the Diversification and Saving of Energy)	Public Agency - National	Implements funding programs and technical support schemes (e.g. PREE, NECP)
Regional Governments (e.g., Catalonia, Madrid)	Public - Regional Level	Adapts and deploys national policies at the regional level; manages regional funds
Municipalities (e.g., Barcelona, Valencia)	Public - Local Level	Implements retrofit policies locally; often develops pilot programs and PPPs
ESCOs (Energy Service Companies)	Private Sector	Delivers energy retrofits through performance-based contracts (EPCs)
Construction Firms and Installers	Private Sector	Executes renovation works; key players in the retrofit supply chain
Financial Institutions (e.g., banks, energy credit programs)	Private Sector	Provide loans and co-financing mechanisms for energy renovations
Homeowners Associations (Comunidades de Propietarios)	Semi-public/Collective	Manage collective decision-making in multi-unit housing retrofits
NGOs and Civil Society (e.g., ECODES, Fundación Renovables)	Civil Society	Advocate for equitable energy access; monitor policy implementation

Table ES8. Multi-level Governance Actors (Retrofit)

Governance Level	Public Actors	Horizontal (Collaborative) Actors
EU	European Commission (DG ENER, DG CLIMA)	—

National	MITECO, IDAE	—
Regional	Autonomous Communities (e.g. Catalonia)	Regional energy agencies, technical consultants
Local	Municipalities (e.g. Barcelona, Valencia)	ESCOs, construction firms, homeowner associations, NGOs

Table ES9. Multilevel and Horizontal Governance of Retrofitting in Spain

4.5 Achievements, assessments, and challenges

Spain's building retrofitting initiatives have yielded notable achievements in enhancing energy efficiency and improving housing quality. However, these efforts have also introduced significant challenges, particularly concerning housing inequalities. While retrofitting policies have contributed to the country's broader sustainability and energy goals, they have also raised concerns about affordability, displacement, and unequal access to the benefits of energy-efficient housing. Below is a detailed analysis of the measured and potential impacts of retrofitting policies on housing inequalities.

Retrofitting has led to significant reductions in energy consumption and greenhouse gas emissions. For example, energy renovations in Spanish buildings have been shown to decrease energy consumption by as much as 52% (Serrano-Lanzarote et al. 2017), depending on the specific climate zone and the scope of the renovations. This reduction in energy use contributes not only to Spain's climate goals but also helps residents lower their utility bills. For lower-income households, this can have a particularly beneficial effect, reducing the financial burden of high energy costs and improving their overall quality of life.

One of the most tangible benefits of retrofitting is the improvement in housing quality. Upgraded insulation, modernized heating systems, and improved ventilation significantly elevate living standards. These changes contribute to better indoor comfort, healthier living environments, and better overall health outcomes for residents. For example, energy-efficient renovations in public housing have resulted in more consistent indoor temperatures, reduced mold issues, and better air quality. These upgrades are especially beneficial for vulnerable populations, such as the elderly or those with respiratory conditions, by ensuring that their homes are healthier and more comfortable.

The retrofitting sector has also generated significant economic activity, particularly in construction and related industries. By investing in the renovation of existing buildings, the retrofitting market has created employment opportunities in areas like construction, manufacturing, and energy services. These job opportunities contribute to local economic growth and help reduce unemployment, particularly in areas where retrofitting projects are concentrated. For example, large-scale retrofitting programs in cities like Seville and Madrid

have contributed to job creation in the construction sector, supporting not only skilled labor but also the local economy through increased demand for materials and services.

However, one of the most pressing concerns related to energy-efficient renovations is the potential for gentrification and 'renovictions' (renovation-induced evictions). As buildings are retrofitted and energy efficiency is improved, property values can rise, leading to increased rents. In some cases, this results in the displacement of low-income residents who can no longer afford to live in these newly renovated areas (Bouzarovski et al. 2018). This process exacerbates housing inequalities, as wealthier residents are able to benefit from the improved infrastructure and amenities, while long-time residents are forced out due to rising costs. For instance, in neighborhoods in Madrid and Barcelona where retrofitting has taken place, rising rents have driven lower-income residents to seek housing in more peripheral and less developed areas, contributing to increased socio-economic segregation.

While subsidies and financial incentives for energy-efficient renovations exist, many low-income households struggle to access the necessary financing for retrofitting projects. Although there are programs in place to support renovations, these may not be sufficient to cover the full cost of retrofitting for those with limited financial resources. Additionally, the bureaucratic hurdles associated with accessing such funding can be prohibitive, leaving many low-income residents unable to participate in these programs. This issue limits the ability of disadvantaged communities to benefit from the energy savings and improved living conditions that retrofitting can provide, thereby reinforcing existing inequalities.

Spain's 17 autonomous communities have significant autonomy over the implementation of retrofitting programs, which has led to regional disparities in the availability and scope of these initiatives. While some regions, such as Catalonia and the Basque Country, have made significant progress in rolling out energy efficiency programs, other regions have lagged behind due to a combination of limited funding, political will, and regional priorities. These disparities in retrofitting efforts can lead to geographic inequalities, where some areas benefit from the environmental and economic advantages of retrofitting, while others remain stuck with outdated and inefficient housing.

As the demand for energy-efficient homes grows, there is a risk of creating housing shortages in urban areas. Retrofitted buildings, particularly those in desirable locations, can become scarce commodities as demand outstrips supply, further driving up prices. In high-demand cities like Madrid and Barcelona, this can lead to increased competition for energy-efficient housing, making it more difficult for low-income households to access these improved living spaces. Moreover, while retrofitting increases the quality of housing, the higher costs associated with energy-efficient homes can reduce affordability for vulnerable populations, particularly in the face of urban housing shortages.

All in all, while Spain's retrofitting policies have led to significant progress in energy efficiency, housing quality, and economic stimulus, they also present challenges that must be addressed to avoid exacerbating housing inequalities. Issues such as gentrification, access to funding, regional disparities, and housing shortages highlight the need for more targeted measures to ensure equitable access to the benefits of retrofitting. Moving forward, policies must prioritize social equity by ensuring that the most vulnerable populations benefit from energy-efficient



housing, that funding mechanisms are accessible to low-income households, and that the risk of displacement due to rising rents is mitigated. Additionally, greater coordination across regions and levels of government is essential to ensure that the benefits of retrofitting are distributed more evenly across Spain. By addressing these challenges, Spain can continue to advance its energy efficiency goals while promoting a more inclusive and equitable urban development model.

Access to retrofitting programs in Spain remains uneven across both tenure and income lines. Most incentives — such as PREE — are directed at homeowners or homeowner associations, making it difficult for renters to benefit from improvements to their buildings, reflected initiatives such as the Alianza por una rehabilitación de viviendas sin dejar a nadie atrás (the alliance for the rehabilitation of houses without leaving anyone behind) (Ecodes 2023). As the Ministerio de Vivienda y Agenda Urbana (MIVAU), covering the Efficiency Aid Program for Individual Dwellings within the Recovery Plan (PRTR), states, programs are geared towards homeowners wherein applicants must handle documentation, which can be a barrier for lower-income or elderly households (MIVAU 2024).

Additionally, low-income households often cannot afford the co-financing share required by most retrofit aid programs. Under the national **framework PREE**, subsidies cover only **35% to 45%** of eligible costs, depending on the type of intervention and the efficiency gains achieved. This means that households must contribute between **55% and 65% of the total investment**, often upfront and without guaranteed financing support. For families without access to credit or savings, these requirements represent a substantial barrier to participation in renovation schemes aimed at energy efficiency improvements (IDAE 2024).

Finally, regional differences in administrative capacity and technical readiness lead to unequal access to EU and national retrofit funds. While the overall funding framework is national, each **Comunidad Autónoma** is responsible for implementing its own programs, resulting in **uneven rates of fund absorption**. Wealthier and more administratively capable regions—such as **Catalonia and Madrid**—tend to absorb a larger share of resources, while less developed or rural areas face barriers in matching funds, processing applications, or launching technical assistance. This has created a fragmented retrofit landscape that reinforces existing territorial inequalities (European Commission 2023; IDAE 2023).

Impact area	Measured potential or	Description/evidence
Access by tenure	Measured	Retrofit programs primarily target owner-occupied and condominium housing, excluding renters who depend on landlord participation (MIVAU 2024; Interview with NGO representative).
Affordability of co-financing	Measured	Low-income households struggle with required personal investment (often >50% of total cost), limiting their ability to participate in national schemes such as PREE (IDAE 2023; Policy Lab 2025).

Territorial disparities	Measured	Uneven administrative capacity across regions results in unequal absorption of retrofit funds, disadvantaging rural and lower-income regions (EC 2023; Interview with regional authority).
Energy cost burden	Measured	Energy retrofits lower utility costs long-term, but upfront costs limit access to these savings for vulnerable populations (Interview with local energy agency).
Administrative barriers	Measured	Complex application processes create obstacles for elderly, non-digital users, and immigrants (MIVAU 2024; Field interviews).
Opportunities for neighborhood regeneration	Potential	If well-targeted, retrofitting can be combined with area-based regeneration, particularly in degraded or mono-functional urban neighborhoods (Policy Lab 2025).

Table ES10. Measured and Potential Impacts on Housing Equality (Retrofit)

5 Nature-Based Solutions

This section examines Spain's evolving approach to Nature-Based Solutions (NBS), shaped by a mix of EU policy influence, national legal frameworks, and municipal innovation. Although "NBS" is not a common term in Spanish law or planning, related concepts such as green infrastructure, ecological urbanism, and climate adaptation are increasingly embedded in urban policy. The analysis highlights key milestones, including the 2015 Natural Heritage and Biodiversity Law and the 2021 ENIVCRE strategy, and explores the diverse implementation landscape—from EU-funded LIFE projects to city-led green roof programs. Attention is given to governance structures, the role of NGOs and platforms like FEMP, and funding inequalities across regions. While NBS projects deliver clear environmental and social benefits, the section also flags risks of environmental gentrification and uneven access to green amenities.

5.1 The policy cycle: emergence of the issue and policy decisions

While the term "nature-based solutions" (NBS) has gained traction in EU-level discourse, it is rarely used explicitly in Spanish national or municipal policy. Instead, related terms such as "green infrastructure," "sustainable urban development," and "ecological restoration" are more common. In this section, NBS is used as an analytical lens to group and assess a diverse set of interventions that deliver environmental and social co-benefits through nature-based means. Spain's approach to nature-based solutions (NBS) has evolved through a series of national policies and the transposition of European Union (EU) directives. Below is a timeline highlighting key milestones, actors, documents, and the influence of EU interventions on Spain's policy development in this area.

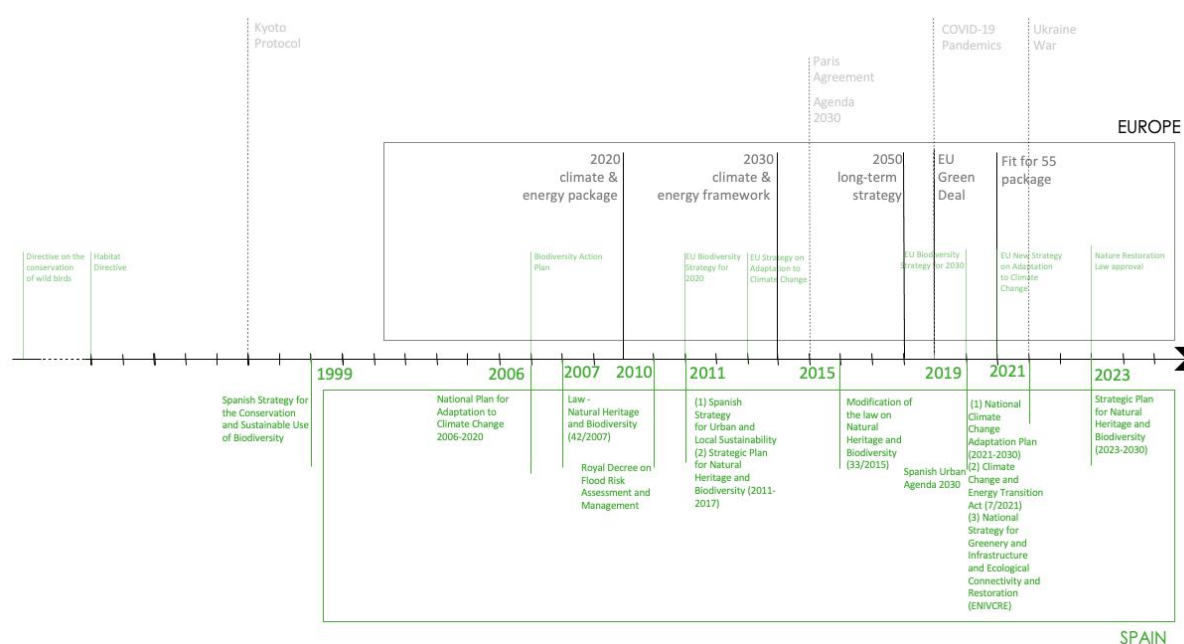


Figure ES2. Timeline illustrating key policies and regulations in Spain (bottom) and EU (upper) affecting Nature-based Solutions (in green).

YEAR	MILESTONE/EVENT	ACTORS	KEY DOCUMENT (short name if possible)	RELEVANCE TO NBS
1992	Habitat Directive	EU	92/43/EEC	Introduces Natura 2000, supporting habitat preservation crucial for NBS development.
1992	Spain ratifies the UN Convention on Biological Diversity	Spanish Government		Aligns Spain with global biodiversity goals, integrating NBS as a biodiversity strategy.
1999	The Spanish Strategy for the Conservation and Sustainable Use of Biodiversity	Spanish Government		Outlines national biodiversity conservation, indirectly promoting NBS applications.
2006	Biodiversity Action Plan	EU		EU-level biodiversity plan encouraging member states to adopt NBS for ecosystem services.
2006	National Plan for Adaptation to Climate Change 2006-2020	Spanish Government		Emphasizes adaptation measures like NBS to address climate impacts.
2007	Law on Natural Heritage and Biodiversity	Spanish Government	Law 42/2007	Framework law integrating NBS as tools for biodiversity and natural heritage conservation.

2010	Royal Decree on flood risk assessment and management	Spanish Government		Encourages use of NBS like wetlands and floodplains for managing flood risks.
2011	EU Biodiversity Strategy for 2020	EU		Promotes NBS to halt biodiversity loss and improve ecosystem services.
2011	Spanish Strategy for Urban and Local Sustainability	Spanish Government		Includes NBS as part of urban sustainability efforts, particularly in green urban planning.
2011	Strategic Plan for Natural Heritage and Biodiversity 2011-2017	Spanish Government		Incorporates NBS into strategies for conserving biodiversity and enhancing ecological networks.
2015	Modification of the law on Natural Heritage and Biodiversity	Spanish Government	Law 33/2015	Updates legal framework, strengthening NBS relevance in biodiversity protection.
2016	Climate Change Adaptation Strategy for the Spanish Coast	Spanish Government		Highlights NBS such as dunes and wetlands for coastal resilience.
2019	Spanish Urban Agenda 2030	Spanish Government		Advocates for green urban infrastructure and NBS to enhance urban sustainability.
2020	EU Biodiversity Strategy for 2030	EU		Prioritizes NBS as central to restoring ecosystems and increasing biodiversity.
2020	Government's Declaration on the climate and environmental emergency	Spanish Government		Commits to integrating NBS to address climate challenges and enhance resilience.
2021	National Climate Change Adaptation Plan 2021-2030	Spanish Government		Expands on NBS as a tool for addressing climate risks and promoting resilience.
2021	Spain's Climate Change and Energy Transition Act 7/2021	Spanish Government	Act 7/2021	Establishes binding targets for emissions and highlights NBS as part of climate solutions.
2021	National Strategy for Greenery Infrastructure and Ecological Connectivity and Restoration (ENIVCRE)	Spanish Government		Defines strategic goals for implementing NBS to improve ecological connectivity and restore degraded ecosystems.
2021	Recovery Plan, Transformation and Resilience	Spanish Government		A key instrument for the development of European funds under the Next Generation EU recovery plan.
2022	Strategic Health and Environment Plan 2026	Spanish Government		Focuses on integrating health and environmental considerations, including NBS to improve urban

				resilience and public health outcomes.
2023	Strategic Plan for Natural Heritage and Biodiversity 2023-2030	Spanish Government		Sets comprehensive goals for conserving biodiversity and enhancing natural heritage, explicitly incorporating NBS for ecological restoration and connectivity.
2024	Nature Restoration Law approval	EU	(EU) 2024/1991	Establishes legally binding targets for ecosystem restoration across the EU, promoting widespread adoption of NBS to address climate and biodiversity crises.

Table ES11. Table summarizing EU regulations transposed at national level (NbS)

The EU has been a driver in shaping Spain's policies related to the development of NBS, guiding and influencing national strategies and frameworks. NBS and related terms like green infrastructure (GI) pop up in many of the national environmental policies. They are more frequently explicitly mentioned in guidance documents and non-binding strategies, as compared to binding laws and regulations (Davis et al., 2018). However, an exception is the Spanish Law 33/2015 on Natural Heritage and Biodiversity (Ley del Patrimonio Natural y de la Biodiversidad), which requires mandatory GI strategies both on the national level and for the autonomous regions of Spain (Jefatura del Estado (Gobierno de España), 2015). The National Strategy for Greenery Infrastructure and Ecological Connectivity and Restoration (ENIVCRE) came into force in 2021, significantly impacting regional GI deployment, although many regions had already developed their own strategies beforehand.

After Law 33/2015 mandated the development of GI strategies at both the national and autonomous community levels, the National Strategy for Green Infrastructure, Ecological Connectivity, and Restoration (ENIVCRE) came into force in 2021, requiring regions to develop their own strategies within a maximum period of three years, based on the national strategy. Some autonomous communities developed their own GI strategies before 2021, such as Madrid, Valencia and Catalonia.

In terms of assessment, the implementation of the strategy is divided into work programs. Annual monitoring and reporting are conducted on the current work program, along with triennial evaluation reports for each Work Program until 2050. Additionally, a review of the national strategy is carried out in 2023, as well as mid-term evaluations in 2030 and 2040, and a final evaluation report in 2050 (Ministerio para la Transición Ecológica y el Reto Demográfico, 2021).

The economic downturn following the 2008 financial crisis negatively affected municipalities willingness to invest into NBS (Dorst et al., 2022). This highlights the importance of EU funds for Spain to implement NBS.

A study from 2021 highlights that urban NBS development cases in Spain were marked by relatively limited experience with citizen engagement, although notable differences were observed between cities and city districts. One explanation was the low level of environmental awareness among the public, which often leads to unrealistic expectations regarding the functions and benefits of green spaces (Dorst et al., 2022). Another aspect of low public engagement or participation in such programs or interventions, might be connected to how new green or blue spaces tied to biodiversity, environmental regeneration, health promotion or nature conservation, might be erasing past uses and the identity of places. In other words, the social and cultural aspects of places deemed as suitable for the implementation of NBS might not be considered early on in the process of implementation, with consequences on how residents and social groups engage in such projects.

5.2 The implementation process

Spain's implementation of NBS policies has involved a multifaceted approach, with a balanced distribution between legislative measures, financial incentives, and supportive programs. In terms of legislation, the country has implemented environmental and spatial planning regulations to promote NBS, while financial tools have included public procurement of land. Additionally, inter-municipal exchange platforms and educational programs supported the mainstreaming of the protection and creation of NBS (Van Der Jagt et al., 2023). This process has been characterized by various tools, timelines, beneficiaries, territorial considerations, deadlines, and assessment mechanisms, while also not free of socio-political frictions, experiments, controversies, and conflicts. Below is an overview of these aspect of policy implementation around NBS.

Legislative measures

By transposing EU directives, Spain has enacted national laws to strengthen the role of NBS in regional and urban planning. Law 33/2015, which amended Law 42/2007, incorporated the concept of GI into the Spanish legal system (FEMP, 2019). Law 33/2015 on Natural Heritage and Biodiversity (Ley del Patrimonio Natural y de la Biodiversidad) establishes the foundational legal framework for the conservation, sustainable use, enhancement, and restoration of natural heritage and biodiversity. This law includes tools to promote knowledge and planning of natural heritage and biodiversity, such as the State Strategy for Green Infrastructure, Ecological Connectivity, and Restoration, which requires the autonomous regions of Spain to develop NBS strategies and integrate NBS initiatives within their competencies (Sekulova et al., 2020).

Financial Support Mechanisms

A 2021 report highlights the absence of a dedicated national budget for NBS in Spain (Dorst et al., 2022). Instead, NBS development relies primarily on local and EU funding sources. Spain has benefited significantly from EU programs including the LIFE and Horizon program and European Regional Development Funds. These programs include specific allocations for NBS, biodiversity conservation, and climate adaptation measures (Fundacion Biodiversidad, 2025b).

Programs like the award of grants by the Biodiversity Foundation (Fundación Biodiversidad)¹⁶⁷ were established for projects that contribute to implementing the National Climate Change Adaptation Plan 2021-2030. In the new financing period of 2021-2027, the Biodiversity Foundation (Fundación Biodiversidad) plays at national level, the role of an intermediate body for the European Regional Development Fund (ERDF) with the aim of contributing to the National Strategy for Green Infrastructure, Connectivity and Ecological Restoration (IVCRE), the National Plan for Adaptation to Climate Change, and other important policies to be materialized with transformative interventions in the territory. Its mission includes enacting interventions related to knowledge generation around biodiversity, the promotion of bioeconomy, protecting the marine environment and fomenting sustainability and NBS in urban environments (Fundacion Biodiversidad, 2025c).

The foundation is managing two calls for grants directed to municipalities for the renaturalization and resilience of cities within the framework of the Recovery, Transformation and Resilience Plan, financed by the European Union – Next Generation EU. A total of 120 million euros will be allocated in the coming years (Fundacion Biodiversidad, 2025b). The grant was distributed between different projects initiated by municipalities with over 50 000 inhabitants across Spain (Fundacion Biodiversidad, 2025a). Another call for grants focuses on the restoration of river ecosystems and flood risk reduction in Spanish urban environments, with a commitment to include NBS, amounting to 75 million euros (Fundacion Biodiversidad, 2025c).

In some cases, cities were more innovative and proactive in implementing NBS independently of policies and incentives at the national level, which in turn might have led to regional disparities along lines of city size and available budget (Dorst et al., 2022). Many city governments have launched their own subsidy programs to promote NBS. For instance, the Municipality of Barcelona started a program in 2017 to support the establishment of new green roofs in the city. In the second call of the program the competition's ten winning projects received a 75% subsidy on the cost, with a limit of €100,000 per roof. The selected projects included features such as self-sufficient urban allotments, rainwater collection, installations for renewable energy generation, a composting area for organic waste, and the inclusion of relaxation and leisure areas (Ajuntament de Barcelona, 2020).

Supportive Programs and Structures

The first inter-municipal exchange platform promoting NBS in Spain has been the "**Local Government Network + Biodiversity**", established in 2006. It represents a federation operating under the guidance of the Spanish Federation of Municipalities and Provinces (FEMP), with the aim of adopting and influencing policies, as well as co-developing knowledge related to biodiversity, ecological connectivity, and the restoration of nature in (peri-)urban areas. FEMP has a membership of around 300 municipalities (Red Biodiversidad, 2025; Van Der Jagt et al., 2023). In 2019 the federation developed the "**Guide of Municipal Green**

¹⁶⁷ The Biodiversity Foundation (Fundación Biodiversidad) is a public foundation founded in 1998, operates under MITECO (Ministry for Ecological Transition and the Demographic Challenge), with the mission to contribute to reversing biodiversity loss. The foundation is responsible for distributing related EU and national grants and provides financial support.

Infrastructure” handbook in collaboration with the Association of Green Infrastructure Management Companies (ASEJA) and the Spanish Association of Public Parks and Gardens (AEPJP) (FEMP, 2019). The federation was also a key contributor to the development of the ,”National Strategy for Green Infrastructure, Connectivity and Ecological Restoration” (Red Biodiversidad, 2025; Van Der Jagt et al., 2023).

In 2019 the **Nature-Based Solutions Working Group (GT-SbN)** was established, co-financed by MITECO (Ministry for the Ecological Transition and the Demographic Challenge) and coordinated by the Conama Foundation (a Spanish, independent, non-profit foundation that promotes open dialogue to foster sustainable development in Spain and Latin America) and the IUCN (International Union for Conservation of Nature) Mediterranean Cooperation Centre. Originating from a session at the 14th National Environmental Congress in 2018, this multidisciplinary group includes professionals from various fields, such as research, governance, and the private sector. The working group aims to promote awareness of the importance and benefits of NBS, foster a network for exchanging knowledge and information on NBS and identify replicable examples of NBS with measurable impacts to encourage their wider adoption. The GT-SbN has also launched an online platform, the **Observatory of NBS in Spain**, which provides tools, bibliographic resources, success stories, and a catalog of innovative projects to support professionals in the field (Fundacion Conama, n.d.; Sekulova et al., 2020).

Although nature-based solutions in Spain are often deployed through municipal urban planning strategies, their design and implementation generally do not explicitly differentiate by tenure (e.g., owner-occupied vs. rental vs. social housing). Publicly led initiatives, such as green corridors, urban gardens, or superblocks, may span across diverse tenure contexts, but tenure is rarely a formal criterion in site selection or investment planning.

Interviews and the policy lab suggested that tenure can indirectly shape the outcomes of NbS. For example, green infrastructure introduced in neighborhoods with high levels of rental housing or socio-economic vulnerability—such as Sant Martí in Barcelona—has sometimes been associated with gentrification pressures. As one planner in Barcelona noted: “Even if the greening is public, the value goes up and that pushes people out—we’ve seen that in Poblenou and Sant Martí.” In contrast, public or cooperative housing projects have more capacity to retain residents and manage public space equitably, enabling a more stable integration of NbS without displacement. One housing official emphasized: “We could do more green interventions in social housing, but it requires coordination. Right now it’s mostly happening around market-led regeneration.”

While there are isolated examples of NbS in social housing contexts (e.g., roof gardens or shaded courtyards), a systematic tenure-sensitive approach remains absent from most NbS planning in Spain.

ELEMENT	DESCRIPTION
Legislative measures	Law 33/2015 on Natural Heritage and Biodiversity (Ley del Patrimonio Natural y de la Biodiversidad)
Financial Support	Award of grants by the Biodiversity Foundation (distribution of ERDF), EU programs (Horizon, Life, Next Generation EU), local subsidy programs

Supportive programs	Local Government Network +Biodiversity, "Guide of Municipal Green Infrastructure" handbook, Nature-Based Solutions Working Group (GT-SbN), "Observatory of NBS in Spain" online platform
Time horizon	The ENIVCRE requires regions to develop their strategies within three years from approval based on the national strategy
Assessment mechanisms	Annual monitoring reporting and triennial evaluate reports of the ENIVCRE
Challenges and controversies	Financial constraints post-2008 crisis, Lack of public environmental awareness and public engagement

Table ES12. Implementation Process (NbS)

5.3 Size and role of the market

The market for urban NBS development in Spain is expanding, driven by a combination of regulatory frameworks, urban resilience strategies, and the demand for sustainable urban planning. While precise market size figures are not readily available, the role of NBS is gaining prominence.

Although there is an absence of a dedicated national budget for NBS in Spain, large cities like Barcelona and Madrid have been leaders in funding GI projects, integrating them into broader urban development and climate plans (Dorst et al., 2022). For instance, Barcelona's „Nature Plan" and Madrid's „Madrid+Natural" framework have allocated significant municipal resources to expand urban greenery (Ajuntament de Barcelona, 2021; Ayuntamiento de Madrid, 2019). Large public investments in NBS were made in the city of Vitoria-Gasteiz, which was awarded the title of European Green Capital in 2012, partly due to its green belt project (Ayuntamiento de Vitoria-Gasteiz, 2022). Similarly, the city of Valencia received the same award in 2024 for its commitment to restoring natural ecosystems, improving air quality, and providing well-distributed urban green spaces within walking distance for residents (European Commission, 2024).

There is an increasing role for private investments, particularly in real estate developments that incorporate green roofs, green walls, and sustainable urban drainage systems (SUDS) to enhance property value and meet regulatory requirements. Although a study from 2021 highlights the perceived low market demand for NBS further dampened private sector interests; even NBS mainstreaming was not thought to be feasible without private sector contributions because of limited public sector capacity. The limited role of the private sector is explained with the profit- and result- oriented mindset of real estate developments and the perception of NBS as technically risky regarding costs and reputation. The study also highlights that urban NBS are competing with commercial building development in peri-urban areas (Dorst et al., 2022).

Spain significantly relies on EU funding mechanisms to carry out NBS, including the LIFE program, Horizon, the European Regional Development Funds and the Next Generation EU funds that support NBS projects as part of broader goals for sustainable and climate-resilient urban planning (Fundacion Biodiversidad, 2025b).

5.4 The multi-level governance process

Spain's approach to fostering NBS is characterized by a multilevel governance framework involving national, regional, and local authorities, as well as various stakeholders from the public and private sectors. NBS policies in Spain follow a top-down flow, starting at the EU level, where directives and strategies provide overarching frameworks. These are then transposed into national legislation, as laws and policies such as the ENIVCRE. From there, responsibilities and frameworks are passed down to the autonomous communities, which are required to develop their own strategies in alignment with national guidelines. Finally, on the local level provinces, metropolitan areas and municipalities implement these policies through tailored projects and initiatives, ensuring that the broader goals of the EU and national strategies are adapted to local contexts and needs.

At the level of central government, The Ministry for the Ecological Transition and the Demographic Challenge (MITECO) is the primary body responsible for formulating national environmental policies, including those related to NBS. It develops strategic plans, such as the “Spanish Strategy for the Conservation and Sustainable Use of Biological Diversity” and the ENIVCRE. Fundación Biodiversidad is an agency under MITECO, which promotes the conservation, restoration, and sustainable use of biodiversity through funding programs, building alliances and public awareness campaigns.

Spain's 17 autonomous communities have significant authority over urban development. They adapt national policies to regional contexts, manage funding allocations, and implement regional programs to promote NBS. From 2021 every Autonomous Community is required to develop their own GI strategy, however some of them have already developed such a strategy, like Catalonia with the Catalonia Green Infrastructure Program (PIVC) 2017-2021 (Generalitat de Catalunya, 2017).

Provincial Governments (Deputacio) play a coordination role between autonomous communities and municipalities. They provide technical and financial support to smaller municipalities that may lack resources to independently implement NBS. Deputations facilitate regional-level collaboration and ensure that urban greening efforts align with broader regional goals.

Metropolitan areas, which encompass multiple municipalities, coordinate urban development strategies across municipal boundaries. They ensure that NBS initiatives are integrated into broader metropolitan-scale planning. For example, the Metropolitan Area of Barcelona develops the Metropolitan Urban Master Plan in which (re)naturalization plays an important role (AMB, 2025).

Local municipal governments are responsible for urban planning and building permits. They play a crucial role in implementing NBS projects, enforcing building codes, and facilitating community engagement. For example, the city of Barcelona set a goal to develop 10,67 ha of green areas every year, partly by reclaiming public spaces in dense urban neighbourhoods (Ajuntament de Barcelona, 2021). The city Vitoria-Gasteiz, one of the leading cities in Spain in urban greening, created its GI strategy in 2012 and implemented several NBS projects over time (Climate ADAPT, 2018).

The "Local Government Network + Biodiversity" intermunicipal exchange platform was established in 2006 under the guidance of the Spanish Federation of Municipalities and Provinces (FEMP) and developed the "Guide of Municipal Green Infrastructure" handbook and contributed to the development of the ENIVCRE. The Association of Green Infrastructure Management Companies (ASEJA) and the Spanish Association of Public Parks and Gardens (AEPJP) are Spanish organizations working towards the promotion of NBS (FEMP, 2019). The Conama Foundation, a Spanish NGO that promotes sustainable development in Spain and Latin America, and the IUCN Mediterranean Cooperation Centre are two key non-governmental actors engaged in policy work, advocating for NBS, and coordinating the NBS Working Group (GT-SbN) (Fundacion Conama, n.d.; Sekulova et al., 2020).

A scientific paper from 2021 studying the barriers working against NBS in Spain points out that the main barriers, related to underlying structural conditions in Spain, were for example the limited communication between parties in government and certain lack of flexibility by departmental organizations linked to bureaucracy. The uncertainty and lack of capacity was underlined within local governments to take the lead in sustainability innovations. Although the research highlighted that in many cases the city level was more innovative than the state that time (Dorst et al., 2022). Another study stressed that the national government was seen as lagging behind in providing policy-based support for NBS, especially when compared to certain cities (Van Der Jagt et al., 2023). This changed in 2021 when the ENIVCRE came into force.

ACTOR	TYPE	LEVEL	ROLE	IMPACT
Minister (MITECO)	Public	National	Develops national environmental policies and strategic plans.	Sets overarching goals and frameworks for NBS.
Biodiversity Foundation	Public	National	Distribution of public funds from the national to the local level.	Implementation of NBS.
Autonomous Communities	Public	Regional	Adapt and implement national policies; manage regional programs.	Ensure policies are tailored to regional contexts.
Provincial Government (Deputacio)	Public	Regional	Facilitate cooperation between municipalities and manage regional-level services.	Bridge regional and local efforts for consistent NBS implementation.
Metropolitan Areas	Public	Regional/ Local	Coordinate urban development strategies across municipalities.	Integrate NBS into broader metropolitan strategies, ensuring regional cohesion.
Municipalities	Public	Local	Oversee urban planning, building permits, and local initiatives. NBS in urban areas are mainly initiated by the local municipalities.	Directly engage with communities and enforce regulations.
Conama	NGO	National	Conama is a Spanish,	Initiator of the GT-SbN, the national

			independent, non-profit foundation that promotes open dialogue to foster sustainable development in Spain and Latin America.	Nature-based Solutions Working Group
Non-governmental and Civil Society Organizations	Non-profit	National/Regional/Local	NGOs and networks such as the Local Government Network +Biodiversity, the Association of Green Infrastructure Management Companies (ASEJA) and the Spanish Association of Parks and Public Gardens (AEPJP) advocate for NBS practices and community initiatives.	Raise awareness and influence policy development.
Private real-estate developers	Private	National/Regional/Local	Invest in green amenities within real estate developments.	Drive market-based NBS projects.

Table ES13. Key Actors and their Roles (NbS)

5.5 Achievements, assessments, and challenges

Spain's policy initiatives regarding NBS have contributed to a shift over the last decade, scaling up the implementation of NBS from pilot phase to more broad application on the local level (IUCN, 2019). However, these efforts have also introduced challenges, particularly concerning housing inequalities. Below is an analysis of the measured and potential impacts of NBS on housing inequalities, accompanied by a summary table.

The implementation of NBS in Spanish cities led to the mitigation of urban heat island effect by cooling the environment through shading and evaporation. In recent years, the city of Barcelona implemented a Climate Shelter Program aimed at enhancing climate adaptation. As part of this initiative, NBS like greening, creating shade, green roofs and green walls were developed in many schoolyards (Ajuntament de Barcelona, 2025). NBS projects demonstrated a positive effect on the transition to sustainable stormwater management (SUDS) through reducing surface-runoff and the increase of biodiversity by providing habitats for various urban species, for example in Vitoria-Gasteiz (Climate ADAPT, 2018). NBS in Spain also positively affected the improvement of urban air quality and protected coastal areas. For instance, hybrid dunes in the Barcelona Metropolitan Area protected urban areas from coastal erosion and extreme events (OPERAs, n.d.). However, irrigation and maintenance of green areas are costly in the dry Mediterranean climate.

New green spaces contribute to the improvement of physical and mental health by encouraging active lifestyles, they reduce stress and improve well being by providing access to nature. Urban gardens play an important role in creating spaces for community interaction, fostering stronger social ties and resilience (Camerin & Longato, 2024). For example the city of Barcelona in 2012 started an environmental stewardship program which allows citizens to participate in the creation and maintenance of urban green areas (Ajuntament de Barcelona, n.d.).

The construction and maintenance of new urban green areas requires increasing public investment and employing more workforce which generates employment opportunities and stimulates economic activity (Barseghyan et al., 2023). It also (re)creates areas previously considered degraded or of low aesthetic and recreational value, indirectly boosting the local economy.

However, urban greening can drive up property values and rents, potentially displacing low-income residents. Environmental gentrification is already evident in major cities like Barcelona, which pursue ambitious urban greening policies while facing significant pressure in the property market and a shortage of affordable housing. This process exacerbates housing inequalities by making neighborhoods increasingly unaffordable and/or unwelcoming for long-term residents, either by causing displacement due to increasing rental prices, or by slowly changing the social and business fabric of neighborhoods (Anguelovski et al., 2018).

A 2021 report highlights the absence of a dedicated national budget for NBS in Spain. Instead, NBS development relies primarily on local and EU funding sources (Dorst et al., 2022). Variations in regional policies and funding availability can result in unequal implementation of NBS implementation, with some areas advancing more rapidly than others, for example the municipalities of Vitoria-Gasteiz and Barcelona. At city level, also, low budgets for NBS implementation might mean that more high-income, white and politically powerful neighborhoods are prioritized over others that are more marginalized and ethnically diverse.

Spain's progress in integrating NBS reflects a dynamic interplay between EU directives, national frameworks, and local innovation. At the national level, the enactment of Law 33/2015 marked a significant milestone, requiring the development of national and regional GI strategies. However, many municipalities had already begun developing GI strategies and implementing NBS well before the national GI strategy was introduced in 2021. Despite the absence of a dedicated national budget for NBS, cities such as Barcelona, Madrid, Vitoria-Gasteiz, and Valencia have led urban greening efforts through substantial municipal investments and innovative projects. Spain has heavily relied on EU funds, programs like LIFE, Horizon, ERDF, and Next Generation EU provided crucial financial support to advance these initiatives. The multi-level governance of NBS faces notable challenges, including limited stakeholder communication, bureaucratic inefficiencies, and capacity gaps at the local level. However, innovative cities have often taken the lead, setting ambitious goals and implementing strategies despite these structural barriers. NBS initiatives have yielded many benefits, including urban heat mitigation, enhanced biodiversity, improved air quality, and contributions to climate resilience. Socially, these projects have fostered community engagement, reduced

stress, and promoted public health. However, the implementation of NBS has also highlighted challenges, particularly concerning housing inequalities. Green gentrification has emerged as a pressing issue in larger cities, where urban greening efforts often increase property values.

Impact area	Measured or potential	Description/evidence
Access to green infrastructure	Measured	Low-income and marginalized communities often lack equitable access to new NbS (e.g., green corridors, urban gardens) which are concentrated in central, high-visibility zones (Eggimann 2022; Interview with CSO).
Green gentrification	Measured	NbS projects in central areas (e.g., Barcelona Superblocks) have increased surrounding housing costs and displaced vulnerable groups (Anguelovski et al., 2023).
Uneven implementation	Measured	Municipal capacity affects NbS rollout; large cities implement more extensive projects than small towns or peri-urban areas (Barcelona, Vitoria-Gasteiz vs. rural municipalities).
Disconnection from housing strategy	Measured	NbS often introduced through environmental planning with little integration with housing affordability policies (Interview with urban planner).
Potential for participatory governance	Potential	Community-led greening initiatives offer avenues for more inclusive outcomes, particularly in smaller-scale interventions (Policy Lab notes).
Co-benefits for health and climate	Potential	Well-targeted NbS improve microclimates, reduce urban heat islands, and support mental health—benefits that could reduce inequality if equitably distributed (Ghosh et al. 2024).

Table ES14. Table Measured and Potential Impacts on Housing Equality (NbS)

6 Densityfication

This section explores how urban densification has been regulated in Spain over the past two decades, particularly in the context of climate transition, housing access, and spatial planning reform. While densification is not always an explicit goal, it is often advanced through instruments such as zoning updates, infill incentives, and urban regeneration programs. Spanish cities operate within a multi-tiered legal and planning framework, with regional governments defining land use regimes and municipalities translating them into local development plans. The analysis examines how different actors deploy densification logics,

the territorial asymmetries in implementation, and the emerging tensions between environmental efficiency and social equity.

6.1 The policy cycle: emergence of the issue and policy decisions

Densification policies in Spain have evolved as part of a broader strategy to address urban sprawl, improve housing availability, and promote sustainable land use. The drive toward compact urban development has been influenced by European Union (EU) frameworks, national urban development goals, and the need to mitigate environmental degradation caused by dispersed urbanization. Spain's approach integrates legislation, planning instruments, and financial measures that prioritize efficiency in land use and infrastructure.

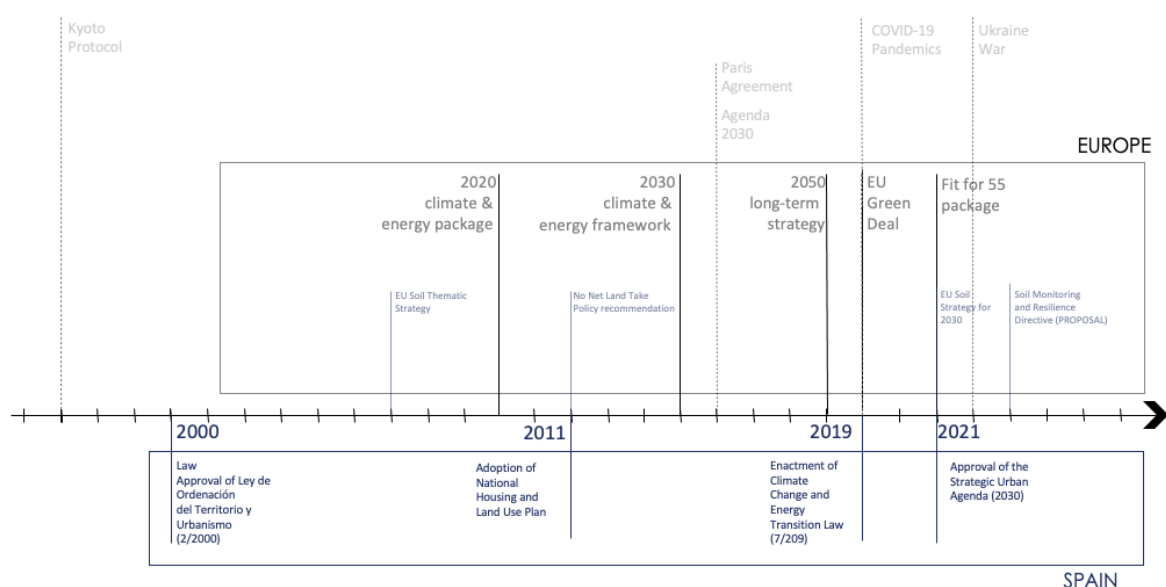


Figure ES3. Timeline illustrating key policies and regulations in Spain (bottom) and EU (upper) affecting urban densification (in blue)

YEAR	MILESTONE / EVENT	ACTORS	KEY DOCUMENTS	EU INFLUENCE
2002	Adoption of the Energy Performance of Buildings Directive (EPBD) 2002/91/EC	EU	EPBD 2002/91/ec	Initiated EU-wide standards for building energy performance
2006	Implementation of the Technical Building Code (Código Técnico de la Edificación - CTE)	Spanish Government	Royal decree 314/2006	Transposed EPBD 2002/91/EC into national law, setting energy efficiency standards for new and renovated buildings.
2010	Recast of the EPBD (Directive 2010/31/EU)	EU	EPBD 2010/31/EU	Strengthened requirements for nearly zero-energy buildings and cost-optimal levels.

