REDUCING
HOUSING
INEQUALITIES

# Comparative Report on the Regulatory Systems of Environmental and Energy Policies

**ReHousIn Deliverable 3.3**

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The ReHousIn project aims to spark innovative policy solutions for inclusive, high-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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# Executive summary

This report highlights the flexibility versus constraints of national and local policies in delivering the different streams of EU Green Deal policies, namely housing retrofitting, densification and Nature Based Solutions (NBSs). The report further provides a basis for formulating recommendations on EU Green Deal policies and how such policies can minimise social and housing externalities. The three policy domains, as part of climate adaptation and mitigation strategies aimed at climate and environmental targets, show distinct yet parallel temporal waves. Retrofitting emerged in response to the 1970s oil crisis; densification evolved from early post-war efforts to contain urban sprawl in the 1950s to acquire market prominence in the 90s; NBSs spread in the early 2000s thanks to guidelines and the international circulation of models.

EU frameworks have helped shape all three domains at some point — Energy Performance of Buildings Directive (EPBD), Energy Efficiency Directive (EED), and the Renovation Wave for retrofitting; the Soil Charter, the Leipzig Charter, and "No net land take" for densification; and LIFE, Horizon, and Recovery and Resilience Facility (RRF) for Nature-Based Solutions (NBSs) — yet binding legislation more established in energy retrofitting (Green deal note, 2025).

The three areas differ in their policy tools: financial instruments dominate retrofitting (subsidies, grants, tax incentives); densification relies on regulation, public funds, or taxes; NBS draws on EU-level funds as well as national and local guidelines and programmes. Private investors dominate all three domains, benefiting from tax breaks, density bonuses, fast-track permits, and subsidies.

Some gaps remain between policy targets and actual implementation. The landlord-tenant dilemma remains structurally unresolved across rental sectors. Tenure bias overwhelmingly favours homeowners; multi-owner buildings face collective-action problems. Gentrification, housing affordability pressure and social exclusion are documented across countries and various domains. Energy poverty receives an inadequate structural response; social housing providers face untenable trade-offs between affordability and environmental standards.

Implementation remains fragmented, with flagship projects (sustainability-oriented urban developments, TODs, waterfront redevelopments) concentrating investment in high-value areas, while disadvantaged neighbourhoods rely on under-resourced micro-pilots. Municipalities are primary implementers everywhere but face systematic capacity constraints, especially in smaller towns. Administrative complexity consistently deters uptake, particularly for vulnerable groups.

All three domains are primarily designed as environmental and spatial policy tools, not housing policy: integration with affordability, tenure diversity, and anti-displacement goals is limited in all countries. However, the drivers differ: energy prices are the main market drivers for retrofitting, trapping low-income households without capital; land regulation influences densification; NBS are driven by public funds and cultural shifts. Results show that all three sectors risk exacerbating housing inequalities across Europe, although case studies indicate that targeted public actions can mitigate the worst outcomes, and that governance

fragmentation and market-driven approaches undermine social equity and policy effectiveness.

Certainly, monitoring social impacts and integrating housing justice into environmental policy remain critical gaps. The report points to: how environmental interventions produce or prevent housing inequalities in high-demand cities; the conditions under which public land policy counteracts market-driven trends (Vienna model, French ZAC *Zone d'Aménagement Concerté*); the limits of cross-subsidy models versus alternative financing (public investment, Community Land Trust(s) - CLTs, cooperatives).

# 1. Methodology

The Comparative Report on EEPs (D3.3) synthesises the outcomes of the national reports on EEPs' regulatory systems for each country (see the reference list), integrating first insights and reflection from the case study analysis (D5.1). This comparative report examines the nine national reports created under the ReHousIn project (Deliverable D3.2 August 2025). The nine countries reviewed are Austria, France, Hungary, Italy, Norway, Poland, Spain, Switzerland, and the United Kingdom. Each national report organises its EEPs analysis around a standard set of dimensions: the policy cycle, the implementation process, the size and role of the market, and the multilevel governance process, followed by an evaluation of achievements and challenges. This comparative synthesis draws directly from those national reports to identify commonalities, differences, and systemic lessons across the nine European contexts.

Main research questions include:

- How have energy efficiency policies (EEPs) emerged, evolved, and been implemented across countries since the 1990s, and what convergences, divergences, and policy trajectories can be observed in relation to the broader European framework?

And more precisely:

- What are the main drivers of policy change, and how do they interact with institutional arrangements to produce accelerations or ruptures in national trajectories?
- How have policy tools been designed and implemented across countries, geographical scales, and timelines, and what challenges arise in practice?
- What role does the market, including private actors and financial instruments, play in shaping the adoption, effectiveness, and outcomes of EEPs?

To answer those questions, D3.3 adopts a comparative qualitative approach, based on data collected by project partners through literature reviews, thematic workshops, and semi-structured interviews with policymakers and experts. The WP3 core group is divided into sub-groups, each comparing one type of EEP across nine countries: SPO and MRI focus on housing retrofitting policies, SPO and UAB on Nature-Based Solution policies, and ETH and NMBU on densification policies. All partners are invited to review the intermediate version of the comparative report, identify where their country is mentioned, and, where relevant, add references to their three case studies as illustrative examples. Following the structure of national reports, each policy area is examined 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.