2013	Transposition of the Energy Efficiency Directive (EED) 2012/27/EU	Spanish government	Law 15/2013	Established measures to achieve energy savings across sectors, including buildings.
2014	Submission of the National Energy Efficiency Action Plan 2014-2020	Spanish government	National Energy Efficiency Action Plan 2014-2020	Outlined strategies to meet EU energy efficiency targets, focusing on building renovations.
2018	Amendment of the EPBD (Directive 2018/844/EU)	EU	EPBD 2018/844/EU	Emphasized long-term renovation strategies and smart technologies in buildings.
2020	Approval of the Integrated National Energy and Climate Plan (NECP) 2021-2030	Spanish government	NECP 2021-2030	Set national targets for energy efficiency and building renovations in line with EU goals.
2021	Enactment of the Climate Change and Energy Transition Law	Spanish Government	Law 7/2021	Aimed for carbon neutrality by 2050, with specific measures for building energy efficiency.
2023	Publication of the revised Energy Directive (Directive 2023/1791)	EU	EED 2023/1791	Raised the EU's energy efficiency target, requiring member states to achieve an additional 11.7% reduction in energy consumption by 2030.
2024	Spain's updated National Energy and Climate Plan	Spanish Government	Updated NECP 2024	Increased targets for green hydrogen production and energy storage, reflecting ongoing commitment to EU energy efficiency objectives.

Table ES15. Table summarizing EU regulations transposed at national level (Densification)

The evolution of densification strategies in Spain reflects a gradual alignment with sustainable urban planning principles and broader European Union (EU) frameworks. Each milestone represents a critical step in shaping the country's approach to land use, urban development, and climate resilience.

Before the year 2000, several key laws and regulations shaped urban development and densification in Spain. The **Ley del Suelo (Land Law) of 1956** was one of the first comprehensive land-use laws in the country. It established a framework for urban development and land classification, introducing the concept of zoning and defining land categories such as urban, developable, and non-developable. Though the law indirectly supported densification by encouraging the development of urban land within city boundaries and restricting development in non-urban areas, its enforcement was inconsistent, and urban sprawl continued to occur unchecked.

In 1975, the **Ley General de Ordenación Urbana (General Urban Planning Law)** replaced the 1956 law. This new legislation provided a more structured approach to urban planning, focusing on the preparation of municipal urban plans (known as Plan General de Ordenación

Urbana, or PGOU) to guide development. The PGOU frameworks introduced by this law often included provisions to increase housing density in urban centers, especially in cities experiencing rapid population growth. Cities like Madrid and Barcelona began preparing urban plans that incorporated compact city principles, helping to manage their expanding populations.

Throughout the 20th century, **various *Plan Nacional de Vivienda* (National Housing Plans)** were introduced to address housing shortages and improve living conditions across Spain. These plans often focused on the construction of social housing in urban areas, contributing to rising population density in cities such as Valencia, Seville, and Bilbao. These housing developments typically consisted of multi-story apartment blocks built within existing urban boundaries.

In 1992, the *Ley del Suelo* was revised to yet again curb urban sprawl. This revision prioritized urban renewal and redevelopment over the expansion of urban peripheries and introduced stricter requirements for municipalities to justify land-use changes. By promoting urban renewal and infill development, the 1992 law implicitly encouraged densification and set the stage for future policies that would explicitly prioritize compact urban development.

During the 1980s and 1990s, the first decades of democracy following the death of the dictator Francisco Franco (1975), many Spanish cities adopted their own urban development plans, often shaped by national laws and regional policies. For example, Barcelona's urban plan following the 1992 Olympics emphasized the redevelopment of industrial zones into residential and mixed-use areas, laying the groundwork for modern densification efforts – albeit leading to expulsions and urban cleansing of working-class communities while marking the end of *barraquismo*¹⁶⁸ in the city. Similarly, in Madrid, urban renewal projects in districts such as Lavapiés aimed to increase population density while preserving the ‘historical fabric’ of the city.

The foundation for densification efforts in Spain was laid **in 2000 with the Urban Planning Law (*Ley de Ordenación del Territorio y Urbanismo*)**, which introduced several core principles of land use planning in Spain. These principles emphasized compact urban growth, prioritizing infill development over expansion into greenfield areas, and promoting mixed-use developments to integrate residential, commercial, and public spaces within neighborhoods. The law also stressed the conservation of natural resources and the reduction of environmental impacts by limiting urban sprawl and optimizing infrastructure.

For example, Valencia embraced these principles through the revitalization of the Cabanyal-Canyamelar district. This project involved transforming an underutilized area into a vibrant mixed-use neighborhood with improved housing, public spaces, and tourism facilities. While the initiative successfully enhanced urban density and economic activity, it also drew criticism

¹⁶⁸ The historical phenomenon of informal housing settlements, characterized by makeshift shacks or huts (known as *barracas* or *chabolos*) built by people who lacked access to formal housing. These settlements often emerged on the outskirts of cities, especially during periods of rapid urbanization in the 20th century.

for gentrification and the displacement of long-time residents, reflecting the challenges of balancing densification with social equity.

In 2007, the EU further strengthened these ideas with the adoption of the **Leipzig Charter on Sustainable European Cities**. This document emphasized the importance of compact urban development, mixed-use neighborhoods, and the integration of sustainable transport systems. These principles were implemented, for example, in Zaragoza as part of the city's preparation for Expo 2008. The transformation of the Ebro River area focused on creating high-density housing, public spaces, and integrated transportation infrastructure. The project successfully enhanced urban connectivity and increased population density in previously underutilized areas. However, some parts of the development struggled with long-term occupancy after the Expo, highlighting the importance of sustained economic activity to support densification efforts.

Building on these foundations, Spain introduced the **National Housing and Land Use Plan in 2011**. This plan promoted urban regeneration, the reuse of underutilized land, and the development of high-density housing to address growing population demands. Bilbao's Zorrotzaurre redevelopment exemplified this approach by transforming a semi-abandoned industrial peninsula into a thriving mixed-use urban area. The project prioritized affordable housing, commercial spaces, and sustainable infrastructure, creating a model for urban regeneration in Spain. This initiative significantly increased the availability of housing and public amenities, although some challenges related to environmental remediation and funding complexities emerged during the process (Radovanović and Perović 2024).

The launch of the **EU Urban Agenda in 2016** marked another pivotal moment, emphasizing sustainable urbanization and compact city models as central pillars of European urban planning strategies. Madrid aligned its planning efforts with this agenda by implementing transit-oriented development (TOD) initiatives, focusing on areas around major transport hubs like Chamartín. The city's TOD projects encouraged high-density, mixed-use developments that improved public transit accessibility and reduced reliance on private vehicles. These efforts supported Madrid's goals of reducing carbon emissions and enhancing urban mobility. However, rising property values near these hubs raised concerns about affordability for lower-income residents, underscoring the need for equitable housing policies within densification efforts.

In **2019, the Climate Change and Energy Transition Law** linked densification with climate resilience by promoting urban models that reduce greenhouse gas emissions through efficient land use and infrastructure. The city of Seville applied these principles by creating green urban corridors that connected dense urban neighborhoods with parks and natural areas. These corridors incorporated bicycle lanes, pedestrian pathways, and public transit stops, reducing car dependency and improving overall urban livability. While the initiative was widely appreciated for enhancing environmental quality and promoting active mobility, some residents expressed concerns about the need for more extensive public transit options to support growing populations.

The **Strategic Urban Agenda 2030**, approved in 2021 at National level, reinforced compact city models and smart growth strategies, integrating environmental, economic, and social

objectives into densification efforts. Barcelona's Superblock program became a flagship initiative under this agenda, with cities around the world aiming to replicate the initiative as to integrate green space within densification projects (Eggimann 2022). Superblocks consolidate traffic into perimeter streets, creating pedestrian-friendly internal areas with green spaces and community-oriented facilities. This approach significantly reduced air pollution, improved public health, and enhanced the quality of life for residents. However, it faced resistance from some car users and local businesses who relied on vehicle access, highlighting the challenge of balancing diverse urban priorities. Furthermore, Barcelona's Superblocks may contribute to green gentrification as the transformation of urban spaces into pedestrian-friendly, green environments can increase property values, attracting wealthier residents while displacing lower-income and historically marginalized communities, thereby reinforcing social inequalities (Anguelovski et al. 2023).

Finally, the **revision of the EU Territorial Agenda in 2023** strengthened the focus on urban density for sustainability. Valencia integrated these principles through its Valencia Smart City initiative, which emphasized energy-efficient buildings, smart grids, and IoT-based urban management in high-density zones. These projects improved energy efficiency, reduced waste, and showcased Valencia as a leader in smart urban growth – playing a role in the city being awarded the title the 2024 European Green Capital. However, the substantial investment required for such advanced technologies has posed challenges for scalability and equitable access for all residents (Mahmoud and Wael 2019).

Densification policies are increasingly tied to broader environmental and energy goals, as reflected in national climate planning. The Integrated National Energy and Climate Plan (NECP 2021–2030) explicitly promotes compact urban form and transit-oriented development as tools to reduce emissions from transport and buildings. The Climate Change and Energy Transition Law requires urban plans to integrate climate adaptation and mitigation criteria, further aligning densification with energy and greening policies. Moreover, densification is linked to energy retrofitting strategies (e.g., through the PREE program) by targeting dense areas for energy-efficient redevelopment, and to NbS initiatives like green corridors and superblocks, which often support both climate goals and higher density use of space.

This progression illustrates how Spain's densification strategies have been shaped by a combination of national priorities and EU directives. Each milestone not only pushed forward the country's approach to urban planning but also laid the groundwork for future initiatives, creating a cohesive and adaptive national policy framework which continues to impact localized (re)development projects throughout the country's 17 autonomous communities.

6.2 The implementation process

Spain's densification policies are implemented through a mix of legislative tools, financial programs, and planning instruments. The implementation process reflects a multi-pronged approach to addressing urban challenges while promoting sustainability and economic growth. An overview of these elements is provided below.

Urban Planning Legislation and Climate Integration

The Urban Planning Law of 2000 was the first foundational legislation establishing legal frameworks to encourage compact city development, urban renewal, and efficient land use. The law guided local governments to combat urban sprawl by prioritizing infill development and repurposing existing urban spaces. For instance, Valencia's El Carmen neighborhood revitalization utilized these principles by transforming an aging urban district into a high-density, mixed-use area with 'modern' amenities. This project preserved the historic character of the neighborhood while introducing efficient land-use practices, fostering economic growth, and increasing housing availability. However, the focus on economic revitalization often led to gentrification, displacing low-income residents and reducing the social diversity that made the neighborhood unique, through an influx of tourists and the touristification of the area (El Español, 2024)

The Climate Change and Energy Transition law of 2019 connected urban densification to Spain's climate goals by emphasizing compact urban models to reduce greenhouse gas emissions. It highlighted the integration of renewable energy systems, green roofs, and energy-efficient infrastructure in high-density areas. For example, in Vitoria-Gasteiz, green infrastructure initiatives were incorporated into urban densification projects, including the development of urban gardens and green roofs on residential buildings. These measures not only reduced energy consumption but also enhanced urban livability and resilience to climate change.

National Subsidies and Urban Regeneration Programs

Subsidies, coming from both the national government and local government sources, for urban regeneration, such as those found in programs such as the Plan Estatal de Vivienda (State Housing Plan), offer financial incentives to developers for undertaking infill development and repurposing unused urban spaces. In Bilbao, subsidies from the national government, the Basque Regional Government and the Bilbao City Council, were instrumental in transforming the Zorrotzaurre peninsula, where abandoned industrial areas were redeveloped into a vibrant urban quarter. The subsidies reduced financial barriers, enabling the development of affordable housing and public spaces while attracting private investment. However, these efforts have often prioritized economic growth over social equity, with affordability initiatives failing to meet the needs of the lowest-income households, exacerbating housing inequality in regenerated areas (Bilbai Hiria, 2024).

EU Co-Financing and Structural Funds

Structural and cohesion funds from EU, such as those from the European Regional Development Fund (ERDF), the European Social Fund (ESF), the Cohesion Fund, and NextGenerationEU funds, have also significantly supported Spain's urban densification initiatives. These funds have co-financed major projects in metropolitan areas across Spain, facing housing shortages – including Madrid, Barcelona, Valencia, Seville, Bilbao, Malaga, Zaragoza, Alicante, Castellón, Vigo, Santander, Oviedo, Murcia, and Palma de Mallorca. The Barcelona Superblock program, a celebrated and globally recognized initiative, benefited from EU funding to reconfigure traffic patterns, expand pedestrian zones, and increase urban

density without compromising sustainability. This initiative demonstrated the potential of EU funds to create transformative urban projects with long-term benefits.

Task Incentives and Fiscal Tools

Tax reductions have also been implemented to encourage developers to focus on high-density housing projects and retrofitting existing urban infrastructure. In Madrid, developers received tax benefits — including reductions in the Impuesto sobre Construcciones, Instalaciones y Obras (ICIO) — for projects located near major public transport hubs, which helped promote compact, transit-oriented development. These fiscal tools were designed to reduce upfront development costs and improve the financial viability of high-density, sustainable housing.

Some municipalities have also introduced property tax (IBI) reductions for renovated buildings that meet energy performance or urban integration criteria. This has proven especially effective in medium-sized cities like Zaragoza and Valencia, where local governments actively promote the reuse of existing urban land rather than expansion into peripheral areas. While these tax policies help catalyze urban regeneration and densification, critics argue that their application often lacks social targeting, risking the promotion of market-rate development that are unaffordable for low- and middle-income households (Bouzarovski et al., 2018).

Local Plans and Zoning Reforms

Localized densification plans within cities have guided urban development in cities like Barcelona and Madrid, prioritizing transit-oriented development (TOD), mixed-use neighborhoods, and efficient public spaces. The Madrid Nuevo Norte project exemplifies this, integrating residential, commercial, and transit infrastructure within a compact area. By aligning urban growth with public transit, the project aimed to minimize reliance on private vehicles and promote sustainable mobility. However, critics highlight that the prioritization of high-end commercial spaces and luxury housing often marginalizes low-income populations, who are unable to access these benefits.

Incentivized zoning reforms have encouraged higher-density housing near transit corridors and employment hubs. For example, Seville introduced zoning incentives to facilitate residential development near its metro lines, increasing population density while reducing urban sprawl. These reforms simplified approval processes, making it easier for developers to invest in high-density projects. Still, these zoning changes frequently favor upscale developments, further displacing economically vulnerable groups who cannot afford the new housing stock.

Element	Description
Legislative measures	Climate Change and Energy Transition Law (2021), Technical Building Code (2006, updated periodically)
Financial Support	

	Subsidies (e.g., PREE), tax incentives, regional programs (e.g., Asturias' energy efficiency subsidies)
Supportive programs	One-stop shops, training and certification programs
Time horizon	NECP 2021-2030 outlines a 10-year strategy with interim targets
Assessment mechanisms	Regular monitoring and reporting to evaluate progress and adjust strategies as needed
Challenges and controversies	Financial constraints post-2008 crisis, regulatory changes causing uncertainty, low public awareness and engagement

Table ES16. Implementation Process (Densification)

6.3 Size and role of the market

The densification market in Spain is influenced by various policy frameworks, financial mechanisms, and private sector participation. These elements interact in complex ways to shape urban development trends, particularly in high-density cities. Understanding how each component functions requires a deep dive into the legislative, economic, and social factors driving the urban densification process, as well as the role of public and private actors in these developments.

Vertical Housing and Private Development

Private developers have historically played a critical role in shaping the densification landscape in Spain, particularly in urban centers such as Madrid, Barcelona, Valencia, and Bilbao. These cities have experienced substantial population growth, urban migration, and increased demand for affordable housing, which has driven the need for high-density housing solutions. As Spain's cities have become more populated, urban planning policies have encouraged the construction of vertical housing—such as apartment buildings and mixed-use developments—in the heart of urban areas.

There have been several key legislative influences in this regard. The Ley General de Ordenación Urbana (1975) and its subsequent revisions, like the Ley del Suelo (1992), set the stage for high-density housing in Spain by introducing zoning laws and urban renewal initiatives that enabled developers to build more densely in cities. These laws allowed for more flexible land-use practices, enabling the vertical growth of urban spaces. The Ley de Vivienda (2022), which reaffirms the government's commitment to affordable housing, provides new incentives for the construction of high-density, low-cost housing by private developers.

Public-Private Partnerships (PPPs)

Public-Private Partnerships (PPPs) are instrumental in urban densification efforts in Spain, particularly when it comes to mixed-use developments and affordable housing projects. These partnerships allow municipalities to leverage private sector capital and expertise while fulfilling

public objectives like increasing housing stock, urban regeneration, and improving infrastructure.

Several key legislative moments have influenced the importance of PPPs in urban densification efforts in Spain. In 2017, the Ley de Contratos del Sector Público provided the legal framework for PPPs, enabling municipalities to engage private developers in projects that support urban densification and revitalization. Private developers play a crucial role in these projects, often providing the capital, expertise, and efficiency needed to deliver high-density housing and mixed-use developments, particularly in city centers and underdeveloped areas. The National Housing and Land Use Plan (2011) and Strategic Urban Agenda 2030 (2021) further encourage collaboration between public and private sectors by offering various incentives, such as tax breaks, density bonuses, and fast-tracked permits for projects that meet specific sustainability and affordability criteria. These plans create more transparent pathways for joint ventures, incentivizing developers to prioritize urban regeneration and sustainable growth, and to incorporate green infrastructure, affordable housing, and mixed-use spaces in their projects.

In Valencia, a notable example of a PPP-driven project is the regeneration of the Old Turia Riverbed, where public land has been revitalized with private investment to create mixed-use spaces, residential areas, and recreational zones. Similarly, Madrid's operation "Madrid Río" transformed the Manzanares River area into a green space while incorporating affordable housing, thanks to a successful public-private collaboration.

Market Instruments: Tax Bonuses, Density Incentives, and Land Readjustment

Several market interventions are designed to facilitate urban densification and encourage private sector involvement. These include tax incentives, density bonuses, land readjustment schemes, and innovative financing models, such as green bonds, that promote sustainable development.

Tax incentives and density bonuses are increasingly common in urban centers, particularly for developers who meet sustainability and affordability criteria. For instance, the Madrid City Council offers density bonuses in exchange for including a certain percentage of affordable housing in development projects. Similarly, Barcelona has incentivized the construction of energy-efficient buildings and increasing density by offering tax rebates and expedited permitting processes.

In densely populated urban areas, land availability is often scarce. **Land readjustment schemes**, which allow for the consolidation of fragmented plots, enable more efficient development. These schemes function as a **market mechanism** because they rely on **private landowners and developers** to drive urban transformation, with the government acting as a **regulator rather than a direct investor**. Instead of expropriating land, municipalities facilitate **land pooling**, allowing private owners to consolidate their plots for redevelopment. This process **raises property values**, enabling landowners and developers to profit while financing infrastructure improvements, making it a **self-sustaining model**. By shifting costs to the private sector and letting the market dictate redevelopment, land readjustment promotes **densification without heavy state intervention**, aligning public planning goals with market-

driven urban renewal. These schemes are particularly prevalent in Barcelona, where urbanization policies prioritize land consolidation to create denser, mixed-use neighborhoods that balance residential, commercial, and green spaces.

Green Financing and Investment Tools

In recent years, financial institutions in Spain have been increasingly focusing on sustainable urban development through mechanisms like green bonds and other forms of green financing. This aligns with Spain's push for more sustainable cities and the EU's Green Deal. In particular, banks and financial institutions have begun offering specialized loans for energy-efficient buildings and low-carbon infrastructure, which has made high-density development more viable for developers committed to sustainability.

6.4 The multi-level governance process

Spain's densification efforts involve coordination across national, regional, and local levels, with each tier of government playing a crucial role in ensuring that policies are effectively implemented. Effective governance is essential to harmonize diverse policy objectives and ensure that densification meets both national goals and local needs.

At the national level, the Ministry of Transport, Mobility, and Urban Agenda (MITMA) plays a leading role in developing strategic frameworks such as the Urban Agenda 2030. MITMA is also responsible for overseeing the allocation of national and EU funds to densification projects, ensuring that resources are distributed efficiently to achieve the country's urban development goals. In particular, the National Housing and Land Use Plan (2011) outlines clear priorities for sustainable urban development, offering financial incentives for projects that align with densification and urban regeneration efforts. Moreover, MITMA's policies emphasize the importance of compact, sustainable cities, helping to guide local and regional efforts to reduce urban sprawl and enhance environmental sustainability.

The National Housing Observatory, a key governmental body, monitors housing trends across Spain. This body collects data, conducts research, and provides valuable insights that inform densification policies and address emerging challenges. By tracking housing demand, supply, and affordability, the Observatory plays an instrumental role in shaping policies that respond to shifting urban dynamics.

At the regional level, autonomous communities are granted significant regulatory autonomy, allowing them to adapt national policies to suit local contexts. This flexibility enables each region to address specific needs and challenges unique to its urban environments. For example, Catalonia has introduced regional legislation to promote transit-oriented development (TOD), encouraging high-density housing near public transportation hubs to reduce car dependency and improve urban mobility. Similarly, Andalusia has focused on revitalizing historic urban cores, combining preservation with densification efforts to breathe new life into older neighborhoods while addressing housing shortages.

Municipalities are the key actors in implementing zoning, urban planning, and permitting processes. They are responsible for the ground-level application of densification policies, often

working in collaboration with both regional and national authorities to align local projects with broader strategic goals. Local governments also engage directly with communities to ensure public support for densification initiatives. In some cases, municipalities offer incentives to developers to ensure that projects meet local housing needs, such as including affordable units in new developments.

Private developers play a crucial role in these projects, delivering high-density housing that aligns with local zoning and urban planning policies. By providing capital and expertise, private developers help municipalities meet their densification goals. The National Housing and Land Use Plan (2011) and the Strategic Urban Agenda 2030 (2021) have offered developers a framework of incentives to prioritize sustainable and affordable projects, such as tax breaks, density bonuses, and green building certifications.

Actor	Type	Scale	Domain	Role	Policy Effect
Ministry of Transport, Mobility and Urban Agenda	Public	Central/National	Political	Sets national strategy for urban planning and densification	Frames densification priorities, allocates funding
Ministry for the Ecological Transition (MITECO)	Public	Central/National	Technical/Political	Aligns urban form with climate targets (energy, mobility, land use)	Encourages sustainable, low-carbon urban models
National Housing Observatory	Public	Central/National	Technical	Provides data and analysis to support housing policy development	Informs evidence-based planning and densification monitoring
Autonomous Communities (e.g., Catalonia)	Public	Regional	Political/Technical	Tailor national frameworks, coordinate zoning and subsidies (e.g., TOD projects)	Localize densification tools to specific challenges
INCASÒL (Catalonia)	Public	Regional	Technical	Facilitates land readjustment and urban redevelopment	Unlocks land for densification, especially in brownfield sites
Municipalities / Local Governments	Public	Local	Political	Implement planning regulations, issue permits, and engage communities	Control the pace and location of densification
EU Institutions / Funding (e.g., ERDF, NextGenEU)	Public (Supranational)	EU	Political/Technical	Fund urban regeneration, promote green densification	Provide incentives for compact, sustainable development

				through strategic agendas	
ICO (Instituto de Crédito Oficial)	Public	National	Technical	Provides affordable public financing to urban development and densification projects	Lowers financial barriers for socially oriented densification
Private Developers	Private	Local/National	Technical	Design and build high-density housing and mixed-use projects	Shape built environment, often guided by market logic
Banks / Real Estate Funds	Private	National/EU	Technical	Provide investment capital, especially for large redevelopment projects	Influence what types of projects get built and where
Civil Society Organizations / Housing NGOs	Civil Society	Local/National	Political	Advocate for affordable, inclusive urban development; monitor exclusionary trends	Pressure for equity, transparency, and anti-displacement safeguards
Community Associations / Neighborhood Groups	Civil Society	Local	Political	Represent resident concerns, especially in areas targeted for densification	Enable participatory planning, resist unwanted gentrification or displacement

Table ES17. Key Actors and their Roles (Densification)

6.5 Achievements, assessments, and challenges

The compact city model has helped curb urban sprawl, preserving green spaces and aligning with EU sustainability goals. Cities like Madrid and Barcelona have prioritized infill development, converting underutilized areas into high-density, mixed-use neighborhoods that minimize outward expansion. Transit-Oriented Developments (TODs), particularly in Madrid and Valencia, have improved accessibility, reduced car dependency, and contributed to EU mobility targets.

Economically, densification has revitalized local economies, attracting businesses and boosting property values. Cities like Bilbao and Seville have seen increased tourism and service industry growth, alongside infrastructure upgrades. However, higher-density developments often drive up property values and rents, reducing affordability for lower-income residents. Gentrification in Barcelona and Madrid has underscored the need for policies like the **Ley de Vivienda** (2022) to protect vulnerable populations from displacement.

Infrastructure strain remains a challenge. Rapid densification can overwhelm public services, causing congestion and service bottlenecks. Valencia, for example, has expanded housing availability but faces growing pressure on waste management and transportation. Strategic planning and investment are crucial to maintaining livability.

Densification has not been evenly implemented, deepening regional disparities. While Barcelona and Madrid lead in urban transformation, rural and peripheral areas like Castilla-La Mancha struggle to keep pace, leading to unequal access to housing and services. Key Performance Indicators (KPIs), utilized by governments, such as population density, housing affordability, and land-use efficiency help monitor these efforts.

Periodic policy reviews, like those assessing Barcelona’s Superblock program, aim to refine strategies, yet wealthier districts tend to receive more resources, perpetuating inequality. Public opposition to densification, often driven by concerns over overcrowding and gentrification, highlights the need for inclusive, participatory planning. However, marginalized groups often lack meaningful involvement in decision-making processes.

Regulatory hurdles, including bureaucratic delays and conflicting local policies, further slow densification efforts. High land costs in cities like Madrid and Barcelona deter private investment in central areas, sometimes pushing development to peri-urban zones, inadvertently encouraging sprawl.

From an environmental justice perspective, densification supports sustainability by reducing per capita carbon emissions and enhancing public transit. However, if not carefully managed, it can exacerbate social inequities. In Madrid, the rise of luxury developments in areas like Malasaña and Lavapiés has displaced lower-income residents, highlighting the need for a balanced approach that integrates affordability with sustainable urban growth.

Impact area	Measured or potential	Description/evidence
Socio-spatial exclusion	Measured	High-density redevelopment displaces low-income residents in city centers (e.g., Madrid Río, Barcelona Superilla) (Anguelovski et al., 2023).
Affordability pressures	Measured	Rising land values in densified areas make inclusion of affordable housing difficult without regulation (Zorrotzaurre, Bilbao; Policy Lab 2025).
Limited inclusion of social housing	Measured	Densification programs often lack binding quotas for affordable units (Strategic Urban Agenda 2030).
Inequitable TOD development	Potential	Transit-oriented projects risk prioritizing market-value housing without enforceable inclusionary zoning (Interview with academic planner).

Displacement through upgrading	Measured	Combined infrastructure and densification projects indirectly displace existing low-income communities (Bouzarovski et al., 2018).
Opportunity for vertical equity	Potential	Emerging regional practices (e.g., Catalonia's INCASÒL) integrate safeguards and land readjustment for more inclusive outcomes.

Table ES18. Measured and Potential Impacts on Housing Equality (Densification)

7 Summary and discussion of results

Spain has successfully implemented **energy retrofitting programs**, improving the sustainability and efficiency of its building stock. The **PREE program** and **tax incentives** have encouraged energy-efficient renovations, particularly in aging urban areas. However, **regional disparities in implementation** persist, with wealthier regions benefiting more from subsidies than economically disadvantaged areas. Furthermore, **gentrification concerns** have emerged as retrofitting often leads to higher property values, pushing lower-income residents out of renovated areas.

Spain has made significant strides in implementing **urban greening projects**, with cities like **Barcelona, Valencia, and Vitoria-Gasteiz** leading the way. Benefits include **improved air quality, climate adaptation, and biodiversity conservation**. However, the **lack of a dedicated national budget for NBS** means that funding remains heavily dependent on **EU grants and local government initiatives**. Additionally, the phenomenon of **green gentrification** has raised concerns, as improved green spaces tend to increase property values and attract wealthier demographics, potentially displacing long-term residents.

Densification has been a **key strategy** in Spain's urban sustainability agenda, with policies aimed at **curbing urban sprawl and integrating public transit with high-density developments**. Projects such as **Madrid Nuevo Norte and Barcelona's Superblock initiative** have reshaped urban landscapes, reducing car dependency and improving environmental sustainability. However, densification has also led to **rising housing costs**, making affordability a significant challenge. **Regulatory inefficiencies and fragmented governance** have further slowed the implementation of high-density developments, particularly in economically weaker regions.

Spain's environmental and energy policies are shaped by overlapping economic, normative, institutional, and contextual factors at both national and local levels. Spain's highly decentralized governance system plays a central role: while national frameworks (e.g., NECP, Climate Law) establish broad objectives and legal parameters, implementation is largely delegated to autonomous communities and municipalities. This often leads to uneven uptake, administrative capacity, and funding absorption, particularly between wealthier and less-resourced regions. Economically, the structure of incentives—co-financing requirements, tax rebates, density bonuses—favors actors with access to capital, contributing to unequal participation in retrofit and densification schemes. Normatively, the strong focus on sustainability and urban innovation in public discourse often coexists with conflicting market

logics, where private developers prioritize profitability over affordability or equity. Institutionally, EEPs are fragmented across different ministries and levels of government, creating coordination gaps, while local authorities often rely on EU or national funds to act. Finally, contextual factors such as the ageing housing stock, high rates of homeownership, and growing social inequality directly shape how policies are received, contested, and adapted on the ground.

One important avenue for mitigating displacement risks associated with green infrastructure and urban renewal is the expansion of social and other forms of decommodified housing. While Spain's social housing stock is currently limited, particularly in rental form, there is growing recognition among experts and policymakers that ensuring affordability and tenure security must accompany green urban transitions. Interviews with housing professionals and public officials emphasized that retrofitting and urban regeneration, when driven primarily by market actors, tend to favor middle- and upper-income groups. Embedding affordability conditions into green redevelopment programs, dedicating a share of upgraded housing stock to public or cooperative housing, and expanding public land banking (as seen with INCASÒL in Catalonia) are potential tools to counteract exclusionary effects. Strengthening non-market housing mechanisms could thus serve as a structural safeguard against the unintended consequences of EEPs, particularly in gentrifying neighborhoods undergoing green and dense redevelopment.

While Spain has made substantial progress in **retrofitting, NBS implementation, and densification, socio-economic inequalities have not been adequately addressed** in policy design. Future policy efforts should:

1. **Expand financial accessibility for low-income households to participate in energy retrofitting programs.**
Current retrofit programs, such as PREE, often require high upfront co-financing and complex application processes, which create barriers for vulnerable groups. Policy revisions should include simplified procedures, targeted subsidies, and zero-interest financing mechanisms to ensure equitable access and prevent the exclusion of those most in need of energy efficiency improvements.
2. **Mitigate displacement risks associated with green infrastructure and urban renewal projects.**
Green interventions can inadvertently trigger rent increases and gentrification in upgraded neighborhoods. Urban sustainability policies must incorporate displacement risk assessments, tenant protections, and participatory planning approaches to ensure long-term residents are not pushed out as a result of environmental improvements.
3. **Integrate affordability protections into green renewal policies.**
Social housing and decommodified housing instruments should be used to anchor affordability within areas undergoing energy retrofits, greening, or densification. Mandating affordable housing quotas and supporting cooperative and public housing models can help align environmental objectives with long-term social equity goals.
4. **Improve governance coordination across national, regional, and municipal levels.**

Spain's multilevel governance system leads to fragmented implementation and uneven access to funding and technical resources. Stronger coordination mechanisms, standardized frameworks, and shared learning platforms are needed to reduce administrative gaps and support consistent policy uptake across regions and cities.

- 5. Prioritize affordability in densification efforts to ensure that urban sustainability does not come at the cost of social equity.** Urban compactness strategies must be tied to clear affordability objectives, especially in high-demand areas. Densification policies should require affordable housing components, incentivize mixed-income development, and monitor socio-spatial impacts to avoid exacerbating existing inequalities.

By refining these approaches, Spain may be able to reach their sustainability goals in a more just manner.

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NATIONAL REPORT ON THE REGULATORY SYTEM OF EEPs IN SWITZERLAND

1 Executive Summary

This report aims at providing an analysis of Switzerland's environmental and energy policies, with a focus on energy renovations of residential housing, densification and nature-based solutions (NBS). It is primarily based on an in-depth review of policies and regulations, which are analysed through a multi-level governance lens. In addition, interviews were conducted with state ministry representatives, with experts from national and cantonal organisations, the private sector, and academia. The report also includes some preliminary reflections on their implications on housing inequality.

Chapter 1 provides a general introduction. It is followed by chapter 2, which focuses on Switzerland, a small and wealthy country with a population of only about nine million. Historically, the favourable economic situation and employment opportunities have attracted large numbers of migrants, leading to a steady population growth. The country is governed under a federal system at three levels: the Confederation, the 26 cantons and the 2,172 municipalities. Being characterised by a direct democracy, Switzerland provides extensive opportunities for political participation. Over the last decades there have been dozens of popular initiatives and referenda related to housing, energy and the environment, clearly reflecting the importance of these topics in public debates.

Switzerland is a country of tenants with the lowest homeownership rate in Europe. Only 35.9% of dwellings are owner-occupied. High housing prices and the liberal rental housing market that contribute to making investments in the rental sector profitable are among the reason given for this situation. Apartment buildings constitute the majority of the rental housing stock. They are primarily owned by private individuals, private companies and pension funds. Public- and non-profit cooperative housing play an important role in some cities, but a relatively marginal one at national level.

Chapter 3 focuses on Switzerland's energy policy with particular focus on energy retrofitting of residential buildings. The Swiss government's commitment to the 1992 Climate Change Convention, the Kyoto Protocol and the Paris Agreement resulted in the passing of the CO₂ Act in 2000. This Act mandated a 10% reduction in CO₂ emissions by 2010. It also includes a provision for a CO₂ levy on fossil fuels used for heating, lighting, or electricity generation that was introduced in 2008. In 2010 Switzerland launched the Buildings Programme, which provides financial incentives for energy-efficient renovations. The programme is being implemented and is co-financed by the cantons. Concerns that energy refurbishments are contributing to the loss of affordable housing have started to emerge as costs related to property improvements—such as energy refurbishments—can be passed on to tenants in the form of rent increases.

Chapter 4 focuses on nature-based solutions (NBS). Until recently Switzerland did not use the term NBS and related policies are integrated in those focusing on biodiversity conservation,

climate change adaptation, and river restoration. In 2012 the Federal Council released the first part of its Climate Change Adaptation Strategy, which proposes enhancing green infrastructure, promoting open spaces, preventing soil sealing, and using green and shaded areas to mitigate heatwave impacts and river restoration. The 2014 Action Plan emphasized the importance of spatial planning in adapting urban areas to increasing heat stress. Municipalities, supported by cantons and federal offices, were tasked with implementing climate change adaptation and mitigation measures, with limited funding coming from the federal government. As a result, only few cities are currently programmatically implementing NBS, while smaller towns often lack a clear strategy.

Chapter 5 focuses on densification, which has been a key policy goal in Switzerland since the 2014 revision of the Spatial Planning Act, when densification became legally binding. However, the implementation of densification objectives has been rather slow as the principle of subsidiarity grants significant authority to local governments. In fact, a significant portion of new housing continues to be built on undeveloped land, particularly in rural and peri-urban areas. This trend is gradually shifting, especially in cities and tourist regions, where the combination of restrictive building zones and low interest rates has sparked a construction boom and driven up land prices. One of the key challenges of densification is its impact on housing affordability. In fact, between 2000 and 2021, the price of single-family houses increased by 80%, while rents rose by 30%. Currently, no policies specifically address the social impacts of densification. Most strategies focus on spatial issues, while socioeconomic consequences like displacement and unequal housing conditions are largely overlooked.

2 Introduction and methodology

This report aims at providing a qualitative analysis of Switzerland's environmental and energy policies, with some preliminary reflections on their implications on housing inequality. The report is based on an in-depth review of policies and regulations and eight interviews, which are analysed through a multi-level governance lens. Switzerland is not part of the EU but shares the same climate goals. The strategies towards these goals, however, are defined by national and cantonal policies, with cantons and municipalities enjoying a high degree of autonomy. Switzerland is characterised by a direct democracy; its citizens can and do exercise a strong influence on environmental and energy policies through popular initiatives or referenda. While there is an overall consensus on climate goals, the strategies towards attaining them are constantly being challenged as reflected by numerous popular initiatives, often followed by federal government's counter proposals.

The report focuses on three specific domains that are expected to play a key role in the adaptation and mitigation of climate change: energy renovations of residential buildings, densification, and nature-based solutions (NBS).

Energy efficient retrofitting includes the building envelop and the engineering system, including the replacement of windows and heating systems. In Switzerland, these measures are strongly incentivized and subsidized through the Buildings Programme (*Gebäudeprogramm*).

Densification emerged as a concept at a global level in response to the environmental debates of the 1960s and 1970s (Burgess, 2000). Advocacy for 'compact cities' aimed at transforming

urban settlements to enhance their environmental sustainability by reducing land consumption, limit commuting, and slow down urban sprawl. In Switzerland, a small and mountainous country characterised by the scarcity of buildable land and the desire for a high degree of self-sufficiency in food production, a parsimonious land use has been the main concern of spatial planning for several decades. But only since 2014 densification has become a legally binding objective for the whole country.

NBS is a term increasingly used in policy and academic circles to refer to actions that are inspired by, supported by, or copied from nature with the aim to increase urban sustainability and to improve the resilience for humans and biodiversity (European Commission: Directorate-General for Research and Innovation, 2015). NBS often aim to address climate change mitigation and/or adaptation and to combat biodiversity loss. This implies the protection, restoration, and/or management of natural and semi-natural ecosystems, management of productive land and coastal areas, and the creation of new “green” or “blue” infrastructures. In Switzerland, the concept of NBS appeared in policy documents only recently, but public concerns, political debates, popular initiatives, and local-level projects that may be labelled as NBS are not new. However, national level policies to promote NBS are rather weak with initiatives depending entirely on municipal governance. Moreover, while public debates, political concerns, and scientific literature over the negative impact of energy refurbishments and densification on an equitable and affordable access to housing in Switzerland are not new, so far links between NBS and housing inequality trends have not been explored and debated yet.

This report is based on the review of secondary data, such as information, data, thematic studies, and evaluation reports available on the website of relevant governmental agencies (e.g. those of the Federal Office of Housing, the Federal Office of Spatial Development, the Federal Office of Energy) and those related to specific programmes such SwissEnergy (*EnergieSchweiz*) and the Buildings Programme. In addition, interviews with experts from the public and private sector and academia provided insights into legislation, multi-level governance processes and the implementation of regulations. To this aim, we spoke with representatives of the SFOE, the SFOSD, the FOEN, the EnDK, EspaceSuisse, ETH SPUR, Grünstadt Schweiz and LemonConsult (see appendix). Moreover, the subjects were discussed at a PolicyLab attended by 28 participants, resulting in the provision of additional information (see appendix). Longitudinal Information on popular initiatives, direct and indirect counter-proposal and legal frameworks related to environmental and energy policies could be found on the official website of the Federal Council. As will be discussed in the following chapters, Switzerland is a federal state with its 26 cantons and 2'172 municipalities, which enjoy a high degree of autonomy, with considerable implications on the specific modalities and progress in the implementation of environmental and energy policies. These are affected by several factors, such as context specific concerns and interests, the economic situation and the overall political orientation.

The report aims at providing an overview of national policies and the system through which they are being implemented. However, it was beyond its scope to analyse the specific environmental and energy policies of each canton and municipality. Finally, the report is also based on a review of scientific literature, in particular related the impact of environmental and energy policies on housing inequality. Such literature remains relatively limited and focuses

primarily on the impact of densification in and around Switzerland's main cities (Zurich, Basel and Geneva), with only limited studies on other regions and cities. Publications on the impact of energy refurbishments on housing equity, with few exceptions, is almost exclusively limited to some research projects commissioned by Federal Office of Housing, while we could not find any scientific publication focusing on NBS and its interlinkage with sustainable and inclusive housing in Switzerland.

3 Switzerland: main socio-economic characteristics and governance system

3.1 Switzerland's socioeconomic profile

Switzerland is a small country with a size of only 41,285 km² and a population of approximately 9 million people. With the Alps occupying two thirds of its territory, but housing only 10% of the population, the country is facing a considerable pressure on its scarce land resources (EDA, 2024). Indeed, about 2/3 of Switzerland's population live in the Swiss Plateau region, which covers only 30% of its surface. 84.8% of the country's inhabitants live in areas classified as urban (BFS, 2024d).

With an annual GDP per capita of USD 92'000 in 2022 Switzerland ranks as one of the top 10 economies worldwide. Approximately 74% of Swiss GDP is generated by the services sector, 25% by industry and less than 1% by the agricultural sector (FDFA, 2024a).

Switzerland has one of the lowest unemployment rates in Europe (2.0% in 2023; Staatssekretariat für Wirtschaft SECO, 2024) and is actually experiencing a labour shortage in many sectors (Jaberg, 2024; O'Sullivan, 2024). The monthly median gross salary for full-time employees in 2020 amounted to CHF 6'665. However, there is a significant discrepancy between the salaries of lower- and higher paid jobs. In fact, the lowest-paid 10% of employees earned less than CHF 4,382 gross per month, compared with over CHF 11,996 gross per month for the highest-paid 10% (FDFA, 2024b).

The country's favourable economic situation and employment opportunities have historically attracted large numbers of migrants, in particular from surrounding European countries. As a result, Switzerland has seen a steady population growth in the last three decades, from close to seven million inhabitants in 1990 to slightly over nine million in 2024 (BFS, 2024e). 40% of Switzerland's permanent resident population have a migration background, defined by the Federal Statistical Office (FSO) as "all foreign nationals and naturalized Swiss citizens, except for those born in Switzerland and whose parents were both born in Switzerland (3rd generation), as well as Swiss citizens at birth whose parents were both born abroad" (FSO, 2024).

Switzerland is not exempt of poverty; in 2022, 8.2% of the Swiss population i.e. approximately 702'000 people were affected by income poverty. Most severely affected were people living alone, single-parents with minor children, persons with no post-compulsory education, foreign nationals from Eastern Europe or non-European countries, and those living in households with no employed person. However, in 2022, also 3.8% of all employed persons in Switzerland

were affected by poverty, corresponding to 144'000 persons. Employed persons particularly affected by poverty are those who worked for only part of the year, self-employed persons, persons with a temporary contract and persons employed in small businesses (FSO, 2023).

On average, Swiss households spend 13.8% of their gross income on housing and electricity, 7.7% on transport, 6.3% on food and non-alcoholic beverages and 6.6% on compulsory health insurance (BFS, 2024c).

3.2 Switzerland's governance system

Switzerland is governed under a federal system at three levels: the Confederation, the 26 cantons and the 2,172 municipalities. The country is governed by the Federal Council, a seven-member collegial body whose decisions are made by consensus. Accordingly, left, right, and centrist parties all share executive power. Members of the Federal Council are traditionally drawn from the ranks of the four parties with the largest share of popular votes: the (right conservative) Swiss People's Party (SVP), the Social Democratic Party (SP), the Centre (an alliance of the Christian Democratic People's Party (CVP) and the Conservative Democratic Party (BDP)) and The Liberals (FDP). There are also parties, such as for example the Green Party and the Green Liberal Party, which are not represented on the Federal Council but have representatives in the Swiss Parliament (FDFA, n.d.). Federal councillors are elected by the national parliament, the Federal Assembly.

Each federal councillor (sometimes also referred to as minister) is assigned a department, which is further divided into several federal offices. Particularly relevant to our project is the Federal Department of the Environment, Transport, Energy and Communication (DETEC), which includes, among others, the Swiss Federal Office of Energy (SFOE) and the Federal Office for the Environment (FOEN). Equally relevant to our project is the Federal Office for Housing (FOH), under the Federal Department of Economic Affairs, Education and Research (EAER).

The Federal Assembly consists of an upper and a lower chamber. The National Council (200 members) is the lower house and represents the people. The Council of States (46 members) is the upper house and represents the cantons. Delegates from eleven different parties set forward their views in the current parliament. Switzerland has several more political parties, but some are only active at the regional level. Members of the parliament (both chambers) are elected every four years.

3.3 Switzerland's direct democracy and its impact on housing, energy and environmental policies

Since becoming a federal state in 1848, Switzerland has been characterised by a direct democracy providing expanded opportunities for democratic participation. Along the usual voting rights accorded in democracies, the Swiss people also have the right to launch and vote on referenda and popular initiatives. Popular initiatives allow citizens to propose changes to the Swiss Federal Constitution. If an initiative gathers enough support, it is put to a nationwide vote. To launch a popular initiative, citizens must collect at least 100,000 valid signatures from

eligible voters within 18 months. Once the required signatures are collected and verified, the initiative is examined by the Federal Assembly, which may either accept the proposal, reject it, or put forward a counter-proposal. If the initiative proceeds to a nationwide vote, it requires a double majority to pass: the majority of voters across the whole country (the popular majority) and a majority of the cantons (the cantonal majority). Each canton, regardless of its population, has one vote, so even small cantons have an equal say in the final decision. If both conditions are met, the initiative becomes law.

A counter-proposal is an alternative proposal that either modifies the original initiative or offers a different solution to the issue at hand. A counter-proposal can be presented alongside the original initiative in a nationwide vote, giving the public the option to choose between the initiative, the counter-proposal, or reject both. If the counter-proposal is accepted but the original initiative is rejected, the counter-proposal may still become law if it also receives majority support from the voters and the cantons.

Referenda are another critical component of Switzerland's system of direct democracy. Through a referendum, citizens can challenge laws or legal provisions that have already been passed by Parliament. This allows people to stop or amend legislation they disagree with. To call for a referendum, 50,000 valid signatures must be collected within 100 days after the law is passed. If enough signatures are gathered, a national vote is held, and the citizens decide whether the law should stand or be repealed. Like the popular initiative, a referendum also requires a double majority: the majority of voters and the majority of the cantons must approve the decision for it to be valid. The voting system in Switzerland ensures that both the majority of the population and the majority of cantons are involved in decision-making. This dual majority aims at protecting the interests of both larger urban areas and smaller rural regions.

Overall, Switzerland's system of direct democracy empowers citizens to influence the country's laws, ensuring that government decisions reflect the will of the people. Whether it is through a popular initiative to amend the constitution, a referendum to challenge a law, or a counter-proposal to offer an alternative solution, these mechanisms give Swiss citizens a substantial role in shaping their nation's future.

Over the last few decades issues related to housing, energy and the environment have been subject to several popular initiatives, clearly reflecting the importance of these topics in public debates. For example, in 2015, the popular initiative "More Affordable Housing" (*Mehr bezahlbare Wohnungen*) was launched. It aimed at making housing more affordable by promoting the construction of affordable housing, improving tenants' rights and limiting speculative practices in the housing market by introducing a right of first refusal for public authorities. The initiative was supported by the Swiss tenants' association and several progressive political groups. However, it was rejected by the majority of voters in a popular vote held in 2020.

Also launched in 2015, the popular initiative "Stopping urban sprawl - for sustainable settlement development" (*Zersiedlung stoppen – für eine nachhaltige Siedlungsentwicklung* (*Zersiedlungsinitiative*)) raised concerns about the environmental consequences of urban sprawl and demanded to further limit building zones. Due to the recent revision of the Spatial Planning Act (SPA, *Raumplanungsgesetz*, revised in 2014), the issue was not considered

urgent enough to convince a majority of the voters and was accordingly rejected in 2019. The partial revision of the SPA in 2014 proposed by the Federal Council had itself been triggered by the popular initiative “Space for Human and Nature” (*Raum für Mensch und Natur (Landschaftsinitiative)*) in 2013. The original motion sought to freeze the spreading of building zones, aiming to curb urban sprawl.

In 2003, the popular initiative “Yes to fair rents” (*Ja zu fairen Mieten*) aimed to tighten the regulation and contestability of rents and to improve tenants' rights. It was rejected by the electorate.

The years before the 2000s saw a number of initiatives raising demands on stricter rent control, more affordable housing, land use regulations, and measures against speculation in the housing market. For example, in 1986, the Swiss population called for an improvement of the tenant's rights with a popular initiative titled “For the legal protection of tenants” (*Für den Mieterschutz*), causing a counter-proposal by the federation, which was accepted in 1987. It was followed by the “Urban-rural Initiative against land speculation” (*Stadt-Land-Initiative gegen die Bodenspekulation*) in 1988, which addressed rising land prices, but was rejected by the voting majority.

Switzerland is a liberal-conservative country. Accordingly, progressive initiatives are typically rejected by voters. However, in some cases led to accepted counter-proposals by the government, thus nevertheless leading to some policy changes. However, because of Switzerland's system of subsidiarity, in which the responsibility for implementing federal spatial planning decisions lies with cantons and municipalities, many initiatives address issues at the local level. Housing initiatives, targets for a minimum proportion of affordable housing, and land conservation initiatives, have attempted to secure affordable housing in many municipalities. Likewise, active spatial policies are also implemented locally.

Over the years, Switzerland has also seen a significant number of popular initiatives related to a wide range of environmental issues, including climate change, conservation of natural resources, biodiversity, and pollution control. For example, the recently withdrawn “Glacier Initiative” (*Für ein gesundes Klima (Gletscherinitiative)*) sought to achieve net-zero carbon emissions in Switzerland by 2050, aligning the country's policies with the goals of the Paris Agreement. The Federal Council decided on an indirect counter-proposal for a new climate law (*Klimagesetz*), which was accepted by almost 60% of the population in a referendum in 2023. This law sets a net-zero carbon target for 2050 and mobilises subsidies for climate-neutral energy sources.

The popular initiative “For a sustainable and resource-efficient economy” (*Für eine nachhaltige und ressourceneffiziente Wirtschaft (Grüne Wirtschaft)*) focused on sustainable production, waste reduction, and the efficient use of resources and aimed at a better regulation of the economy on these issues. It proposed new measures to integrate environmental sustainability into economic decision-making, but was rejected by the voters in 2012.

As shown, also the initiatives aiming at a stronger climate protection, are generally rejected by the Swiss voters but have triggered fierce public debates around these topics and in some instances nevertheless had an influence on related policies, in particular in cases where public support for the cause was strong.

An overview of all popular initiative held in Switzerland between 1893 and today is provided online by the Swiss Federal Chancellery.

3.4 Switzerland's housing system

Switzerland is a country of tenants with the lowest homeownership rates in Europe. Currently only 35.9% of dwellings are owner-occupied (Bundesamt für Statistik, 2024b). Several reasons explain this low rate of homeownership such as the very high prices of residential real estate (Bourassa & Hoesli, 2010), a relatively liberal rental housing market with a relatively weak protection of tenants (Debrunner, Kolocek, et al., 2024). These factors contribute to making investments in the rental sector profitable, even though rents can only be increased in case of a proven increase of operation and maintenance costs or interest rates (Bourassa et al., 2010, p. 270). This leads to higher investments in the construction and maintenance of rental units than in other countries, with the result that these have a quality comparable to owner-occupied housing (BWO, 2005). Furthermore, as pointed out by Bourassa et al. (2010, p. 269), income tax rules in Switzerland are not particularly favourable to home ownership due to the imputed rent system. However, the tax value of a property for wealth taxation purposes is generally significantly below its market value.

Another factor that may have contributed to the low share of homeownership is related to the fact that a legal framework for condominium ownership was introduced in Switzerland only in 1965. As a result, in urban areas characterised by a relatively old multifamily housing stock, homeownership rates remain very low (BWO, 2005).

There are significant differences in the homeownership rates between urban and rural areas. In several predominantly rural cantons more than 50% of the households own their dwelling, but the highly urbanised cantons of Geneva and Basel-City, for example, have homeownership rates of only 18.9% and 15.5% respectively. In the city of Zurich, over 90% of the households do not own the dwelling in which they reside (BFS, 2024a).

Currently, Switzerland counts close to 1.8 million residential buildings and 4.8 million dwellings (Bundesamt für Statistik, 2024c). Each year between 30'000 and 50'000 new dwellings are being built to meet the demand of a growing population and a shrinking average household size. On average each dwelling is inhabited by approximately 1.9 persons. While the per capita consumption of space in 1980 was 34 m² in 1980, it increased to an average of 46.5 m² in 2023 (BFS, 2024b).

About 18.7% of Switzerland's dwellings were built before 1919, 42.1% between 1913 and 1980 and 39% in the past 44 years, i.e. after 1980. Detached single family privately-owned houses prevail in sub-urban and rural areas. At national level, 23% of Switzerland's inhabitants live in this housing typology and another 11.2% in semi-detached or terraced houses. The majority of the rental housing stock in cities consists of apartment buildings. 37% of the country's inhabitants live in apartments buildings with less than 10 dwellings, and 25% in larger ones. Apartment buildings are primarily owned by private individuals and to a lower degree by private companies and pension funds. Public rental housing and non-profit housing owned either by cooperatives or by public and private foundations constitute a significant category of owners in some cities but play a relatively marginal role at national level. Public housing is generally subsidized and targeting socioeconomically disadvantaged households, while housing

cooperatives are committed towards non-profit and non-commodifiable housing for their members, regardless of their socioeconomic status.

Whereas most European countries define housing costs as burden when they exceed 30% of the gross income, in Switzerland a housing costs are considered a burden for lower income people when they exceed 25% of their disposable income. On average, households in Switzerland spend an average of 20% of their disposable income on housing, but for large share of lower-income people, single parents, and foreign-born households they often exceed 30% of their disposable income¹⁶⁹.

	Housing	Housing Retrofitting	NBS	Densification
National level	<i>Responsible for the promotion of adequate and affordable housing for all</i> Federal Office for Housing (FOH) - Financial tools for non-profit sector - Federal tenancy law	<i>Responsible for reduction of Co2 emissions and decarbonisation</i> Swiss Federal Office of Energy (SFOE) - Financial tools - Support and initiative for Innovation - Objectives for energy efficiency and decarbonisation	<i>Responsible for the protection of ecologically valuable landscapes and strategies in climate adaption and biodiversity</i> Federal Office for the Environment (FOEN) - Financial tools for pilot-projects - Objectives for biodiversity and climate adaptation	<i>Responsible for sustainable land use and the differentiation of building- and non-building zones</i> Federal Office for Spatial Development (SFOSD) - Laws - Objectives sustainable land take - Technical guidelines
Cantonal level	<i>Responsible for the regulations, implementation and subsidy schemes</i> - Cantonal tenancy law - Cantonal housing policy¹⁷⁰: e.g. Subsidy programmes, promotion and consultancy, rent control)	<i>Responsible for the regulations, implementation and subsidy schemes</i> - Cantonal regulations and objectives - Cantonal financial tools¹⁷¹: e.g. Subsidy programmes, promotion and consultancy	<i>Responsible for the implementation of national policy</i> - Cantonal objectives - Structure planning - Ecological compensation	<i>Responsible for the implementation of national policy</i> - Cantonal spatial planning (regulation of building zones) - Building law (PBG)

¹⁶⁹ For details see Widmer, Hannah et al. 2024. National report on housing inequality: Switzerland ReHous In Deliverable D2.1.

¹⁷⁰ Housing is a cantonal competence, however only 9 out of 26 cantons have local instruments for housing promotion. These tasks and policies can therefore be considered voluntary. The same goes for municipal housing policy.

¹⁷¹ The cantons can decide whether to promote energy retrofitting. However, they need a cantonal subsidy programme to access federal contributions. Also, municipal programmes are voluntary

	<i>Responsible for the implementation of cantonal policy and additional local policy</i>	<i>Responsible for the implementation of cantonal policy</i>	<i>Responsible for the implementation of cantonal policy and additional local policy</i>	<i>Responsible for the implementation of cantonal policy</i>
Municipal level	- Local housing policy: local regulations, local subsidy programmes, promotion and protection of affordable housing (e.g. non-profit housing, quotas for non profit housing, special land use plans, utilisation planning)	- Local energy policy: local regulations, local subsidy programmes, construction permits	- Municipal utilisation plan - Local subsidy programmes¹⁷²	- Municipal utilisation plan - Municipal zoning- and building regulation (BZO) - Re-zoning and compensation - Adaption of infrastructure

Table CH1. The organisation of competences for ecological transitions and housing policies at different governance levels.

4 Housing retrofitting

4.1 The policy cycle: emergence of the issue and policy decisions

The public promotion of housing retrofitting in Switzerland has a long history dating back to the 1973 oil crisis to which the Swiss Federal Council and the parliament responded by comprehensively reorganising the country's energy policy. For the first time the issue was raised that houses should be better insulated and not excessively heated. The oil crisis, compounded by the first public discussions triggered by the publication of 'Limits to Growth' by the Club of Rome (Meadows et al., 1972), led to a gradual rethinking on the way energy was used. It further enhanced awareness on the dependence on imported energy sources (Gisler, 2022).

Perhaps the most important measure taken by the Federal Council in 1974 was to set up the 'Federal Commission for an Overall Energy Concept'. This commission was tasked with identifying the direction of Switzerland's energy policy and investigating whether it might be necessary to extend federal competences in this domain. The report presented by the commission in 1978 formulated three goals for a future energy policy: an adequate and secure energy supply, the guarantee of economically optimal energy prices, and the protection of people and their environment. It further recommended that the federal government should incorporate an energy article into the Constitution with the aim of creating the foundations for a more active federal energy policy. After prolonged debates, Article 89 (Energy Article/*Energieartikel*) was finally added to the Swiss Constitution in 1990. It stipulates that, within the framework of their responsibilities, the federal government and the cantons must

¹⁷² Municipalities have the discretion to implement support for NBS measures. However, such programs remain voluntary at the municipal level.

establish the necessary prerequisites for securing an adequate, comprehensive, safe, economic, and ecological energy supply, and ensure an efficient and parsimonious energy use. The article also states that measures related to the energy use of buildings are mainly the responsibility of the cantons, even though the national government is strongly involved in the promotion of energy refurbishments. The next sub-section will therefore trace the development of energy efficiency policies at the federal level, and in the subsequent sub-section, we focus on the Buildings Programme (*Gebäudeprogramm*), i.e. on the most important instrument through which Switzerland is promoting energy refurbishments of its housing stock.

Switzerland's energy efficiency policies

Following the addition of the Energy Article to the Swiss Constitution in 1990, the Federal Council launched Switzerland's first energy policy in 1991. The programme "Energy 2000" (*Energie 2000*) aimed to promote a rational use of energy and renewable energies through voluntary measures. This programme was followed by the SwissEnergy (*EnergieSchweiz*) programme in 2001, which specifically focuses on energy efficiency of buildings. Up to date SwissEnergy remains Switzerland's central platform for information on energy efficiency, renewable energies and refurbishment (BFE, 2024b).

After the Energy Article passed, the Federal Assembly also began working on the Energy Act (*Energiegesetz*). Related debates were heated and continued for years, with the result that the Energy Act only came into force in 1999 (Zünd, 2019). The Act is legally binding and requires cantons to regulate energy use and renewable energy sources, for both new and existing buildings (Bundesversammlung, 1998).

Switzerland's energy policy does not only reflect awareness of energy being a scarce resource but also its commitment towards the Climate Change Convention which was approved at the 1992 Earth Summit in Rio de Janeiro and came into force on 21 March 1994 (United Nations, 1992). However, it soon became clear that the provisions of the Convention were insufficient and as a response, the Kyoto Protocol was passed in 1997. In the Protocol, the participating industrialised countries committed to reduce their greenhouse gas emissions between 2008 and 2012 by an average of 5.2% in comparison to 1990. Switzerland made the same formal commitment as the European Union to reduce greenhouse gas emissions by an average of 8% between 2008 and 2012 (BAFU, 2023c).

In response to its commitments made to the Kyoto Protocol, the Swiss government passed the CO₂ Act (*CO₂-Gesetz*), which came into effect in 2000 and is legally binding. The law mandates a 10% reduction in CO₂ emissions by 2010, relative to the 1990 levels (BAFU, 2000). It also includes a provision for a CO₂ levy on fossil fuels used for heating, lighting, or electricity generation (excluding gasoline and diesel), to be introduced after 2004, should other reduction measures fail to meet the targets. The CO₂ levy was ultimately introduced in 2008 and has been increased several times due to the shortfall in achieving the reduction goals (BAFU, 2020).

In 2010, the launch of the Buildings Programme (*Gebäudeprogramm*) marked a significant step in Switzerland's energy and climate policies by offering financial incentives for energy-efficient renovations. This federal-cantonal partnership, partially financed through the CO₂

levy, aims to reduce heating energy consumption and to improve insulation standards across the country (BFE, 2023)¹⁷³.

Following the nuclear catastrophe of Fukushima, the Federal Council introduced the Energy Strategy 2050 (*Energiestrategie 2050*), a long-term vision focused on phasing out nuclear power and increasing renewable sources, such as solar and wind energy. Retrofitting buildings became a key component of the strategy to curb energy consumption and emissions within the housing sector. As part of the new Energy Strategy 2050, the Energy Perspectives 2050 were developed as political guidelines and the revision of the Energy Act (see below) was advanced (BFE, 2013, 2018).

On the international front, the 2015 Paris climate conference led to an agreement for the post-2020 era that committed all states to reducing their greenhouse gas emissions and largely eliminated the previous distinction between industrialised and developing countries. Switzerland ratified the Paris Agreement in October 2017, thereby committing to halve its emissions to 1990 levels by 2030, partially through international emissions reductions.

In 2016, the 1999 Energy Act dating was revised. The updated law, which came into force in 2018, sets clear targets for expanding electricity generation from renewable sources. It also includes an interim target of reducing per capita energy consumption by 43% by 2035. (Federal Assembly, 2018). With this revision, the Federal Assembly also decided to extend the Buildings Programme (Eidgenössisches Departement für Umwelt, Verkehr, Energie und Kommunikation UVEK, n.d.).

In 2021, Switzerland enacted its “Long-Term Climate Strategy 2050” (*Langfristige Klimastrategie 2050*), a comprehensive and binding roadmap to achieve net-zero greenhouse gas emissions by 2050 (FOEN, 2023). A major focus of this strategy is the buildings sector, aiming at reducing greenhouse gas emissions from the existing building stock to zero by 2050. This will require a swift change in energy refurbishment practices, as many existing oil and gas heating systems continue to be replaced with new fossil-based systems, undermining the long-term goals of the Climate Strategy (Federal Council, 2021).

The Energy Perspectives 2050+ (*Energieperspektiven 2050+*), adopted in 2021, outlines Switzerland's long-term energy policy and serves as basis for decision making. The report presents two main scenarios: ZERO and BAU (business as usual), with the ZERO scenario further divided into several subvariants. All ZERO scenarios aim to achieve net-zero greenhouse gas emissions by 2050, in line with Switzerland's climate goals, while ensuring a secure and stable energy supply. The overarching strategy calls for a reduction in energy consumption across all sectors, along with the replacement of carbon-intensive energy sources with renewable alternatives. The strategy highlights significant reductions in energy consumption for space heating despite an increase in the energy reference area for housing. The goal is that 95% of Switzerland's households will be heated with heat pumps or district heating by 2050 (BFE, 2021).

A proposed revision of the CO₂ Act sought to establish more ambitious climate targets, including stricter regulations for buildings. This included additional taxes on fossil fuel heating

¹⁷³ Further details on the Buildings Programme are provided in Section 0.

systems, the creation of a climate fund, and further incentives for renewable energy retrofitting. However, the revision was rejected in a popular vote in June 2021, largely due to concerns about increased costs for households and businesses. This vote marked a setback for Switzerland's climate policy, in particular in the relation to the effort to accelerate retrofitting in the building sector (BAFU, 2021).

In 2019, a popular initiative "For a healthy climate (Glacier Initiative)" (*Für ein gesundes Klima - Gletscher-Initiative*) called for a ban on the use of fossil fuel by 2050. In response, the Federal Assembly and the Federal Council developed an indirect counterproposal, the "Climate and Innovation Act" (*Klima- und Innovationsgesetz*) which was passed in 2023 and came into force in January 2025. This Act legally enshrines Switzerland's commitment to reaching net-zero greenhouse gas emissions by 2050. In the buildings sector, it sets a target for an 82% reduction of emissions by 2040, with a complete decarbonization by 2050. The Act also introduces a Stimulus Programme (*Impulsprogramm*) that complements the Buildings Programme with additional subsidies. The specific measures and subsidies to support this transition are outlined in the Climate Protection Ordinance (*Klimaschutzverordnung*) and in the Energy Ordinance (*Energieverordnung*) which are both legally binding (BFE, 2023; Bundesversammlung, 2022).

The Swiss Engineers and Architects Association (SIA) set a new building standard called Climate Path (*Klimapfad*, SIA 390/1) in 2025 to limit CO₂ emissions in the building sector. As a holistic consideration of construction, operation and induced mobility over the entire life cycle of buildings, it allows to evaluate and compare new developments and retrofits. The SIA's standards are highly influential in the construction industry, and the association plays an important role in political decision-making (Ménard, 2025).

In addition to national policies and initiatives, certifications with national and international labels have a growing impact on energy efficient refurbishments. Especially for international investors, green labels are important cachets to persist with a portfolio in an EU wide market. In Switzerland, the most important certification for sustainability is the Sustainable Building Standard Switzerland SNBS (*Standard Nachhaltiges Bauen Schweiz*) which was originally developed for new buildings but is increasingly applied also to refurbishments. The SNBS covers social, economic, and ecological sustainability. Labels are voluntary instruments that can also be applied only partially. They entail benefits like increased density (Representative of Lemon Consult AG, personal communication, May 7, 2025).

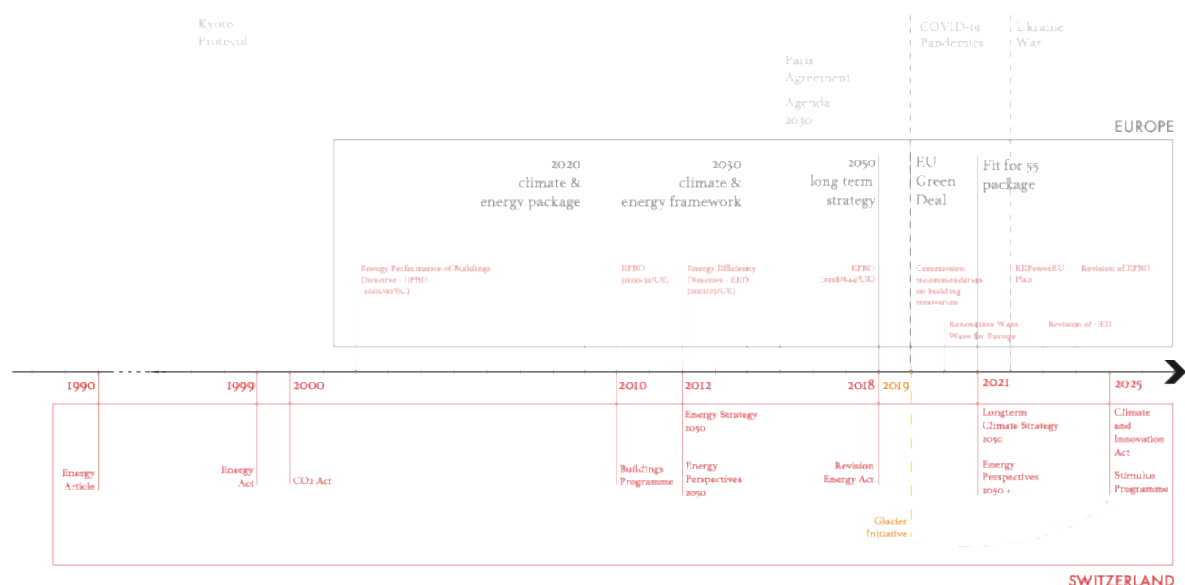


Figure CH27. Timeline of policies, initiatives and strategies regarding energy refurbishments in Switzerland

The Buildings Programme

In Switzerland, buildings are responsible for over 40% of energy consumption and around a third of the CO₂ emissions. It is estimated that currently more than one million houses have little or no insulation and are therefore in urgent need of energy-efficient refurbishment. In addition, more than 60% of all residential buildings are still heated with fossil fuels or conventional electricity (Bundesamt für Statistik, 2024a). According to official estimates, in a significant portion of buildings better insulation can reduce heating requirements by more than half. Furthermore, by switching from fossil-fuelled heating to renewable energies, CO₂ emissions during operation can be reduced to almost zero (EnDK & Bundesamt für Energie BFE, 2024).

The Buildings Programme was launched in 2010 with the aim to reduce the energy consumption of the building stock and to cut CO₂ emissions. It provides financial subsidies to the owners of any type of building for energy refurbishments (e.g. replacement of windows, replacement of the heating system, and insulation of walls and roofs). The current Buildings Programme builds upon a previous building programme that was implemented until 2009 with public support by the Stiftung Klimarappen (Interface Politikstudien Forschung Beratung & Ernst Basler + Partner AG, 2010). With the revision of the Energy Act 2018, the Federal Assembly decided to continue the Buildings Programme (Eidgenössisches Departement für Umwelt, Verkehr, Energie und Kommunikation UVEK, n.d.).

The federal subsidies provided through the Buildings Programme only apply if the respective canton also has a financing program for energy refurbishments. Details of the subsidy schemes' implementation are explained in section 3.2. As previously mentioned, the Buildings

Programme is complemented by the Stimulus Programme that was introduced under the Climate and Innovation Act. This temporary subsidy programme is designed to address areas where existing subsidies are insufficient and will run for ten years. It primarily aims at fostering the replacement of fossil fuel heating in multi-family buildings and electric heating systems with renewable alternatives. In total, a credit of 2 billion CHF were allocated to the Stimulus Programme (Das Gebäudeprogramm, 2024b).

4.2 The implementation process

As mentioned in the previous sections, housing retrofitting in Switzerland is primarily taking place with the support of the Buildings Programme, which is a joint initiative of the confederation and the cantons. Funding is provided through a partial earmarking of the CO₂ levy at the federal level, as well as contributions from the cantons. Since 2010, one third of the revenue from the CO₂ levy has been invested in measures to reduce CO₂ emissions from buildings. This funding is capped at CHF 450 million per year and is distributed to the cantons as an overall federal contribution. To receive this contribution, a canton must have a programme in place that promotes energy-efficient building renovations, including improvements to building envelopes and building technology, as well as the replacement of electric and oil heating systems.

The federal contribution is divided into two components: a basic contribution per inhabitant and a supplementary contribution. The basic contribution can account for up to 30% of the available funds. The supplementary contribution is limited to twice the amount the canton has approved for its own programme. The funds provided by both the Confederation and the cantons support a variety of energy-related measures, including the insulation of roofs and façades, the utilisation of waste heat and the use of renewable energies (BFE, 2024c). According to a representative of the BFE, the buildings programme primarily aims to promote energy efficiency and, secondarily, decarbonisation, as related measures create greater deadweight effects (Representative of SFOE, personal communication, May 8, 2025).

While cantons are free to determine which measures to support and under what conditions, the Conference of the Cantonal Energy Directors (*Konferenz der Kantonalen Energiedirektoren*, EnDK) has developed the “Harmonised Promotion Model of the Cantons” (*Harmonisiertes Fördermodell der Kantone*, HFM), which offers a standardized framework for developing cantonal subsidy schemes. Nevertheless, each canton is entitled to customise its programme based on regional needs and available financial resources. The first version of the HFM of 2003 was revised in 2007, 2009 and again in 2015 to reflect new policies, developments and evaluations of the Buildings Programme (BFE & EnFK, 2016). In some cantons, regulatory tools have been introduced, like the forbidding of the replacement of obsolete heating systems with fossil fuel heating systems (Zurich, Basel Stadt, Geneva, Neuenburg).

Additionally, the cantons have jointly developed the “Cantons’ Model Regulations in the Energy Sector” (*Mustervorschriften der Kantone im Energiebereich*, MuKE) which set guidelines for energy use for both new and existing buildings. These regulations have been periodically updated since 1992, with the most recent version dating from 2014. Also the MuKE can be adapted by the cantons to their specific needs and incorporated accordingly into their canton-

specific legislation (Konferenz Kantonaler Energiedirektoren, 2018). However, according to EnDK, the requirements of most of the 26 cantonal energy laws are practically identical, which explains why the Swiss building stock is relatively homogeneous in terms of energy efficiency. (Representative of EnDK, personal communication, May 8, 2025).

An evaluation of the Buildings Programme for the phase from 2010 to 2014 revealed that its impact was below expectations, suggesting that meeting targets in the buildings sector will be challenging. Data collected by the BFE suggests that funds are actively used by larger, more affluent real estate owners (Representative of SFOE, personal communication, May 8, 2025). Some cantons reduced their budgets, which affected the federal contributions, while in others, demand for subsidies was lower than anticipated (Bundesrat, 2016). However, since 2016, the federal funding for the Buildings Programme has increased significantly, from slightly over CHF 150 million to CHF 425 million in 2022, hinting at a growing momentum for energy refurbishments. Indeed, energy renewal rates between 2011 and 2020 were around 40% to 50% higher than in the previous decade (BFE, 2024a). However, even though representatives of several administrative levels emphasize the importance of the Buildings Programme to attain climate goals, a drastic reduction of its funding is currently under discussion (Representative of EnDK, personal communication, May 8, 2025), (Representative of SFOE, personal communication, May 8, 2025).

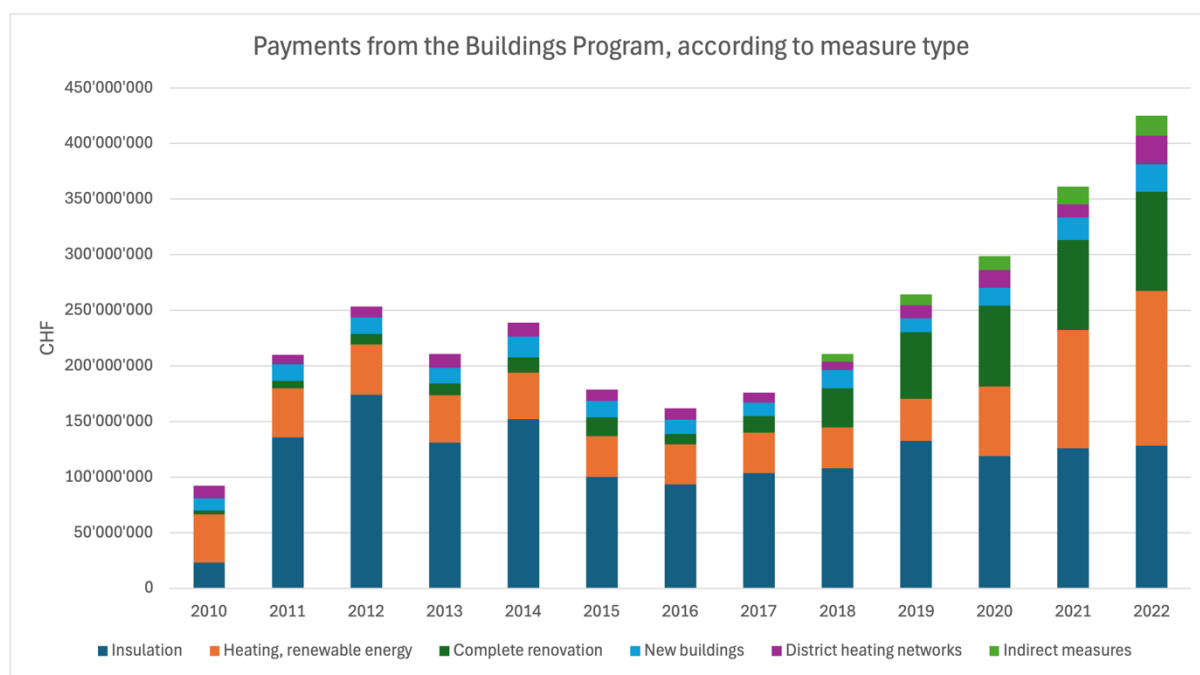


Figure CH28. Federal payments for the Buildings Programme by measure type, in CHF. Source: MURE Database (2023).

4.3 Size and role of the market

The energy refurbishments benefit from significant public support; over 3.6 billion francs in subsidies have been disbursed under the Buildings Programme between 2010 and 2023 (Das

Gebäudeprogramm, 2024a). Subsidy payments in 2023 alone totalled CHF 528 million. Private market actors (specialized consultants and the building industry) play a key role in the implementation of energy refurbishments. The building sector also supports SwissEnergy financially and has a strong lobby for maintaining the Buildings Programme (Representative of SFOE, personal communication, May 8, 2025). Indeed, according to a recent official publication, so far the Building Programme had an employment effect of 3025 man-years (EnDK & Bundesamt für Energie BFE, 2024). Accordingly, it may be said that the Buildings Programme has been quite successful in the creation of green jobs, in line with the objectives of the European Green Deal.

However, apart from incentives and funding, there are also market-related factors that affect real estate owners' decision-making about energy retrofitting. For example, the currently unpredictable energy prices strongly building owners' attitudes towards refurbishments. Fluctuating energy pricing undermine a reliable planning of renewable energy systems, leading to a slowdown of retrofitting (Representative of EnDK, personal communication, May 8, 2025).

As subsidies only cover a fraction of the refurbishment costs, homeowners typically rely on private financing mechanisms such as mortgages or construction loans for retrofitting projects. Banks set a credit limit based on available equity, generally applying an 80/20 equity-to-loan ratio (hausinfo, 2024). Financing depends on the potential to increase the value of a property or to achieve energy savings. The public sector plays a crucial role through subsidies in supporting retrofitting projects that align with sustainability goals, but that are not immediately economically viable because, for example, the initial investment is high, or not all external costs are calculated correctly. Ideally, these public funds enhance market-based financing, incentivizing homeowners to pursue energy-efficient renovations (BFE, 2024b).

4.4 The multilevel governance process

Switzerland's direct democracy and federal system plays an important role in the climate debate, as shown once again when the revision of the CO₂ Act was rejected by the majority of the voters in 2021. The governance of housing retrofitting policies is based on a multilevel system. The cantons are primarily responsible for reducing the energy consumption in buildings and hence for the implementation of the Buildings Programme and are also in charge of processing and approving the funding applications.

As mentioned earlier and illustrated in Figure 3, the funds for the Buildings Programme come from federal as well as cantonal sources: a share of the CO₂ levy (federal contribution) and cantonal contributions. Cantonal contributions range from CHF 130 to 200 million annually, while federal contributions from the CO₂ levy total up to CHF 450 million annually, with an average of CHF 400 million (BFE, 2023). The federal support consists of a basic contribution and a supplementary contribution which can be twice as high as the funds approved by the respective canton. This structure incentivizes cantons to allocate higher budgets, as larger cantonal contributions result in higher federal funding. Additional cantonal funding programs beyond the Buildings Programme are also possible (BFE, 2024c).

As argued by an energy expert, there is a fundamental social equity problem with the programme as it provides public funding in the form of subsidies to private landlords that enhance the value of their property, which in turn enable them to increase rents. However,

social problems that such refurbishments may cause, such as evictions and unaffordable rents for the most vulnerable people have to be absorbed by the state (Representative of SFOE, personal communication, May 8, 2025). Furthermore, the Buildings Programme does not include any social criteria in defining subsidy entitlements, thus externalising its eventual negative social impacts.

Additional subsidy programmes, complementing the federal and cantonal programmes, can also be put in place at the municipal level. Predominantly larger municipalities and cities have launched their own subsidy programmes for energy refurbishments. For example, the city of Zurich provides additional subsidies for the replacement of heating systems, photovoltaic systems, and building renovations (Stadt Zürich, 2024a). But also smaller municipalities such as for example Amriswil in the canton of Thurgau with a population of 14,300 in 2023 (Kanton Thurgau, 2024) have their own local funding for EEP programmes. In addition to building renovations, they support for example battery storage, charging infrastructure, cargo bikes, bike trailers, and greening of roofs and facades (Stadt Amriswil, 2024). The online platform Energy Franc (*Energiefranken*), supported by the Electricity Provider of the Canton of Zurich (*Elektrizitätswerke des Kantons Zürich*, EKZ), provides a comprehensive overview of subsidy schemes at different levels of government.

Besides federal, cantonal, and municipal offices for energy, other important actors in the energy refurbishment sector are the “Conference of the Cantonal Energy Directors” (EnDK – Konferenz der Kantonalen Energiedirektoren), which assembles the cantons in the energy and climate sector at government level, the specialist level Conference of Energy Agencies (EnFK – Energiefachstelle Konferenz), and the “Conference of Heads of Environmental Protection” (KVU – Konferenz der Umweltämter). These bodies jointly develop and coordinate the cantons’ energy and climate policy activities, such as for example the HFM and the MuKEN (EnDK & Bundesamt für Energie BFE, 2024). They are important because, as was mentioned, energy policy, building policy and the specifications for energy standards in the construction industry are cantonal competences.

In most cantons, strategies, concepts, guidelines or planning reports on the canton's energy and climate policy with concrete objectives and action plans – including rules on which measures are subsidised by the Buildings Programme – have been developed only in recent years, based on the MuKEN. Targets are defined based on the objectives of federal legislations in the energy and CO₂ domain, among others. Despite extensive guidelines, a study commissioned by WWF Schweiz found that the implementation of energy and climate policies in the building sector varies significantly across cantons. While the canton of Basel-City has adopted exemplary policies (fulfilling 4 out of 5 points), 11 cantons only fulfil 2 out of 5 points, while none of the cantons is implemented a policy fully in line with the Paris Agreement (EBP Schweiz AG, 2019).

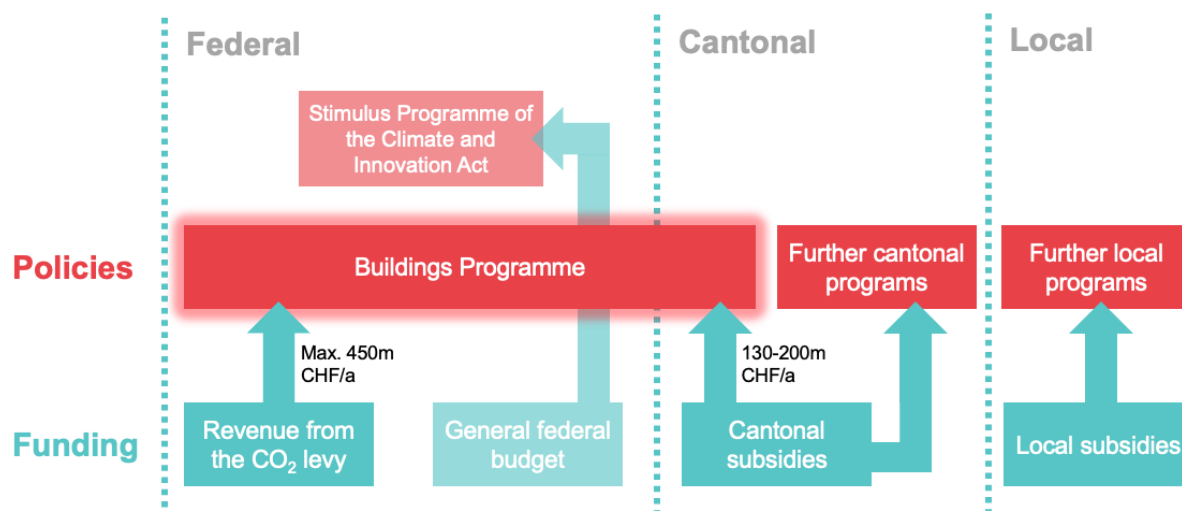


Figure CH29. Multilevel governance process of the Buildings Programme. Source: authors' own

Sector	Level of governance	Name	Role	Date of appearance
Public	National	Federal Office of Energy (SFOE)	Implementation of federal energy policies	1907
Public	National	Federal Office for the Environment (FOEN)	Implementation of federal climate policies	1971
Public	Cantonal	Cantonal offices of energy	Implementing their canton's energy policies	late 1970s-early 1980s, depending on Canton
Public	National	Conference of Heads of Environmental Protection (KVU – <i>Konferenz der Umweltämter</i>).	Promotion of sustainable development, including energy efficiency initiatives. Coordination of environmental policies across cantons; fostering collaborations between cantons and other stakeholders.	1976
Public	National	Conference of the Cantonal Energy Directors (EnDK – <i>Konferenz der Kantonalen Energiedirektoren</i>), EnDK	Development of common guidelines for cantonal energy policies and frameworks for regulating energy use in existing and new-built buildings	1988
Public	National	Conference of Energy Agencies (EnFK –	Connect energy experts across the country, provide support to energy offices, ensure that local and	1997

		<i>Energiefachstelle Konferenz</i>	regional energy initiatives align with national goals.	
Public	Cantonal	EKZ (Energieversorgung Zürich/Energy supply Zurich)	Provides consulting services to optimise energy use, including energy refurbishments and offers financial incentives for renovations. Collaborates with other actors to foster large-scale energy refurbishments, including residential buildings. Overall responsibility for the Platform “Energie Franken”	1997
Private		Faktor Journalisten AG	Collaborations with energy companies, NGOs, government agencies, and other stakeholders in communication on energy transition, environmental protection, climate change, and sustainable development. Responsible for data collection on available subsidies by commune for Energie Franken	2001
NGO	National	Stiftung Klimarappen	Was responsible for the implementation of the energy refurbishment programme that preceded the Buildings Programme	2008
Public	National	Energiehub Gebäude	Platform for building owners , planners, and energy consultants to access information and resources about energy efficiency measures for buildings. It helps stakeholders identify, plan, and implement strategies that reduce energy consumption in buildings, optimize heating, cooling, and lighting systems, and ensure better insulation and overall energy performance.	2014
Public	Municipal	Municipal offices of energy	Implementing local energy policies	Depending on municipality
Private	National/local	Consulting firms and networks of certified consultants on energy efficiency (e.g.	Advisory services to improve energy efficiency in homes and businesses. Support for energy-efficient renovations,	

		SuisseEnergie, Energieberater Schweiz, Enco AG, Green Tech AG, Minergie, Swiss Energy and Environmental Engineering (ESE)	including insulation, heating systems, and renewable energy solutions	
Private	National/local	Building industry, building technology companies (e.g. Losinger Marazzi, HRS Real Estate AG, Baumer Group, Züblin Schweiz AG, Walo Bertschinger AG)	Implementation of energy refurbishments, including thermal insulation, windows, and renewable energy installation	

Table CH2. Actors involved in the policy cycle of energy retrofitting

4.5 Assessments, achievements, and challenges

As mentioned in Section 3.2, the volume of federal contributions to the Buildings Programme is the main aspect that is being monitored and regularly published, for example in its Annual Reports. However, it may be argued that the real impact of the programme should rather be assessed in terms of the reduction in energy consumption and CO₂ emissions. Since its inception in 2010, the programme has resulted in a decrease of 3.8 billion kilowatt-hours (kWh) in energy consumption and a reduction of 1,064,000 tons in CO₂ emissions (Das Gebäudeprogramm, 2024a). In its latest evaluation, the Buildings Programme was deemed effective, as the savings per Swiss Franc exceeded initial expectations (Bundesrat, 2016).