Key comparative criteria for national reports include: the impact of the privatization process on housing inequalities 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 tackling housing inequalities shaped by EEP; contradictions, lack of coordination, and conflicts among various actors, levels of governance, and sectoral policies; the spatial

effects of these processes across different territorial scales: local, regional, and subnational; and the identification of corrective, innovative, or experimental measures that can reduce housing inequalities.

# 2. Housing retrofitting

Housing Retrofitting Policies (RP) can be defined as a set of regulatory, fiscal, and programmatic instruments aimed at improving the energy performance of the existing building stock, particularly residential buildings, to reduce energy consumption, greenhouse gas emissions, and, increasingly, energy costs poverty. Originating in the 1970s as energy-security measures in response to oil shocks, these policies have progressively evolved into a central pillar of climate governance, especially after the introduction of EU frameworks such as the Energy Performance of Buildings Directive (EPBD), the Energy Efficiency Directive (EED) and, more recently, the Renovation Wave and Recovery and Resilience Facility. Across the nine countries, public tools at both national and sub-national levels supporting housing retrofitting generally relies on financial incentives—subsidies, grants and tax deductions—designed to mobilise private investment by homeowners and, to a lesser extent, landlords and social housing providers.

Despite this shared architecture, national trajectories differ considerably, although common structural features remain: a dominant reliance on financial instruments rather than binding obligations; a persistent gap between renovation targets and actual deep-renovation rates; and notable social asymmetries, with benefits mostly accruing to wealthier homeowners while rental sectors and vulnerable households remain relatively underserved.

All countries have embraced housing retrofitting as a key part of decarbonisation, but the heavy reliance on financial incentives like subsidies, tax reductions, and eco-loans has strengthened existing social inequalities. Retrofitting efforts have mainly been the first step in energy-efficiency measures, later incorporated into broader climate strategies. Originally seen as a technical necessity to cut emissions and energy use, retrofitting has later been recognised as a deeply social issue. Owner-occupiers, especially in wealthier areas, tend to be best able to access these resources, whereas tenants, households in vulnerable situations, and social housing providers may encounter barriers, including technical challenges and budgetary constraints. While many countries such as Austria, Switzerland and the UK introduced energy efficiency policies early on, issues of housing affordability and tenant protections have typically remained of lesser priority.

## 2.1 The policy cycle

The trajectory of retrofitting policy varies substantially across countries, reflecting historical shocks, political institutions, the EU accession/exit and the timing of European and international policy frameworks. Since the 1970s oil crisis, European housing policy gradually transformed from narrow energy-security measures into a broad climate-and-equity policy field. Policy matured in the 2000s as the EPBD and other EU frameworks required member states to establish energy performance regimes and renovation strategies.

Retrofitting policy trajectories reveal three groups:

- early starters (Austria, Switzerland,) responding to 1970s oil crises with energy-security measures, later reframed as climate policy — Austria's 1984 Federal Housing

Renovation Act and Switzerland's 2000 $CO_2$ Act with its distinctive $CO_2$ levy (2008) redistributing revenues through buildings programmes;

- central-period activists (France, Italy, Norway, UK) expanding during 2000s–2010s under EPBD influence—France's mass-incentive Grenelle laws, Italy's tax-driven Superbonus 110% (2020), Norway's technology-focused Enova grants established in 2001 by the government to manage the Energy Fund, and the UK's unstable market-led Green Deal;
- EU dependents (Poland, Hungary and Spain) that may have started their residential renovation efforts in the late 1990s, early 2000s from national resources but later on following the EU climate and energy regulations became dependent on EU financial sources. Mobilising after 2015 — with Spain transformed by RRF funding into a vigorous actor with the 2021 Climate Law, while Hungary's path diverged post-2010 through political centralisation.

EU frameworks (EPBD, EED, Renovation Wave, RRF) broadly shape national policy, though binding legislation remains uncommon: France's 2021 ban on renting '*passoires thermiques*' (subsequently weakened) and Austria's non-binding federal-state coordination exemplify the regulatory shortfall.

More in detail, early starters like Austria and Switzerland embedded retrofitting into national energy policy as early as the 1980s and 1990s, before the first EPBD, albeit with different mixes of regulation and fiscal support. The oil crises of the 1970s marked the first wave of housing energy policy.

- Austria reacted swiftly, embedding efficiency into its 1975 first Energy Plan and introducing the Federal Housing Renovation Act in 1984, which created legal basis for subsidising housing renovation, including thermal refurbishments, and for subsequent legislations and schemes introduced by federal states. This early activism was linked less to climate than to energy security, a theme reinforced by Austria's 1974 membership in the International Energy Agency. By the 1990s, with EU accession looming, Austria gradually reframed retrofitting as a climate issue, adopting the Environmental Subsidy Act of 1993 to align with EU environmental regulations and negotiating federal–regional 15a agreements (see glossary) on energy savings. Subsequent decades saw the layering of EU-driven legislation, including transpositions of the Energy Performance of Buildings Directive, the Energy Efficiency Act of 2014, and the Renewable Heat Act of 2023. Austria's long trajectory thus reflects both continuities, through a subsidy and standards regime, and fragmentation, with the result of poor implementation due to a lack of the political priority of the Länder.
- Switzerland provides a parallel yet distinctive case, having promoted housing retrofitting since 1973 as part of the broader reorganisation of the country's energy policy. The 1990 constitutional amendments assigned responsibility for buildings energy measures to the cantons. Although not an EU member, it committed early to international climate regimes, adopting the $CO_2$ Act in 2000 with a national target of reducing emissions by 10% by 2010. A landmark came with the $CO_2$ levy in 2008, a market-based instrument that set Switzerland apart from its neighbours, redistributing revenues partly through government funds for environmental and energy-related