Nevertheless, several concerns and critiques have been raised regarding the programme, its funding structure, along with equity considerations. Concerns have also been raised with regard to its potential **deadweight effect** as property owners receive subsidies even if they would have undertaken energy refurbishment also without them. An evaluation from 2023 estimated that the deadweight effect accounts for approximately 47% (BFE & EFK, 2024). These numbers, however, were only based on cantonal and national experts' estimates (Representative of SFOE, personal communication, May 8, 2025) (Representative of EnDK, personal communication, May 8, 2025). Furthermore, an evaluation commissioned by the Stiftung Klimarappen confirms that households with higher gross incomes have disproportionately benefitted from the programme (Interface Politikstudien Forschung Beratung & Ernst Basler + Partner AG, 2010), suggesting that it could exacerbate social inequality. As an energy expert stated, there is a basic social problem with the funding: although it benefits from public funding, the subsidies are provided to private landlords. However, inequalities such as energy poverty and social problems caused by increasing housing affordability problems are absorbed by the state (Representative of SFOE, personal communication, May 8, 2025).

There is increasing concerns that energy refurbishments are substantively contributing to the loss of affordable housing with severe consequences on lower income people (e.g. Suppa et

al., 2019). In Switzerland, costs related to property improvements—such as energy refurbishments—can be passed on to tenants in the form of rent increases, provided these improvements increase the property's value (Burkhalter, 2014). Under current regulations, which date back to 1977, 50–70% of the investment in extensive renovations can be considered "value-enhancing" and subject to rent increases, minus the subsidies received. This rule was originally intended to incentivize landlords to renovate (King et al., 2019). However, the relatively weak tenant protections (Debrunner, Kolocek, et al., 2024) make **renovictions**—forced evictions due to renovations—a more appealing option for landlords. This enables them to carry out extensive renovations and subsequently charge significantly higher rents. A case study covering ten instances revealed that, even when accounting for lower utility costs, tenants experience an increase in financial burden following energy refurbishments, particularly when rental contracts are terminated (B,S,S & Basler & Hofmann AG, 2014).

To date, subsidies for retrofitting have been offered based exclusively on technical criteria, without any social equity consideration (Debrunner & Hartmann, 2020). The impacts of these policies are multifaceted, especially concerning housing quality and affordability, affecting in particular lower-income tenants in urban areas and agglomerations. **Renovictions** became a widely diffused practice in the 2010s and have remained high, particularly in urban centres (Vogel, 2019). In Zurich, for example, 30% of all housing renovations between 2021 and 2022 entailed renovictions, affecting over 1,000 individuals annually (Stadt Zürich, 2024d). Research with focus on the canton of Zurich indicates that renovations and replacement constructions contribute to the displacement of lower-income and vulnerable tenants, with new tenants in renovated or rebuilt buildings earning, on average, 3,000 Swiss Francs more than those they replace (Kaufmann et al., 2023). Nationwide data on renovictions remains difficult to obtain (Vogel, 2019).

While energy refurbishments themselves do not necessarily entail comprehensive renovations (BWO, 2016), the subsidies granted under the Buildings Programme make such renovations financially more attractive. This, in turn, increases the likelihood of renovictions and rent increases, potentially accelerating gentrification in certain areas.

In recent years, the federal government has explored ways to modify the subsidy structure to better align with housing policy objectives. A study commissioned by the Federal Office of Housing (BWO, 2016) outlines various options and their anticipated effects on energy policy, housing affordability, government spending, and enforcement (BWO, 2016). One recommendation is to link subsidies to additional criteria, such as vacancy rates, in order to prevent the deadweight effect in high-demand areas where renovations (and energy refurbishments) would be profitable even without subsidies. Another proposal is to make the obtainment of subsidies contingent on landlords' agreement not to evict tenants or to comply with rent control regulations. A stronger alignment of energy and housing policies could also entail amendments to tenancy laws, such as reducing the percentage of renovation costs that can be passed on to tenants through rent increases or enhance eviction protections.

While such measures could mitigate the risk of renovictions and excessive rent increases, they have been criticized for potentially reducing incentives to renovate, undermining Switzerland's energy policy goals. Furthermore, they are often seen as an infringement on property rights

(BWO, 2016), or are regarded as costly and difficult to enforce. Up to date, none of these measures have been adopted at national level. However, some cantons, for example Geneva and Basel Stadt, have introduced stricter rent controls and tenant protections to address the risks of renovations, gentrification, and rising rents. For instance, under Basel's new housing protection laws, landlords must seek approval from a committee before raising rents following a renovation. These measures aim at reducing gentrification and renovation risks, but have also been criticised for slowing down renovations, which harms smaller enterprises in the building sector (Hauser, 2023), (Künzle & Kenan, 2024).

Nevertheless, retrofitting also has the potential to reduce housing inequality. If rent increases resulting from energy refurbishments are controlled and do not outweigh the savings on utility costs, retrofitting could alleviate **energy poverty**, particularly for low-income households. Over time, the financial relief from reduced energy consumption could directly ease the burden on families in need.

Policy / Programme	Measured impacts on housing inequalities	Potential impacts on housing inequalities
Buildings Programme	-	Inefficient Funding: In 2023, 47% of recipients report they would have retrofitted without subsidies. Unequal Benefits: Only property owners and the building industry directly benefit from the Buildings Programme. Eligibility for subsidies exclusively based on technical criteria; socioeconomic factors are not considered Negative Social Impacts: Energy retrofits often trigger full renovations, leading to evictions, higher rents, displacement and gentrification
Stimulus Programme	-	Inefficient Funding: The Stimulus Programme focuses on measures, which would often be retrofitted without funding (e.g. decarbonisation of heating systems)
Swiss tenancy law: landlords can transfer 50–70% of renovation costs to tenants	Rent increases typically exceed energy cost savings (BWO, 2016) Cost transfers are often not controlled (only if tenants insist)	Incentivized Rent Hikes: Tenancy law encourages combining energy retrofits with value-adding renovations, allowing greater rent increases.

		Reduced Affordability: Retrofitted homes often become unaffordable for low-income tenants.
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Table CH3. Summary table of measured and potential impacts of retrofitting policies on housing inequalities.

5 Nature-Based Solutions

5.1 The policy cycle: emergence of the issue and policy decisions

Currently, Switzerland lacks policies explicitly promoting nature-based solutions (NBS), as this concept is not yet used at national level. However, NBS are closely related and in some cases reflected into policies on biodiversity, climate change adaptation, and river restoration. Public awareness on climate change and environmental protection are playing an important role in advancing NBS in Switzerland. As a result, the number of policies instruments aiming at promoting NBS have grown rapidly over the past decade, a sharp contrast to the slower developments before 2010. The Swiss Spatial Planning Act only contained a planning principle stating that residential areas should include 'a lot of green and trees', which, although vague, was still legally useful wording. Furthermore, the Swiss Nature and Heritage Conservation Act (Natur- und Heimatschutzgesetz, NHG) assigned all cantons with “ecological compensation”¹⁷⁴ in intensively utilised areas in 1988 (SR 451 - Art.18 B2, 1966). However, already in 1996, WWF Switzerland (*WWF Schweiz*) criticized spatial planning practices that led to excessive land sealing without adequate compensation in the form of land or river restoration (Bernath et al., 2024). This triggered public debates on the need of actions that today we would refer to as NBS. The first popular initiative that promoted NBS (without using this term) was launched by the Swiss Fishing Federation (*Schweizerischer Fischerei-Verband, SFV*) in 2005. Named "Living Water (River Restoration Initiative)" (*Lebendiges Wasser (Renaturierungs-Initiative)*) it primarily aimed to address the extinction or near-extinction of native fish species by calling for an amendment to the Swiss constitution. It advocated for river restorations and the establishment of cantonal funds to protect biodiversity and improve aquatic habitats. The initiative prompted the Swiss Parliament to draft an indirect counterproposal in 2010, which addressed many of the initiative’s goals, but gave more weight to the interests of the water energy industry. It proposed alternative financing mechanisms for river restoration and to incorporate these issues into amendments to the Water Protection Act (*Gewässerschutzgesetz*) rather than to the constitution. The initiative was eventually withdrawn, and in 2011, while the Water Protection Act amendments were enacted.

Nevertheless, these amendments have faced opposition, particularly from the right-wing party SVP, the Swiss Farmers’ Union, the electricity industry, and power plant operators, which objected to cantons’ requirement to designate watercourse areas that cannot be used for

¹⁷⁴ Collective term for measures that serve to preserve and promote habitats and their connectivity in intensively utilised or densely populated landscapes. According to the FOEN, ecological compensation measures mainly promote native biodiversity in resident areas.

intensive agriculture or construction. At the same time, the slow pace of river restorations has also drawn criticism in relation to the increasing number of floods and landslides caused by climate change. As a result, river restorations are increasingly advocated as a key NBS for the management of climate change-induced floods (Bernath et al., 2024).

At national level, the Federal Council began developing a Climate Change Adaptation Strategy (*Strategie Anpassung an den Klimawandel*) in relation to the 2011 revision of the CO₂ Act (*CO₂-Gesetz*), which requires the Federal Council to coordinate climate adaptation measures. In 2012, the Federal Council released the first part of this strategy, titled "*Objectives, Challenges, and Fields of Action*" (Schweizerische Eidgenossenschaft, 2012). While not explicitly mentioning NBS, it identified heatwaves and floods as growing natural hazards due to climate change and proposed mitigation strategies that align with NBS principles. Key measures included creating and enhancing green infrastructure, promoting open spaces, preventing soil sealing, and using green and shaded areas to mitigate heatwave impacts. River restoration was also highlighted as a measure for flood protection.

In 2014, the Federal Council published the Action Plan for the Period 2014-2019 as part of the Climate Change Adaptation Strategy (Schweizerische Eidgenossenschaft, 2014). This plan, while again not directly referring to NBS, emphasized the importance of spatial planning in adapting urban areas to increasing heat stress. It called on cantons and municipalities to take responsibility for urban climate adaptation, with the federal government providing guidelines and support, but it is not legally binding. A notable example is the guide "Heat in Cities: Principles for Climate-Adapted Urban Development" (BAFU, 2018), which offers best practices for urban planning.

Building upon the previous one, the Federal council published a second Action Plan in 2020 (Schweizerische Eidgenossenschaft, 2020). One of its main foci is the enhancement of urban green spaces and watercourse areas. It further aims to raise awareness about the ecosystem services provided by green and blue infrastructure. Municipalities, supported by cantons and federal offices, are encouraged to adopt these measures. As of 2020, the federal government funded 81 pilot projects addressing climate change adaptation and mitigation at municipal and regional levels.

While climate change adaptation is the main concern of the projects promoted by the Action Plans, initiatives that may be labelled as NBS are also being promoted with the aim of protecting biodiversity.

For example, already back in 2009, the Federal Council mandated the Federal Office for the Environment (FOEN) to develop a strategy on biodiversity, which was presented to Parliament in 2011. The strategy primarily entailed securing ecological infrastructure and providing and enhancing ecological spaces in urban areas. It gained support from the Social Democratic Party (SP) and the Christian Democratic People's Party (CVP), but was criticised for its lack of concrete action, particularly from the Green Party (Grüne Schweiz), the Liberals (FDP), and the Swiss People's Party (SVP), who feared excessive regulation and costs (Flückiger, Porcellana, Gerber, et al., 2024). Nevertheless, it was adopted in 2012, and a participatory process was launched to develop an Biodiversity Action Plan, which was finally adopted in 2017 for the period 2017-2023 (Bundesrat, 2017). Although the Action Plan does not use the

term NBS, it aimed to create a nationwide ecological infrastructure, integrating settlements into ecological networks. This infrastructure was expected to have additional benefits such as improving air quality, regulating microclimates, and reducing noise.

Despite criticism regarding delays, the lack of funding, and the non-binding nature of the plan, the Action Plan was extended into 2024 and the development of a second Action Plan (2025-2030) underway. However, in September 2024, three environmental organizations—Pro Natura, WWF, and BirdLife Schweiz—issued a joint statement criticizing the draft of the Action Plan for its insufficient funding and effectiveness (Pro Natura et al., 2024).

The second Action Plan, published in November 2024, reiterates the importance of promoting biodiversity in urban areas through the creation and enhancement of green spaces, integration into ecological networks, and land and river restoration. For the first time, the plan explicitly uses the term NBS (*naturbasierte Lösungen*) for one of the 15 measures under the FOEN's responsibility mentioned in the Action Plan (Bundesrat, 2024). This measure outlines plans for the Confederation to oversee NBS projects and support at least 30 regional and municipal NBS projects by 2030. Municipalities remain key players in the implementation of NBS. Following a recent revision of the CO2 Act, which came into force in January 2025, the federal government has launched the *adapt+* funding programme to promote measures to adapt to climate change, including NBS. Starting in August 2025, the program is planned to run until 2030 with an annual budget depending on submitted projects, mainly by cantons, regions, municipalities and organisations. This year, around 1.5 million has been allocated for the funding programme (BAFU, 2025).

Stronger commitments towards the biodiversity conservation were also sought by the popular initiative titled "For the Future of Our Nature and Landscape" (Biodiversity Initiative) (*Für die Zukunft unserer Natur und Landschaft (Biodiversitätsinitiative)*) of 2019, which was launched by environmental organizations, including, among others, the Swiss Fishing Federation. The initiative demanded increased funding for biodiversity, more protected areas, and greater responsibility for cantons in preserving landscapes. Critics argued that the initiative would negatively impact agriculture, energy production, and tourism and incur significant costs for both the Confederation and the cantons (Flückiger, Porcellana, & Ziehli, 2024). With these arguments they succeeded persuading 63% of the voters who rejected the initiative by popular vote in September 2024.

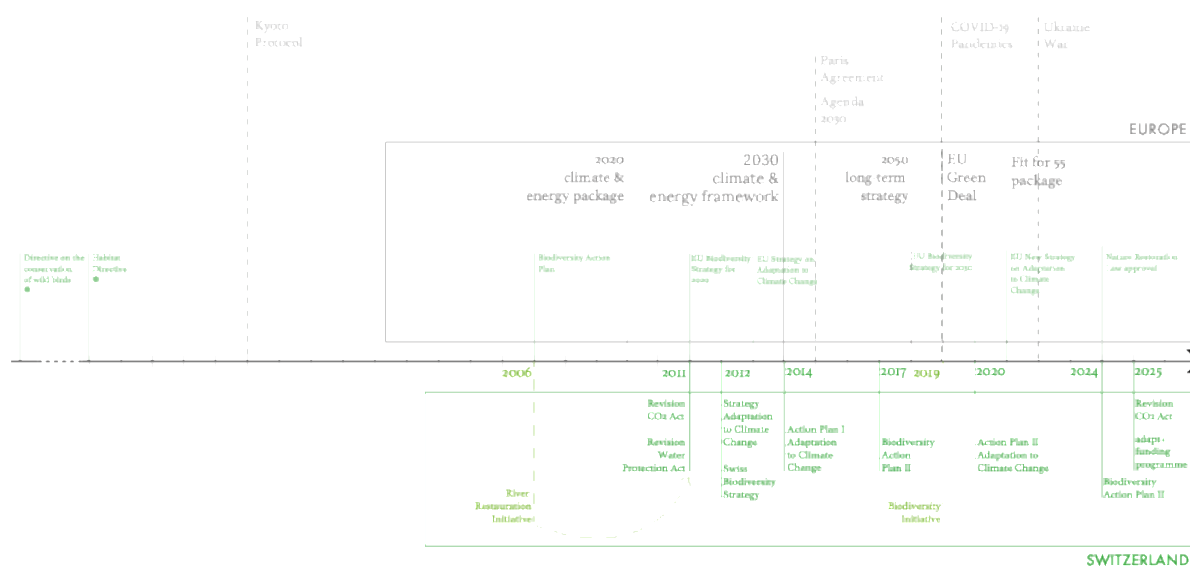


Figure CH4. Timeline of policies, initiatives and strategies affecting NBS goals in Switzerland

5.2 The implementation process

The implementation of NBS policies at cantonal or municipal level is not explicitly regulated or defined at the national level. While national strategies on biodiversity and climate change adaptation recognize cantons and municipalities as key partners in implementing related measures, they do not provide clear guidance on how this implementation should unfold at lower levels of governance. As a result, so far none of Switzerland's 26 cantons developed a strategy specifically focused on NBS. Since 2008, the Federal Office for the Environment (FOEN) started supporting the cantons with project-specific financial contributions for a period of up to 4 years through environmental sector programme agreements (*Programmvereinbarungen im Umweltbereich*) (BAFU, 2008). However, it is the responsibility of the cantons to include measures for landscape politics and ecological compensation in their legislation. By early 2022, only 17 out of the 26 cantons adopted strategies for climate change adaptation, while in the remaining cantons, such strategies were still under preparation (BAFU, 2023a). Notably, the Climate Strategy of the Canton of Thurgau, published in December 2022, is the only one to explicitly mention NBS (*naturbasierte Ansätze*). This is likely related to the term's recent emergence, as NBS were introduced into national policies only in 2022 (Bundesrat, 2022). Cantons pursue different strategies. For example, Basel Stadt uses an added-value levy (*Mehrwertabgabe*), which has to be paid when a building permit is issued, to fund public green spaces. Even though the majority of the cantons are still without an operational strategy, it is argued that the need for climate adaptation is widely recognized at the cantonal level (BAFU, 2023a).

At the municipal level, there has been a notable increase in climate strategies and action plans since 2020. While early efforts focused on energy related issues, the first comprehensive

climate strategies began to appear in 2015. Since then, there has been a significant increase in the number of cities and towns developing climate-related policies (Schweizerischer Städteverband et al., 2024). However, currently, 97% of Swiss municipalities are addressing climate change to some extent, but only 31% adopted specific strategies or measures for climate adaptation. A recent study on the integration of climate change adaptation goals in Swiss municipalities concluded that local adaptation measures remain rare, largely depending on individual stakeholders' initiatives or the occurrence of extreme events (Braunschweiger & Pütz, 2021). Local governments have expressed frustration over the lack of clear directives on climate change adaptation at the cantonal and municipal levels, questioning whether direct national legislation would be politically feasible. Many municipalities have called for more guidance and stricter legal requirements from higher levels of government, particularly from cantons (Schweizerischer Städteverband et al., 2024). In response to this lack of support, the FOEN has issued model clauses for biodiversity and landscape quality in urban areas and the implementation of the ecological compensation, aimed at assisting cantons and municipalities (BAFU, 2023b, issued for the first time in 2022).

In the specific domain of heat adaptation in urban settings, a study focusing on Swiss cities' administrations' perspectives revealed that many local authorities would welcome greater support from both cantons and local legislative bodies (Fujara, 2022). A large majority of cities and towns recognize the increasing strain that heatwaves put on urban areas and deem it an urgent issue. However, only 17% of the cities (mainly large and medium-sized ones) have strategies dedicated specifically to heat adaptation. According to the FOEN, those are mainly cities with strong administrative structures under progressive political influence (Representative of FOEN, personal communication, April 17, 2025). These strategies include support tools or regulatory measures that aim to encourage the greening of private properties and climate adaptation of public spaces. About one-third of the cities lack a strategy altogether. The remaining municipalities have integrated heat adaptation into their broader climate strategies.

One of the earliest regulatory policies involving NBS at the municipal level is the requirement to green flat roofs on newly constructed buildings—sometimes extending this obligation to renovations. Zurich introduced this regulation in 1991, while Basel followed in 1999. The policies include guidelines on the height, mass and profile of the substratum, and on the species of plants. There are stricter demands for extensive roof greening in large projects, which have special building policies (Stadt Zürich, n.d.-b). Today, most municipalities in Switzerland have similar regulations requiring the greening of flat roofs (Wepf, 2016).

5.3 Size and role of the market

Rather than ushering the adoption of NBS, the market's lack of interest appears to hinder progress. This can be seen in the various examples where the implementation of nature-based measures was slowed down by other market interests.

One relevant market factor pertains to the obligation to green flat roofs. A recent study of Zurich's flat-roof greening initiative found that, in the 1990s, the percentage of green roofs increased from under 20% to over 25%. However, since the 2000s, this percentage has

steadily declined, with only slightly more than 10% of newly constructed flat roofs being green between 2011 and 2015 (Kübler, 2024). This decline is attributed to increasing competition for roof space, as many building owners use the upper floors for terraces or penthouse apartments, which add value to the property but reduce available space for greening.

Another example is the sponge city concept (*Schwammstadtkonzept*), an urban planning principle that aims at rainwater retention instead of drainage, which is currently being tested in several pilot projects. As a NBS, it aims to improve urban climate and is even supported by some municipalities (e.g. Zurich) through incentives for unsealing private land. However, it is technically challenging to implement in existing residential areas and economically unattractive, as it tends to hinder rather than encourage construction. According to a FOEN representative, the lack of market appeal is one of the reasons why NBS do not have a strong lobby and are not prioritized politically (Representative of FOEN, personal communication, April 17, 2025).

Furthermore, the challenge with NBS for real estate investors lies in their limited measurability and quantifiability, which makes it difficult to incorporate their value into property pricing (Interview CM). If the costs of such investments cannot be recovered through higher rents, profit-oriented landlords have little incentives to adopt these ‘soft factors’, as stated by a real estate investor to FOEN: “For these (factors) to be considered serious criteria for developing a property portfolio, they must be more measurable” (Representative of FOEN, personal communication, April 17, 2025).

NBS Measure	Policy / Example
Greening of flat roofs	Mandatory in Zurich since 1991 and currently mandatory in most municipalities
Sponge City Principle	Pilot projects in several municipalities (Bern, Lucerne, Zurich...), Municipal subsidy programmes for unsealing private land
River Renaturation	Water Protection Act, National subsidy programme
Increase of Tree canopy area	Tree protection, Municipal subsidy programmes for heat reduction
Renaturation of large-scale infrastructure (grey to green)	Project-based public funding, e.g. Schwamendingen (Zurich): Enclosure of highway with park on top

Table CH4. Examples for NBS measures in Switzerland.

5.4 The multilevel governance process

Sections 4.1 and 4.2 have highlighted that the development of NBS-related policies are relatively recent that gained momentum only over the past decade. While environmental organizations, particularly in the area of biodiversity, have exerted significant pressure, movements like Fridays for Future, which started in Switzerland in December 2018, have contributed to increasing the pace of policy development related to climate change mitigation

and adaptation (Schweizerischer Städteverband et al., 2024). However, resources allocated at the national level remain limited (as criticised regarding the Actions Plans for biodiversity; Pro Natura et al., 2024), with implementation largely expected to occur at the municipal level. This means that the success of these initiatives depends primarily on local stakeholders—whether government officials, administrators, local parliamentarians, or civil society organisations (Braunschweiler & Pütz, 2021).

As a result, some cities are leading the way with innovative strategies and implementations, while smaller towns often lack a clear strategy altogether (Schweizerischer Städteverband et al., 2024). This disparity may also reflect political orientation, as progressive parties tend to support NBS and related strategies, whereas liberal-conservative parties often oppose them, citing concerns about high costs and negative impacts on sectors such as agriculture, energy, and tourism.

Municipalities can implement NBS on public land, for example by greening municipal buildings, planting trees along roads, or undertaking river restorations. However, expanding the presence of green roofs and facades mainly depends on the willingness of private property owners. To this aim, many cities offer incentives, such as subsidies and free consultations, and have incorporated the greening of flat roofs into building regulations (Wepf, 2016).

A notable example of a municipal program promoting both heat reduction and biodiversity is the *Stadtgrün* initiative by the City of Zurich, which began in 2024 and will run until 2035. The programme consists of four sub-programmes targeting different stakeholders: the first supports green measures in public spaces and streets; the second offers advice and subsidies to private property owners; the third promotes green measures on municipal properties; and the fourth funds research and pilot projects on heat reduction (Stadt Zürich, 2024b). The program has a total budget of 130 million Swiss Francs, with 28.2 million allocated to the second sub-programme for private property owners between 2024 and 2029 (Stadt Zürich, 2024c).

At the national level, the *Grünstadt Schweiz* (Green City Switzerland) label promotes urban greenery and sustainable management of green spaces. This label, founded and managed by the Association of Swiss Departments for Green Spaces since 2017 (*Verband Schweizerischer Stadtgärtnereien und Gartenbauämter*, VSSG) and partially funded by the FOEN, is awarded to cities committed to urban greening. Up to date, 20 cities have received the *Grünstadt* label, with 7 more in the certification process.

Sector	Level of governance	Name	Role/Responsibilities	Date of appearance
Public	National	Federal Office for the Environment (FOEN)	Elaboration of NBS strategies and action plans at national level	1971
Public	Cantonal	Cantonal offices for the environment	Elaboration of NBS strategies and action plans at cantonal level and implementation with cantonal boundaries	depending on Canton
Public	Cantonal	Cantonal offices for the spatial development/construction	Regulation of greening obligations and compensation areas through planning and building regulations	depending on Canton
Public	Municipal	Municipal offices for the environment	Elaboration of NBS strategies and action plans and their implementing at local level	depending on municipality
Public	Municipal	Municipal offices for the spatial development/construction	Regulation of greening obligations and compensation areas through planning and building regulations	depending on municipality
Non-governmental organisation	National	WWF Schweiz	Promotion of biodiversity through NBS	1961
Non-governmental organisation	National	BirdLife	Promotion of biodiversity through NBS	1922
Non-governmental organisation	National	Pro Natura	Promotion of biodiversity through NBS	1909
Non-governmental organisation	National	Swiss Fishing Federation	Promotion of biodiversity through NBS	1883
Non-governmental organisation	National	Swiss Farmers' Union	Opposition to NBS entailing transition from intensive land cultivation to extensive uses	1897
Non-governmental organisation	National	+ others		
Non-governmental organization	National	Grünstadt Schweiz (under the responsibility of the Association of Swiss Departments for Green Spaces (Verband Schweizerischer Stadtgärtnereien und Gartenbauämter VSSG, partially funded by the FOEN)	Certification of cities with formal commitment to urban greenery	2012
Private	Municipal	Private landowners	Implementation of NBS (greening of roofs/facades, de-sealing)	

Table CH5. Actors involved in the policy cycle of NBS.

5.5 Assessments, achievements and challenges

Given the lack of a policy specifically defining and promoting Nature-Based Solutions (NBS), there has been no targeted evaluation or research focusing on their implementation or overall impacts. According to FOEN and SFOE representatives, the national agenda focuses on climate adaptation strategies with measurable goals, such as achieving net zero by 2050 (Representative of FOEN, personal communication, April 17, 2025) (Representative of SFOE, personal communication, May 8, 2025). The focus on climate adaption rather than biodiversity measures was also reflected in the popular vote in 2024, when the Biodiversity Initiative was rejected. Switzerland's policies are influenced by the powerful farmers' lobby that favours biodiversity measures concentrated in urban and residential areas. *As a result, no federal subsidy programme has been established.* In rural areas, biodiversity measures are rare and are usually implemented and subsidised by the cantonal authorities, since small municipalities often lack the resources and expertise to implement such complex concepts.

The varying degrees of progress in the greening of municipalities of different sizes are also reflected in the Greencity certification (Representative of Grünstadt Schweiz, personal communication, April 15, 2025). **Nature-based solutions (NBS) are not only complex and costly to implement, but their adoption is also hindered by political tensions—particularly between national strategic goals and the resistance from conservative governments.** To date, there has been no mandatory ecological planning at a municipal level, meaning that local legislation and subsidy programmes are highly diverse (Martinoli et al., 2025).

One notable aspect of the Swiss situation is the absence of public or academic discourse around issues of distributive justice related to green spaces and greening subsidies. There is little debate regarding the impact of creating or upgrading green spaces on property values and housing costs, nor is there significant discussion about where and for whom green spaces are developed. **The implementation of NBS varies significantly depending on whether the land is privately or publicly owned, particularly in terms of the stakeholders involved, funding mechanisms, and resulting impacts. In public spaces, green interventions tend to influence rent and property prices only after several years, making it difficult to establish a direct correlation. Moreover, Swiss tenancy law has yet to clarify whether NBS can be legally considered value-enhancing measures that would allow rent increases. As a result, further research is needed to understand whether and how NBS affect housing affordability.** Additionally, the unequal effects of subsidies for greening private roofs, facades, or gardens—particularly on homeowners versus tenants—have not been addressed by public debates and research yet.

Policy / Programme	Measured impacts on housing inequalities	Potential impacts on housing inequalities
Municipal Subsidies for NBS (e.g. Stadtgrün ZH)	-	Unequal Access: Only Property owners benefit from subsidies.

		Green Gentrification: Large-scale greening projects can lead to rent increases and displace existing residents.
Certifications by Grünstadt Schweiz	-	Green Gentrification through location improvement
Green Building Policies (e.g. Greening of flat roofs)	-	Higher rents because increasing construction costs can be passed on to tenants

Table CH6. Summary table of measured and potential impacts of NBS policies on housing inequalities.

6 Densification

6.1 The policy cycle: emergence of the issue and policy decisions

Given Switzerland's scarcity of buildable land (see section 2.1), it is not surprising that land use regulations, directly or indirectly aiming at densification, already began emerging after the 1960s construction boom, focusing initially on controlling pressure on agricultural land and later on landscape protection and biodiversity conservation, as stipulated by the Federal Constitution (Art. 2 CSC). Areas like natural monuments and historic pathways are regulated by the Federal Act on the Protection of Nature and Cultural Heritage (*Bundesgesetz über den Natur- und Heimatschutz, NHG*), which was passed in 1966.

In 1979, a national vote led to the incorporation of spatial planning principles into the Federal Constitution. The first Spatial Planning Act (SPA; *Raumplanungsgesetz, RPG*) introduced dynamic structural and use planning by assigning spatial responsibilities and effective tasks to the regions and municipalities. It aimed at distinguishing building and non-building areas, without initially emphasizing densification. The Swiss Federal Office for Spatial Development (*Bundesamt für Raumentwicklung, ARE/ SFOSD*), created in 2000, coordinates sustainable development, balancing compact settlement, landscape protection, and land use across the 26 cantons.

Despite these regulations, urban sprawl continued into the 2000s. With the spatial development report (*Raumentwicklungsbericht*), the SFOSD published a self-critical assessment which found that spatial development in Switzerland is unsustainable and asked for a holistic spatial development concept and a revision of the SPA (Representative of SFOSD, personal communication, May 20, 2025). This prompted the 2008 Landscape Initiative (*Landschaftsinitiative*) which called for a 20-year freeze on building zones and the promotion of inner-city development by the federal government and the cantons (ARE, 2024b). In response, the Federal Council proposed a thorough revision of the SPA, introducing densification as a legally binding policy and restricting land hoarding. The revision was approved by a large majority of voters in 2013. The SPA I, which came into force in 2014, can

be seen as a turning point in Swiss spatial planning, with significant requirements for densification and land conservation through the strict regulation of building zones.

In parallel, the non-binding Swiss Spatial Concept (*Raumkonzept Schweiz*), launched in 2012, seeks to harmonise the objectives of the cantons and municipalities. It aims to guide development with a focus on sustainable urban planning, mobility and regional diversity. The Swiss Biodiversity Strategy, adopted in 2012, stresses integrating biodiversity into spatial planning and promoting biodiversity within settlement areas (Bundesrat, 2012). Additionally, the Second Home Law (*Zweitwohnungsgesetz, ZWG*), which was approved by Swiss voters in the same year, limits the construction of vacation residences to preserve land, protect the character of existing settlements and increase use density.

Despite these efforts, settlement areas expanded by 31% between 1985 and 2018, consuming large amounts of agricultural land (BFS, 2021). In response, the Green Party launched a popular initiative against urban sprawl (*Zersiedlungsinitiative*), demanded further limitations on building zones and emphasized small-scale settlement (ARE, n.d.). It was rejected by the Swiss voters in 2019. The second landscape initiative, which followed shortly afterwards, again called for measures against urban sprawl, the protection of building-free zones and the prevention of the conversion of agricultural buildings (ARE, 2024b). This prompted the Federal Council to counter-propose the second revision of the SPA, which focuses on regulating construction outside designated zones. It was approved by the Swiss parliament in 2023 and will soon be implemented.

In 2020, the Landscape Concept Switzerland (*Landschaftskonzept Schweiz, LKS*) was adopted to ensure the cultural quality in landscape development. Furthermore, the Swiss Soil Strategy (*Bodenstrategie Schweiz*) was introduced to limit construction activities and to protect land as a non-renewable resource. In line with the EU Soil Strategy 2030 aiming at ceasing land consumption by 2050 both are legally binding (BAFU, 2024). These recent initiatives highlight the growing urgency of densification and land preservation in Switzerland, marking a shift towards a more concrete implementation of these goals. Today the share of undeveloped building zones in Switzerland as a whole is 10 to 16%, with the largest part being urban areas at 46%, while peri-urban and rural areas have similar ratios at 29% and 25% respectively (ARE, 2022).

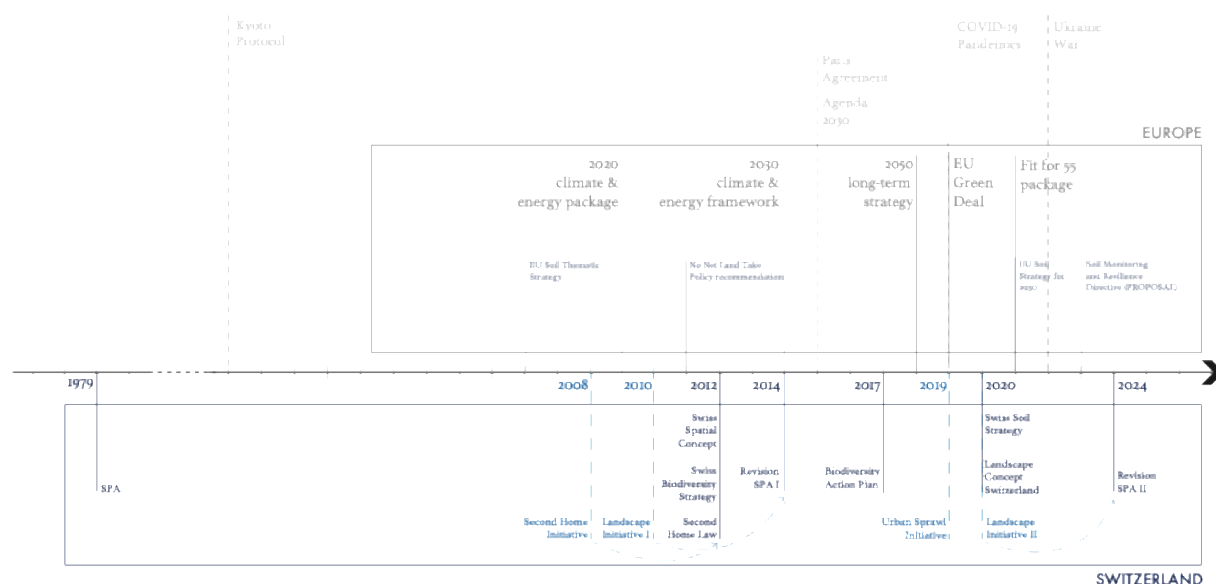


Figure CH30. Timeline of policies, initiatives and strategies affecting densification goals in Switzerland.

6.2 The implementation process

Due to Switzerland's federalist structure the implementation of densification objectives has been rather slow, with meaningful influence on local planning becoming visible only a decade after the introduction of the first revision of the SPA in 2014. In fact, the principle of subsidiarity grants significant authority in spatial planning and thus in the implementation of densification goals to local governments.

While the federal government sets legal frameworks, broad concepts and strategies (*Konzepte und Sachpläne*), such as the SPA and the Spatial Planning Concept, the cantons are required to align their regional structure plans (*Richtpläne*) with these national directives. These plans, typically spanning 20-25 years, focus on land use in urban areas, landscapes, transport, and infrastructure (ARE, 2024c). Cantons must allocate building land based on demographic forecasts, adjust building zones to protect agricultural land, and ensure that any increase or decrease in land value due to new zoning is compensated. Specifically, 20% of the added value from new building rights must be deducted (Art. 5 SPA). Zoning was only possible until all cantonal structure plans had been approved by the federal government, which is why there is an absolute freeze on building zones from 2019.

Municipalities play a key role in guiding and executing local densification efforts through utilization plans (*Nutzungspläne*). These plans often integrate various planning instruments, such as planning zones, which serve as a precursor to relocating and rezoning building land. Densification strategies target a range of sites, including brownfields, greenfields, underutilized building zones, gaps between structures, and urban wastelands in easily accessible locations.

Priority is given to fully utilizing these resources before implementing rezoning measures, which may involve transforming or replacing the existing housing stock (ARE, 2019).

Beyond issuing building permits, municipalities are now tasked with ensuring the realization of dense, high-quality settlements. In many cantons, municipalities must concretize structure plans by developing settlement concepts and establishing minimum density requirements for building zones. These new responsibilities require expertise in development and process management. Utilization plans must strategically address the impacts of densification on living quality, ensuring they are both practical and compelling.

Some municipalities have taken proactive steps to institutionalize densification as a planning objective. For instance, the city of Zurich adopted densification as a legally binding planning goal in 2016 to promote sustainable urban renewal. To this aim, the City Council introduced innovative planning tools, such as designated densification zones (*Verdichtungszonen*), which offer developers economic incentives like density bonuses (Zürich Amt für Städtebau, 2013).

The process of adapting local legislation to the national densification policy is not as advancing in municipalities at the same pace: while large cities have administrative power and political influence, smaller municipalities often lack the resources and expertise to implement federal policies. As a result, in 2024 only 43% of the municipalities completed their structure plan adaptation (UVEK & ARE, 2024). According to the head of EspaceSuisse, no general regional differences in the implementation of SPA I can be identified (Representative of EspaceSuisse, personal communication, March 24, 2025). Whereas larger cities feature complex urban fabrics and limited building land reserves, smaller towns often lack the political backing and strategic housing policies needed to implement densification projects. According to a representative of EspaceSuisse, the severity of the housing crisis in larger cities can be attributed to a slowdown in building activity due to the new conditions under the revised SPA, and by the heated housing markets driven by international investors.

Swiss citizens by and large support the SPA I, but local acceptance of densification projects can be challenging, particularly in existing neighbourhoods due to the NIMBY (Not In My Backyard) effect. For projects to gain public approval, they must demonstrate clear social and ecological benefits that enhance the quality of the affected neighbourhood (UVEK & ARE, 2024). Without such benefits, Swiss voters have the power and are likely to block essential planning tools for densification, such as special land-use plans (*Sondernutzungsplan*).

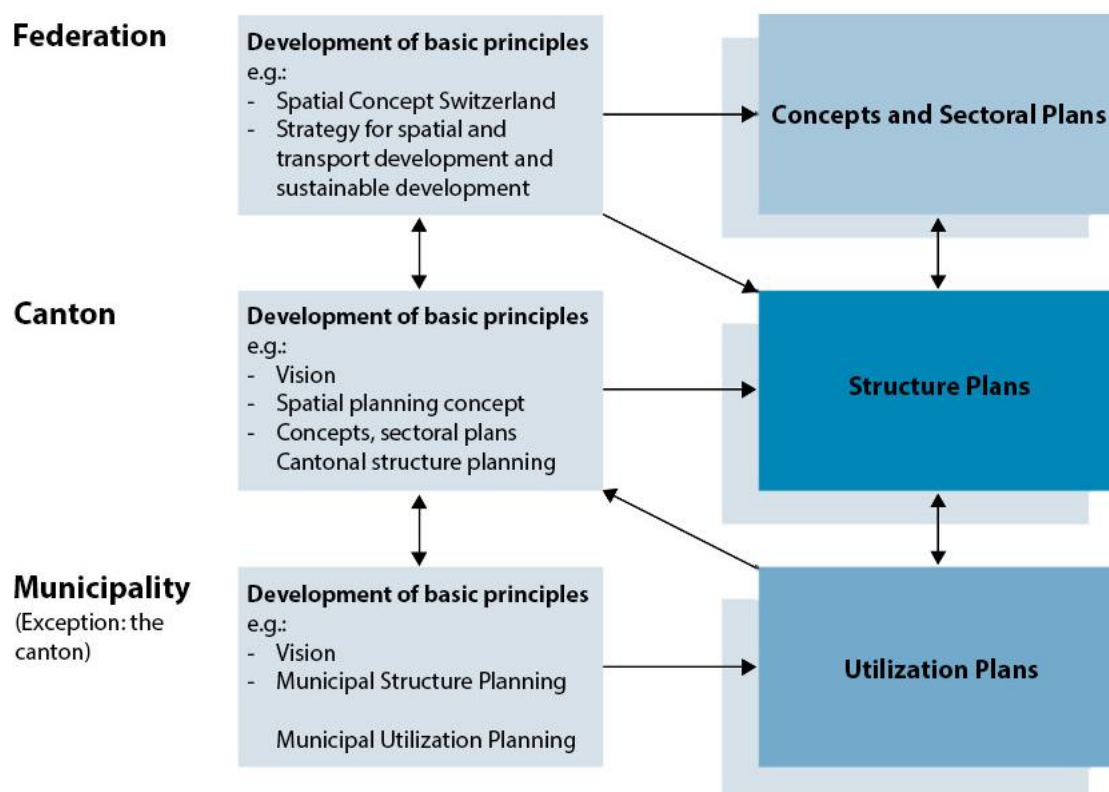


Figure CH6. Spatial planning instruments according to the Federal Law on Spatial Planning (source: SFOSD, 2012; own translation).

Form	Level of governance	Name	Aim	Date of appearance
Law	National	Nature and Cultural Heritage Protection Act (NHG)	Secures the protection and conservation of biodiversity, heritage landscapes, sites of local character, historical sites, natural and cultural monuments.	1966
Inventory	National	Federal Inventory of Heritage Sites of national importance (ISOS)	Inventory of townscape and settlements with significant cultural value that should be protected (ca. 1250 objects).	1970
Inventory	National	Federal inventory of landscapes and natural monuments (BLN)	Inventory of the most valuable landscapes and natural monuments of Switzerland (162 objects).	1977

Inventory	National	Federal inventory of historic pathways and transport routes (IVS)	Inventory of valuable historic transport routes of Switzerland (3'750 km).	1883
Law	National	Spatial Planning Act (SPA)	Aims to ensure sustainable land use by coordinating urban development, environmental protection, and infrastructure planning. It seeks to balance development needs with the preservation of natural resources and quality of life across the country.	1979
Initiative	National	Second Home Initiative	Aimed at limiting the share of vacation homes per municipality and was accepted by the majority of Swiss voters in 2012 (see below)	2007
Initiative	National	Landscape initiative (<i>Landschaftsinitiative - Raum für Mensch und Natur</i>) (withdrawn)	Aimed to introduce densification as a legally binding policy objective. It proposed that building zones should cover no more than the demand for the next 15 years, and that oversized building zones should be reduced or moved to other locations.	2008 - 2013
Strategy	National	Spatial Concept Switzerland	Outlines the country's long-term spatial planning strategy, focusing on balanced regional development, sustainable land use, and the efficient integration of transportation, housing, and environmental conservation.	2012
Law	National	Second Home Law	Bans the construction of new vacation apartments and the use of over 20% of existing apartments per municipality as second homes with the aim of preserving the character of existing settlements and increase their density of use.	2012
Strategy	National	Swiss Biodiversity Strategy	Promotes biodiversity within settlement areas to ensure that they contribute to the networking of habitats, to the preservation of settlement-specific species, and provide	2012

			people opportunities to experience nature in their living environments and local recreational areas.	
Law Revision	National	SPA I (1. revision of the SPA)	Compared to the previous version, the revised law introduced stricter controls on building zones, emphasized the protection of open spaces, and focused on directing urban development to already built-up areas, aiming to ensure more efficient and environmentally conscious land use.	2014
Action Plan	National	Biodiversity Action Plan	Conserve biodiversity by serving as an interface between the Confederation's biodiversity policy and other policy areas, including agriculture, spatial planning, transport, and economic development.	2017
Initiative	National	Initiative against urban sprawl (<i>Zersiedlungsinitiative</i>) (rejected)	Launched by the Young Green Party. It demanded a total freeze of the building zones in Switzerland and that new building zones could only be created if an area of at least the same size had been removed as a building zone elsewhere.	2019
Strategy	National	Landscape Concept Switzerland	With the aim of preserving and enhancing diverse landscapes it defines the framework for their coherent and quality-based development. It encompasses 14 landscape quality objectives that provide a framework to support landscape-related stakeholders at the federal, cantonal, and municipal levels with the aim of integrating landscape protection into spatial planning processes, fostering ecological, social, and economic cohesion across the country	2020
Strategy	National	Swiss Land Strategy	In the framework of the 2050 climate net zero goal it aims at ensuring that no more land	2020

			shall be consumed in Switzerland beyond 2050	
Initiative	National	2. Landscape initiative (2. <i>Landschaftsinitiative</i>) (withdrawn)	Called for stricter measures to prevent urban sprawl, the protection of landscapes from construction and the prevention of conversion of agricultural buildings	2020
Law Revision	National	SPA II (2. revision of the SPA)	Was developed by the Parliamentary Committee for the Environment, Spatial Planning and Energy (UREK) as a counterproposal to the “Landscape initiative” of 2020 and was unanimously approved by the Parliament in 2023. Its aim is to stabilise the number of buildings and the sealed area outside the building zone.	2023

Table CH7. Policies, initiatives and strategies influencing spatial planning and densification.

6.3 Size and role of the market

The combination of restrictive building zones and low interest rates in Switzerland has sparked a construction boom and driven up land prices, especially in urban areas (BFS, 2021). This trend is primarily fuelled by two factors: a dwindling land supply and increasing demand are causing the housing market to heat up. Additionally, rezoning in certain areas triggered urban renewals and refurbishments of the building stock. Rezoning often entails enhancing accessibility, infrastructure, and the overall quality of neighbourhoods, making these areas more attractive to both residents and businesses. Large-scale rezoning projects, such as those involving entire districts, trigger construction, create jobs, and stimulate local economies. Such economic productivity reinforces densification trends and attracts investors seeking to capitalize on anticipated appreciation, further intensifying demand and development in these urban areas.

For example, the city of Zurich, after years of population decline due to suburbanization, is experiencing a renewed population growth since the late 1990s, partly driven by the influx of highly skilled, high-income migrants, primarily from other European countries (Stadt Zürich, n.d.-a). The redevelopment of former industrial zones entailed large projects that gave a strong boost to the building industry.

Switzerland already has one of Europe's most expensive real estate markets, with Zurich, Geneva, and Basel leading the way. Its robust economy has supported consistent demographic and economic growth. According to a 2023 study by the Federal Office of Housing (BWO, 2023), spatial planning plays a crucial role in shaping housing costs by determining how flexibly the housing supply can respond to shifting demand: Property values

rise most sharply in areas where available building land is scarce. Wüest Partner (2024) further report that the ongoing shortage of rental housing is both caused by rents and transaction prices for owner-occupied properties.

While this increased demand makes urban property highly attractive to investors, it also opens the door to speculation, pushing up land prices and rents. The disparity in rental prices in Zurich, for example, ranges from CHF 15/m² to CHF 55/m² (Lutz et al., 2023). High property values are attracting investors and fuel speculation, which might lead to volatility. According to an expert, investments are primarily driven by the financial sector, as the Swiss property market is regarded as a safe haven for capital (Representative of SFOSD, personal communication, May 20, 2025). Within the high price segments, public-private partnerships (PPP) are increasingly being adopted to finance large-scale urban redevelopment projects designed to support densification (discussed further below).

From an economic standpoint, Swiss spatial planning in urban areas presents both opportunities and challenges. Rising land values make urban development an attractive target for investments and speculation. These may align with the national densification goals and give a boost to the economy. However, densification often triggers socioeconomic changes, particularly in terms of housing affordability. Although densification may increase the housing supply, it generally entails higher rents due to rising land prices and the renovation of buildings to higher standards. Consequently, market-driven densification often favours higher-income residents, increasing building density without necessarily improving occupancy density. Moreover, higher rents diminish disposable income, reducing purchasing power for many residents.

A similar problem has emerged in tourist areas, where municipalities are experiencing a housing crisis fuelled by the prevalence of second homes and capital investments in underutilized properties. As stated a representative of SFOSD, “There is no shortage of housing in these regions but too little that is affordable for the local population” (Representative of SFOSD, personal communication, May 20, 2025). Furthermore, rural cantons depending on tourism, such as for example Valais, are not in favour of densification, as could be seen in the popular vote in 2013 (Figure CH31). The focus on growth in cities can lead to opposite developments In rural areas: limited land reserves and a growing rural exodus can leave some remote areas behind by further concentrating development and resources in urban centres (Zufferey, 2020).

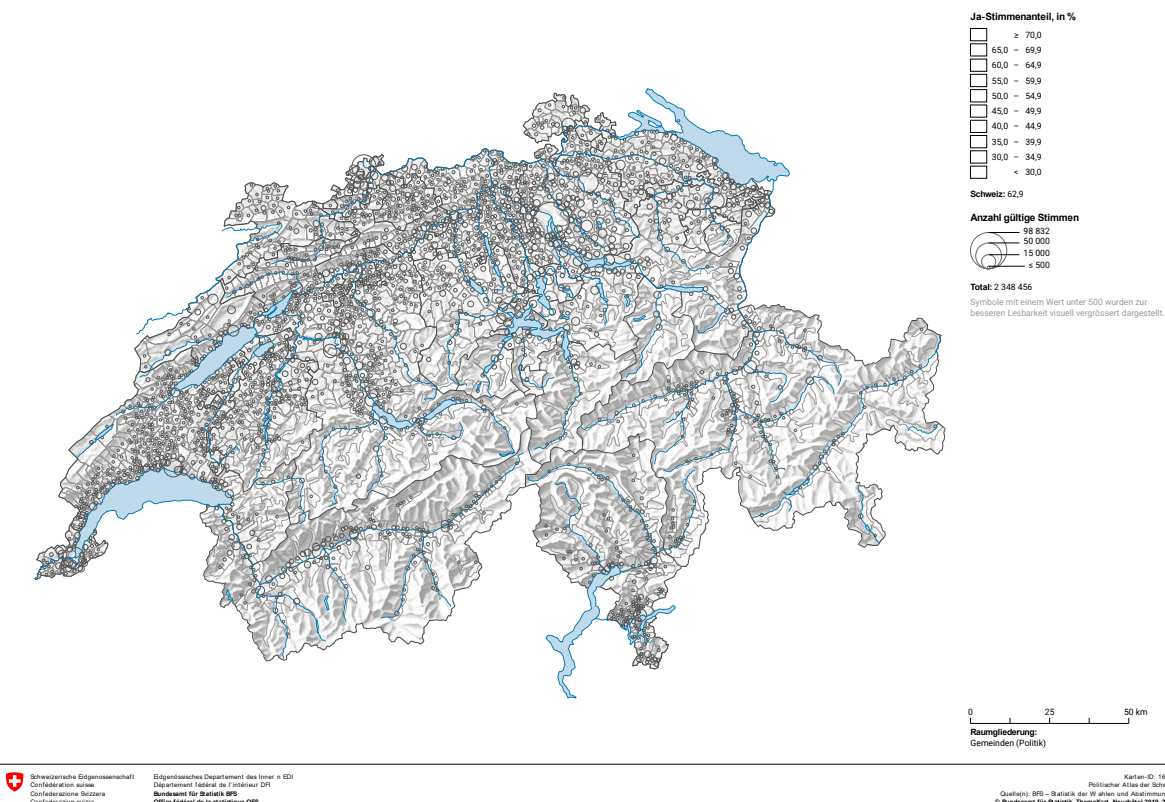


Figure CH31. Distribution of votes on the SPA revision in 2013. Source: BFS – Statistik der Wahlen und Abstimmungen © Bundesamt für Statistik, ThemaKart, Neuchâtel 2010–2020.

6.4 The multilevel governance process

The Swiss Spatial Planning Act (SPA I) aims to coordinate spatial activities across different government levels to promote denser construction. However, implementation varies locally, influenced by cantonal structure plans, planning culture, financial capacity, municipal strategy, and political orientation. Experts view Switzerland's federal structure as a barrier to an effective densification, as regions—despite playing a key role in local spatial development and having the potential to support smaller municipalities—lack formal planning authority (Representative of ETHZ SPUR, personal communication, June 4, 2025).

A report by the SFOSD on factors constraining densification (ARE, 2019) shows that these often result from conflicts between different administrative levels as well as tensions with private individuals. Building codes and land use regulations might hinder the national densification aims, as they regulate distances in between buildings or the usage of strategically important areas (ARE, 2019). Furthermore, regulations of townscape images and landscape heritage can be in conflict with the objectives of the SPA. Besides the legislation of land use planning and cantonal townscape preservation, information and recommendations by the

applicable federal heritage protection inventories¹⁷⁵ have to be considered as well. For each case, a holistic coordination process is required to reach an overarching spatial concept. As a basic planning tool, ISOS is often used to challenge building projects and can constitute a major obstacle to densification. However, it is argued that if applied in line with the SPA it could help to increase public acceptance and the spatial quality of urban developments (ARE, 2016).

Private land hoarding in development zones is common in densifying areas. Accordingly, cantons are required to implement land mobilization measures, by introducing time limits for development. Direct democracy in Switzerland allows citizens to influence legislation, making it crucial to anticipate objections. To mitigate these risks, the SFOSD suggests the adoption of participatory planning processes and an early involvement of all stakeholders as a means to avoid conflicts (ARE, 2019). Municipalities also use tools like special land use plans (*Sondernutzungsplan*) to prevent objections and integrate dense settlements effectively (EspaceSuisse, 2020). Cantons have also introduced instruments to address land ownership issues and achieve densification goals (ARE, 2019).

Regarding horizontal governance, there is broad support for stopping urban sprawl across various political perspectives. The debate over preserving (agricultural) land and natural heritage often engages conservative groups, linking land use to national identity and tourism. Meanwhile, climate-conscious movements advocate densification for social and ecological reasons. Right-wing (*SVP*), liberal (*FDP, GLP*), and conservative (*CVP*) parties tend to be more sceptical of densification, while the Green Party (*Grüne*) and the Social Democrats (*SP*) are generally in favour (M. Gerber et al., 2024).

63% of households in Swiss cities live in apartments owned by the private sector, including firms, banks, insurance companies, and pension funds (Debrunner & Hartmann, 2020). To align private profit motives with public densification goals, municipalities offer incentives like densification bonuses. However, competition in the building market means private actors retain significant power, with public-private partnerships (PPPs) facilitating collaboration between municipalities and investors. Depending on local regulations, these dynamics may lead to high profit margins with significant social costs, as observed in Zurich, or lead to more modest returns and a comparatively stable housing market, as in the case of Geneva (Representative of SFOSD, personal communication, May 20, 2025).

¹⁷⁵ The three inventories Federal Inventory of Landscapes and Natural Monuments (*Bundesinventar der Landschaften und Naturdenkmäler von nationaler Bedeutung, BLN*), Inventory of Swiss Cultural Heritage Sites (*Bundesinventar der schützenswerten Ortsbilder der Schweiz von nationaler Bedeutung, ISOS*), and Inventory of Historic Pathways and Transport Routes (*Bundesinventar der historischen Verkehrswege der Schweiz, IVS*) are part of the NHG and aim at the preservation of cultural and natural monuments in spatial planning.

Sector	Level of governance	Name	Role	Date of appearance
Nation-wide association	National	VLP Espace Suisse	Swiss association for Spatial Planning Works for the federation in questions of spatial planning as educator, consulting	1943
Public	national	Federal Department of the Environment, Transport Energy and Communications, DETEC (<i>UVEK</i>)	Responsible for infrastructure and environment, hence spatial planning issues.	1848
public	national	Federal Office for the Environment, FOEN (<i>BAFU</i>)	Ensures sustainable use of natural resources such as soil, water, air, tranquillity and forests	1971
public	national	Swiss Federal Office for Spatial Development (<i>ARE</i>)	Federal authority responsible for spatial planning, mobility policy and sustainable development.	2000
public	cantonal	Cantonal Offices for Spatial Development	Prepare regional structure plans, allocate and adjust building land and define a land use development strategy in the areas of settlement, landscape, transport and infrastructure for a medium planning interval of 20-25 years.	
public	municipal	Offices for Urban Development	Concretise the structure plan through utilisation plans, targeting areas for certain use and density goals, issuing building permits, integrating the public	
NGO	nationwide association	Swiss Heritage Protection	Independent organisation for the preservation of cultural building heritage	1905
NGO	nationwide association	ProNatura	Independent nature preservation organisation in Switzerland, e.g. protecting nature reserves, launching initiatives	1909
NGO	nationwide association	BirdLife	Independent nature preservation organisation in Switzerland, e.g. protecting	1922

			nature reserves, launching initiatives	
private	nationwide association	Different political parties	Parties are involved in the proposal of initiatives representing public opinions and if accepted changing the law	-
private	different	Private landowners Private investors		-

Table CH8. Actors involved in the policy cycle of densification

6.5 Assessments, achievements and challenges

Urban densification has been a key policy goal in Switzerland since the 2014 revision of the Spatial Planning Act. Yet, despite this legal framework, a study by the Swiss Federal Office for Spatial Development (ARE, 2024a) shows that a significant portion of new housing continues to be built on undeveloped land, particularly in rural and peri-urban areas. However, this trend is gradually shifting, especially in cities and tourist regions. From 2018 to 2022, 59% of new dwellings were built on existing sites, often through redevelopment of already built areas (ARE, 2024a). This shift is reflected in the stable building zones from 2017 to 2022, with demographic growth contributing to a reduction in land consumption per capita—from 309 m² in 2012 to 282 m² in 2022. Today, 95% of the Swiss population lives within building zones, of which 10-16% remains unbuilt and available for future development (ARE, 2022). However, according to a researcher, densification in Switzerland is not contributing to sustainable development at the moment: “De facto, more is being built in the form of more building volume, more concrete in the end.” (Representative of ETHZ SPUR, personal communication, June 4, 2025).

With the second revision of the Swiss Spatial Planning Act, densification became legally mandatory and a key priority of Swiss policies (UVEK, 2024). Platforms like densipedia.ch and EspaceSuisse were established to support its implementation. Harmonizing structural conditions across cantons is also a key focus, which sometimes requires complete overhauls of cantonal building laws. By 2022, all 26 cantonal structure plans were accepted by the Federal Council, with municipalities now tasked with land-use planning and the finalization of building zones. However, so far only 43% of municipalities have adapted their land-use plans to meet cantonal structure requirements (UVEK & ARE, 2024). Urban municipalities are generally ahead of their rural counterparts in adopting SPA I, likely due to greater housing demands, more planning resources, and lower public resistance. Nevertheless, for densification to succeed, municipalities must develop new competences to maintain both urban quality and public support. Limited resources often lead municipalities to rely on external experts, which can slow down knowledge transfer and hinder locally adapted solutions. Particularly in rural areas with a high proportion of residential properties, changes to land use plans - such as the rezoning of land - is often causing strong political resistance (UVEK & ARE, 2024).

One of the central challenges of densification is its impact on housing affordability. Critics have argued that the 2014 SPA revision has contributed to rising housing costs, and in some urban areas to gentrification and displacement (Debrunner, 2024). Indeed, between 2000 and 2021, the price of single-family houses increased by 80%, while rents rose by 30%. The mechanisms of Swiss spatial planning, according to an employee of the SFOSD, allow the market to react immediately, depending on the capacity of local regulation to stabilize: “Ultimately, it is always a question of who benefits from regulation and who from non-regulation” (Representative of SFOSD, personal communication, May 20, 2025). Land rezoning plays a crucial role in facilitating or restricting development and thus the possibility to adapt to the housing shortage. However, densification only alleviates the housing shortage in places where occupancy rates are already exhausted. In general, therefore, the impact of densification depends on the context (BWO, 2023).

Public acceptance remains a crucial factor in the success of densification, as pointed out by multiple studies (J.-D. Gerber & Debrunner, 2022; Herdt & Jonkman, 2023; Sudau & Grêt-Regamey, 2024; Wicki et al., 2022). A media analysis from 2010 to 2019 on gentrification found that public opinion is pivotal to the success of densification projects. While support for densification at the national level has grown to 57.5%, local support remains much lower, at just 11.9% (Wicki et al., 2022). Emotional responses tied to concerns over place identity and personal autonomy often cause resistance, especially in communities close to proposed densification projects (Herdt & Jonkman, 2023). Despite general agreement on the need for more housing, NIMBYism often obstructs local efforts. Researchers suggest that Switzerland’s direct democratic tools, if used for site-specific solutions and public participation, could improve the quality and equity of densification (Herdt & Jonkman, 2023). Collaborative efforts between the public and the private sector are seen as essential for achieving socially sustainable densification (Perić et al., 2023).

Critics have also pointed out that private actors, particularly corporate property owners, are the main beneficiaries of densification, often prioritizing financial gains over social justice (Debrunner, 2024). Large-scale projects are typically driven by private entities such as banks, insurance companies, and pension funds. Switzerland’s strong property protection laws, which favour property owners, further contribute to rising property values and an imbalance of decision-making power, leaving tenants at a disadvantage (Debrunner, Jonkman, et al., 2024; J.-D. Gerber et al., 2017). This unequal distribution of the benefits of densification has led to growing public resentment. Comparative studies suggest that granting municipalities greater authority to intervene in property rights could lead to more equitable and effective densification outcomes (Götze & Jehling, 2023). A representative of SFOSD criticized the insufficient consideration of the connection between spatial development and real estate market: “I believe the purpose of (spatial) regulation should be (...) to ensure excessive profit opportunities are not offered at the expense of communities or individuals” (Representative of SFOSD, personal communication, May 20, 2025).

Different densification strategies—such as brownfield developments, transit-oriented developments (TODs), and rezoning—have varied effects on local demographics. For example, it was found that in Zurich, densification efforts have largely been driven by new construction (being 6.5 times more common than refurbishments), leading to the displacement of lower-income residents (Kaufmann et al., 2023). Lutz et al. (2024) also noted that while

TODs increase population density, they tend to displace low-income households near transportation hubs, exacerbating inequality and contributing to gentrification. Similarly, Verheji et al. (2023) explored the challenges of ensuring public access to green spaces in privately managed densification projects.

Currently, no policies specifically address the social impacts of densification: most strategies focus on spatial issues, while socio-economic consequences like displacement and unequal housing conditions are largely overlooked. An expert highlights the construction-oriented focus of current legislation, noting: “If we want to make consistent contributions towards sustainability with the SPA, we must promote use density and mixed uses.” (Representative of SFOSD, personal communication, May 20, 2025). Most densification projects are driven by private developers who view housing primarily as an investment, rather than a social good (Perić et al., 2023).

Policy / Programme	Measured impacts on housing inequalities	Potential impacts on housing inequalities
SPA I	Displacement of vulnerable groups: In zones with scarcity of buildable land, densification often replaces older, affordable housing with new developments. (Debrunner, 2024) In TOD (transit oriented developments), displacement of lower-income residents has been proved (Lutz et al., 2024)	Rising Costs: Reduced building zones and land speculation drive up land prices and urban rents. Ignored Tenant Needs: Federal policies prioritize inner development and investor interests over tenant protections. Uneven Capacity: Small and large municipalities share densification responsibilities but differ in capacity, leading to slower housing delivery and reduced quality.
Second Home Initiative		Rising housing prices, disappearance of affordable housing for local population in tourist areas

Table CH9. Summary table of measured and potential impacts of densification policies on housing inequalities.

7 Summary and discussion of results

7.1 Summary of changes in EEPs

Also in Switzerland, international policies such as the Kyoto Protocol and Paris Agreement triggered ambitious national climate goals in the early 2000s. With national support, several local governments—especially larger cities—enhanced these goals by launching their own complementary programmes.

As mentioned in Chapter 1, over the last two decades, Switzerland has seen a continuous evolution of environmental and energy policies. Popular initiatives and social movements have played an important role in shaping EEPs, with public opinion capable of both accelerating and impeding political momentum. Although most initiatives aimed at more progressive regulation or stronger climate protection were rejected, they sparked lively public debates and sometimes prompted revisions to legislation.

The Swiss political system not only influences how decisions are made but also leads to considerable variation in regulations across the country. *The subsidiarity principle gives equal responsibility to all municipalities, regardless of capacity, leading to uneven implementation.* Depending on available financial and professional resources, national policies are therefore not implemented uniformly across all municipalities. *Direct democracy can lead to diluted measures in order to gain majority support.* This can lead to approaches deviating from their original objectives or being redirected to serve different agendas. For example, the relatively weak tenant protection law triggers **renovictions as they** enable landlords to carry out extensive renovations and subsequently charge higher rents.

Lobbies are an important part of political decision-making in Switzerland. For EEPs **the conservative farmers' lobby and the liberal building sector have exerted considerable influence, while the homeowners' association (*Hauseigentümerverband* HEV) plays a key role in shaping housing policies, in particular the tenancy law.** Several representatives from federal organisations agreed that parliamentary decision-making is largely driven by market interests rather than environmental concerns. The real estate sector is fuelling density goals, primarily aiming for higher building density. *The building sector defends the Buildings Programme and promotes densification developments.* Thus, while both energy refurbishments and densification are supported by influential lobbies, NBS lack political support, as the market shows little interest in non-profitable measures provided by nature. Furthermore, the farmer's lobby opposes federal subsidies, as it has no interest in more regulations for agriculture. All experts we in on NBS we could interview explained that biodiversity objectives are of secondary importance to parliament, meaning that funds are preferably channelled into energy savings and decarbonisation. Market interests partly explain the political focus on measurable change and technical responses in the climate debate. Regarding an international real estate market, climate adaptation measures are becoming increasingly important to obtain sustainability certifications that enhance property value.

Switzerland's national policies reflect a strong political focus on energy efficiency, driven by climate goals and energy strategies. The Buildings Programme, with a total budget of CHF 528 million in 2023, has significantly expanded over the past decade making an important contribution to energy savings. National support to energy refurbishments further incentivised cantons to pursue active energy policies and required municipalities to establish structure plans and schemes. However, as stated by the representatives of different federal organisations, there have been considerable budget reductions in all departments. The political orientation of department heads, this can lead to a reduction in funding (Representative of SFOE, personal communication, May 8, 2025).

The term *nature-based solutions* (NBS) has only recently entered public discourse in Switzerland and still lacks a dedicated federal funding scheme—likely due to limited market

interest. To date, municipalities have remained the central actors in regulating, implementing, and promoting NBS, meaning that their success depends entirely on local political will and available resources.

With the enactment of the SPA I revision, densification became a legally binding and central planning objective nationwide. In combination with increased land and real estate speculation, the reduction of designated building zones has been identified as a contributing factor to rising housing costs. **As the implementation of the SPA at the local level has hardly started, these challenges are expected to intensify.**

7.2 Relations and trade-offs between EEPs and housing policies

Both energy retrofitting and densification have entered Swiss legislation in the early 2000s and have led to significant impacts on social sustainability overall and the housing sector specifically. **However, NBS are only now beginning to be considered in relation to housing affordability—and so far, only in large-scale greening projects. By outlining the general challenges and effects of EEPs on housing affordability, their broader social impacts become evident.**

The subsidy structure for energy retrofitting in Switzerland (Buildings Programme) is being criticised due to a significant deadweight effect—nearly half of the funds go to projects that would have occurred anyway. Wealthier households disproportionately benefit from these subsidies, raising concerns about social equity. The programme lacks social criteria, focusing solely on technical aspects, which may unintentionally exacerbate inequalities.

Energy retrofitting often leads to rent increases, as landlords can pass on 50–70% of renovation costs to tenants, minus subsidies. This has contributed to a rise in rents and renovations, especially in urban areas, displacing lower-income tenants and accelerating gentrification. In Zurich, for example, 30% of renovations involved tenant displacement, with new tenants earning significantly more than those replaced. Proposed reforms to align energy and housing policy - such as tying subsidies to tenant protections - have not been implemented at the national level due to concerns over cost, enforceability, and property rights. If well-regulated, retrofitting could mitigate energy poverty, but current retrofitting policies and incentives risk worsening housing affordability for vulnerable populations.

To date, NBS in Switzerland face limited national support, as federal priorities lean towards climate adaptation over biodiversity. Implementation is largely left to cantonal and local levels, where smaller municipalities often lack the capacity to manage complex NBS projects. As a result, progress is uneven and highly localized. The unequal distribution of greening subsidies - favouring homeowners over tenants - remains largely unexamined. There is little public or academic debate on how NBS affect housing costs or who benefits from green space investments. While green interventions in public areas may raise property values, the delay in effect makes it hard to measure their impact on rents. Swiss tenancy law does not clearly define whether NBS qualify as value-enhancing improvements that could justify rent increases.

Following the second revision of the SPA in 2014, when densification became legally binding, reducing land consumption has become a central goal of Swiss spatial planning policy. Due to the Swiss federal structure, the state of implementation varies widely between municipalities. Critics argue that densification primarily benefits private investors, such as banks and pension funds, while tenancy needs are bypassed. Switzerland's strong property rights further reinforce this imbalance, limiting tenant influence and fuelling public discontent. While direct democratic tools could enhance participation and equity, they are not yet systematically used in densification processes.

Multiple studies found that densification leads to rising housing costs, gentrification, and displacement, particularly in urban areas. The effects of densification on the local context, by factors such as vacancy rates and municipal governments' regulatory capacity. Land rezoning plays a key role in shaping development potential, but its benefits are unevenly distributed. **Currently, national policies prioritize hard densification, often at the expense of ecological and social considerations that could be addressed through more inclusive soft densification strategies.**

The combination of EEPs – **as for example densification targets and the promotion of energy retrofitting** – appears to generate severe social impacts that are require a strong political will to be mitigated. As was mentioned, they trigger large scale demolitions of older but affordable housing. The **Swiss tenancy law limits the right to increase rents following minor upgrades and within ongoing rental contracts, indirectly promoting more extensive renovations or full the full replacement of older buildings, which allow tenant evictions** Such demolitions are not only problematic from a social perspective; as highlighted by some scholars, **current energy policies do not consider the ecological impact of demolition** (Representative of ETHZ SPUR, personal communication, June 4, 2025)..

The growing number of popular initiatives addressing regulations of housing and affordability underscores the increasing tensions between EEPs and social sustainability. Switzerland's complex administrative and political structure leads to significant variation in regulatory approaches across cantons. **Moreover, strong lobbying interests often shape political decisions, frequently sidelining social concerns. Yet, these concerns must be meaningfully integrated into both the development of EEPs and housing policy.**

8 Glossary

Abbreviation (ENG / GER)	German	English
SFOE / BFE	Bundesamt für Energie	Federal Office of Energy
SFOSD / ARE	Bundesamt für Raumentwicklung	Swiss Federal Office for Spatial Development
FSO / BFS	Bundesamt für Statistik	Federal Statistical Office
FOEN / BAFU	Bundesamt für Umwelt	Federal Office for the Environment
FOH / BWO	Bundesamt für Wohnungswesen	Federal Office for Housing
NHG	Bundesgesetz über den Natur- und Heimatschutz	Federal Act on the Protection of Nature and Cultural Heritage Protection
IVS	Bundesinventar der historischen Verkehrswege der Schweiz	Inventory of Historic Pathways and Transport Routes
BLN	Bundesinventar der Landschaften und Naturdenkmäler von nationaler Bedeutung	Federal Inventory of Landscapes and Natural Monuments
ISOS	Bundesinventar der schützenswerten Ortsbilder der Schweiz von nationaler Bedeutung	Inventory of Swiss Cultural Heritage Sites
BDP	Bürgerlich-Demokratische Partei	Conservative Democratic Party
CVP	Christlichdemokratische Volkspartei	Christian Democratic People's Party
	CO ₂ -Gesetz	CO ₂ Act
	Die Mitte	Centre
EAER / WBF	Eidgenössische Departement für Wirtschaft, Bildung und Forschung	Federal Department of Economic Affairs, Education and Research
DETEC / UVEK	Eidgenössisches Departement für Umwelt, Verkehr, Energie und Kommunikation	Federal Department of the Environment, Transport, Energy and Communication
EKZ	Elektrizitätswerke des Kantons Zürich	Electricity Provider of the Canton of Zurich
	Energie 2000	Energy 2000
	Energieartikel	Energy Article
	Energiefranken	Energy Franc
	Energiegesetz	Energy Act
	Energieperspektiven 2050	Energy Perspectives 2050

	Energieperspektiven 2050+	Energy Perspectives 2050+
	EnergieSchweiz	SwissEnergy
	Energiestrategie 2050	Energy Strategy 2050
	Energieverordnung	Energy Ordinance
FDP	FDP.Die Liberalen	The Liberals
	Gebäudeprogramm	Buildings Programme
	Gewässerschutzgesetz	Water Protection Act
	Grüne Schweiz	Green Party
GLP	Grünliberale Partei	The Green Liberal Party
	Grünstadt Schweiz	Green City Switzerland
HFM	Harmonisiertes Fördermodell der Kantone	Harmonised Promotion Model of the Cantons
	Junge Grüne Schweiz	Young Green Party
KIV	Klimaschutzverordnung	Climate Protection Ordinance
	Klimastrategie Kanton Thurgau	Climate Strategy of the Canton of Thurgau
EnDK	Konferenz der Kantonalen Energiedirektoren	Conference of the Cantonal Energy Directors
	Langfristige Klimastrategie 2050	Long-Term Climate Strategy 2050
MuKE	Mustervorschriften der Kantone im Energiebereich	Model Regulations of the Cantons in the Energy Sector
	Nutzungsplan	Utilization Plan
SPA / RPG	Raumplanungsgesetz	Spatial Planning Act
	Richtplan	Structure Plan
	Sachpläne und Konzepte	Concepts and Strategies
	Schweizer Bauernverband	Swiss Farmers' Union
SVP	Schweizerische Volkspartei	Swiss People's Party
SFV	Schweizerischer Fischerei-Verband	Swiss Fishing Federation
	Sondernutzungsplan	Special Land Use Plan
SP	Sozialdemokratische Partei	Social Democratic Party
	Stimulus Programme	Stimulus Programme

	Strategie Anpassung an den Klimawandel	Climate Change Adaptation Strategy
	Strategie Biodiversität Schweiz	Swiss Biodiversity Strategy
	Umwelt Schweiz 2022	Swiss Environmental Report 2022
VSSG	Verband Schweizerischer Stadtgärtnereien und Gartenbauämter	Association of Swiss Departments for Green Spaces
ZWG	Zweitwohnungsgesetz	Second Home Law

Table NO 11. Glossary of Swiss names and acronyms

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10 Annex

Institution	Focus	Name	Place and date	Duration
SFOSD	Densification	Matthias Howald	20.05.2025, online	81 min
SFOE	Energy retrofitting and Buildings Programme	Andrea Streit	08.05.2025, Zurich	85 min
FOH	Housing policy and debate	Martin Tschirren	10.07.2025, online	74 min
EspaceSuisse	Densification	Damian Jerjen	24.03.2025, online	60 min
EnDK	Energy retrofitting, multilevel governance	Olivier Brenner	08.05.2025, online	55 min
ETHZ SPUR	Densification	Gabriela Debrunner	04.06.2025, online	60 min
FOEN	Nature-based solutions	Claudia Moll	17.04.2025, Zurich	62 min
Grünstadt Schweiz	Nature-based solutions, densification	Antonio Diblasi	15.04.2025, online	45 min
Lemon Consult	Energy retrofitting, labels	Mark Frey	07.05.2025, Zurich	45 min

Table CH12. List of Interviews.

PolicyLab	How can ecological sustainability and access to affordable housing be combined?
Date	03.04.2025
Location	Bahnhofplatz 2, 9001 St.Gallen, "Historischer Saal" (in person event)
Number and types of participants	28 participants representing the following organisations: - Federal Office of Housing - Federal Office of Energy - Federal Office of Spatial Planning - Cantonal Office for Spatial Development Zurich - Cantonal Office for Spatial Development Thurgau - Cantonal Office for Housing Subsidy (SG, TG, AI) - Building Directorate St.Gallen - Office for Environment and Energy St.Gallen - Office for Urban Planning St.Gallen - Office for Urban green areas St.Gallen

	- Office for Urban green areas Amriswil - Tenants' Association Zurich - Swiss Homeowners Associations - Association of Housing cooperatives Switzerland - Association of Housing cooperatives Zurich - Association of Housing cooperatives Eastern Switzerland - Housing cooperative ABZ - Housing cooperative St.Gallen - Axa Winterthur (private developer) - Intep (Sustainability consulting and applied research) - Wincasa (private developer) - Pensimo (private developer) - ETH SPUR (Institute for Spatial Planning and Urban Politics) - Fachhochschule OST (Institute for Social Work and Space) - ZHAW (Institute for Social Work) - EAWAG (Swiss Federal institute of Aquatic Science & Technology)
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Table CH13. Details PolicyLab.

NATIONAL REPORT ON THE REGULATORY SYSTEM OF EEPs – THE UNITED KINGDOM

1 Executive summary

This report details the legislative and governance frameworks for retrofitting, Nature-based solutions (NBS), and densification in the UK. The key message is that the UK central government uses legislative and public funding mechanisms primarily to catalyse and enable market delivery of its retrofit, NBS and densification strategies. This centres on the belief that markets can and should deliver where public needs are identified, if government can set the right context for markets to flourish. But where private markets are relied on to provide the capital required for service delivery, these will also need to be commercially viable, with trade-offs for equity and public benefit.

Chapter 4 outlines the legislative and governance frameworks for retrofitting. The main challenge here is that domestic energy improvements are not being rolled out at the pace required to meet the UK's climate obligations. It seems likely that this is because the UK government has prioritised small scale demand-side incentives intended to catalyse productivity in the supply-side. However, the retrofitting sector is likely to require significant levels of public investment to become a fully functional industry. One impact is that while government focusses on small scale demand-side schemes, the cost of retrofit installation remains extremely high. Meanwhile, funding schemes reproduce underlying housing inequalities: houses with disrepair, damp or mould are excluded, narrow eligibility excludes other households in need, and market-led schemes prioritise cost-efficiency over quality.

Chapter 5 outlines the legislative and governance frameworks for NBS. Biodiversity requirements for all development and regeneration became effective from 2024, meaning that both small and major new development must ensure a minimum of 10% biodiversity net gain, ideally on site, in order to secure planning permission. Delivery of NBS through housing development means NBS are likely to be delivered in line with the private sector values of the UK real estate sector, viewing nature as asset for the enhancement of real estate value. Additional costs may also lead developers to question viability and reduce affordable housing delivery. At the same time, local authorities are required to develop Local Nature Recovery Strategies, to set the framework for developers to make their proposals for NBS delivery. Local authorities must negotiate with the private sector over the specific nature of NBS provision, in conditions of reduced capacity. This may lead to developers pursuing a limited range of NBS and further inequalities being entrenched due to the uneven capacities of local authorities.

Chapter 6 outlines the legislative and governance frameworks for densification. On the face of it, housing densification in the UK can be considered part of the central government's low-carbon strategy. However, looking at the history of densification in the UK shows it has deeper

roots, and emerged very separately to the green agenda. Within the mechanisms for housing delivery that have been established as part of the UK housing (and planning) system, regeneration and densification are processes through which housing provision – and the land underlying housing provision – have become privatised and re-commodified. Provision of social housing on these sites relies on cross-subsidy from private tenure owner occupied or rental homes, which has been found to result in a net decline in social homes. This form of urban development can radically increase housing inequalities in the affected areas.

2 Introduction and Methodology

This report details the legislative and governance frameworks for retrofitting, NBS and densification in the UK. As noted above, the UK is made up of four countries: England, Scotland, Wales and Northern Ireland, with some competencies of the UK government applying only to England. While the administrative and legislative frameworks for green initiatives like retrofitting, NBS and densification are complex and often involve overlap between the UK government and the devolved administrations, these are broadly areas in which UK national strategy applies to the English territory. Each of the devolved administrations have separate frameworks and institutions for these initiatives, and an analysis of each one would require that four separate national frameworks were detailed in turn. Since the local case studies for this project are located in England, we have focussed on the English case. Nevertheless the 'West Lothian Question' (detailed above) means the governance frameworks for England are often determined by the UK central government. Therefore when unpacking governance mechanisms at the national-scale, we usually refer to UK level policy frameworks. Desk-based policy analysis at this level was conducted through analysis of central government strategy, legislative and consultation documents, sourced from the websites of central government departments such as the Department for Energy Security and Net-Zero, the Department for Environment, Food and Rural Affairs, and the Ministry of Housing, Communities and Local Government.

A few governance competencies are completely devolved to England, for example Homes England is 'the housing and regeneration agency' for England, and provides the finance for social and affordable housing in England. (In the devolved administrations this role is occupied by the Scottish Housing Regulator, the Northern Ireland Housing Executive, and the Welsh Government). In cases like this, we refer to English level policy frameworks throughout this report.

All areas in England are provided local services by at least (usually) one local authority. Regional authorities are not common throughout the UK, but the GLA is a significant example of this tier of government, setting out the spatial development strategy for London and providing additional support to the Greater London Boroughs. Desk-based policy analysis at this local and regional level was conducted through analysis of local authority and GLA strategy, legislative and consultation documents, sourced from the websites of various local authorities and the GLA. This policy analysis was supplemented by 5 interviews (see Table 1 below) and a 'Policy Lab' workshop, with attendees from national, regional and local government as well as housing providers, development companies and NGOs. The purpose of these workshops was to present our hypotheses about the impacts of retrofit, NBS and

densification implementation in England on housing affordability and access, and to seek on-the-ground expertise about how these initiatives work in practice.

Institution type	Role	Date of interview
Local authority arms length management organisation	Sustainability Associate	28/5/2025
Local authority climate team	Climate Action Officer	28/5/2025
Housing association	Senior Repairs & Maintenance Surveyor (responsible for affordable housing retrofit programme)	18/06/2025
Housing association	Project Director for new housing development	8/7/2025
Local authority planning team	Development Management Planning Officer	16/07/2025

Table UK1. Competences of ecological transitions and housing policies as organized at different governance levels

The report also draws on academic and grey literature, particularly for a deeper understanding of how the markets for retrofitting, NBS and densification work in the UK, and for assessing their constraints and likely impacts for housing inequalities. One limitation of the review of this literature is that it has been non-systematic; relying largely on the authors' professional judgement for selection of studies and reports, rather than defining a methodology for the selection of literature. The limitations of this approach were mitigated by the authors by consulting key academic informants prior to review (one leading academic working in each of the three areas of retrofitting, NBS and densification) to guide the review process and ensure a broad range of literature has been consulted.

3 General Governance System

The UK Office For National Statistics (ONS) have estimated the UK population at mid-year 2023 to be 68,265,200. This can be divided into the population of England (57,690,30), Scotland (5,490,100), Wales (3,164,400) and Northern Ireland (1,920,400).

The United Kingdom (UK) is made up of four countries: England, Scotland, Wales and Northern Ireland (NI). The UK has its own legislature (UK Parliament) and executive (UK Government). The 'devolved administrations' (Scotland, Wales and NI) also have their own legislatures (Scottish Parliament, National Assembly for Wales, and Northern Ireland Assembly), and their own executives (Scottish Government, Welsh Government, and Northern Ireland Executive).

There is no separate legislature or executive for England. This creates a political issue around what gets called the West Lothian Question or the English Question, concerning whether members of Parliament (MPs) from the devolved administrations (who sit in the UK Parliament) should be able to vote on matters that affect only England, while these same matters are reserved for the devolved administrations to vote on separately, without being impacted by

votes from MP's representing other parts of the UK. Devolution also means that there can be different political parties in power in each of the four countries of the UK. These different parties are then able to set a different political agenda for that administration, supported by the Civil Service (which supports the Scottish Government, the Welsh Government and the UK Government; the Northern Ireland Executive is supported by a separate Northern Ireland Civil Service).

This governance architecture means that the administrative and legislative frameworks for specific policy areas can be quite complex, with not only multi-level governance to consider (central, regional and local tiers of government and the governance ecosystems surrounding them) but also separate-yet-overlapping central administrations with distinct political landscapes. When it comes to analysing specific policy spheres at the national level, it is worth bearing in mind that the powers of UK legislation do not always apply equally to all four countries within the UK, particularly in policy areas which are devolved to Scotland, Wales or NI. Some areas of the UK government's work apply largely to England, meaning for example that some statistics produced by the UK government are for England only.

The following powers are devolved to the devolved administrations: local government (including planning); agriculture, forestry and fisheries; transport; health and social care; education and training; justice and policing; sports and the arts, some taxation, and some social security elements. The following powers are reserved to the UK administration: defence; foreign affairs; immigration; trade policy; constitution; and most aspects of broadcasting. Energy policy is not a devolved power, but the devolved administrations can have a significant impact on those aspects of energy policy that are manifested through the built environment, due to devolved planning powers.

Sub-national government in the UK is divided into three levels: civil parishes, local authorities and regional authorities. Not all areas have all three levels of government. Civil parishes exist mostly in rural areas, with locally elected parish councils being responsible for the maintenance of public spaces and facilities.

At least one local authority provides local services to all areas in the UK: these are either single-tier areas, where one single borough council or unitary authority provides services relating to planning and housing as well as education, transport, and waste management; or two-tier areas where local authority services are divided between a district council and a county council.