programs and partly returning them to citizens and businesses on a per capita basis or according to their aggregate wage sum. The Buildings Programme launched in 2010 introduced substantial financial incentives for energy-efficient renovations, supported by cantonal implementation and partly financed by the CO2 levy. While effective at improving performance, these measures also led to higher rents, as landlords passed retrofit costs on to tenants, highlighting the tension between environmental and social goals. Switzerland, therefore, illustrates an early, regulation- and market-oriented pathway, stable over two decades but challenged by distributive effects.

France, Italy, Norway, and the United Kingdom expanded retrofitting during the 2000s and 2010s, though along divergent paths: in France and Italy, mass retrofitting mainly relied on financial incentives; Norway focused on technology support; and the United Kingdom promoted market-oriented schemes. The early 2000s marked the central phase of retrofitting activism. EU directives, notably the 2002 and 2010 Energy Performance of Buildings Directive, acted as common triggers, but each country embedded them differently.

- France launched the Plan Climat in 2004, a strategic framework linking climate change and building efficiency. This was rapidly followed by the Grenelle laws of 2009 and 2010, which set quantified renovation targets of a 38 percent reduction in energy consumption of the existing building stock by 2020, and 400,000 dwellings renovated annually. The 2015 Loi Transition Énergétique, the 2019 Loi Énergie-Climat of 2019 and the 2021 Loi Climat et Résilience subsequently raised ambition toward carbon neutrality by 2050. They also brought with growing attention to energy poverty issues, prioritized the renovation of most energy-consuming buildings and the introduction of MaPrimeRénov'. The Plan de Relance of 2020 allocated over six billion euros to building renovation, anchoring retrofitting at the core of France's COVID recovery strategy. France thus pursued an incentive based, target-driven pathway. However, social protests such as the Gilets Jaunes forced caution in applying carbon pricing and highlighted the importance of distributional design.
- Italy also integrated retrofit into its fiscal policy. Since the late 1990s, generous tax deductions have encouraged private renovations, culminating in the introduction of the "Superbonus 110%" scheme in 2020, which reimbursed more than the full cost of qualifying retrofits. While this stimulated unprecedented activity, it mainly benefited higher-income owners and caused administrative bottlenecks and fraud risks. However, in some local contexts, such as Reggio Emilia, the Superbonus was successfully applied within the public and cooperative housing sectors. More recently, the "national complementary plan" (PNC), adopted alongside the Italian Recovery and Resilience Plan, included the Sicuro, Verde, Sociale programme, aimed at directing funds towards the renovation and upgrading of public housing. Italy thus exemplifies a tax incentive-driven approach, where retrofit is seen both as climate policy and as an economic stimulus.
- Norway, although not an EU member but participating to the EU internal market, took a different route. National regulations define building requirements mainly targeting new construction rather than existing buildings, revealing a regulatory gap. From the mid-2000s, agencies such as Enova and Husbanken (see glossary) supported energy efficiency through grants and technology demonstration, promoting heat pumps, smart

energy systems, and high-performance standards. Yet without binding retrofit mandates, uptake remained limited and skewed toward wealthier households. Norway's model is best described as a technology and innovation pathway, where climate ambition is high but social targeting weak.

- The United Kingdom demonstrates another distinctive trajectory: a market-led but unstable pathway. Housing retrofitting emerged as priority with the 2012 Green Deal. Since the 2000s, successive governments experimented with retrofit pilots and demand-side subsidies, such as the Green Deal and the short-lived Green Homes Grant. Delivery was frequently reorganised, undermining stability and trust. Net-zero legislation of 2019 renewed strategic clarity, and the UK 2021 Environment Act introduced biodiversity net-gain requirements for new housing. Yet retrofit policy remained fragmented, relying heavily on local councils and private contractors, with limited sustained public investment.

Poland, Hungary mobilised at the end of the 90s to match the energy consumption target and after 2015 again, along with Spain, under EU pressure or with EU funding. Spain, however, illustrates how EU funding and post-crisis recovery mechanisms can rapidly transform a laggard into an accelerator.