Regional authorities are not common throughout the UK, but are used to provide additional services to some larger areas, for example the Greater London Authority (GLA) which is supported by the Mayoral Assembly, and which creates and maintains London-wide strategies such as the London Plan. Other areas (such as Greater Manchester) have created combined authorities which do not replace the local authorities in question but which have additional powers, including the ability to receive separate funding and to directly elect a combined authority mayor, for joint strategic functions.

	Housing	Housing retrofitting	NBS	Densification
National level	Sets national policies and laws for the entire country (Department for Housing, Communities and Local Government, DHCLG). E.g. setting affordable rent levels.	Sets national policies and laws for the entire country (Department for Energy Security and Net-Zero, DESNZ) E.g. setting minimum EPC standards.	Sets national policies and laws for the entire country (Department for Environment, Food and Rural Affairs, DEFRA) E.g. Biodiversity Net-Gain legislation.	Sets national policies and laws for the entire country (Department for Housing, Communities and Local Government, DHCLG) E.g. creation of the National Planning Policy Framework (NPPF), and Estate Regeneration National Strategy.
Regional authorities	Provide some additional services and funds within some larger areas (e.g. Greater Manchester and Greater London Authority (GLA)), often implemented through the local authorities in these areas.	The GLA provides some additional services and funds to help local authorities in London make the best use of nationally available funds.	Provide some additional services and guidance (e.g. GLA: Urban Greening for Biodiversity Net Gain: A Design Guide).	Providing funds for non-profit sector to purchase land for densification. In the case of London, creation of the London Plan, setting strategic planning priorities for London, e.g. Opportunity Areas.
Local authorities	Responsible for providing public housing services. Including (but not limited to): planning for housing development, negotiation of planning gain for public housing delivery through Section 106 agreements with private developers, maintaining housing registers for public housing allocation.	Responsible for providing public services. Including (but not limited to): coordinating retrofit of all local authority owned housing, application to centrally coordinated funds for public housing retrofit.	Responsible for providing public services. Including (but not limited to): drafting local strategies including Green and Blue Infrastructure Strategies or Local Nature Recovery Strategies, for the coordination of NBS delivery by private developers in the borough.	Responsible for providing public services. Including (but not limited to): planning for housing development, working in partnership with private and non-profit sector for the delivery of housing.

Table UK2. Competences of ecological transitions and housing policies as organized at different governance levels

4 Housing retrofitting

4.1 The policy cycle: emergence of the issue and policy decisions

Emergence of the issue in national policymaking

The main driver of retrofitting policy in the UK is the legally binding climate obligations made by the UK as part of the Paris Agreement and subsequent commitments. The UK's Nationally Determined Contribution (NDC) towards these efforts is a commitment to reducing greenhouse gas emissions by at least 68% by 2030 (compared with 1990 levels), and to reach net zero by 2050.

Of the nearly 28 million residential dwellings in the UK, over 65% were constructed before the 1970s (Camarasa et al 2018). The construction of new dwellings has declined steadily since then, meaning that the building stock in the UK is some of the oldest, and least energy efficient, in Europe. Within the UK, homes account for the second largest sector (after transport) in terms of energy use (18% of carbon emissions), requiring significant retrofit measures. The UK Climate Change Committee (UK CCC) has stated that in order to achieve the UK's climate obligations, the rate of residential retrofits must increase to 500,000 each year by 2025, and to one million per year by 2030 (Paillet 2024).

However, the UK is significantly 'off track' with regard to retrofit, according to the UK CCC, who in their recent Progress Report to Parliament (UK CCC 2024) stated that energy efficiency measure installations in homes „are moving in the wrong direction compared to the scale-up that is required. They fell in 2023 and were already significantly off track in 2022“.

1995: Home Energy Conservation Act (HECA)

Local authorities were required to produce a strategy for the improvement of residential energy efficiency in their area by 30% in the next 10-15 years, including consideration of the private as well as public housing stock in their areas (Preece et al 2023).

2008: Climate Change Act

The UK's 2008 Climate Change Act set out domestic targets for carbon emissions reduction, standing separately to EU law on carbon emissions. The Act set targets to reduce emissions to 35% below 1990 levels across all sectors by 2020, and 80% below 1990 levels by 2050. As part of the act, the independent UK CCC was established, to set the UK's carbon emissions reductions budgets (five year targets) and to design the strategies that would allow these budgets to be met. The UK CCC also makes an evaluation of all national policies in the UK to assess whether these are aligned with current budgets and to suggest amendments. As part of this role, the UK CCC maintains a position on retrofit activity within the UK, for example stating that residential retrofits would need to increase to a rate of 500,000 per year by 2025, and one million per year by 2030, to meet the UK's net zero target (RICS 2024).

2010: Retrofitting emerges as a policy priority, with announcement of the 2012 Green Deal

In September 2010, the government made a statement in advance of launching its 'Green Deal', which would 'radically overhaul the energy efficiency of homes and small businesses'. This included the suggestion that retrofitting measures could catalyse £7 billion of Green Deal private sector investment per year and create up to a quarter of a million jobs by 2030 (DECC 2010 A).

In December 2010 the Department for Energy and Climate Change published a summary of the government's proposals (DECC 2010 B) to allow landlords, tenants and homeowners to pay for retrofit measures (listed in total) through savings in their energy bills.

2011: Energy Act

This Act set out the legislation that underpinned the Green Deal, one of several publicly funded schemes providing funding for the retrofit of the UK's housing, outlined in the section on implementation below. The legislation also required all landlords to make energy efficiency improvements to their properties as requested by their tenants by 2016, and to improve the least efficient properties to a minimum of energy efficiency rating of E before rental, by 2018 (Camarasa et al 2018).

2012: Energy Efficiency Strategy: The Energy Efficiency Opportunity in the UK

In 2012, the UK Government launched its Energy Efficiency Strategy (updated in 2013). It frames energy efficiency measures as a driver of economic growth. This document provides the strategic context for the Green Deal and the Energy Company Obligation (ECO) scheme, both outlined below.

2017: UK CCC Report to Parliament

In 2017, the UK CCC outlined the extent of retrofits required for the UK to meet its energy efficiency targets, in a report to parliament (UK CCC 2017): all (practicable) lofts (8.4 million) would need to be insulated by 2022; all (practicable) cavity walls (6.2 million) would need to be insulated by 2030; 2 million solid walls would need to be insulated by 2030; 2.5 million heat pumps would need to be installed by 2030, and around 3 million homes would need to be connected to low-carbon heat networks (UK CCC 2017)

2017: The UK's Clean Growth Strategy

This strategy set out energy and carbon emission reduction policies. Key policies and proposals for improving the energy efficiency of homes included retrofitting as many homes as possible across the UK to have an Energy Performance Certificate (EPC) band C by 2035 (Camarasa et al 2018) using, for example, investment to support the Energy Company Obligation (ECO) Scheme.

2021: UK Net Zero Strategy: Build Back Greener

The 2021 'Long-Term Low-Emission Development Strategy' outlines the governments proposals for supporting retrofit in the private rented sector, owner occupied homes, and social rented housing (HM Government 2021), including strengthening Minimum Energy Efficiency Standards to EPC band C by 2028 in the PRS, and providing £800 million additional funding

to the Social Housing Decarbonisation Fund (SHDF) over 2022/23 to 2024/25. The setting of minimum EPC standards in effect legislates for compulsory retrofitting of homes to reach the required energy performance standards.

2024: UK CCC Progress Report to Parliament

In its 2024 Progress Report to Parliament, the UK CCC (2024) identified the UK as being significantly off track, in relation to other European countries, in terms of annual heat pump installations in homes (which would require ‘a considerable scale-up’ to meet targets), and in terms of other energy efficiency measure installations in homes, which „are moving in the wrong direction compared to the scale-up that is required. They fell in 2023 and were already significantly off track in 2022“.

2025: New Labour government’s Warm Homes Plan

The concrete measures to be implemented by the new government are not certain, although the Labour government’s 2024 election manifesto September 2024 Warm Homes Plan press release indicated that the government would look into

The Warm homes plan strengthens existing Minimum Energy Efficiency Standards from EPC band E to EPC band C in the private rented and social rented sector, This will apply to new tenancies by 2028, and all tenancies by 2030. This places the responsibility on landlords, including private landlords, corporate landlords, local authorities and other social housing providers to retrofit all rental properties. The strategy also replaces the existing Home Upgrade Grant (HUG) scheme with the Warm Homes: Local Grant, and has rebranded the Social Housing Decarbonisation Fund (SHDF) as the Warm Homes: Social Housing Fund. There is a suggestion that the eligibility for application to the Warm Homes: Local Grant scheme would now be area based, rather than individually means tested, helping to retrofit the UK’s residential dwellings at greater scale than means tested schemes.

Position of the country with EU’s policies on retrofitting

During the 1990s, the rise of climate policies globally but also driven by EU regulation, helped to kick-start the creation of residential energy efficiency schemes (see section X below).

More recently, the 2009 EU Renewable Energy Directive (EC 2009) set a target to decarbonise end-use sectors such as transport, heating and cooling and industry, by increasing the share of renewable energy to 20% in 2020, with the highest shares expected to be reached in the power sector, and an aspiration to achieve 45% by 2030. As a member of the EU in 2009, the UK Renewable Energy Strategy was published in 2009, and the EU legislation transposed into UK law, through The Promotion of the Use of Energy from Renewable Sources Regulations, and the 2011 Renewable Transport Fuel Obligations (Amendment) Order. The Renewable Energy Directive was renewed in 2023 after the UK left the EU, meaning this has not been transposed into UK law.

The 2009 EU Ecodesign Directive established a framework for the setting of ecodesign requirements for 28 specific energy-related products which, in relation to retrofit, include boilers, windows, and insulation materials. This legislation was aimed at building into these

products, at the design stage, obligations to reduce energy consumption, thereby aiding the EU's overall energy efficiency targets. While the UK's transposition of EU ecodesign requirements stayed the same immediately after exit from the EU, The 2019 Ecodesign for Energy-RElated Products and Energy Information (Amendment) (EU Exit) Regulations ensured that ecodesign requirements already in force or scheduled to apply before the point of exit would continue to apply to products placed on the UK market before or following exit, until the legislation was replaced.

The 2012 EU Energy Efficiency Directive set out the EU's ambitions to encourage the uptake of energy efficiency measures within the EU, setting an energy efficiency target of saving 20% of the Union's primary energy consumption by 2020 compared to 2007 baseline projections, and of making further energy efficiency improvements after 2020 (EC 2012). This document established a framework for the implementation of proposals that had been introduced in the 2011 Energy Efficiency Plan, and was transposed into UK law through various regulations, such as the 2014 Energy Efficiency (Building Renovation and Reporting) Regulations 2014, requiring the Secretary of State for Energy and Climate Change to fulfill certain reporting requirements, including the submission of a longterm renovation strategy to the EC, submission of reports on meeting energy efficiency targets, submission of a National Energy Efficiency Action Plan every three years, and, crucially for understanding the current retrofit in the UK, to link financial support for energy efficiency of buildings to targeted or achieved energy savings. As with the Renewable Energy Directive, the Energy Efficiency Directive was renewed in 2023, with the UK no longer aligned with EU policy.

The policy transition away from alignment with EU law was managed during the UK's 'EU exit', through statutory instruments such as the Renewable Energy, Energy Efficiency and Motor Fuel Emissions (Miscellaneous Amendments) (EU Exit) Regulations (UK Department for Business, Energy and Industrial Strategy 2021). This set out amendments to the EU-derived legislation, ensuring that it would continue to operate effectively until replaced. For example, these amendments removed references to EU law and EU institutions, and removed obligations to submit energy efficiency plans and reports to the Commission after 2020. They did not, however, change the substantive nature of the legislation.

The 2024 EU Directive on Energy Performance of Buildings contributes to overall energy and climate goals by setting out a strategy for the building stock specifically, and sets out the aim to achieve a fully decarbonised building stock by 2050. Since this legislation was passed after the UK's exit from the EU, it has not been transposed into UK law.

All EU regulations were transposed into UK law, until the transposition deadlines for EU regulations stretched beyond the date that the UK left the EU (January 2020). This is illustrated in the table below.

EU Package / framework	Relevant Directives	Relevant UK Transposition
2001: EU Sustainable Development Strategy (updated in 2005)	2002 EU Energy Performance of Buildings Directive (EPBD)	Introduced Energy Performance Certificates (EPCs) for homes and buildings. Also led to the introduction of Display Energy Certificates and air conditioning inspections. This directive was later recast in 2010 (Directive 2010/31/EU), and those updates were also transposed into UK law before Brexit.
2009: EU 2020 Climate and Energy Package	2009 EU Renewable Energy Directive (EC 2009)	<i>The Promotion of the Use of Energy from Renewable Sources Regulations</i>
	2009 EU Ecodesign Directive	<i>The 2019 Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations</i> (These ensured that ecodesign requirements remained in force after Brexit.)
	2012 EU Energy Efficiency Directive (EC 2012)	<i>The Energy Efficiency (Building Renovation and Reporting) Regulations 2014</i>
2014 EU 2030 Climate and Energy Framework 2018: EU 2050 Long-Term Strategy “A Clean Planet for All” 2018: EU Clean Energy for All Europeans Package.	2018 Renewable Energy Directive	No. Transposition deadlines after the UK left the EU. As a result, these were not transposed into UK law. The UK had already transposed earlier versions of related directives (from the 2009 and 2012 packages) and set its own legally binding climate targets via the Climate Change Act 2008 and subsequent carbon budgets, which aligned with or exceeded EU ambition.
	2018 Renewable Energy Directive	
2019: EU Green Deal	2023 Renewable Energy Directive	No. Following Brexit, the UK is no longer bound by EU legislation. The UK has independently committed to achieving net-zero greenhouse gas emissions by 2050, as enshrined in the Climate Change Act 2008 (2050 Target Amendment) Order 2019.
	2023 Energy Efficiency Directive	
	2024 Directive on Energy Performance of Buildings	

Table UK3. Transposition of EU regulations to the UK national level

4.2 The implementation process

Laws and regulations

Energy performance standards for rented homes are used to compel landlords to make energy efficiency upgrades to their rental properties in order to be licenced to put them on the market for rent. The Energy Act of 2011 required landlords to make energy efficiency improvements requested by their tenants, and to improve the energy efficiency rating of their properties to Energy Performance Certificate (EPC) band 'E' before rental. This could be improved by the new 2024 government's Warm Homes Plan, which aims to consult on proposals for both private and social rented properties to be brought up to EPC band C by 2030 (currently, social rented homes have no minimum energy efficiency standard at all). Owner occupiers do not require an EPC until they sell their home or place it on the market for private rent.

While new building standards are not strictly relevant to retrofitting, they dovetail with retrofitting in terms of the UK's efforts to make the overall building stock more energy efficient. National buildings standards were first introduced in the Building Regulations of 1965, functional performance standards introduced in the Building Act of 1984, and revisions to these standards made in 2010, 2013 and 2016. Currently, Energy Performance Certificates are required for the construction and/or sale of a building, using a Standard Assessment Procedure (SAP) methodology to determine the energy efficiency of the property (it's SAP rating) based on factors such as construction materials, heating and ventilation, and insulation and glazing. After consultation running 2019-2022, the Future Homes Standard (later the Future Homes and Building Standard) proposed new standards for energy efficiency of new homes, meaning homes would need to be built with low carbon heating solutions such as heat pumps. The previous government intended this legislation to come into effect in 2025, and the new Labour government have stressed commitment to energy efficiency standards, but the exact outcome seems unclear at this point.

Financial support

Schemes providing public funding to support the retrofit of the UK's housing stock are the backbone of the retrofitting strategy. These are not simply intended to increase the number of homes with retrofit measures, and are not sufficient to achieve retrofit at scale; they are also intended to catalyse innovation in retrofit supply chains and boost productivity and capacity in the construction industry, to kick-start genuine market delivery of retrofit. However, this has had limited results. These schemes fall into four categories and are outlined in turn below:

- A. Supplier obligation schemes: programmes requiring energy suppliers to offer retrofit efficiency improvements to customers most in need.
- B. Pay as you Save (PAYS): programmes allowing consumers to apply for loans to cover the cost of retrofitting their own properties, repaid through savings to energy bills.
- C. Publicly funded schemes for owner occupiers and the PRS.
- D. Publicly funded schemes for social housing providers.

Supplier obligation schemes

As Rosenow (2012) explains, the premise of supplier obligation schemes is that: „central government imposes an energy savings target on large energy suppliers (gas and electricity) that has to be achieved at the customer end“. Energy suppliers usually charge a levy to all their customers, spreading the cost of any measures they provide, usually to more fuel-poor customers or living in those properties most in need of upgrading (e.g. EPC rating of D or lower).

These schemes are not only intended to increase the number of homes with retrofit measures; they are also intended to help build up the supply-side of the retrofit market (numbers of contractors and technological development), by encouraging demand. However, by spreading the cost of installations, this artificially lowers consumers' expectations around the cost of retrofit. Measures are often provided at very low or no cost, and consumers more broadly are left unwilling to pay for these measures at market cost. While many of these schemes have been successful in terms of retrofitting the expected numbers of homes, this has not encouraged the demand for retrofit more broadly; therefore neither has it boosted the supply side of the market beyond that needed to meet the specific obligations of each scheme.

Date	Scheme	Supplier obligation scheme details
1994-2002	Energy Efficiency Standards of Performance (EESOP)	From 2000, all licensed energy suppliers with at least 50,000 domestic customers were required to deliver energy efficiency measures to domestic households (Preece et al 2023). Suppliers asked to focus on the 'disadvantaged' (Grubb et al 2015). EESoP ran from 1994 to 1998; EESoP 2 ran from 1998 to 2000; EESoP 3, ran from 1998 2000 to 2002 (Rosenow 2012). Jointly developed/managed by Ofgem (initially the Office of Electricity Regulation (OFFER) and the Energy Saving Trust. Funded through a levy of £1 per customer bill year, rising to £1.20 in 2002 (Preece et al 2023). The most common measure delivered was insulation, given its cost efficiency and ability to save customers money. Around 3 million households benefited from EESoP1, with savings of around £120 over the lifetime of the measures (Preece et al 2023).
2002-2008	Energy Efficiency Commitment (EEC)	In 2002, the EESoP scheme was renamed the Energy Efficiency Commitment (EEC). EEC 1 ran from 2002 to 2005; EEC 2 from 2005 to 2008 (Rosenow 2012). Funded through a levy on household bills, with the measures securing a household saving of £9 for every £1 spent by energy suppliers (Preece et al 2023). Preece et al (2023) express doubts about whether this scheme had any 'pump-priming' potential within the retrofit market: suppliers had to offer insulation at a considerable discount to encourage uptake, and without these financial incentives, it seemed doubtful to some that consumers would continue making energy efficient choices (Preece et al 2023).

2008-2012	Carbon Emissions Reduction Target (CERT) Program	In 2008, EEC was renamed the Carbon Emissions Reduction Target (CERT). This was the largest supplier obligation programme thus far, creating an estimated energy saving of more than £2bn annually (Grubb et al 2015). Funded by a customer levy, estimated at £24 per year for each fuel (Preece et al 2023). As with previous supplier obligation schemes, there are doubts as to whether these interventions were economically sustainable without financial support, or had the capacity to kick-start market-based activity in the absence of financial mechanisms based in legislation. Insulation was often offered free or cash incentives provided to incentivise those in priority groups; (Preece et al 2023) note concerns amongst stakeholders that this left a legacy of customer expectation that such measures should be provided free or at a very low cost.
2009-2012	Community Energy Saving Programme (CESP)	CERT was complemented by the CESP area-based scheme which focussed supplier obligation-based provision of retrofit measures on the most deprived areas, in order to focus efforts on vulnerable households and communities. Preece et al (2023) note that area-based schemes can bring significant benefits in terms of take-up and cost-effective delivery, with local authorities taking on a central role in building awareness of the scheme.
2012-ongoing	ECO scheme	Launched on 1st January 2013, replacing previous supplier obligation schemes. Suppliers could install improvements directly themselves, through contracted installers, or through a brokerage platform (Preece et al 2023). The ECO scheme and its subsequent iterations (ECO 1-3) lead to 1.4 million homes being improved between 2013-2016, with the most common measures being cavity wall insulation. Preece et al (2023) note that the scheme has failed to develop a market for solid wall insulation, partly because of the focus on these cheaper measures.
2022-2024	ECO4	At an estimated cost of £4 billion over 4 years, the scheme specifically aims to support households on the lowest incomes, with eligibility determined by receipt of means tested benefits (Preece et al 2023). ECO4 'Flex' is a parallel programme which is also designed to target households on low incomes, but not in receipt of benefits (Preece et al 2023).
2023-2026	The Great British Insulation Scheme (previously ECO+)	Running in parallel to the other ECO supplier obligation schemes, this programme is intended to be taken up by customers who do not currently benefit from any other government support to upgrade their homes, but are living in the least energy efficient homes (EPC band G-D), either in receipt of certain state benefits, or in lower Council Tax bands (Preece et al 2023). Rather than a 'whole house' approach, the scheme offers single insulation measures.

Table UK4. Supplier obligation schemes.

Pay as you Save schemes (PAYS)

The PAYS mechanism was developed specifically for the launch of the 'Green Deal' in 2012, under the premise that households should pay for their own home energy efficiency retrofits, rather than all energy consumers contributing through levies, as with supplier obligation schemes (Preece 2023). This mechanism allows individual households to finance the installation of retrofit measures by applying for a 'Green Deal Loan', which would then be repaid on the basis of money saved on energy bills (Camarasa et al 2018). The Green Deal was also intended to incentivise private rental tenants to take on the costs of retrofit, as they would benefit from reduced energy bills, rather than landlords (who had been targeted by supplier obligation schemes) who were slow to apply for schemes that did not benefit them directly (Rosenow and Eyre 2016).

Ultimately the PAYS mechanism of the Green Deal failed to incentivise a critical mass of consumers. While savings on energy bills were, in principle, great enough to cover the costs of the loans required to pay for retrofit measures at the market rate, the scheme has been criticised as having a poor understanding of consumer behaviour. Consumers are not always economically 'rational' actors, and the fact that their costs would be covered was not enough to incentivise the time and effort required for retrofit uptake (Rosenow and Eyre 2016). While in 2011 the Department for Energy and Climate Change (DECC) estimated the Green Deal would result in 14 million domestic retrofits (Rosenow and Eyre 2016), take up was in fact 'dismal' (Grubb et al 2015), with only 6,000 homes being retrofitted each year, and a total of 15,000 at its completion). The Green Deal Loan Programme was discontinued in 2015 (Camarasa et al 2018).

Date	Scheme	PAYS scheme details
2012-2015	Green Deal	The scheme cost government £240m, but was assessed by the National Audit Office as failing to generate additional energy savings, and not value for money. Preece et al (2023) cite 'lasting damage to the retrofit sector due to loss of momentum'. The scheme failed to incentivise uptake and retrofit measures fell dramatically (loft insulation by 90%, cavity wall insulation by 62%, and solid wall insulation by 57%, in 2015 compared to 2012).

Table UK5. PAYS schemes.

Publicly funded schemes for owner occupiers and the PRS

As with supplier obligation schemes, publicly funded schemes are not simply intended to fund retrofit measures, but rather as a demand-side incentive to 'set the right conditions' for the retrofit supply chain to grow, encouraging the construction sector to increase activity to meet demand. As with supplier obligation schemes, these demand-side measures have failed to boost productivity and innovation at scale in the retrofit market. While many schemes have been successful in and of themselves in increasing retrofit installations to the tune of the funding provided, they have not aided any great shift in the numbers of retrofits required to meet the UK's carbon reduction targets by 2050.

Date	Scheme	Scheme details
1991-2000	Home Energy Efficiency Scheme	A scheme for improving the energy efficiency of private tenure households in receipt of certain benefits, through provision of insulation and central heating grants (Preece et al 2023). Around £75m was spent in grants annually to low-income families and pensioners (Preece et al 2023).
2000-2013	Warm front	Replacing the Home Energy Efficiency Scheme, this scheme was intended to benefit private tenure households in receipt of certain benefits, and suffering from fuel poverty (Preece et al 2023). The scheme was overseen by the Department for Energy and Climate Change (DECC). Public expenditure was around £3.4bn, and afforded 2.3m households assistance between 2000-2013 (Preece et al 2023).
2014-2022	Domestic Renewable Heat Incentive (DRHI)	Incentives were offered to owner occupiers, landlords with properties in the PRS, and social housing providers (all households), to promote the use of renewable heat sources in domestic properties. Households that installed a renewable heating system would then apply to the scheme to receive quarterly payments as an additional incentive. The total funding offered by the scheme was £1.5 billion, with the scheme supporting 110,830 low-carbon heating system installations (Preece et al 2023).
2020-2021	Green Homes Grant	The scheme allowed home owners and landlords in the PRS to apply for vouchers towards the cost of installing energy efficiency measures, including low-carbon heating systems. While £1.5 billion was allocated to this scheme, only £314 million was issued. This underperformance led to the scheme being withdrawn. 47,500 homes received assistance, rather than the proposed 600,000 (Preece et al 2023).
2020-2023	Green Homes Grant (local authority scheme)	This scheme extended the support to home owners and landlords in the PRS, for energy efficiency measures to be installed in low income homes, delivering funding via local authorities. Around 70,000 measures were installed before the end of 2023 (Preece et al 2023).
2022-2025	Home Upgrade Grant (HUG)	Local authorities could apply for funding to coordinate the delivery of energy efficiency measures in the homes of owner occupiers and for landlords in the PRS, intended to improve EPC ratings to a band C, and with a total of £950 million provided until 2025 (Preece et al 2023).
2022-2025	Boiler Upgrade Scheme (BUS)	Installers of heat pumps and biomass boilers could apply on behalf of consumers (owner occupiers and landlords in the PRS) for capital grant, contributing to the costs of installation. Consumers would receive between £5-6,000 off the costs of installation, but could only apply for this funding through MSC certified contractors, with the value of the grant taken off the final installation bill. 21,438 measures had been installed up to 2023 (Preece et al 2023).

Table UK6. Public funding for owner occupiers and the PRS.

Publicly funded schemes for social housing

The SHDF makes central government grant available to bidders (local authorities and housing associations) for retrofitting their social housing stock. As with all schemes listed in this section, the scheme is not only intended to increase the number of retrofit installations to the tune of the funding provided; it is also intended to develop the supply-side of the retrofit sector: „creating the conditions for growth in the retrofit supply chain capacity and capabilities, boosting productivity and innovation in the construction sector“ (Great Yarmouth 2024). Applications can be made by individual registered providers of social housing (local authorities or housing associations), or consortia of providers working together, and require that a minimum of 100 social homes at EPC band D-G will be improved.

The funding available through the SHDF is not nearly enough to retrofit the social housing stock at scale. Housing providers are asked to bid against each other for funding to retrofit relatively small proportions of their housing stock, with some applicants receiving no funding at all (although the Warm Homes: Social Housing Fund has claimed that all applications meeting minimum requirements should receive some funding). The task of retrofitting all social housing would require either large-scale central government grant, or a way for local authorities to recoup the high cost of installations, which is impossible in straightforward accounting terms since retrofits secure no financial gains for landlords. The scale of social housing retrofit roll-out through the SHDF is indicative of the UK government’s approach to retrofit throughout its schemes, which is to boost the supply-side of the market through small demand-side props, in an effort to kick-start the UK retrofit market in earnest, something which is yet to be seen.

Date	Scheme	Scheme details
2019-ongoing	Social Housing Decarbonisation Fund (SHDF) (now Warm Homes: Social Housing Fund)	A total of £3.8 billion over 10 years is proposed by the Government; as of 2023 just over £1billion had been committed (Preece et al 2023) 2020: Social Housing Decarbonisation Fund Demonstrator (£61 million) 2021: Wave 1 (£179 million offered to 69 projects) 2022: Wave 2.1 (£778 million offered to 107 projects, with £1.1billion additional match funding from applicants) 2023: Wave 2.2 (£75 million offered to 42 projects, with £139 million additional match funding from applicants)

Table UK7. Public funding for social housing

Other public interventions

There are some local-authority and Greater London Authority (GLA) led schemes which provide assistance, funding, or good practice guides for retrofit. Some examples are provided below:

Scheme	Details
Cambridge council's Action on Energy	Provides funding and information.
Cambridge City Council Net-zero retrofit pilot	Pilot project is underway on Ross Street and Coldham's Grove to retrofit 50 council homes in line with the very latest in sustainable design.
Southend-on-Sea City Council's retrofit eco home	Serves as an educational resource, showcasing effective technologies and practical applications for South Essex Homes residents and partners.
GLA Social Housing Retrofit Accelerator	Provides help to London Boroughs with applications to the SHDF
GLA's Net Zero Accelerators	Provides support and enabling services (examples of innovation, knowledge transfer, data and delivery)
GLA Mayor's Warmer Homes Programme (launched 2018)	Provided £14.5m funding towards heating and insulation improvements to homes in or at risk of fuel poverty improving 4,505 homes by April 2023; provided £2,600,000 additional funding the financial year 2023-24.
GLA Warmer Homes Advice Service (launched 2018)	Providing support to over 21,500 households by March 2023; continued for 2023-24.
London Community Energy Fund (LCEF)	Provides support to get community energy projects up and running faster (schools, places of worship, leisure centres and other community buildings).
GLA "London Power" The Mayor's Energy Company	A public-private partnership between the GLA and Octopus Energy, founded by the Mayor of London. Supplying Energy to those living in London.

Table UK8. Current Local and regional government schemes

4.3 Size and role of the market

Major characteristics of the market framework of retrofitting

The UK CCC has stated that in order to achieve the UK's climate obligations, the rate of residential retrofits must increase to 500,000 each year by 2025, and to one million per year by 2030. This number therefore represents to the UK government its demand-side targets for installations in the retrofit 'market' (whether these are financed and coordinated through public or private mechanisms).

It is clear there is a significant shortfall in the numbers of retrofitted homes, when compared with these targets (Camarasa et al 2018, UK CCC 2024) (the extent of actual numbers of retrofits is difficult to establish, not least because 'retrofit' encompasses various measures, with some homes benefitting from insulation, but not low-carbon heat pumps or biomass boilers, and many homes that are not retrofitted to net zero standard).

The challenge the UK government has seized on, in trying to upscale the number of retrofits across the UK, is incentivising greater uptake on this demand-side of the market, hoping that this will catalyse innovation in the construction industry to meet demand more widely. Other

than the Green Deal, which was completely unsuccessful, all schemes listed above involve coordinating either public grant or private finance for small-scale retrofit roll-out projects, in an attempt to boost market-based provision at a far greater scale.

However, research exists which suggests that retrofit installations simply cost too much for sustainable market demand to emerge without the kinds of financial assistance these schemes provide for consumers (Preece et al 2023, Ellison 2024). Eco Experts recently found that while UK consumers have a high-degree of awareness of low-carbon technology, the huge cost of retrofit installations is preventing widespread adoption. Retrofit measures like solar, battery and heat pump installation can cost between £20,000 and £30,000, with additional costs for double-glazing, cavity wall, solid wall, and loft insulation. This significantly limits the size of the demand-side of the market ('effective demand'). Outside of a government scheme, uptake is likely to be limited to those significant income or capital resources.

This means the 'pump-priming' approach of the UK government, when setting the framework for a retrofit market, is likely to be unsuccessful.

It is worth also considering the supply-side of the market, to understand this problem. Part of the problem of high costs in the retrofitting market is the undersupply of skilled contractors and installers, and the fragmented nature of the construction industry more broadly. A shortfall of skilled construction professionals (Springford 2023, BCIS 2024, Colemans 2024) is compounded by the need for an increase of labour to meet the retrofitting goals outlined by the UK CCC. There is a retrofitting "skill crisis" (Ashden, n.d.) with the Construction Leadership Council (PwC 2022) estimating that the UK will need 500,000 new professionals within construction and retrofit. Currently, only 1,000 trained retrofit co-ordinators are able to oversee the management and design of retrofit measures where 50,000 are needed; 3,000 heating engineers are trained to install heat pumps, where 60,000 are needed (Ashden, n.d.).

As with the organisation of the energy industry, most engineers and installers are self-employed, single-director companies, who are then subcontracted by larger firms, connecting them to consumers. Some installers work independently, connecting to consumers through installer-lead cooperatives. These self-employed installers are likely to have transitioned from previous positions as electricians, gas engineers, or other roles in the construction industry; a transition that can imply significant risk to those individuals' incomes. These factors combine to create incredibly high costs on the supply-side of the retrofit market.

In short, the construction industry will likely need significant levels of public investment, and improved coordination to address the high costs of retrofits. The UK government's approach thus far is to use (demand-side) market-based mechanisms where there isn't yet a sustainable and well-coordinated (supply-side) market. Camarasa et al (2018) also suggest that the complexity and inconsistent funding of government programmes have caused uncertainty and an inability to plan in the sector, causing firms to go out of business. From the perspective of supply-side stakeholders, these authors suggest that the UK government should instead provide extensive professional education, tailored policies, and standardisation of refurbishment solutions. This sector is likely to require significant input from government if it is to become a fully functional industry.

This would stand on top of further subsidies and tax incentives to encourage innovation on the supply-side, and uptake on the demand-side. Add to this the fact that energy consumers have been shown not to respond to ‘rational’ economic incentives (Rosenow and Eyre 2016). This all stands counter to the “the traditional ‘neoclassical’ assumption ... that if energy efficiency saves money, markets would deliver it” (Grubb et al 2015).

How dominant are purely market-based interventions in the retrofitting market?

As noted above, supply-chains are relatively fragmented and effective demand relatively low in the retrofit market, meaning purely market-based mechanisms are a small segment of the market. This notwithstanding, some purely market-based interventions exist. These also rely on market intermediaries (see institutional section below) to connect installers and customers.

Some private business models are emerging that leverage the value uplift that retrofitting affords private home ownership, in order to cover retrofit costs. For example, residential developers are able to buy up homes with poor energy standards, renovate and then sell those homes on at higher prices. Nevertheless, since private developers and corporate landlords in the UK are largely involved in building new buildings (rather than buying and retrofitting older properties), they have a relatively minor involvement with market-based interventions in the retrofitting market.

4.4 The multilevel governance process

The most direct relationship between central and local government is in the coordination of the SHDF. Applicants must co-fund at least 50% of installation costs. There have been controversies around the multilevel governance and coordination of this scheme, since some successful applicants were unable to deliver their retrofit plans at the scale initially expected, or match the funding due to budget constraints, and had to return their allocated funds (this meant that much of the funding allocated through Wave 2 of the scheme was ‘recycled’ from Wave 1, rather than being new funding in earnest (Riding 2024a). The inability of some local authorities to deliver on their SHDF proposals has been reframed by some as the central government ‘responsibility dumping’ its climate obligation strategy to the local level, asking local authorities with stretched resources and capacity to apply to a competitive fund in order to implement central government targets, without support in terms of design, monitoring or accountability. Some councils, such as Islington, have managed to secure this support by engaging consultants, for example to investigate how best to get their social housing stock to net zero by 2030 (Evans et al 2023). Nevertheless, uneven capacity and levels of in-house expertise will mean that local authority actions are likely to be uneven with greater success in better resourced areas.

Many local authorities have developed their own climate strategies, for example Islington’s *Vision 2030: Building a Net Zero Carbon Islington by 2030* (London borough of Islington, 2020a). In this plan, local authority priorities include retrofitting all domestic buildings (not only social homes) to an average level of EPC B (2020–2030). Local authorities clearly need to consider the private housing stock within their climate plans, but addressing this in a strategic

way is likely to be difficult. Additionally, and as the Islington plan points out, 'Our housing retrofit programme alone demands funding which we can't raise':

„The council will need the government to make significant and ongoing funding available in order to deliver our ambition for Islington. For instance, the cost of retrofitting the council's housing stock to become both energy efficient and zero carbon is in excess of what the council can afford within existing resources. This also applies to private housing and social housing provided by other organisations. Funding needs to be made available on a consistent, ongoing basis, with reasonable time given for applications to be processed and funds spent; this will enable the development of high quality proposals, provide stability and security for the delivery industry and reduce costs.“ (London borough of Islington, 2020a)

Vision 2030 also includes a plan to seek funding for skills development programmes in fields like retrofitting, for local residents. But coordination of these actions requires input from higher tiers of government. The role currently played by local authorities therefore seems to highlight a gap in directives and support from central government.

At local authority level, housing officers and the regeneration team often sit separately from teams concerned with retrofits, which might exist as part of the property maintenance team. This could create a disconnect between the departments responsible for retrofit and regeneration, where synergies might allow for better coordination of retrofit policy.

Central Government have been accused of 'flip-flopping' and creating an uncertain environment for retrofit professionals. For example, a recently proposed ban on installing new gas boilers (intended to encourage the predictable uptake of heat pumps, and certainty for industry) has been withdrawn in early 2025 (Horton 2025).

In the UK case, the Greater London Authority (GLA) is an important case of intermediate regional government. The role of the GLA is to support the London Boroughs through additional funds and technical support, but cannot diverge greatly from the national context due to the market conditions leading to high retrofit costs. The GLA's support is detailed in table 5. Some of these schemes, including the GLA's Net Zero Accelerators which offers advice, training knowledge sharing and finance advice to London-based organisations including local authorities and social housing providers, was launched using £950,000 funding for a 'Retrofit London' programme', to create a suite of programmes for advice provision and technical support. The GLA successfully bid for £12,006,000 from the Home Upgrade Grant 2 scheme (from DESNZ) for use in London in 2023-24 and 2024-25. The GLA can therefore best be understood as significant enabler of local authorities within the governance and funding frameworks set by central government. Beyond the £14.5 Warmer Homes Programme for homes in or at risk of fuel poverty, the GLA has not been able to offer significant public funding towards retrofit rollout.

Key actors and institutions

Institution type	Name	role
Local and regional governments	Local authorities (numerous)	Design local climate strategies, considering the entire building stock within the local area. Implement the SHDF, as well as other public measures locally. Apply for funding from central government for skills-upgrading and retrofit roll out measures and demonstrator projects. Provide support to energy suppliers in delivery of supplier obligation schemes.
	GLA	Provides some funding for retrofit rollout (£14.5 Warmer Homes Programme for homes in or at risk of fuel poverty), also provides programmes offering advice and technical support to local authorities and social housing providers.
Central Government	Department for Energy and Climate Change (2010-2016) Department of Business, Energy and Industrial Strategy (2016-2023) Department for Energy Security and Net-Zero (2023-present)	Design of UK policy strategy relating to retrofit; coordinates retrofit schemes of the UK government.
	UK Parliament Energy Security and Net Zero Committee	This committee scrutinises the policy, spending and administration of the Department for Energy Security and Net Zero and its public bodies, including Ofgem and the Committee on Climate change. Builds evidence bases, e.g. through enquiries such as the 'Heating our homes' (UK Parliament 2023), which looked into issues of energy efficiency (including insulation), heat pumps and other technologies, as well as infrastructure problems surrounding delivering warm homes and the need to ensure that there is a skilled workforce when needed. Holds one-off sessions and events e.g. 'Retrofitting our homes for a net zero future', (UK Parliament 2024)
	UK CCC (arms length / independent organisation)	The UK CCC set the budgets and design strategies to achieve the UK's climate obligations. Evaluates central government policies and identifies where shortfalls in policy need to be addressed (Camarasa et al 2018), for example holding the government to account on the rate of retrofit nationwide.
Energy Suppliers	Various	Implement supplier obligation schemes. Suppliers can coordinate the roll-out of retrofit measures for customers in a number of ways: by contacting installers directly; by subsidising 'do it yourself' measures; by liaising with other

		managing agents (e.g. local authorities and supermarkets who then subcontract individual installers); or by creating their own insulation businesses to deliver retrofit measures themselves (e.g. British Gas). Energy suppliers are able to offer retrofit assistance to individuals who do not qualify for the ECO scheme (or alternatives) outlined above. This could be through the provision of funding, or by helping self-funding households with information and links to professionals.
Financial	Green Finance Institute	Financial intermediaries such as the Green Finance Institute exist to analyse barriers to investment, develop financial instruments and channel public, private and philanthropic investment into 'real economy outcomes', targeting commercial returns. Their 'Coalition for the Energy Efficiency of Buildings' advocates for measures such as area-based financing, and a new National Investment Bank „to co-create new investable asset classes and channel both public and private capital towards defined net-zero outcomes“ (GFI n.d.).
	Banks	Some banks offer preferential rates for the purchase of well-retrofitted homes, or cash incentives (e.g. a £20,000 5-year interest-free loan for green upgrades is available from Nationwide (Nationwide, 2024)). These measures are relatively recent and small scale.
	Equity release council	Retrofit mortgage: A mortgage that provides funding to enhance the energy efficiency and reduce the carbon footprint of a residential property. The Equity Release Council (ERC 2024) has unveiled new guidance for member firms to consider when launching retrofit lifetime mortgages
Interest groups	The UK Green Building Council (UKGBC)	The UKGBC is an interest group concerned with the sustainability of the built environment. They produce recommendations to government, with some level of influence.

Table UK9. Key institutions involved in the policy cycle for retrofitting

Accelerators and other market-based institutions and initiatives

A proliferation of small-scale organisations exist to help catalise the retrofit market, for example RetrofitWorks, an installer-led cooperative who link consumers with installers, or People Powered Retrofit, an organisation providing consumers and installers with advice and support to plan, procure and deliver retrofit projects. These organisations are unlikely to have an impact on the structure of the industry, but aid coordination within the segment of the market currently supported by effective demand.

Name	Purpose
Free Energy Grants	Consumer / household advice and liaison
RetrofitWorks	Links individual consumers with installers. Installer-led coop
People Powered Retrofit	Provides consumers and installers with advice and support to plan, procure and deliver retrofit projects.
Cosy Homes Oxfordshire	Provides individual consumers with information e.g. to make a "draft retrofit plan"
OpenEcoHomes in Cambridge	An initiative to support home owners by visiting other homes, with support from Cambridge City Council and local businesses.
Nesta's visit a heat pump service	Delivering a service to help people learn about heat pumps in real-world settings.

Table UK10. Current Market-based institutions involved in retrofitting

4.5 Achievements, assessments, and challenges

The main challenge highlighted above is that retrofits are not being rolled out at the pace required in order to meet the UK's climate obligations. It seems likely that this is because the UK government has used a 'pump priming' approach to its retrofit policy, using small scale demand-side incentives to catalise innovation in the construction industry and boost productivity in the supply-side of the market. Meanwhile supply-side blockages are not properly addressed, and subsidy for the currently prohibitive cost of retrofit interventions is not forthcoming at scale. Policy

One impact of this on inequalities is that while government focusses its efforts on small scale demand-side schemes, the cost of retrofit installation for the population more broadly remains extremely high. Houses continue to be constructed, renovated and improved without consistent policies or standards, kicking the cost of retrofit down the road. Since only those with considerable disposable income will be able to afford retrofit measures without assistance, and to benefit from reduced energy bills, middle- and low-income earners, particularly those who do not qualify for assistance elsewhere, will face a choice between the relatively high cost of installation or more energy inefficient homes and higher energy bills.