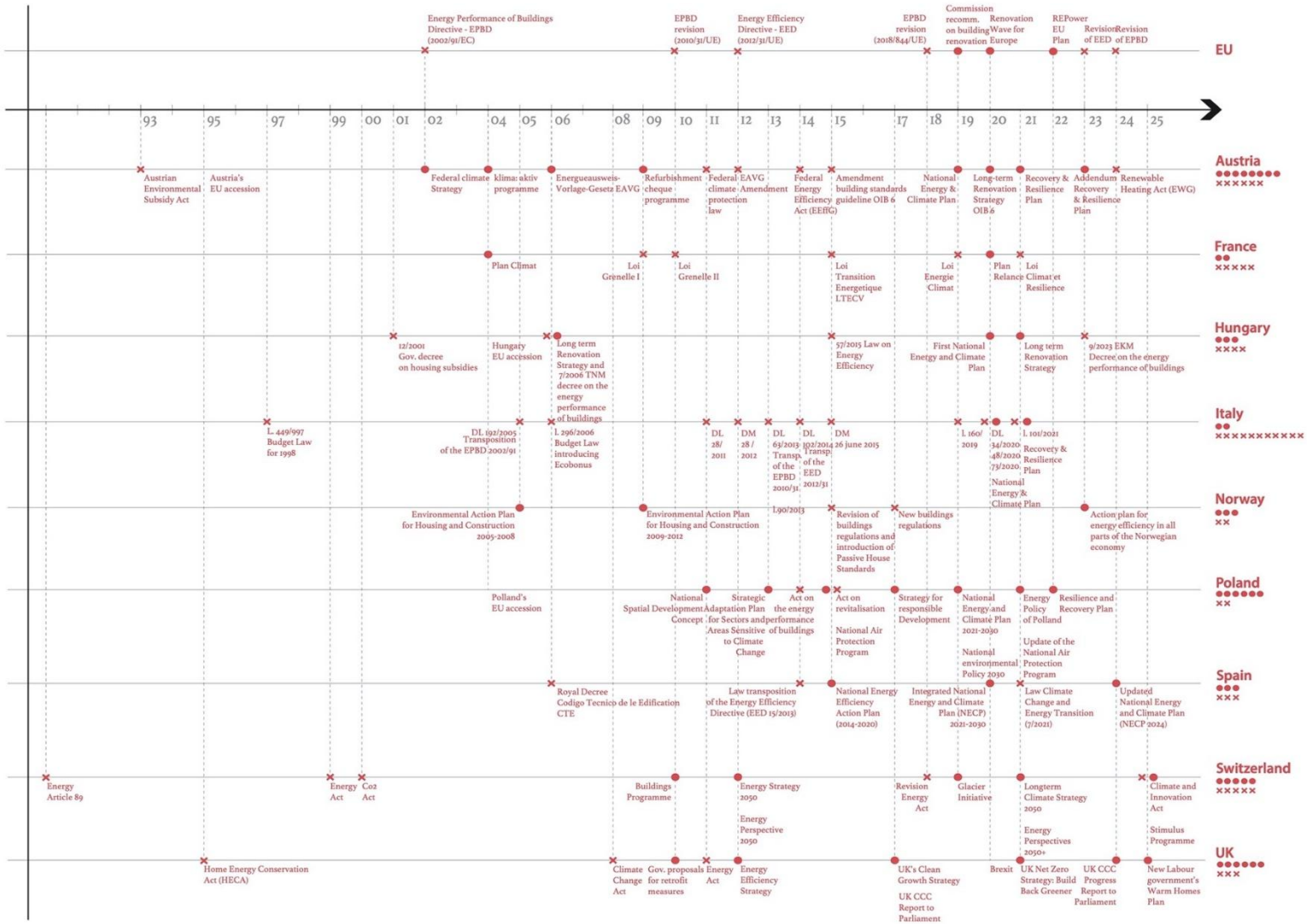
- Poland began addressing building retrofits as early as 1998 yet more systematically after 2014, under the regulatory pressure and financial support of the European Union, with the Act on the Energy Performance of Buildings, the Energy Efficiency Act and the Clean Air Programme. The emphasis has been less on climate than on air quality and energy security, given the heavy reliance on coal-based heating. EU funds are essential in financing retrofit, but uneven municipal capacity hampers implementation. Large urban centres, such as Powiśle or Stara Praga in Warsaw, possessing more advanced institutional capacity and greater financial resources, typically implement modernization projects faster and on a larger scale than smaller municipalities. At the same time, a significant portion of the housing stock - particularly in multifamily buildings characterized by a fragmented ownership structure - remains difficult to meet through comprehensive modernization interventions. As a result, smaller cities, such as Pabianice and Radomsko, demonstrate relatively greater potential for implementing modernization projects in single-family buildings, taking advantage of programs such as Clean Air. In Warsaw, modernization efforts are more often integrated into a broader framework of urban revitalization.
- Hungary did pursue retrofitting schemes using national resources also in the 2000s, but continuity broke down in 2009 due to the financial crisis. Retrofitting of residential units were pushed back on the political agenda in the 2010s when political centralisation took place that favoured public buildings. With a very high private ownership rate (over 95 %), retrofits in the 2020s are characterised by two major value driven considerations: 1) preferring the renovation of single-family homes against multi-family ones, 2) applying market based solutions - energy efficiency obligation schemes - instead of public resources. In contrast to Poland, where EU funds sustain momentum, the Hungarian trajectory - which lacks large scale European resources lately due to unmet conditionality criteria - illustrates the risks of policy discontinuity and institutional hollowing.

- Spain's trajectory reflects a similar reliance on EU impetus, but with stronger momentum in the 2020s. The adoption of the Energy Performance of Buildings Directive in 2002 led to the Technical Building Code in 2006, which was Spain's first significant framework for energy standards. Yet sustained activism only emerged later, with the Energy Efficiency Directive transposed in 2013 and the National Energy Efficiency Action Plan for 2014–2020. The decisive turn came in 2020 with the Integrated National Energy and Climate Plan for 2021–2030, which aligned with the EU Green Deal and set a 39 percent energy reduction target. The Climate Change and Energy Transition Law of 2021 enshrined carbon neutrality by 2050 and mandated efficiency upgrades in buildings. Most importantly, the Recovery and Resilience Facility channelled large-scale funds into the Program for Energy Renovation of Buildings and regional schemes, making retrofitting a central pillar of Spain's recovery strategy. Spain's small public housing stock limited the reach of social programmes, but municipalities such as Barcelona and Madrid, through agencies like INCASOL and EMVS, became active in implementing large-scale retrofits. By 2023 and 2024, updated EU directives and Spain's revised National Energy and Climate Plan reinforced long-term renovation strategies, cementing Spain as a late but vigorous actor. Its pathway combines ambitious targets, decentralised implementation, and explicit attention to energy poverty, though uneven regional capacity creates disparities in outcomes.

From this chronology, a set of policy types can be distilled:

- Austria and Switzerland emerge as regulation-driven coordinators, combining early adoption of building codes and subsidy laws with long-term stability but fragmented implementation.
- France, Italy, and Spain represent mass-incentive spenders, pursuing ambitious numerical targets and large fiscal transfers, with strong political signalling but significant distributional and administrative challenges.
- Norway exemplifies a technology and innovation promoter, where incentives and innovation are prioritised but without binding mandates or strong equity measures.
- The United Kingdom illustrates a market-led and unstable pathfinder, relying on private actors stimulated by public funding, but undermined by frequent reversals.
- Poland and Hungary fit the profile of early starters that have reformed their approach under EU-directives, with major progress tied to EU funds and conditionality, but vulnerable to political discontinuity or weak local capacity.

*Figure 1: timeline illustrating key national policies and regulation across selected countries and in the EU affecting housing retrofitting. Binding documents are indicated with a cross.*



## 2.2 The implementation process

A complex landscape of financial incentives, governance structures, and persistent challenges emerge from countries' trajectories: differences are not merely technical, they shape who benefits from public support, how equitably resources are distributed, and how effectively climate objectives are met. Although not surprising, a striking feature common to all cases is the overwhelming reliance on financial instruments. Subsidies, grants, and tax incentives dominate the policy mix, with governments seeking to mobilise private investment by lowering the costs of energy efficiency improvements.

Austria is emblematic in this regard. Through its long-standing Environmental Support in Austria (UFI, Umweltförderung im Inland) and newer targeted programmes such as the Federal Sanierungsoffensive, the country provides subsidies for a wide range of retrofitting activities, including heating system replacement and thermal refurbishments. Within this umbrella, streams on national level like Raus aus Öl und Gas focus on phasing out fossil fuels, while Sanierungsbonus offers general renovation incentives and targeted support is provided for vulnerable groups (Sauber heizen für Alle, Wohnschirm Energie). While retrofitting subsidies are open to all building owners, thermal refurbishment is one of the key priorities of Austria's limited-profit housing sector (LPHA), as such refurbishments allow combining energy efficiency with affordability. The Austrian case study of Linz shows that a strong LPHA base and dense district-heating network support affordability, but provincial subsidy logic prioritising new-build over renovation creates misalignment, and slow heat transitions risk costly dual infrastructures that can raise operating costs.

France has undergone a similar evolution. Having relied heavily on tax credits in the past, since the early 2020s it has prioritised upfront subsidies for private renters and homeowners through MaPrimeRénov'. This change was designed to reduce the barrier of upfront costs, particularly for low-income households, and represents one of the most significant subsidy programmes in Europe. Public support for the renovation of the social housing stock (through ANRU, Action Logement and local authorities) remains limited relative to needs, however.

Italy's tax incentives schemes (Ecobonus, Bonus Facciate and Superbonus), although the Superbonus has highly criticised, created a surge in renovation activity, primarily among wealthier homeowners and the construction sector. Large scale renovation of public housing is hindered by the absence of specific tools and the gradual phase-out of structural funds. More recently, earmarked envelopes linked to the National Recovery and Resilience Plan have targeted the retrofitting of public housing (such as the Sicuro, Verde, Sociale program).

Comparable mechanisms exist elsewhere: Poland's Clean Air Programme supports heating system replacement and insulation. Within this programme, three subsidy levels are defined based on income brackets. Other direct subsidies specifically target low-income households, such as Stop Smog or Warm Apartment. Additional support instruments include programs such as My Electricity, which promotes the installation of photovoltaic systems in single-family homes, and My Heat, which focuses on the implementation of heat pumps. At the local level, municipalities often use programs that provide Energy Advisory Services.

In Hungary, beyond the limited financial scheme, as EU funds are hardly available, currently the public sector provides little support for the renovation process, and exclusively for family houses. It was not the case in the 2000s when generous subsidies were available for prefabricated buildings, but as for nowadays, the financing of retrofitting is rather based on market forces and market obligations (energy efficiency obligation scheme).

In Norway, grants are channelled through Enova (see glossary) and loans through the state housing bank Husbanken. These support mechanisms are universal and do not differentiate by income.