There is some indication that good-quality retrofits can increase house values. Camarasa et al (2018) observes that house prices can vary by 5-10% based on their Energy Performance Certificate (EPC) rating, and cites a Department of Business, Energy and Industrial Strategy (BEIS) 2013 report estimating that retrofits could increase property values by an average of 14%. This means that those who have been able to afford retrofit installation could benefit further from house price rises, locking certain groups out of these homes. This effect is likely to be marginal, however. Retrofit is more likely to drive house prices rises for already affluent households who can afford comprehensive, architect-led retrofits with high-quality materials and installation, but the number of these self-funded 'whole house' retrofits remains very low. Grant schemes, which tend to fund less holistic retrofits, have a more limited effect.

In terms of spatial inequalities, the UK's approach to retrofit has so far been geographically fragmented, with retrofit uptake (beyond funding for social housing retrofits) depending on

individual's own inclinations to follow up on the available government schemes or fund their own projects. However, the new 2024 government have indicated that the eligibility for application to the Warm Homes: Local Grant scheme will now be partially area-based, rather than individually means tested, helping to achieve greater scale. This could open an avenue for whole streets or local areas to benefit from retrofit improvements and, if house prices are affected, to lock certain groups out of these areas. Nevertheless, the deployment of area-based schemes remains extremely limited, and house price effects are not yet proven for the less holistic retrofits available through such schemes.

A further potential spatial inequality could be created by 'retrofit mortgages' allowing individuals to access equity in their homes to fund retrofit projects. Since property values vary across the UK, regional differences could be created between individual's capacity to retrofit their homes. Those living in London, where house values are highest, may be able to access adequate finance, whereas those living elsewhere (particularly in the North) where house values are lower may find that retrofit installation and certification could exceed the level of equity they can access from their homes. However, green mortgages remain a nascent market and mainly function as loyalty schemes for lenders to retain existing borrowers. The interest rate and total borrowing cost of green mortgages are not the lowest on the market, so the incentive for homeowners to switch mortgage providers for a green mortgage is relatively weak.

Therefore, retrofit policy and roll-out could (but cannot yet be shown to) produce inequalities through the mechanism of house prices or affordability. Nevertheless, and as supported by our Policy Lab workshops (see Table 11 below), the way that publicly funded retrofit schemes are designed in the UK can reproduce inequalities relating to housing quality. Publicly funded retrofit schemes such as supplier obligation schemes often exclude housing with disrepair, damp, and mould, locking out households living in the worst conditions and those most in need. Market-led support schemes also prioritise cost efficiency over quality and appropriateness, and have led to damp and mould being worsened through poor ventilation. The bottom line is that these schemes are not extensive enough to contribute the quantity or quality of retrofits required within the UK.

With regard to social housing, since local authorities and housing associations must match-fund their funds from the SHDF, there is the potential for rising rents within the social housing sector. For example, in a recent rent review meeting held at Blackpool council, members of the local authority cabinet discussed the need to ensure the Housing Revenue Account (a ring-fenced financial account used by local authorities in the UK to manage all income and expenditure related to their landlord functions for council-owned or social housing) would remain financially secure, "alongside measures to decarbonize our stock":

„In terms of climate change the 2024/25 capital programme includes an additional £500,000 to enable all remaining properties to achieve a minimum energy efficiency level of SAP C. There is currently no significant external funding to support this work, and decarbonisation of the whole stock is estimated to cost in the region of £80-90 million on the best available information.“ (Blackpool Council 2024)

The report concludes with a recommendation "That rents for all Housing Revenue account properties are increased by 7.7% in 2024/25 to maintain the health and future viability of the

Housing Revenue Account in line with official guidance“. While rent reviews are not uncommon and may not be caused solely by spending on the council’s SHDF programme, the clear link between energy efficiency measures and rents in social homes illustrated in this report suggests this question is worth investigating.

The previous points are summarised in the table below, with further insights drawn from Policy Lab workshop #1, held in London.

Hypothesis: impacts on housing inequalities	Further insights, drawn from Policy Lab workshop #1 (WP7)
Potential for rising rents within the social housing sector	Although this may be offset by lower energy bills.
The cost of private retrofit installation for the broader population remains extremely high	The costs of retrofit including more complex insulation measures, heat pumps, ventilation, and solar panels – and ‘whole house’ approaches which combine these measures – remain prohibitively expensive for most of the population, despite the universal heat pump subsidy and targeted grants for retrofit. Despite government subsidies and grants, retrofit remains financially inaccessible to most households, with middle-income households ineligible for most support but unable to self-fund improvements.
Good-quality retrofits can increase house values, and could lock certain groups out of retrofitted homes	This effect is likely to be marginal. There is limited evidence that retrofit grant schemes are driving house price rises. This is truer for affluent households who can afford comprehensive, architect-led retrofits with high-quality materials and installation. The number of self-funded ‘whole house’ retrofits remains very low. Grant schemes, which tend to fund less holistic retrofits, have a more limited effect.
Area-based schemes (where whole streets or local areas can benefit from retrofit improvements) could lock certain groups out of these areas, if house prices are affected.	Potentially. Area-based schemes tend to take a more comprehensive approach and improving multiple properties may magnify the effect on house prices. However, the deployment of area-based schemes remains extremely limited. The upcoming national Warm Homes: Local Grant scheme, which introduces area-based eligibility criteria, should provide more insight into the effects of area-based schemes on house prices.
Those living in London, where house values are highest, may be more able to access retrofit mortgages.	However, green mortgages remain a nascent market and mainly function as loyalty schemes for lenders to retain existing borrowers. The interest rate and total borrowing cost of green mortgages are not the lowest on the market, so the incentive for homeowners to switch mortgage providers for a green mortgage is relatively weak.

Supplier Obligation Schemes can lead to low-quality retrofits	Energy supplier obligation schemes for lower-income households often result in retrofits which are partial, poorly installed, and driven by cost-efficiency rather than quality, while affluent homeowners can procure comprehensive architect-led retrofits.
Those living in poor-quality housing are excluded by current retrofit policy	Current retrofit policies systematically exclude properties with the most severe housing deficiencies (disrepair, damp, mould), leaving households in the poorest housing conditions without effective support.
While retrofit policy is not yet reproducing housing market inequalities at scale (e.g. inequalities relating to affordability or house prices), it is reproducing inequalities in housing provision (e.g. inequalities relating to access to certain types of housing, or locking individuals into certain tenures, types or qualities of housing, including those with poor energy standards).	Retrofit policies exclude housing with disrepair, damp, and mould, locking households living in the worst conditions out of support schemes. The narrow and complex eligibility requirements of retrofit support schemes exclude many households in need. The universal support scheme (for heat pumps) only covers half the cost of installation, so more affluent households benefit disproportionately. Market-led support schemes prioritise cost efficiency over quality and appropriateness – with sometimes hazardous consequences – and provide little agency for households over the measures installed.

Table 11 . Summary table

5 Nature-Based Solutions

5.1 The policy cycle: emergence of the issue and policy decisions

Emergence of the issue in national policymaking

2018: 25 Year Environment Plan

The Policy paper *A Green Future: Our 25 Year Plan to Improve the Environment* (DEFRA 2018) sets out the British agenda for environmental protection and improvement post-Brexit. This was the foundation for UK legislation departing from EU legislation, and set the framework for the UK environmental legislation that would follow. This includes the biodiversity net-gain legislation detailed below, which would become the UK's flagship NBS policy. This would require developers contribute a minimum 10% biodiversity net-gain for each new development, and ask local authorities to negotiate the location and type of NBS. The text points to early,

as-yet-undeveloped thinking around this, for example on p79: “As we build more homes, preserving and creating green spaces in towns is more important than ever. Local authorities and developers need to take account of all the benefits when deciding how much land to allocate as green space”.

2021: Environment Act

The UK 2021 Environment Act is the current legislative basis for all nature recovery and biodiversity net gain in the UK. The act establishes the twin mechanisms of biodiversity net gain law, and the production of local nature recovery strategies by local authorities, which are the central pillars of NBS policy in the UK.

Biodiversity net gain law outlines the responsibility of the private sector to deliver on NBS, stating that all planning permission granted under the Town and Country Planning Act 1990 will be subject to a condition for biodiversity net gain that must be met before the development commences. Before any construction, developers must measure the existing biodiversity values of each site, and present a plan to show how at least 10% gain in biodiversity value will be achieved.

Local nature recovery strategies are, in part, the mechanism by which the public sector can engage with private sector delivery of NBS. The 2021 Act states that all local authorities must have a nature recovery strategy in place. Much like local development plans, local nature recovery strategies are plans designed by the local authority, setting out their vision for the area. This includes the context, specific requirements and biodiversity conditions that must be acknowledged by the private sector when applying for planning permission for new development.

2023: Environmental Improvement Plan

The 2023 Environmental Improvement Plan is a scheduled update of the 2018 25 Year Environment Plan: “Where the 25YEP set out the framework and vision, this document sets out the plan to deliver”. The ‘apex goal’ of the policy is ‘improving nature’, which is achieved through various initiatives. Landscape Recovery Projects, and a ‘Nature Recovery Network’ of new protected areas, are likely to be rural and/or remote. In terms of urban nature, the plan reinforces the commitment to implement the 2021 Environment act: „including rolling out Local Nature Recovery Strategies to identify areas to create and restore habitat, and Biodiversity Net Gain to enhance the built environment”. The plan also proposes an updated Green Finance Strategy, setting out “a goal to raise at least £500 million per year of private finance into nature’s recovery by 2027 and more than £1 billion by 2030”.

Position of the country with EU’s policies on NBS

From the 1970s onwards, the UK’s environmental protection policy clearly benefitted from the UK’s membership of the EU. Environmental groups, often marginalised at the national level in Britain, worked in alliance with the EU Commission to expand the EU’s competence in biodiversity policy, and thereby ‘outflank’ the UK government to ensure environmental protections were in place (Fairbass and Jordan, 2021)

Since leaving the EU, the UK has been 'ahead' of the EU in approving legislation that enforces nature recovery and biodiversity net gain, passing the Environment Act in 2021, several years before the EU parliament approved the 2024 Nature Recovery Directive.

This may have been because the UK faced a crisis after leaving the EU, at which point EU legislation would remain in place until it was replaced at the UK level. Given the profound uncertainty created by the UK's internal politics post-referendum, there was a concern that environmental safeguards would fail with only the undermined legacy EU law underpinning environmental protection. This placed an imperative on the UK to pass legislation including for the protection of the environment.

2024 Nature Restoration Directive

The EU's Nature Restoration Directive was approved by the European Parliament in February 2024. The overall aim is to contribute to achieving the EU's climate mitigation and climate adaptation objectives, through recovering biodiversity in a long-term and sustained way, partly using NBS strategies.

In some senses, the definition of NBS in the UK and the EU are similar. Nature-based solutions are defined in this text as

„solutions that are inspired and supported by nature, that are cost-effective, and that simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions. Nature-based solutions need to therefore benefit biodiversity and support the delivery of a range of ecosystem services.“ (EU 2024: 10).

As well as rural-based NBS, such as restoring wetlands and peatlands and promoting sustainably managed forests and farmland, the directive exemplifies NBS with initiatives such as developing urban green spaces and installing green roofs and green walls in the design of buildings (EU 2024: 11, 28).

While in the UK context there is an emphasis on 'biodiversity', in the EU context, there is an emphasis on 'ecosystems'. A central target of the directive is to ensure that, by 2030, at least 30% of degraded ecosystems are under effective restoration' (EU 2024: 3), including urban ecosystems. This is determined as Member States having put in place restoration measures that are necessary to improve to good condition at least 30 % of all habitat types considered to be not in good condition (EU 2024: 63). The directive stresses the need for 'increasing urban green space' as a major aspect of improving the health of urban ecosystems.

With their different emphases on 'biodiversity' and 'ecosystems', it is relatively complex to determine the UK's natural protection legislation compares to the EU agenda and approach. When drilling down into the implementation, there are some differences between the approach of the EU 2024 directive and the UK 2021 Act, particularly with regard to biodiversity restoration and/or gain in urban areas. Article 8 of the 2024 EU directive (*Restoration of urban ecosystems*, p78) states that Member States shall ensure that there is *no net loss* in the total

national area of urban green space and of urban tree canopy. There is no such stipulation in the UK, but the requirement for a 10% biodiversity *net gain* to be made under any new development means UK legislation could be seen as stronger in enforcing the restoration of nature in urban environments.

The EU 2025 directive supplements this with a requirement that from 2031 onwards, Member States shall achieve an *increasing trend* in the total national area of urban green space, (including through the integration of urban green space into buildings and infrastructure), although the exact increase is not stipulated at this point.

As well as legislation for the protection and improvement of nature, both the EU 2025 directive and the UK 2021 Act include plans to improve plan making. At the EU level, this will be implemented through the creation of national restoration plans, to be reviewed by 2032 and 2042. This target (Target 1 of the directive) ‘ensure[s] that all areas are under participatory, integrated and biodiversity inclusive spatial planning and/or effective management processes’ (EU 2024: 3). This is equivalent to the creation of local nature recovery strategies under the 2021 Act in the UK, albeit at the national, rather than local level.

How the EU and UK approaches compare is not straightforward, not least since gains in *biodiversity* and increases in *green spaces* or in *habitat types* are not straightforwardly comparable. Some feel that the UK’s biodiversity clauses are more stringent than those implemented in the EU. On the other hand, Gravey and Jordan (2023) characterise British environmental policy-making after Brexit as a new form of governance, ‘disengaged’ from the EU environmental rule book, and testing new forms of implementation (e.g. ‘more top-down’). They argue that without a better understanding of the causal mechanisms through which this new form of governance shapes outcomes, “the outcomes may not become clear for many years.”

All EU regulations were transposed into UK law, until the transposition deadlines for EU regulations stretched beyond the date that the UK left the EU (January 2020). This is illustrated in the table below.

EU Package / framework	Relevant Directives	Relevant UK Transposition / equivalent
1992 EU commitments to international Convention on Biological Diversity (CBD).		2004 UK Biodiversity Action Plan (UK BAP) formed part of the UK’s national obligations towards EU commitments
2006 EU Biodiversity Action Plan	Habitats Directive (92/43/EEC) Nitrates Directive (91/676/EEC) Birds Directive (2009/147/EC, originally 79/409/EEC)	All specific directives were transposed into UK law. The Action Plan itself is not transposable law, but objectives informed creation of subsequent UK biodiversity policy frameworks and updates, ensuring coordination with

	Water Framework Directive (2000/60/EC) Environmental Impact Assessment Directive (85/337/EEC, amended by 2014/52/EU)	EU and global biodiversity objectives.
2011 EU Biodiversity Strategy to 2020	Did not introduce new directives but built on and strengthened earlier biodiversity policies	The Strategy itself is not transposable legislation, but objectives informed creation of the 2012 UK Post-2010 Biodiversity Framework
2013 EU Strategy on Adaptation to Climate Change	Did not introduce new directives but built on and strengthened earlier biodiversity policies	The Strategy itself is not transposable legislation, but informed the 2013 UK government's National Adaptation Programme (NAP) for 2013–2018
2020 EU Biodiversity Strategy for 2030	Did not introduce new directives but built on and strengthened earlier biodiversity policies	Not transposed into UK law, since it was adopted after the UK left the EU The equivalent UK legislation is the 2025 UK National Biodiversity Strategy and Action Plan (NBSAP) for 2030
2021 EU Strategy on Adaptation to Climate Change	Did not introduce new directives but led to the creation of new commitments including the Nature Restoration Law (2024/1991), a regulation aiming to restore at least 20% of the EU's land and sea areas by 2030, with binding restoration targets for specific habitats and species.	Not transposed into UK law, since it was adopted after the UK left the EU. The equivalent UK legislation is the Environment Act 2021.
2019: EU Green Deal	2024 EU Nature Restoration Directive	Not transposed into UK law, since it was adopted after the UK left the EU The equivalent UK legislation is the Environment Act 2021.

Table 12. Transposition of EU regulations to the UK national level

5.2 The implementation process

As noted by the UK House of Lords Inquiry into Nature-based solutions for climate change, The UK government's focus for NBS has been „mostly on large-scale land sparing approaches, such as large-scale tree planting and peatland restoration“ (UK Parliament 2021). The funding mechanisms associated with these kinds of interventions, largely focussing on landscapes like farmland, grassland and woodland, without residential development, are unlikely to have an impact on housing inequalities beyond the fact that the UK has focused most NBS funding streams towards areas without housing.

NBS strategy in areas with housing development receive very little government funding, but are guided by two legislative frameworks. Firstly, the 2024 Biodiversity net-gain legislation requires all new housing development (of every tenure) to provide a 10% net-gain in on-site biodiversity (delivered through NBS provision). This means that NBS are provided through all new housing development, and are the responsibility of private, public and non-profit housing providers and developers. Secondly, all local authorities are required under the Environment Act 2021 to draw up Local Nature Recovery Strategies, which will guide the provision of NBS by housing providers in local areas, according to Biodiversity net-gain law.

Biodiversity net gain

Biodiversity requirements for all development and regeneration became effective from 12th February 2024, meaning that the majority of major new planning development will require an element of NBS. From 2nd April 2024, small developments were also asked to delivery on biodiversity requirements. The law states that developers must ensure a minimum 10% net gain in biodiversity (based on a pre-development assessment of the land they are developing), in order to secure planning permission.

One goal of this legislation is to deliver positive outcomes for nature, and ,leave the environment in a better state than it was found (The Environment Agency, 2024). A further goal is to encourage developers to chose areas for redevelopment that are already lacking in biodiversity, since a net-gain requirement of +10% is far harder to achieve in biodiversity hotspots. The goal is thus also to guide development into areas with the least nature value, keeping new housing away from green spaces.

While biodiversity net-gain is site-based and therefore incremental, it is mandated by the 2021 Environment Act, and therefore is a powerful tool for enforcing the delivery of NBS in the UK, providing clarity to developers about their obligations, and grounding NBS delivery in local authorities' local nature recovery strategies.

Local nature recovery strategies

There is currently no comprehensive landscape planning instrument in England and Wales (although there is for Scotland). This means there currently exists no high-level coordination as to conservation efforts, landscape management or NBS at the national scale. Local nature recovery strategies may go some way to plugging this gap, since they should be drafted by every local authority, and will eventually cover the whole of England. Nevertheless, while preparation and delivery will be supported by central government, these strategies are locally-

led, and must be designed and implemented by the local authorities themselves (although the Greater London Authority (GLA) is presently drafting a London-wide nature recovery strategy and will subsequently provide guidance to all London Boroughs).

The purpose of these plans is to identify local priorities and map out proposals for specific actions to provide environmental benefits in each area. For example, key elements to be included in the strategies, as set out in the central government guidance (DEFRA 2023) are a statement of biodiversity priorities and a local habitat map, as well as mapping “opportunities for the use of NBS for wider environmental issues like flooding, climate change mitigation and adaptation, or poor water quality” (UKGBC 2023 A). These plans will therefore set the local vision and framework against which developers will need to make their proposals for NBS delivery, as part of the binding new biodiversity net gain requirements.

The mitigation hierarchy

Biodiversity net gain is underpinned by the ‘mitigation hierarchy, as set out in the National Planning Policy Framework (NPPF) (UKGBC 2023 B).

This provides a sequence of four approaches to addressing potential damage to biodiversity from development. ‘Avoidance’ of damage is the approach that should be prioritised in all planning applications, before ‘minimisation’ and ‘mitigation’ measures are considered, and finally ‘compensation’ or offsetting of any damage.

Before development can take place, developers must provide evidence within a Biodiversity Net Gain Plan, outlining evidence of the steps taken to avoid and/or minimise adverse impacts to biodiversity. Proposals must provide strong rationale and evidence for forgoing avoidance and mitigation measures (on-site NBS, delivered as part of new development), in order to justify offsetting or compensating for any damage off-site (off-site NBS, delivered elsewhere, and usually in rural locations). The rationale for offsetting or compensating for damage to biodiversity, rather than avoiding, minimising and mitigating it, cannot include considerations of financial cost (UKGBC 2023 B).

Off-site NBS delivery as part of developers biodiversity net gain obligations will also be directed by local authorities’ Local Nature Recovery Strategies. Where NBS for biodiversity net gain cannot be achieved on-site after consulting the mitigation hierarchy, off-site opportunities should be identified, giving priority to local enhancements (UKGBC 2023 B). Compensation or offsetting through NBS delivery outside of the local area will be given a ‘multiplier’ of 0.5, meaning that developers will need to contribute greater biodiversity value off-site, than those who deliver on-site NBS in new developments.

Financial support

There exist several grant schemes for NBS that are open to applicants. These tend to have a rural focus, concentrating on landscapes and habitats such as farmland, grassland and woodland. Since there is no housing development permissible on farmland, grassland or woodland, and these kinds of landscapes tend to be large stretches of natural environment without residential developments, these funds are not relevant to this study’s focus on housing and housing inequalities.

Name	Institution	Details	Urban or rural focus
Nature-based Solutions for Climate programme : Habitat creation grant	Natural England, Environment Agency, Forestry Commission, Board of Trustees of the Royal Botanic Gardens Kew, Department for Environment, Food & Rural Affairs, Department for Business, Energy & Industrial Strategy and Department for Energy Security and Net Zero	Offers one-off grants to partnership-led pilot projects. Projects must achieve habitat creation and restoration at a landscape scale - an area of at least 500 hectares in size. Date: 2022	Rural farmland, grassland and woodland
Nature-based Solutions for Climate Change at the Landscape Scale	Natural England with the Environment Agency, the Forestry Commission and Royal Botanic Gardens Kew at Wakehurst, Kew's wild botanic garden in Sussex.	2021: £12.5m pilot programme to test approaches for creating and restoring species rich habitats 2022: one-off grant offering a small number of projects a share of £5m funding to pilot these approaches. The habitats prioritised for this research programme include those found within a mixed land-use system typical of the English countryside. This includes grassland, scrub, hedgerows and woodland though other habitats may still be eligible for funding.	Rural farmland, grassland and woodland
Environmental Land Management schemes	Department for Environment, Food and Rural Affairs (DEFRA)	The SFI (Sustainable Farming Incentive) will pay Farmers are paid to adopt and maintain sustainable farming practices that can protect and enhance the natural environment alongside food production, and also support farm productivity CSHT (Countryside Stewardship Higher Tier) provides financial incentives for farmers to look after and improve the environment. The Higher Tier agreements will be bespoke, developed with the input of Natural England or Forestry Commission advice. Landscape Recovery will pay landowners or managers who want to take a more radical and large-scale approach to producing environmental and climate outcomes through land use change and habitat and ecosystem restoration.	Rural farmland, grassland and woodland

Nature for Climate Fund		Provides £750 million up to 2025 of public funding for tree planting and peatland restoration. This will be the main source of funding for tree planting and for peatland restoration until 2025, when it will be replaced by ELMs. The policy is set out in the England Trees and Peat Action Plan 2021-24	Rural farmland, grassland and woodland
Natural Environment Investment Readiness Fund		This offers grants of £10,000–£100,000 to support environmental projects in England. These projects would support research that enables a market-based approach to restoring nature. It will be replaced by the £30 million Big Nature Impact Fund.	Rural farmland, grassland and woodland

Table UK13. Grant schemes for NBS.

Other public interventions

Several public-private partnership initiatives and other public interventions have been geared towards the use of NBS in the UK; again, these tend to have a remote rural focus, and are therefore not pertinent to this study.

Name	Institutions	Details	Urban or rural focus
Nature Returns Programme	Natural England in partnership with the Environment Agency, Forestry Commission, RBG Kew at Wakehurst and six Local Partnership Projects. Co-sponsored by Defra and DESNZ	£17m programme to build the evidence for nature-based solutions to climate change and biodiversity loss. Six local partnership projects have been established to pilot nature-based solutions for climate change, through the creation of habitats. These are located across England from Plymouth to Northumberland. 628 ha of species rich habitats and 9 km of hedgerow have been created at these local partnership sites. The habitats have been selected as those with the potential contribute to the uptake and storage of carbon but for which the evidence base is poor, including biodiverse grasslands, wetland mosaics, scrub, semi-natural woodland and hedgerows.	Rural farmland, grassland and woodland
UK Inter-Agency Group	Membership of the IACCG includes: Natural England,	The Inter-Agency Climate Change Group (IACCG) will showcase 12 projects on Nature-based Solutions from across the UK at its stand at the	Rural farmland, grassland

	Natural Resources Wales, NatureScot, Northern Ireland Environment Agency, Joint Nature Conservation Committee (JNCC), Environment Agency, Scottish Forestry, Scottish Environment Protection Agency (SEPA), Forestry Commission, Forestry England.	UN Climate Change Conference in Glasgow. To showcases some of the very best examples of projects on Nature-based Solutions from across the four countries of the UK	and woodland
The Nature Recovery Network	DEFRA	The Nature Recovery Network is a growing national network of wildlife-rich places, stretching from our cities to countryside, mountains to coast. It is supported by green and blue spaces that buffer and connect these wildlife-rich sites.	Rural farmland, grassland and woodland

Table UK14. Other public interventions for NBS

EU funded projects

Name	Details of the project	UK case	Case specifics
CLEVER Cities	A European-funded project that trialled working with local citizens to 'co-design' the regeneration of urban areas to make them greener and healthier. London was chosen as one of three lead cities along with Hamburg and Milan.	The London project was a partnership between the Mayor of London, Peabody, Groundwork London and Social Finance.	CLEVER Cities Thamesmead: The project used 'nature-based solutions' to address local urban challenges in Thamesmead, South East London. This meant using landscape, planting and nature to help regenerate an area to provide environmental, social and economic benefits. It included traditional features like parks and green spaces, as well as 'urban greening' like rain gardens and street trees.

Table UK15. EU funded projects for NBS

5.3 Size and role of the market

Major characteristics of the market framework of NBS

The UK government are encouraging private investment in environmental improvement, through their 'green finance strategy' (HM Government 2023 A).

To encourage 'a step-change in levels of investment', the Green Finance Strategy represents the governments efforts to '[equip] the market with the information and tools necessary to drive

the transition'. This includes publishing a 'nature markets framework' explaining that markets will be developed to attract investment into natural capital. This framework explains that the introduction of compliance markets in England for biodiversity net gain will allow developers to buy units from habitat creation projects to meet their obligations to mitigate the environmental impacts of development and contribute to the recovery of nature'.

This market is central to developers' ability to compensate for, or offset, NBS provision as part of their biodiversity requirements. Where developers do not provide NBS on site, they will be able to tap into the market for off-site NBS provision, by investing in land and NBS in other areas.

This growing market for biodiversity offsetting is, in some quarters, seen to be contributing to the financialisation of land, since landowners may start to view their land as a source of new income. Some view the market as relatively uncoordinated, since there is as yet no coordinated system of landscape planning across England. Without a comprehensive landscape plan, offsetting investments may be made according to market principles (i.e. developers may make their investment decisions according to the simplest and most straightforward options available, and landowners may participate in this market by selecting the highest bidder able to capture those investments, rather than offsetting investments being coordinated according to carefully designed parameters about where biodiversity compensation might achieve its best results in terms of social and biodiversity value).

How dominant are purely market-based interventions?

The UK government has placed great stock in protecting and restoring nature through market mechanisms. The UK's flagship NBS policy, the biodiversity net-gain requirement, is one that works through setting the right framework for market provision, rather than a state-led provision of NBS or the protection of nature. Very much like S106 (of the Planning and Compulsory Purchase Act 2004 – the UK's flagship affordable housing delivery policy whereby a proportion of all newly developed housing provided by private developers must be 'affordable', rather than affordable housing being provided on its own terms, directly through the public sector and separate from housebuilding by private developers) the biodiversity net-gain policy is dependent on the work of private developers, requiring the provision of NBS to be incorporated as a condition of operating within this market, rather than NBS provisions being made on its own terms, in the basis of the public interest, through public sector actions.

The requirement that local authorities develop local nature recovery strategies should go some way to correcting the lack of a comprehensive landscape planning instrument in England and Wales. While this instrument does not provide a strategic landscape plan to align NBS provision across the country, these plans should provide the public sector with some level of control, determining how the provision of NBS in local areas (through policies such as biodiversity net-gain) can be more aligned with their own local plans and policies. At the same time, without the benefit of an overarching national strategic plan for NBS, this could place a lot of responsibility at the door of local authorities, not least corraling and negotiating with the private sector over the specific nature of NBS provision. Local authorities may well need to establish their own frameworks for monitoring, assessments and indicators, both in order to design comprehensive plans and requirements for NBS provision that is fitting to the specific

needs of their local area and population, and in order to enforce those plans and monitor their results as actioned by the private sector. This could require developing a new layer of expertise at a time when many local authorities are underfunded and facing resource and capacity constraints. We may find that there is uneven capacity across different local authorities depending on the pre-existing inequalities and capacity constraints within different areas. Some local authorities may be more willing, or able, to finance external consultants for the development of their own policy frameworks for plan making. Others may be more willing, or able, to work with private developers in ways that ensure the public interest is best served by NBS provision through private development. It may be interesting to investigate, at the interview stage, whether the different capacity constraints of local authorities in different parts of the country could have implications for how NBS is rolled out in practice, through interactions with the developers engaged in these processes. A further question is how different local authorities are able to modify and mediate the specific ways that NBS provision within privately coordinated housebuilding might impact housing access and affordability for local populations.

5.4 The multilevel governance process

The House of Lords Science and Technology Committee holds the government to account on its policies relating to science and technology, principally through undertaking enquiries, such as the 2021 inquiry into Nature-based solutions for climate change (UK Parliament 2021). This process allows interest groups to feed into the policy making process, by calling for written and oral evidence from national and local experts. The Inquiry then uses this evidence to interrogate the government's policies for NBS, including the Local Nature Recovery Strategies.

Evidence to this enquiry was provided by the following interest groups:

Interest group name
Scottish Forestry
IUCN UK Peatland Programme
UK Centre for Ecology and Hydrology
Nature Programmes, Green Finance Institute
Finance Earth
Country Land and Business Association (CLA)
Science and Nature, National Trust
Scotland's Rural College (SRUC)
Climate Change, Natural England
Forest Services, Forestry Commission
Environment Agency
National Farmers Union (NFU)
Marine Management Organisation (MMO)
Royal Society for the Protection of Birds (RSPB)
Nature and Climate Change, NatureScot
Scottish Forestry
Blue Marine Foundation
Bright Blue
British Ecological Society (BES)
Climate Solutions Exchange
UK Centre for Ecology and Hydrology
Food, Farming and Countryside Commission
Finance Earth

Forest Canopy Foundation
Game and Wildlife Conservation Trust
Landscape Decisions Programme Network
MyOcean Resources Limited
National Association for Areas of Outstanding Natural Beauty (NAAONB)
Soil Association
Society for Applied Microbiology (SfAM)
Sustainable Soils Alliance
Wilder Carbon Ltd
Wildfowl and Wetlands Trust
The Wildlife Trusts
WWF

Table UK16. Interest groups providing evidence to the 2021 Parliamentary inquiry into Nature-based solutions for climate change

This inquiry identified challenges relating to the implementation of Local Nature Recovery Strategies (UK Parliament 2021), and a response from the UK Government (DEFRA 2021), as follows:

Recommendations made by Parliament	Government response
We recommend that the Government follows the recommendations from the Committee on Climate Change in setting targets for nature-based solutions. Where it does not do so, it should provide an evidence-based explanation as to why not, and how it can still reach net zero. It should define terms in its pledges where definitions are contested; this applies particularly to the term “protected”.	We are introducing legally binding long-term environmental targets under the Environment Act, which will drive action by successive governments to protect and enhance our natural world. These targets will cover nature-based solutions, including creating or restoring in excess of 500,000 hectares of a range of wildlife-rich habitat outside protected sites by 2042, compared to 2022 levels and increasing woodland cover from 14.5% to 17.5% of total land area in England by 2050.
We recommend that the Government establishes ambitious skills and training programmes for land managers, authorities developing Local Nature Recovery Strategies and public delivery bodies. Training in surveying, monitoring and verifying, carbon accountancy, forestry, ecology, and planning and carrying out naturebased solutions needs to be expanded urgently. The Department for Education and the Department for Business Energy and Industrial Strategy must allocate some of their funding to this effort to make schemes accessible to land managers and provide sufficient skilled personnel to meet targets	• To ensure that responsible authorities are ready for Local Nature Recovery Strategy rollout, we will provide materials, resources, and specialist advice from Defra ALBs. • Natural England is scoping the potential to create an Environmental School of Excellence both to develop in-house capability, standards and professionalisation, and to support the wider sector to deliver local nature-based solutions
We recommend that the Government provides additional support as a matter of urgency for land managers, in the form of a dedicated advisory service, to help them engage with Environmental Land Management Schemes. The advisory service should be delivered in collaboration with public delivery bodies and should help land managers through the application process. It should help farms to identify the most	We want the environmental land management schemes to be user friendly, and easy to access and engage with, so that advice can focus on where it will really add value. The Future Farming Resilience Fund has been developed to provide free business support to farmers and land managers during the agricultural transition. ALB advisers will also provide free support to

appropriate actions to take, the support they need and can expect, and the likely environmental impact of their actions.	encourage good engagement and ensure high quality agreements. We are exploring through our tests and trials and detailed policy design work the likely need for advice in these schemes, how best it could be delivered, and who is best placed to provide it.
We recommend that the Government develops an overall land use strategy. This should outline how nature-based solutions will contribute to net zero emissions, how they will be integrated with other policies and how trade-offs in land use will be managed. The Government needs to describe how the UK's land can deliver the multiple services demanded of it without offshoring emissions. The Government should work with large landowners, including land and marine managers such as the Ministry of Defence and the Crown Estate, to achieve its objectives.	Meeting our climate targets will require careful consideration about the way we use our land, considering tree planting, peatland restoration and biomass production. We are also exploring other demands on land to meet governments commitments on biodiversity and nature recovery, climate adaptation, housing and infrastructure, and food security. Defra is currently conducting spatially explicit analysis bringing together social, physical, economic, and ecological evidence to assess the level and type of changes indicated by government commitments. This analysis will help to support multifunctional land uses and inform our approach to managing trade-offs. This approach and the need for a land use strategy will be kept under review as the work progresses this year.

Table UK17. Recommendations presented by the 2021 Parliamentary inquiry into Nature-based solutions for climate change, and response from government

With regard to the built environment (rather than remote rural areas) NBS policy in the UK amounts to the biodiversity net gain requirements placed on developers, and the requirement for all councils to have a Local Nature Recovery Strategy in place, providing a strategy for developers' biodiversity net gain contributions.

Thus, the UK's NBS policy is effectively a national framework, coordinated by local authorities, and delivered by the market. This requires that local authorities develop or acquire skills in measuring the performance of different NBS, in prioritising interventions, in how NBS benefit different groups of people differently, in creating and using indicators, and in understanding and communicating the various and multiple benefits of different NBS to developers and to the public. Developing these skills requires capacity at a time when local authorities are under resourced and lack in-house expertise, and there is a risk that this type of multi-level policy coordination could amount to 'responsibility dumping' by the national government onto local authorities, without clear guidance and additional resources. The House of Lords Inquiry into Nature-based solutions for climate change recognised the need for "ambitious skills and training programmes for [...] authorities developing Local Nature Recovery Strategies" (UK Parliament 2021), to which the government have responded that they are providing "materials, resources, and specialist advice from Defra ALBs" (DEFRA 2021). Some feel that local authorities have more questions than answers, indicating a fragmentation of policy between the national and the local level.

Nevertheless, in advance of the Local Nature Recovery Strategies which local authorities are mandated to have in place in 2024, there already exist many local authority frameworks, strategies and initiatives for NBS, including town hall and community plans, both in place and

under construction (see e.g. Massini et al 2021 for the London Borough of Hackney, or London Borough of Islington 2020b). Thus while some feel the NBS policy is poorly coordinated at the UK scale, the reality is that some areas have plans and policies in place that have allowed them to hit the ground running with the new requirements. The degree to which this varies across the UK may depend on resourcing, local politics, and the mix of professionals working at each authority. This also opens a space for consultancies to assist local authorities with developing metrics for NBS and biodiversity measurement, with designing monitoring frameworks, with measuring and mapping benefits, and assessing the potential for scaling up, for example.

Additionally, local authorities are supported by Natural England, a non-departmental public body designed to advise the government on the natural environment in England. Natural England provide authorities with access to evidence and technical information notes, as well as launching the Responsible Authority Network, a ‘forum for enhancing capability and capacity within and across [authorities] to assist in preparing high-quality LNRs’, and recruiting Nature Recovery leads to support plan delivery, as outlined in their letter to chief planners (Natural England 2024).

Authorities may also be supported by a tier of regional government where one exists (e.g. the GLA in the case of London). The GLA have developed various initiatives, including a policy inventory to create a more holistic understanding of NBS and green infrastructure and the London green infrastructure framework (currently under construction), as well as pre-existing frameworks such as the London Environment Strategy and the All London Green Grid (ALGG), a policy framework to promote the design and delivery of green infrastructure across London.

Key actors and institutions

Institution type	Name	role
Local and regional governments	Numerous	Local authorities are responsible for designing and implementing the new Local Nature Recovery Strategies, often supported by a range of consultants.
Central Government	Department for the Environment, Food and Rural Affairs (DEFRA)	DEFRA are responsible for all biodiversity legislation, and mandating the requirement for Local Nature Recovery Strategies. They are also the department responsible for sponsoring Natural England, the Environment Agency, and the Joint Nature Conservation Committee.
	Natural England (non-departmental public body)	Natural England provides advice to central government, and supports local authorities. It is responsible for ensuring that England's natural environment, including its land, flora and fauna, freshwater and marine environments, geology and soils, are protected and improved.
	The Environment Agency (non-departmental public body)	The Environment Agency is concerned with ‘creating better places for people and wildlife’. The development of biodiversity net gain policy and guidance has been a collaborative effort

		between DEFRA, Natural England, the Forestry Commission and the Environment Agency.
	Joint Nature Conservation Committee (JNCC) (non-departmental public body)	JNCC is the public body that advises the UK Government and devolved administrations on UK-wide and international nature conservation. The Committee monitors biodiversity, evaluates options and provide advice to ensure that the natural environment is protected in an effective way.
	UK Inter-Agency Climate Change Group (IACCG)	The UK Inter-Agency Climate Change Group (IACCG) brings together representatives from the UK environmental agencies. Membership of the IACCG includes: • Natural England • Natural Resources Wales • NatureScot • Northern Ireland Environment Agency • Joint Nature Conservation Committee (JNCC) • Environment Agency • Scottish Forestry • Scottish Environment Protection Agency (SEPA) • Forestry Commission • Forestry England
Experts, interest groups and NGOs		There exists a myriad ecosystem of of NGOs, often working with local authorities. These are almost countless but some examples are given here: • Parks for London works with landowners and managers to protect and improve London's green infrastructure. • The Nature-based Solutions Initiative are an interdisciplinary team based at the University of Oxford seeking to shape policy and practice on nature-based solutions, producing case studies, guidelines, research, reports and other resources. • Thames21 is the voice for London's waterways, working with communities to improve rivers and canals for people and wildlife. They have a programme on urban wetlands, and champion the use of natural flood management and sustainable urban drainage systems, which are sub-categories of NBS.

Table UK18. Key institutions involved in the policy cycle for NBS

5.5 Achievements, assessments, and challenges

Nature is viewed as an asset in the UK real estate sector, and as something that enhances real estate value (Juntti and Ozsezer-Kurnuc 2023). A significant category of impact for NBS

is the value of residential properties, and therefore the potential for green gentrification in neighbourhoods benefitting from NBS interventions.

Where developers design their Biodiversity Net Gain Plans with enhancing property values in mind, they may pursue a limited range of NBS, which may not provide the greatest natural or social value in newly developed areas. There currently exist no metrics of social value for NBS (Juntti et al 2025), making it difficult for authorities to negotiate these benefits for local residents. In particular, solutions may be chosen which deliver limited community value, or which benefit certain privileged groups and types of use, over others (Juntti et al 2025). Choices around location may also channel economic, social and environmental benefits into the most expensive and desirable areas of mixed-tenure developments, stratifying communities and entrenching inequalities.

Additionally, BNG requirements increase the delivery and maintenance costs associated with new housing development. Against the backdrop of polycrises increasing the costs of construction, and stagnating house values, developers may seek to offset costs by negotiating down their planning gain contributions (for social homes) through viability assessment negotiations with local authorities. For registered providers of social homes who cannot make such viability negotiations, this makes the delivery of affordable housing schemes more challenging. This could produce an unequal playing field between different kinds of housing providers, in terms of their ability to negotiate rising costs.

The uneven nature of local authorities’ capacity to design and deliver Local Nature Recovery Strategies may also be significant. This is the tool through which authorities can corrale natural and social value from private developers’ biodiversity net gain contributions, according to the public interest. Where local authorities are well placed to seek the support of consultancies and design effective strategies, they may be able to lessen the extent of green gentrification. That being said, authorities depend on the finance made available from private development for their provision of social housing and other community goods. This feature of the UK housing system may disincentivise authorities from negotiating with developers over the type and location of NBS delivery, so that communities benefit from the biodiversity value that is protected by law.

The previous points are summarised in the table below, with further insights drawn from Policy Lab workshop #1, held in London.

Hypothesis: impacts on housing inequalities	Further insights, drawn from Policy Lab workshop #1 (WP7)
Coordinating biodiversity net-gain (BNG) contributions for new development (a legal	BNG requirements increase their delivery and maintenance costs, and means getting a deliverable affordable housing scheme to work is harder.

requirement in the UK) both on- and off-site is a recent addition to affordable housing providers' costs – with the potential to affect affordable housing delivery.	In some urban areas BNG contributions for new development will be particularly expensive, where the urban area is dense or doesn't have the infrastructure required for NBS (e.g. filtration, soil, space). The new BNG regulations have increased the number and range of consultancies that housing providers (both social housing providers and private developers) need to pay, which also raises the costs associated with housing development. Additionally, on sites developed by private developers, rising costs associated with BNG contributions could lead to reduced numbers of social homes in new developments, as private developers and housebuilders seek to offset costs by negotiating down their planning gain contributions (for social homes) through viability assessment negotiations with local authorities.
Where developers design their BNG Plans with enhancing property values in mind, they may pursue a limited range of nature-based solutions (NBS), which may not provide the greatest natural or social value in newly developed areas.	Additionally, bigger private developers may be able to reduce their BNG contributions on account of rising costs. Since affordable housing providers are more regulated than private developers, they are less able to circumvent their BNG requirements. This could produce an unequal playing field between different kinds of housing providers, in terms of their ability to negotiate rising costs.
Choices around location may also channel economic, social and environmental benefits into the most expensive and desirable areas of mixed-tenure developments, entrenching inequalities.	Biodiversity-rich sites may be less likely to be allocated for social homes, because they will be unviable for social housing providers.
The different capacity constraints of local authorities could have implications for how NBS are rolled out in practice, through interactions with the developers engaged in these processes.	Local authorities have inconsistent capacities, and also are given responsibility for how Local Nature Recovery Strategies and BNG contributions should be coordinated in practice, leading to inconsistencies, complexities and additional costs for housing providers. A multi-level governance 'disconnect' was noted between central government and local authorities. While central government has established BNG requirements for new development and some guidance, it falls to local authorities to say how this should work in practice. This disconnect often manifests in the use of external consultancies to manage the

	relationship between central and local government. This can result in inconsistencies in the approaches of different local authorities, which also exacerbates the complexity, and additional costs, faced by housing providers (both private developers and social housing providers) working across multiple authorities.
Potential for green gentrification in areas identified for large-scale redevelopment	Regeneration projects which leverage nature to improve social value, quality of life, inward investment, tourism, or reputation could lead to green gentrification, particularly if these require the demolition and removal of existing homes to make space for nature-based solutions and nature-focused landscape architecture. Funding from Homes England for the construction of new social housing will be crucial to mitigating inequalities.