Administrative complexity frequently deters uptake, particularly among those with limited digital literacy or financial capacity. Many schemes require households to pay for works upfront and claim reimbursement later, a model that excludes those without savings or credit access. France's introduction of the France Rénov' network and Austria's klima:aktiv advisory programme represent attempts to close this gap by providing independent guidance, but the problem remains acute. The failed Green Homes Grant in the United Kingdom illustrates the risks of poorly designed subsidy systems: plagued by cumbersome procedures and sudden termination, it failed to stimulate the market or achieve the expected scale of retrofits. Across the nine countries, the administrative dimension emerges as a critical fault line between policy ambition and household experience.

Another major division relates to tenure. Retrofitting policies are predominantly aimed at homeowners, especially those in single-family dwellings where decision-making is relatively simple. Private rental markets, however, face the well-known landlord–tenant dilemma: landlords have little motivation to invest in renovations that mainly reduce tenants' energy bills unless costs can be shifted to tenants through higher rents. This issue is especially evident in Austria, Switzerland, and Italy, where a significant proportion of housing stock is rented or co-owned in condominiums. Decision-making in multi-owner buildings adds to the difficulty, as reaching a collective agreement is challenging. Some governments have attempted regulatory measures. France's ban on renting the worst-performing dwellings—passoires thermiques—is the most notable example, although it has been scaled back due to political resistance. Austria has also considered regulatory pressure, but implementation remains patchy. Overall, the private rental sector remains neglected, with limited targeted funding and weak enforcement.

A further shared weakness is the insufficient integration of retrofitting policies with social objectives, particularly reducing energy poverty. Most countries introduced emergency measures after the 2022 energy crisis—such as vouchers or bill subsidies—but these are short-term and palliative. Structural solutions, like deep renovations of the least efficient dwellings, are rare and underfunded. Austria's Sauber Heizen für Alle or Wohnschirm Energie and France's Habiter Mieux Sérénité are examples of programmes specifically aimed at vulnerable groups, but they are limited in scale and often hampered by bureaucratic hurdles. Social housing providers in several countries, notably France, Austria, and the United Kingdom, face a significant dilemma: balancing affordability with rising costs of complying with new energy standards. Without stronger financial and regulatory support, these providers risk being caught between conflicting priorities, unable to renovate at scale without compromising affordability.

From this comparative analysis, four distinct trajectories of implementation emerge:

- The first is a centralised, grant-led, and regulatory approach, exemplified by France, Norway and Italy. These countries combine substantial public subsidies with regulatory obligations, enabling rapid mobilisation of funds but exposing themselves to political backlash and uneven regional delivery.
- A second type is the decentralised or federalist model, found in Austria, Switzerland, and Spain, where responsibility is devolved to subnational entities. This structure allows for local adaptation but results in fragmentation and territorial divergence.
- A third model, visible in Hungary, relies predominantly on market mechanisms and selective subsidies; this applies today to Poland, which invested huge amounts in the 90s, however. Here, strategic planning is underdeveloped, and vulnerable groups are poorly served.
- Finally, the United Kingdom exemplifies a fourth type: a hybrid of market mechanisms and supplier obligations, marked by policy instability, fragmented governance, and frequent programme turnover.

This typology underscores that while the financialisation of retrofitting is a common denominator, the balance between regulation, decentralisation, and market reliance varies widely. Ideally, combining stable, long-term funding streams with simplified administrative processes and targeted measures for vulnerable households would enable the delivery of both environmental sustainability and social equity. Without such recalibration, retrofitting policies risk entrenching existing inequalities, limiting their transformative potential in addressing both climate change and housing injustice.

The typology illustrates how institutional arrangements — such as federal versus centralised systems, EU membership versus non-membership, and fiscally expansive versus fiscally constrained models — influence retrofit trajectories. Across all cases, common challenges persist: administrative fragmentation, limited access for vulnerable households, and the ongoing tension between environmental goals and social equity.

*Figure 2: table illustrating public action national and sub-national tools supporting housing retrofitting policies across selected countries (current situation). Policy instruments are grouped into five categories: regulatory, financial, informational, innovation and technology, and monitoring. A tick indicates the presence of one or more tools within the corresponding category and country.*

| | | **Regulatory** | | **Financial** | | | **Informative and technical support[1]** | **Monitoring and evaluation** |
|---|---|---|---|---|---|---|---|---|
| | | Minimum standards[2] | Transparency obligations[3] | Grants | Tax Incentives | Loans[4] | | |
| **Austria** | National | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ |
| | Sub-national | ✓ | | ✓ | | ✓ | ✓ | ✓ |
| **France** | National | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Sub-national | | | ✓ | | ✓ | ✓ | ✓ |
| **Hungary** | National | ✓ | ✓ | ✓ | | ✓ | | ✔ |
| | Sub-national | | | ✓ | | ✓ | ✔ | |
| **Italy** | National | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Sub-national | ✓ | | ✓ | ✓ | | ✓ | ✓ |
| **Norway** | National | | ✓ | ✓ | | ✓ | ✓ | |
| | Sub-national | | | ✓ | | | | |
| **Poland** | National | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Sub-national | | | ✓ | | | ✓ | |
| **Spain** | National | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Sub-national | ✓ | | ✓ | ✓ | | ✓ | ✓ |
| **Switzerland** | National | | | ✓ | ✔ | | ✓ | ✓ |
| | Sub-national | ✓ | | ✓ | ✔ | | ✓ | ✓ |
| **UK** | National | ✓ | ✓ | ✓ | | | | ✓ |
| | Sub-national | | | ✓ | | | ✓ | |

[1] Information and support: Public tools providing information, advisory services, and technical guidance to citizens and businesses to facilitate retrofitting decisions and help them access other instruments. (e.g., One-Stop-Shops).

[2] Minimum standards: legally binding technical or performance benchmarks or obligations to retrofit that buildings must meet. Examples include Technical Building Code (CTE) in Spain which established national energy efficiency standards for both new constructions and major building renovations, or the Legislative Decree 192/2005 in Italy which mandates legally binding minimum energy performance standards for new buildings and existing structures undergoing significant renovations, in addition to stipulating that all new public buildings had to be Nearly Zero-Energy Buildings by 2018.

[3] Transparency obligations: primarily Energy Performance Certificates which mandate transparency and disclosure of energy performance of buildings.

[4] Loans: both subsidized or interest-free or guaranteed loans.

**Retrofitting Policies Country trajectories**

Austria's RP evolved from a focus on energy savings post-1970s oil crisis toward climate-oriented renovations, heavily influenced by EU accession (1995) and subsequent directives. Early measures included the 1980 Energy Savings Agreement and the 1984 Federal Housing Renovation Act. The 1993 Environmental Subsidy Act aligned with EU environmental norms, while the 2002 Federal Climate Strategy aimed to integrate climate goals into housing subsidies. Implementation lagged due to federal fragmentation, leading to infringement procedures by the EU. Recent developments include the National Energy and Climate Plan (NEKP, 2024), the Energy Efficiency Act (EEffG), and the Renewable Heat Act, supported by subsidy programs like Sanierungsoffensive and Raus aus Öl und Gas. Energy poverty gained prominence post-2022 energy crisis, prompting targeted measures like Sauber Heizen für Alle.

**France's** RP emerged in the late 1990s with the Plan Climat (2004), introducing energy certificates (DPE) and tax incentives. The Grenelle Laws (2009–2010) set ambitious targets for reducing energy consumption and renovating social housing. The Loi Transition Énergétique (2015) reinforced these goals, aiming for 500,000 renovations per year and banning passoires thermiques (energy-inefficient homes). The Loi Climat et Résilience (2021) introduced a gradual rental ban for low-performance homes. Financial tools evolved from tax credits (CITE) to direct subsidies (MaPrimeRénov'). Energy poverty became a central concern, leading to measures like the chèque énergie and support for vulnerable households via ANAH.

**Hungary**'s RP has been limited and fragmented. Large-scale energy renovations occurred mainly in the 2000s, with little continuity thereafter. The high rate of homeownership (97%) and centralized governance since 2010 reduced municipal capacity to implement green policies. Retrofitting is largely market-driven, with minimal public intervention. Energy poverty is rarely addressed in policy discourse, and EU directives are transposed slowly. The lack of a cohesive national strategy has resulted in uneven and socially uneven retrofitting outcomes.

Italy's RP has been heavily reliant on fiscal incentives, notably tax deductions (Ecobonus, Superbonus) since the late 1990s. These measures primarily benefited owner-occupiers and higher-income households, with limited impact on the rental or social housing sectors. The National Recovery and Resilience Plan (NRRP) recently channelled significant funds into retrofitting, complemented by targeted programs like Sicuro, Verde, Sociale for public housing. Implementation remains fragmented across regions, with varying levels of administrative capacity and coordination.

Norway's RP has progressed slowly despite political attention since the mid-2000s. National action plans and financial schemes (e.g., Enova, Husbanken) support energy efficiency but lack binding mandates or targeted subsidies for low-income groups. The focus has been on technical standards and voluntary measures, with limited integration with social housing policies. Energy poverty and tenant protections are underdressed, entailing the risk of socio-economic disparities.

Poland's RP gained momentum post-2016 with the Energy Efficiency Act and the Clean Air Programme, driven by EU directives and energy security concerns. Funding combines EU and national subsidies, but implementation is hindered by regional disparities, fragmented governance, and limited local capacity. Rural areas often lack access to support programs, while urban areas face rising costs and affordability challenges.

Spain's RP has been shaped by EU directives and national strategies like the Long-Term Renovation Strategy. Incentive-based programs and subsidies aim to improve energy performance, but implementation is uneven across regions. Energy poverty is a growing concern, though targeted measures remain underdeveloped. The social housing sector receives limited attention, and retrofitting rates remain below EU targets.

Switzerland's RP is rooted in the $CO_2$ Act (2000) and the Buildings Programme (2010), which provides financial incentives for energy refurbishments. However, costs are often passed on to tenants, reducing affordability. The policy is implemented through a federalist system, with significant cantonal and municipal variation. Energy poverty and social impacts are rarely central to policy design.

The UK's RP relies heavily on market-based mechanisms and small-scale demand-side schemes, with limited public investment. Programs like the Green Homes Grant were short-lived and ineffective. Eligibility criteria often exclude vulnerable households, perpetuating inequalities. The private rental sector faces minimal regulation, and social housing retrofitting is underfunded. Energy poverty remains a significant challenge, with inadequate policy response.

## 2.3 Size and role of the market

The role of market forces and private actors in housing retrofitting reveals a complex interplay of energy pricing, financialization, and private sector engagement that significantly shapes the pace and equity of the energy transition across Europe.