Table UK19. Summary table

6 Densification

6.1 The policy cycle: emergence of the issue and policy decisions

Emergence of the issue in national policymaking

On the face of it, housing densification in the UK can be considered part of the central government’s low-carbon strategy. Densification has come to be understood as a way to encourage less carbon intensive lifestyles, reducing car dependency and domestic emissions (Quinio and Rodrigues 2021). Threads of the green agenda can be found in the UK Government’s discussions around denser, mixed-use or ‘walkable’ neighbourhoods. For example, the UK Environmental Improvement Plan 2023 included the commitment „that everyone should live within 15 minutes walk of a green or blue space.“ (HM Government 2023 C). This is resonant of the ‘15 minute city’ concept, which aims to tackle both the climate crisis and urban sprawl through the creation of dense, mixed-use urban neighbourhoods (Moreno 2016: The 15-Minute City: A Solution to Saving Our Time and Our Planet).

In recent years, the UK government’s rhetoric around inner-city densification and new urban extensions has also been framed in these terms. Policies like the relaxation of planning rules to allow for the conversion of industrial sites and retail spaces into homes in city centres have been framed as part of a plan to create denser, ‘walkable’, livable communities. In July 2023, then Secretary of State for Levelling up, Michael Gove, said that government would be “unequivocally, unapologetically and intensively concentrating our biggest efforts [to increase housing numbers] in the hearts of our cities”. (BBC 2023). This went hand in hand with the recommendation that “local planning authorities are not expected to review the Green Belt to

deliver housing” (Michael Gove, quoted in CPRE 2022), and represented discourses around prioritising nature and environmental concerns.

However, looking at the history of densification in the UK shows it has deeper roots, and emerged very separately to the green agenda. Neither is there a significant EU dimension to densification in the UK; densification policy within the UK has its own very distinct historical context. The foundation to UK densification strategy is found in the 1955 Green Belt Circular (Circular 42/55) of the Ministry of Housing and Local Government, prior to the UK joining the EU. This policy outlines five key purposes, amongst which are to check the unrestricted sprawl of built-up areas, and to assist in urban regeneration by encouraging the recycling of brownfield urban land. While this does not reference densification directly, the policy of recycling inner-city brownfield land and restricting urban sprawl is in effect, in a context of rising populations, a policy for urban densification, prioritised in UK planning policy from the 1950s onwards. This policy guided densification in the UK until the early 2000s, when the pressure for increased housing development in the UK became particularly acute, and led the New Labour government to strengthen urban intensification policy through strategies like the Sustainable Communities Plan (see below). Thus, densification has been consistently prioritised in the UK and sits largely outside the influence of EU intervention, as well as sitting outside of sustainability concerns.

Many of the areas currently being densified in the capital were demarcated in the 2004 London Plan as Opportunity Areas (OAs), which defines London's key locations with potential for substantial provision of new jobs and homes (OAs typically have capacity for at least 2,500 homes or 5,000 jobs). These were part of the Central London Growth Corridor, steering densification through large-scale development and regeneration in areas already supported by key transport infrastructures or linked to potential public transport improvements (new London Underground lines, stations or multi-modal nodes). OAs have been unlocking large pieces of (publicly-owned) land through the regeneration of large social housing estates, active industrial estates with low density, and inactive brownfields. There are similar to programmes in other large and middle-sized de-industrialised cities in England, that have followed the London OA model, we focus here on the London model as illustrative of this paradigm. Despite the substantial increase in housing provision by the private sector and non-profit sector, this mode of densification has driven a loss or transfer of social housing stock, processes of residential displacement into peripheral areas, and gentrification.

By analysing and understanding the actual underlying rationales behind densification in the UK, as well as the mechanisms and policy processes that have been used to achieve it, this calls into question the strategic relationship between densification and the net-zero agenda. Instead, we suggest that densification is more closely linked to the politics of land and the residualisation of social rented housing in the UK. Within the mechanisms for housing delivery that have been established as part of the UK housing (and planning) system, regeneration and densification are processes through which housing provision – and the land underlying housing provision – have become privatised, and the land and housing system is further re-commodified. This form of urban development has been prioritised in the revitalisation of cities and, notwithstanding current discourses around walkability, sustainability and inclusivity, they can radically increase housing inequalities in the affected areas.

In the UK we can distinguish between ,hard‘ densification (large-scale (re)development projects concentrated on large pieces of land, usually kick-started through legislative catalysts such as Growth Corridors and Opportunity Areas, and often focused on regenerating pre-existing social housing estates, brownfield and active industrial sites), and ‘soft‘ densification, sometimes called “English-style densification“ (Touati 2015) (small-scale development scattered throughout the city or rural areas, such as infil sites, garden ,grabbing‘, rural exception sites, windfall sites, conversion of single-family houses into apartments, and small-scale redevelopments using permitted development rights).

1930s-1990s: Metropolitan green belt policy as the foundation for urban densification

Densification is an important aspect of the UK’s green belt policy (as set out in the National Planning Policy Framework), which was established in 1955 and designed to encourage development within settlement boundaries, in order to limit urban sprawl. Ecological sensitivity grew in the 1970s - 1990s, with this policy being championed for reasons of environmental protection, and densification of inner-city areas established as an ideal

2003: Sustainable, ‘mixed’ communities

The Sustainable Communities Plan was intended to guide redevelopment across England. The plan prioritised urban intensification across England and identified key Housing Growth Areas for concerted densification: The Thames Gateway, The London–Stansted–Cambridge–Peterborough Corridor, Milton Keynes–South Midlands, and Ashford (Kent). Notably, none of these areas are in the Midlands proper or North of the country.

Additionally, under this plan, the creation of ‘Mixed communities’ became a goal throughout the country, by which all new development should be mixed tenure, „reflecting an integrated and egalitarian society in which people of all social classes and incomes share the same space, services and facilities, creating conditions in which mutual understanding and/or shared norms can potentially develop.“ (Tunstall and Lupton 2010).

However, sites for mixed-tenure development and regeneration were identified using the indices of deprivation, to focus redevelopment in deprived neighbourhoods. Thus, the policy effectively concentrated redevelopment in areas of high social housing density, ultimately reducing the numbers of affordable homes available to the local community. The underlying rationale of ,mixed communities‘ has been called into question. Lupton and Tunstall (2008) argue that the policy of ,regenerating disadvantaged neighbourhoods by reconstructing them as mixed communities‘ is based on „a neoliberal analysis of the problems of low-income neighbourhoods, in which structural problems are individualised and spatialised, and disadvantaged neighbourhoods, particularly those with majority social housing tenure, are discursively repositioned as irredeemably problematic.“

2004: First London Plan under Mayor Ken Livingstone: local authorities to identify areas for densification

The first London Plan, developed under mayor Ken Livingstone, stipulated that the London boroughs should survey their local areas for key parcels of land that could be made available, and where density could be increased, to meet massive local housing needs targets. These

areas were to be identified in relation to their local infrastructure capacity to serve a higher density of homes. They therefore needed good connection to transport hubs, which would make them more 'sustainable'.

While the key method of densification was to draw private investment into these areas, the plan aimed to protect the provision of social and affordable housing through the substantial sums of Section 106 (S106) money that denser development could deliver (New London Architecture 2024). S106 (of the Planning and Compulsory Purchase Act 2004) stipulates that a proportion of all newly developed housing provided by private developers must be 'affordable', and the plan contained an ambitious strategic target that developers should provide 50% affordable homes (70 per cent social housing and 30 per cent intermediate housing). However, by linking social housing delivery to the proportion of private housing delivered, Section 106 means that social housing is not provided on its own terms, instead being linked to the profit requirement of the private sector. This has opened the proportion of affordable housing delivery open to negotiation within specific planning applications. At the time, there was debate about whether such high affordable housing targets would act as a disincentive for developers, or whether the opportunity to build at higher densities would draw developers into the housing programme (Blackler 2002).

Emergence of Opportunity Areas

The first London Plan contained the objective to accommodate London's growth within its boundaries, partly by allowing several 'Opportunity Areas' to intensify (or densify) in order to accommodate the growing housing need and growth in jobs (see also Chapter 3, Part B). Opportunity Areas became a baseline for a new wave of regeneration and densification across London. The Plan states: "*Opportunity Areas have been identified on the basis that they are capable of accommodating substantial new jobs or homes and their potential should be maximised. Typically, each can accommodate at least 5,000 jobs or 2,500 homes or a mix of the two, together with appropriate provision of other uses such as local shops, leisure facilities and schools. These areas generally include major brownfield sites with capacity for new development and places with potential for significant increases in density.*"

map 2A.1 Opportunity Areas and Areas for Intensification



★ Opportunity Areas

- | | |
|---|--------------------------------------|
| 1. Barking Reach | 15. London Bridge |
| 2. Belvedere/ Erith | 16. Lower Lee Valley |
| 3. Bishopsgate/ South Shoreditch | 17. Paddington |
| 4. Cricklewood Brent Cross | 18. Park Royal |
| 5. Croydon Town Centre | 19. Royal Docks |
| 6. London Riverside | 20. Stratford |
| 7. Deptford Creek/
Greenwich Riverside | 21. Thamesmead |
| 8. Elephant & Castle | 22. Tottenham Hale |
| 9. Greenwich Peninsula | 23. Upper Lee Valley |
| 10. Hayes/West Drayton/Southall | 24. Vauxhall/Nine Elms
/Battersea |
| 11. Heathrow/Feltham/Bedfont Lakes | 25. Waterloo |
| 12. Ilford | 26. Wembley |
| 13. Isle of Dogs | 27. Whitechapel/Aldgate |
| 14. King's Cross | 28. White City |

Source: https://www.london.gov.uk/sites/default/files/the_london_plan_2004.pdf

London boroughs are required to prepare Opportunity Area Planning Frameworks (OAPFs), which set the frameworks for planning applications for private development on these sites. These set out „how [local authorities] will encourage and deliver the growth potential of OAs and support development that create job opportunities and housing choice for Londoners“ (Mayor of London n.d.). In the most recent London Plan (Mayor of London 2021), Opportunity Areas are intended to support regeneration and the creation of mixed communities.

2011: London Plan under mayor Boris Johnson

London Mayor Boris Johnson abolished affordable housing targets, and while his Housing Strategy urges that schemes „must ... provide an uplift in affordable housing where viable“, in reality this created conditions where no additional social housing would be built in areas where social housing already existed, as the strategy effectively ensured only that “any affordable homes that are demolished as part of estate regeneration schemes are replaced on a like-for-like basis“ (Mayor of London 2018). During this time many redevelopment projects delivered affordable housing proportions in the low teens (New London Architecture 2024). This also occurred during a time of austerity, which meant local authorities increasingly lacked resources and capacity, something used to justify the authorities’ increasing inability to negotiate for higher proportions of social housing with private developers, due to the S106 mechanism which reduced their leverage. This plan therefore altered the mechanisms of densification to weaken value capture as a mechanism for the production of social housing.

2012: creation of the National Planning Policy Framework (NPPF)

The NPPF simplified the previously disparate and single-issue planning policy guidance notes and statements into a single national planning strategy that supported urban intensification, use of brownfield land for development, and high-density development near public transport. This national-level policy document set the framework for local urban densification strategies such as London’s ongoing Opportunity Areas and subsequent Housing Zones.

2014: Housing Zones

This programme was launched by the Mayor of London Boris Johnson, and Chancellor of the Exchequer George Osborne, creating 20 Zones in London in which homes could be delivered at greater density on brownfield land. £400 million of funding was made available, for local authorities to submit applications to designate an area of ‘majority brownfield land’ as a Housing Zone, usually including „a bid for investment finance from private sector development partners to enable housing schemes to be unlocked or accelerated“. Each bid for Housing Zone designation was required to include „either (a) ... a bid for investment funding from one or a number of private sector partners or (b) confirm that the local authority only wishes to apply for Housing Zone designation and provide a development proposition that will be delivered without government investment.“ (DCLG 2014). Under this scheme, Housing Associations including Peabody have successfully partnered with local authorities to bid for GLA Housing Zone status in several areas.

2016: Estate Regeneration National Strategy

The estate regeneration strategy extended the logic of 2003's 'mixed communities' to encourage the redevelopment of housing estates – usually areas of social housing density – across England. The policy provided 'a detailed framework' for how local authorities can support estate regeneration in their areas, from adopting a 'place-based approach' to planning, to ensuring good design principles are adopted by developers on site, to meeting affordable housing needs on site, in order to deliver 'mixed and inclusive communities'.

The estate regeneration funding prospectus enables areas to bid for a share of £140m of loan funding, £30m of enabling grant, and £2m of capacity building funding. This financial support from government is directly targeted at de-risking the early stages of regeneration schemes and providing support to areas for such activities as community engagement, feasibility studies, scoping of proposals and masterplanning. There is also support available for preconstruction activities such demolition and moving residents.

2021: London Plan under mayor Sadiq Kahn

In Sadiq Kahn's 2021 London Plan, the affordable housing target for new development was restored to 50%, with all affordable housing to be delivered on site, unless in exceptional circumstances.

The Mayor also outlined plans to put funding in place to 'unlock' housing development and build on the Housing Zone programme. For example, the Plan outlines how in the Opportunity Area of Thamesmead, "Housing Zone status and investment by Peabody in estate renewal in the area will improve the quality of the environment and bring new housing opportunities." (Mayor of London 2021). This followed a decision in 2020 to allocate £83.7 million of GLA affordable housing grant to the Peabody Trust for the acquisition of a large brownfield site in Barking and Dagenham. Thus, strategic planning for London at this time was geared towards funding private and non-profit sector partners to deliver housing, including against affordable housing targets, in specific areas designated for densification.

2023: UK Long term plan for housing commits to 'a new era of regeneration, inner-city densification and housing delivery across England'

These plans for a "programme of urban regeneration and a new inner city renaissance" stretch beyond London: "Densification, done the right way, will transform the opportunities available to people across the country" (Gove 2023). The plans included:

- Launching a consultation on new Permitted Development Rights, [which] would make it easier to convert larger department stores, space above shops and office space.
- Establishing a new "super-squad" team of leading planners and other experts charged with working across the planning system to unblock major housing developments, underpinned by £13.5 million in funding.

This strategy went hand in hand with a statement from the Secretary of State for Levelling Up, Housing & Communities, Michael Gove, confirming that "local planning authorities are not expected to review the Green Belt to deliver housing". (Gove 2022). Ultimately this meant that densification would be the primary strategy for housing delivery across the country, with strong guards in place against greenfield development.

6.2 The implementation process

The UK system of planning for housing

The legislative frameworks used to catalyse densification are outlined in section 5.1., namely, Sustainable, ‘mixed’ communities, growth corridors, Opportunity Areas, Housing Zones, and Estate Regeneration (National Strategy).

Analysis of this implementation process can be extended by looking at the UK planning system, which determines the role (and relative power) of central and local government, as well as the non-profit sector (and we return to the relationships between them in section 5.3 below). This section explains how through certain planning mechanisms, the role of local government has been weakened in densification processes, as well as how the role of housing associations and power of private sector developers has grown, with implications for housing affordability.

The introduction of S106 in 1990 as the primary policy for the production and provision of affordable housing (see section 5.1) has weakened the role of setting statutory affordable housing targets for new development, since these can be negotiated down according to the viability of development for private developers. S106 agreements are negotiated and agreed during the planning process, therefore remove regulatory control over planning gain.

Several further mechanisms within the UK housing and planning system have limited the ability of local authorities to steer densification agendas or provide social housing within densification projects, including:

Local authority Housing Revenue Accounts (HRAs), a system of ring-fencing council revenue on housing (from social rents and Right-to-Buy sales) for spending on housing delivery, were introduced in the 1989 Local Government and Housing Act. With the pool of local authority housing shrinking with the RTB, this prevented local authorities from cross-subsidising housing delivery from other sources of revenue, effectively limiting local authority finance for housing. HRA ‘borrowing caps’ (a cap on how much local authorities can borrow against their housing assets to fund new developments) were also centrally defined, further limiting local authority finance for housing until they were abolished in 2018. This also limited local authority budgets for the maintenance and management of their housing stock, residualising this stock and meaning that authorities have become reliant on non-profit housing providers (mostly housing associations) for the production and provision of social housing and delivery of affordable housing targets. During the 1980s and 1990s, much of the social housing stock owned by local authorities was transferred to the non-profit sector.

As well as using the funds available in the HRA, since 2004, local authorities have been “free to finance capital projects by borrowing, provided they can afford to service their debts out of their revenues” (UK Debt Management Office n.d.). This has been part of a shift requiring local authorities to self-finance a greater proportion of their services, with reduced government grant, and has weakened local authority financial sustainability.

Local authorities have also been encouraged to dispose of public land, through policies such as the “Right to Regenerate”, which “will enable public to require councils and public sector to

sell unused land and assets” unless councils can demonstrate a clear plan for future use, for conversion into homes by the private sector (MHCLG 2021). This undermines the ability of councils to protect public land for the provision of affordable homes in the future.

The UK planning system thus renders local authorities as enablers of densification by the private sector, rather than active shapers of the densification agenda. Authorities have needed to sell assets as a source of revenue and to attract private investment for residential growth, and social / affordable housing provision where possible. This emphasis on private sector housing provision and limiting of local authority involvement means that the densification agenda has created the foundations for new forms of ‘affordable’ housing provision by the private and non-profit sector which ultimately undermine genuine affordability (e.g. intermediate housing as a form of social housing not tied to local incomes but determined according to 80% of local private rents, or Shared Ownership programmes promoting home ownership as a share of the affordable housing offer of new densification projects).

Regeneration policy and strategy

‘Soft’ densification is encouraged in UK regulatory frameworks, nevertheless it is ‘hard’ densification (large-scale regeneration projects, including inner-city estate regeneration, growth corridors, OAs, and urban extension projects into the surrounding countryside in smaller cities) that have a more significant impact on housing inequalities. This form of densification can be considered an exercise by government to stimulate private sector market activity within urban development. They are also indicative of a dis-alignment between central and national governments, through which the central government has prioritised expansion of the private housing sector (owner occupation and private rent) at the expense of social and affordable housing provision.

Growth corridors and OAs have created a legislative framework for the implementation of hard-densification through the regeneration of social housing estates, brownfield and active industrial areas, with local authorities acting as enablers of private sector development to ‘unlock’ densification. Once initiated, these programmes can span 20-25 years (some have not yet been started), creating new housing markets and a huge increase in land value, usually near current or future public transport hubs at prime locations of central and inner London (1st generation regeneration, see below for details), and more recently in the outer London boroughs supported by the extension of the London underground Elisabeth line and other public transport routes (2nd generation regeneration). These 1st and 2nd generations of regeneration are intended to support a strategy of growth in the real estate market, by attracting large amounts of inward investment underwritten by the sale of public land and poor regulation of speculative activity. Rather than pursuing public benefit on its own terms, these schemes illustrate an approach by which “the lines between the state and developer become blurred as the state becomes increasingly reliant on land value capture to achieve broader public benefit” Fern (2023: 265).

- **1st generation regeneration** projects link to the 2003 ‘Mix-community’ policy outlined in section 5.1. This targeted central and inner-city boroughs, and was effectively the demolition of social housing estates (often moving social tenants further afield) to be replaced with denser mixed-tenure neighbourhoods, increasing

owner occupation and private rent in the area. These schemes often relied on non-profit housing providers for new social housing production, if any, and required that local authorities sell public land to developers as part of public-private partnerships, as outlined above.

- **2nd generation regeneration** replaced the governance mechanism of public-private partnerships used in the 1st wave (e.g. London Borough of Southwark partnering with Lendlease landowner-developer) with non-profit-private joint ventures (e.g. Peabody housing association partnering with Lendlease landowner-developer). The increasing role given to non-profit sector housing providers in the 1st wave was scaled up in last decade, meaning that large housing associations are now the leading actor in coordinating regeneration projects, rather than local authorities. This new role for the non-profit sector is sometimes supported by central or regional government finance (e.g. Peabody were allocated £83.7 million of affordable housing grant from the London Mayor's affordable housing programme, for the acquisition of the former Ford Stamping Plant site in Daggenham, for regeneration including 50% open market tenures and 50% affordable tenures including Shared Ownership). Non-profit housing providers will also acquire land and housing from local authorities and other housing associations before establishing a joint-venture with larger private developers (e.g. Lendlease, a transnational real estate company). There is also a potential for financialisation of these sites if, for example, non-profit organisations issue bonds to finance the regeneration. This reflects a further weakening of the role of local authorities, which no longer lead or coordinate densification projects, but rather are left as enablers of the private and non-profit sector.
- **3rd generation regeneration** shows some positive signs of a paradigm shift towards an increased role of regional government (particularly the Greater London Authority), and direct provision of social housing by some local authorities. This is exemplified by the Regent Estate in Sommerstown, London, where the existing social housing stock has been retained and infilled with new affordable housing stock. Since the removal of the HRA borrowing cap in 2018, increasing numbers of local authorities have created public companies, often called "local housing companies", for direct delivery of new social housing stock (Marrs 2019). This new direction in densification has shown promising results and may be a response to increasing recognition of the need for new social and affordable housing, as well as grassroots contestation of 1st wave regeneration.

The Current Mayor of London, Sadiq Kahn, has made efforts to increase local authority housing provision within densification projects through various initiatives, including the Council-led Housing Network (peer-to-peer support and good practice sharing), the Housing Development Academy (providing development management courses to council teams) and underpinned by funding from the GLA Affordable Homes Programme (2021-26). In 2022 Kahn introduced a £4 million programme called Land for Council Homes Revenue Fund, intended to scale up local affordable housing delivery programmes by local authorities.

6.3 Size and role of the market

Soft-densification programmes are small construction interventions, supported by the national construction industry.

Hard-densification, catalysing development at a greater pace, fuelled the construction boom of the 2000s, with a large new market from private investors, large scale developers, and international institutions. Densification was harnessed by central government as a way to pursue inward investment by these institutions, as well as attracting house purchase by international buyers through the expansion of owner occupation, particularly in London (with many homes sitting empty). Thus, estate regeneration has been a way to release land in prime locations, with value captured disproportionately by the private sector.

There has been an increased role of the non-profit sector within such schemes, as detailed above in section 6.2.

The global financial crisis of 2008 only temporarily slowed the construction boom in areas marked for densification, but led to a reorganisation of its governance, particularly through a renewed emphasis on Build-to-Rent models of private rental delivery (see Deliverable 4.1), paving the way for ‘financialisation 2.0’, in which risk-averse investors sought the more secure returns that could be achieved from private rental revenue streams. Unconventional monetary policy (e.g. Quantitative Easing) used post-2008 supported a ‘rush-to-assets’ and maintained the value of private property, and a continued prioritisation of regeneration as mechanism for drawing private investment into the housing market, urban development and the construction industry have maintained a development boom throughout this period.

Increasing pressure for new housing starts has led to changes in permitted development rights allowing office-to-residential conversions to be completed without planning permission (Madeddu and Clifford 2022) and for industrial areas with low density industries to be released for housing development (Ferm and Jones 2017).

As noted above in section 5.2, the 3rd wave of regeneration represents a recent counter-trend in this market organisation, with the GLA supporting local authority housing delivery and the creation of some innovative programmes allowing local authorities to deliver housing through mechanisms not limited to planning gain (direct delivery, rather than through S106 agreements). However, these have been relatively small in size, and are restricted by local authority capacity and power relative to central government.

The size of the ‘market’ for densification is difficult to quantify in the UK case. While international investment from Real Estate Investment Trusts (REITS) and other financial institutions surged following the 2008 financial crisis, as Ryan Collins has observed, “Detailed data on non-bank private and institutional investment into the housing market in the UK is limited. This is an area where more transparency, disclosures and research is needed.” (Ryan Collins 2024: 24). Institutional investment into residential assets rose consistently from almost 4Bn in 2012 to almost £10Bn in 2021, with £5.5bn of capital invested into UK residential assets coming from overseas (Knight Frank 2022). This market research also suggests that the proportion of institutional capital invested in residential property (over other forms of property including commercial) continues to rise (ibid). The UK has a consistent history of leveraging

deregulation, planning policy and public funds towards ushering private investment into real estate (See Deliverable 4.2, also Stirling et al 2022). Post crisis, during a low-interest-rate environment which constrained individual (and thereby institutional) investment into owner occupied housing, the government became interested in increasing investment into the private rental sector, commissioning the Montague Report (Montague 2012) which identified barriers to long-term institutional investment in purpose-built rental homes. Many of its proposals were adopted, for example the creation of a government supported Built-to-Rent development fund. Thus, while the pre-crisis market revolved around owner occupation, post-crisis this market was maintained by policies ushering investment into the PRS. While these shifts do not indicate the size of this market, they are an indication of broad policy support for and ongoing success of institutional investment into the UK real estate market, post 2008.

6.4 The multilevel governance process

Here it is worth drawing attention again to the tension that exists between central and local levels of government, which have very different priorities when it comes to housing delivery.

As we have described, densification has been enacted by all levels of government (but pursued particularly at the national level as a means of drawing private investment into the housing market and urban development) since 1990s.

Until the 2008 GFC, we would argue that local and national frameworks converged, with national densification strategies and the strategies of the GLA / Mayor of London following similar paths. These have ultimately intensified the residualisation of social housing and created a bigger role for the non-profit and private sector in the governance of densification, as detailed above in sections 5.1, 5.2, and 5.3.

Post-2008 we see a divergence in the direction of travel between the national level and the regional tier in London (the GLA). Successive London Plans (a competence of the GLA: see Section 5.1) have been used as a test-bed for new governance frameworks, including the removal of affordable housing targets by Mayor Boris Johnson (replacing social housing ,like-for-like), the creation of Housing Zones in 2014, and then under Mayor Sadiq Kahn, the reintroduction of affordable housing targets at the local level, alongside innovative programmes to support direct delivery by the London Boroughs. While local authorities have been increasingly weakened through changes in the planning and housing system, this implies a role for regional tiers of government like the GLA, in protecting housing affordability.

While densification has predominantly been used to recommodify the housing system (through demolition of social housing, reduction of statutory affordable housing requirements and the privatisation of land), it is clear that the national and regional tiers of government can travel in different directions, each with implications for how the local level can operate through densification projects, and with potential for decommodification therein. Nevertheless, beyond the creation of the London Plan and use of affordable housing grant from the GLA's affordable housing programme, the GLA does not have direct competences on densification, and thus plays a largely supporting role to the London Boroughs.

Given the UK's emphasis on regeneration in London as the main mechanism of densification policy (through OAs and other mechanisms), London itself might also be considered something of a test-bed for national strategy. The London Plan has been the site of experimentation (e.g. removal and reintroduction of affordable housing targets within densification frameworks), which are then in national strategies such as the 2016 Estate Regeneration National Strategy. This line of enquiry requires further analysis, however.

It therefore remains something of an open question the extent to which there is space for the continued development of alternative approaches and tools for densification that might foster the decommoification of land and housing, at the regional, and/or local level.

Key actors and institutions

Institution type	Name	role
Central Government	Office of the Deputy Prime Minister (ODPM 2001 – 2006)	Ministerial department responsible for housing, communities and local government.
	Department for Communities and Local Government (DCLG 2006 – 2018)	Design of UK policy strategy relating to densification, e.g. Estate Regeneration National Strategy (2016).
	Ministry of Housing, Communities and Local Government (MHCLG 2018 – 2021)	Produces the The National Planning Policy Framework (NPPF), and the The Planning and Compulsory Purchase Act 2004, which sets the framework allowing S106 agreements to be negotiated between local planning authorities and 'persons interested in land', determining contributions, arrangements and restrictions as planning agreements or planning obligations.
	Department for Levelling Up, Housing and Communities (DLUHC 2021 – 2024)	
	Ministry of Housing, Communities and Local Government (MHCLG 2024 –)	
Local and regional governments	GLA	The Mayor of London leads the GLA and is responsible for the strategic governance of Greater London. Sets out the spatial development strategy for London to be followed by local authorities in the London Plan, including strategic initiatives such as Opportunity Areas and Housing Zones. Provides affordable housing grant from the Mayor's affordable housing grant, e.g. providing £83.7million of funding to Peabody housing association for the acquisition of the former Ford Stampint Plant site in Dagenham for mixed tenure housing delivery (50% 'affordable' tenures including for owner occupation).
	Local authorities (numerous)	Coordinate planning strategies, permissions and land release e.g.: prepare local housing needs assessments and design local development plans, bringing land forward for development; form development agreements with private developers over the transfer of public land

		(including single-tenure social housing estates) for densification; negotiate S106 agreements with developers, including for the provision of social and affordable housing; partner with non-profit and for-profit housing providers and developers e.g. to submit applications to designate areas of majority brownfield land as Housing Zones. Would previously partner with construction companies and private developers to coordinate delivery of densification projects (1st generation densification); currently play a more enabling role, with non-profit housing providers performing this coordinating role (2nd generation densification).
Non-profit sector developers and housing providers	e.g. Peabody housing association	Currently the main actor coordinating densification projects. For example: Peabody as formed a strategic partnership with the GLA for the delivery of regeneration and densification projects, to deliver housing (including up to 7,000 'affordable' tenure homes in e.g. Thamesmead, Daggenham Green, and the former Holloway Prison in Islington. Peabody works in partnership with private construction companies (e.g. The Hill Group) to deliver masterplanning and housing at these sites. As the owner of densification sites (e.g. having purchased the site at Daggenham Green in partnership with Dagenham Dock Ltd), Peabody acts as the client coordinating development and acquiring services related to sustainability, social value advice, town planning, architectural design, masterplanning, landscape design, public realm design, structural engineering, civil engineering, access and inclusivity consultancy, sales and capital markets consultancy.
Private sector construction companies, developers and housing providers	e.g. The Hill Group, British Land (a UK 'developer and asset manager') or Lendlease (an Australian multinational construction and real estate company)	With local authorities playing an enabling role to ensure land release for densification projects, private developers provide the capital required for design, construction, and delivery of new housing. These actors therefore ensure such schemes are 'commercially viable'. Often work in partnership with local authorities or non-profit housing providers in the interest of public benefit (e.g. provision of affordable housing), nevertheless there are trade-offs due to these companies' profit requirements, and planning structures (e.g. S106, affordable housing targets, local authority capacity) which have weakened the leverage of the public interest.

Table UK20. Key institutions involved in the policy cycle for densification

6.5 Achievements, assessments, and challenge

UK densification strategy has encouraged the gentrification of areas designated for regeneration through the residualisation of the social housing stock and extension of owner occupation and private rental tenures.

More significantly, densification has been used to recommodify the land and housing supply system, progressively weakening the role and power of public institutions in these processes, and transferring land, responsibility and revenue streams to the private sector, including to large international organisations. This opens the door for the financialisation of land for densification and the management of these projects, with huge implications for residential inequalities, not least curbing the redistributive role that local authority direct delivery can play in housing provision.

In place of central government finance, the hard regeneration projects detailed above have depended on bringing forward the value inherent in public land (including single tenure social housing estates) and transferring this to the private sector. This means that provision of affordable housing under this densification agenda relies on cross-subsidising social provision with the provision of private tenure owner occupied or rental homes (as negotiated under S106 agreements between local authorities and the developers who take ownership of densification projects). The National Housing Federation suggests that cross-subsidy models of housing delivery result in a net decline in social housing on all estate regeneration projects, alongside an increase in private tenure housing (Riding 2024b). This is supported by Penney (2024) Who illustrates the extent of social housing loss using examples from the Heygate and Aylesbury Estate Regeneration programmes in the London Borough of Southwark: *„On these two estates, 3,971 homes, including 3,435 council homes, will have been demolished by 2035. In their place, a total of 6,979 homes (1.76x density) have been built or planned: 1,897 (27%) will be social homes, 1,017 (15%) will be intermediate homes, and 4,065 (58%) will be market homes. This represents a net loss of 1,538 truly affordable homes. Additionally, the replacement social rented homes are being provided with less secure Assured Tenancies and with £107.51 higher average per week social housing costs“.*

Constraints

The transfer of public land to private ownership, encouraged under the regeneration agenda, constrains direct delivery of social housing by local authorities. This has an impact for any future programmes to expand the decommodified housing stock, as land price cannot be controlled or constrained, meaning it will cost far more to deliver public services (including housing provision) on private land. As an additional concern, since industrial areas have also been targeted for release to private housing developers, there is a risk that many SMEs will be relocated, undermining ‘blue-collar’ employment opportunities and substituting these for predominantly owner occupier and private rental tenure housing.

Opportunities

We have pointed to various innovative programmes of the GLA intended to support local authority housing delivery. This includes the Council-led Housing Network, the Housing Development Academy, and the £4 million Land for Council Homes Revenue Fund. The

removal of the HRA borrowing cap in 2018 increased local authority access to finance, and some local authorities have created 'local housing companies' for direct delivery. While these initiatives are unlikely to reach scale while local authorities are not sufficiently supported by central government grant, they at least offer opportunities for more direct delivery, and indicate the significance of the local level for reducing housing inequalities in the face of the densification agenda.

The previous points are summarised in the table below, with further insights drawn from Policy Lab workshop #1, held in London.

Hypothesis: impacts on housing inequalities	Further insights, drawn from Policy Lab workshop #1 (WP7)
Densification encourages the gentrification of areas designated for regeneration	Not necessarily. Yes, in relation to first-generation densification, based on public-private partnerships, but local authorities are learning from past mistakes. Public sector participants do not regard densification/regeneration as a driver of gentrification in the latest regeneration programmes. Some see the process as 'good gentrification' when the concentration of deprivation of the estate and surrounding area is very high, or when the existing estate is not demolished (as in most recent regeneration programmes).
Densification as implemented in the UK transfers the value inherent in public land (including social housing estates) to the private sector.	Yes, particularly in 1st generation regeneration (public-private partnerships) with the selling of public land to private developers and demolition of council estates. But in the last decade this transfer to the private sector is not so direct, with a change in the governance of regeneration to non-profit-private joint venture (2nd generation), and more GLA funds/loans for acquisition of land (to local authorities and non-profit housing providers), and changing approach to demolition of council estates.
Densification limits the possibility of direct delivery of housing by local authorities.	Yes, due to how the planning system and housing supply system is organised. However, there are signs of growing direct delivery from local authorities in recent years, with introduction of council-owned regeneration companies and housing companies.
Social housing delivery relies on cross-subsidy from private tenure production (Section 106) and results in a net decline in social homes.	Yes. Section 106 is an issue: housing provision by the private sector does not ensure reaching affordable housing targets or good quality homes, so local authorities need vehicles to build better / build themselves (like council-owned regeneration companies)
Opportunities: various innovative programmes of the GLA intended to	Yes. More recently there are signs of a paradigm shift (towards direct delivery), stopping the decline of social housing delivery.

support local authority housing delivery.	
Opportunities: removal of the Housing Revenue Account (HRA) borrowing cap in 2018 increased local authority access to finance, some have created 'local housing companies' for direct delivery.	Yes, there are signs of a shift towards new vehicles for local authority direct provision (see above), but it may be too early to see the benefit of lifting the borrowing cap, as local authorities still have difficulty in borrowing due to the high rise in interest rates (and high cost of construction).
The impact of crises: rising construction costs (alongside stagnant house price rises) means housing developers engaged in densification have increasingly narrow profit margins. This falling viability can compel developers to reduce Section 106 contributions, affordable housing delivery and other 'negotiable' aspects (including net-zero construction targets) where possible.	Higher cost of regeneration (particularly green regeneration) for private, public and non-profit sector, due to raised interest rates, rising construction costs, and Brexit. Brexit in particular made procurement for construction more challenging. Housing associations also struggle with the increased costs of production and raised interest rates. The non-profit sector is changing: housing associations are getting larger by merging, but some are having financial difficulties.
Where we need to improve: coordination	Holistic thinking about budgets at national level for more long-term funding. The planning system is precedent-led, and things are reviewed because of objections, rather than being set against criteria, measurements or data.

Table UK21. Summary table

7 Summary and discussion of results

7.1 Summary of changes in EEP

In the UK, retrofitting, urban greening, and densification are replicating many of the residential inequalities that are already produced by the UK housing system. This is because of a broader contextual historical shift in UK governance structures, that has occurred over several decades. The governance structures determining how these environmental initiatives are rolled out, are underpinned by the same logic that governs the existing housing system: a preference by UK policymakers to catalyse economic activity through the commodification of public goods.

The underlying macroeconomic conditions of this policy preference have deep roots. From the 1960s onwards, attempts have been made to reduce government intervention in the economy, to liberate the supply side (production and provision) of public goods ¹⁷⁶ from state control, alongside tax reductions implemented with the aim of increasing personal consumption and the declining productivity of British industry. These shifts were turbo-charged during the Thatcher era, and increase as Britain shifts increasingly towards a services dominated economy.

This means that while national policy for EEPs is set by national government, these policies are designed so that responsibility for implementation falls to private, public and non-profit housing providers. In this context, public and non-profit institutions are usually left to rely on the private sector to fund implementation. Some funding, guidance and support is available from the national level, but this is usually not sufficient to extend retrofitting, NBS delivery or densification at scale. Rather, national-level funds and support are usually intended as a 'pump-priming' exercise, to stimulate activity at lower scales of governance and market operation. Ultimately, this means that the costs of implementing EEPs are usually shouldered by the private sector, and therefore 'shunted-on' from housing providers to end users, ultimately increasing housing inequalities.

7.2 Relations and trade-offs between EEPs and housing policies

In the UK, environmental debate and the green policy initiatives—such as retrofitting, NBS, and densification—have developed largely in isolation from the housing affordability debate. The housing affordability debate predates the decarbonisation and sustainability debate, and the links between these areas are not part of the current political agenda. Their nexus also remains underexplored in academic circles due to disciplinary silos, although some synergies are gathering momentum.

¹⁷⁶ We define public goods as goods and services the provision of which benefits all members of society, being non-excludable and non-rival. This includes the availability of affordable housing and the creation of a sustainable and net-zero economy, both of which provide benefit at a societal level that individuals cannot be excluded from. These specific public goods cannot be reduced to (for example) individually owned homes or individually owned green space, but extend to the benefit felt by society at large in their wider provision and availability.

Our view however, and as stated above, the governance structures determining how these three green initiatives are rolled out, are underpinned by the same logic that governs the existing housing system: a preference by UK policymakers to catalyse economic activity through the commodification of public goods. These EEPs are public goods that are manifested through the built environment, and as such their design follows the same logic as the UK housing system, and replicates many of the mechanisms whereby housing inequalities are created.

This policy preference for private provision of public goods, the historical context of which is outlined above, has seen shift from state intervention and investment in the supply side (largely but not limited to central government subsidy) to the demand side (largely but not limited to tax restructuring). This has created decades' worth of housing, fiscal and welfare policy intervention intended to lubricate the flow of private (rather than public) investment into housing, and now into green initiatives. Direct state investment into supply (which was a norm during the postwar de-commodification of the UK housing system) has been replaced by attempts to stimulate privately funded supply by boosting. This logic has been applied both to housing and to green initiatives.

We would add that this is not primarily an issue of environmental policy or governance, but of how the governance of public goods provision works in the UK. By outsourcing the provision of public goods to the private sector, the costs of both housing production and of green interventions will rise, with costs ultimately re-couped from end-users, thereby increasing residential inequalities. These three green initiatives are therefore replicating and amplifying the residential inequalities that are already produced by the UK housing system.

In retrofitting, homeowners and landlords (whether private, public, or non-profit) have struggled to retrofit their properties and are unlikely to do so by 2035–2050 due to prohibitive costs. Similarly, the provision of NBS remains scarce, often off-site, and of poor quality, while densification continues to drive up housing prices, making the delivery of affordable housing increasingly untenable.

Just as the UK housing debate (since 2004 – see Deliverable 4.2) has framed the housing affordability crisis as a supply-side (market failure) problem, the climate and environmental discourse is now expected to follow suit—framing shortfalls in the provision of retrofits, NBS, and densification of housing as a supply-side problem, rather than a problem of state funding, coordination and provision. This narrative risks justifying further demand-side subsidies and deregulation of planning and the housing system to stimulate market-led production of green goods, rather than addressing the complex implications of green interventions for housing affordability and regional or urban inequalities.

Thus, although the housing affordability and environmental debates remain largely disconnected, the systems themselves are deeply intertwined—following similar narratives, governance structures, and policy patterns, albeit with a time lag.

More importantly, the idea that decarbonisation may hinder housing affordability—and in fact make housing less affordable—is largely absent from the UK's national debate. In international academic circles, the the green-housing affordability nexus has gained traction through the concept of 'green gentrification' (Anguelovski et al 2022) (environmental initiatives triggering neighbourhood changes which drive green gentrification and displacement). Green gentrification may occur in certain areas (particularly those that are already quite gentrified

such as Woodbury down – see WP2 for more details). However, our hypothesis is that green gentrification is far from being the main mechanism whereby EEPs reinforce housing inequalities in the UK context.

Green initiatives in the UK are impacting housing affordability more fundamentally through the housing provision/production system itself. As the cost of production for green initiatives such as NBS and retrofitting continues to rise, and with minimal direct state intervention and only limited demand-side subsidies, the financial burden of the UK's low-carbon policies is increasingly falling on housing providers rather than the national government. Private developers, non-profit organisations, and local authorities are being tasked with both funding and implementing decarbonisation efforts. Consequently, a portion of these costs is either passed on to tenants and prospective buyers, further exacerbating housing affordability challenges, or re-couped through negotiable aspects of development such as Section 106 contributions and affordable housing unit delivery. As housing providers are increasingly required to deliver green initiatives—whether on-site or off-site—the production and retrofitting of affordable housing is being constrained. Small and medium-sized private and non-profit providers are already struggling to operate under these conditions. At the same time, policies aimed at expanding low-carbon technologies are not improving housing affordability. In fact, green policy instruments and subsidies often raise development costs, indirectly limiting the supply of affordable housing and reinforcing the commodification of the housing system.

Due to the UK's exit from the EU, the scale of public investment in the UK green agenda is significantly smaller than for other EU countries, which benefit from substantial EU subsidies. One issue here is not only the size of these funds, but also how they are distributed. In the UK, the limited availability of grants (for example, local authorities must bid competitively for limited funds to retrofit their social housing stock, meaning many apply for but are left without grant funding) constrains the capacity to support 'green and affordable' housing initiatives effectively.

The UK's environmental agenda is missing a critical opportunity to support the production of affordable housing. Current green policies lack mechanisms to foster the de-commodification of housing, which would mitigate the affordability crisis. This would require, for instance, direct state intervention in the provision of these three green initiatives. Furthermore, green programmes and subsidies to housing providers are not accompanied by regulatory safeguards to prevent rent increases or speculative practices. Nor do they include fiscal tools and land value capture mechanisms that would allow the state to reclaim a portion of the increased land value resulting from public investment (e.g., through improved environmental quality). This gap is rooted in the UK's weakly regulated private rental sector, and in the negotiable nature of planning gain (like Section 106 agreements), which are designed to allow the private sector to retain much of the uplift in value as an incentive to deliver public goods.

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