A dominant theme across nearly all national contexts is the fundamental role of energy prices as a primary market driver for retrofitting. The sharp increase in gas and electricity prices since 2021, exacerbated by the global energy crisis, has acted as a powerful incentive for homeowners to invest in energy efficiency measures. In countries like Austria and France, this market signal has proven more immediately effective in stimulating demand for renovations than many policy measures. However, this market-driven dynamic creates immediate equity concerns, as higher energy prices disproportionately impact low-income households who lack the capital to invest in efficiency upgrades, effectively trapping them in a cycle of high energy costs and inefficient housing. The policy response to this market pressure has varied, with France implementing a 'tariff shield' (*bouclier tarifaire*) to mitigate the immediate impact on households, while other countries have relied more on targeted subsidies to cushion the blow for vulnerable groups. Hungary on the other edge implements a utility price cap since 2013 (with a slight modification in August 2022), which results in the lowest household electricity

and gas prices in Europe. This policy limits the level of energy poverty in households using grid-related energy, but provides counter interest against renovation measures that pay-off in several decades. In Poland, there is a tension between short-term consumer protection ("electricity price freezes") and the long-term goals of retrofitting. Price interventions and the limited investment capacity of some households mean that the potential of long-term retrofitting measures is not fully utilized.

The financialization of retrofitting and the growing involvement of private financial actors represent another significant market evolution. Countries are increasingly developing mechanisms to leverage private capital for energy efficiency investments. Austria's Green Finance Agenda aims to combine government incentives with private loans and green mortgages, while in France, banks like Banque Postale offer 'green loans' (Prêts verts) to social housing providers, financed through green bonds issued by public financial institutions. However, this financialization trend risks creating new inequalities, as private lenders naturally prioritise creditworthy borrowers and profitable projects, potentially excluding the most vulnerable households and least efficient buildings that need renovation most urgently.

The implementation of energy obligation schemes, particularly White Certificate schemes such as France's *Certificats d'Économies d'Énergie* (CEE), represents a hybrid approach that leverages market mechanisms to achieve policy goals. These systems impose obligations on energy companies to achieve energy savings, creating a market for the trading of certificates. France has notably increased the share of these obligations that must be directed toward low-income households, aiming to channel market mechanisms toward addressing energy poverty. However, the effectiveness of these schemes is often limited by their complexity and energy companies' tendency to pursue the least-cost compliance options, which may not always align with comprehensive renovation needs. The implementation of energy -efficiency obligation schemes since 2021 became the leading tool for retrofitting in Hungary as well, mainly since the latest modifications of the system in 2025 that provided a bonus on residential retrofitting measures. The programme accelerates the implementation of the most cost-effective energy-efficiency measures (low-hanging fruit, like insulating the attics of family houses), but paralyses the renovation process once the obligations are fulfilled (in 2026, it was already in February). A similar programme was introduced in Italy but without much impact on residential buildings.

Private-sector capacity and innovation play a crucial role in implementation, with significant variation across countries. There is a widespread recognition of capacity constraints in the construction and energy advisory sectors, which struggle to meet sudden increases in demand stimulated by new subsidy programs. Countries like Austria explicitly note a lack of qualified professionals as a key barrier to scaling up renovations, but this refrain is likely heard everywhere. This capacity issue creates bottlenecks in implementation and can drive up costs, particularly for comprehensive deep renovations rather than single-measure interventions like heating system replacements. The private sector's preference for simpler, more profitable interventions further skews the renovation market toward partial rather than comprehensive solutions, despite the latter being more effective for long-term energy performance.

The role of energy companies themselves has evolved significantly with market liberalization. The phased elimination of regulated gas tariffs in France and the opening of electricity markets across Europe have transformed energy companies from passive infrastructure managers into

active market participants with complex incentives regarding energy efficiency. While obligation schemes theoretically align their interests with efficiency goals, their fundamental business model still relies on energy sales, creating inherent tensions in their role as drivers of reduced consumption.

Finally, the emergence of green financial products and energy service companies (ESCOs) represents a growing market-based approach to retrofitting. However, their development is uneven across countries, with more established markets in countries like Austria and France, and less development in Central and Eastern European countries like Hungary and Poland. These models face challenges in scaling beyond public and large commercial buildings to the residential sector, particularly for individual homeowners and smaller multi-family buildings, due to complexities in structuring financing and measuring energy savings.

## 2.4 The multilevel-governance process

The implementation of housing retrofitting policies reveals complex vertical and horizontal governance arrangements that significantly shape policy effectiveness and equity outcomes across European countries.

A central tension emerges between centralized policy setting and decentralized implementation. In formally federal states like Austria and Switzerland, constitutional divisions of power create inherent coordination challenges. Switzerland's cantonal system creates significant variation in implementation, though direct democracy mechanisms give citizens greater influence over energy and housing policies.

Even in more centralized states like France, the UK, and Hungary, effective implementation requires navigating complex multi-level governance landscapes. France presents a paradox of highly centralized policy design coupled with increasingly decentralized implementation. While national ministries define the regulatory framework and primary funding instruments like MaPrimeRénov', regions have gained responsibilities for energy efficiency strategies since 2015, departments lead on energy poverty, and intermunicipal authorities integrate climate goals into urban planning documents. This creates a complex institutional mosaic where national ambitions confront local implementation capacities and priorities. The UK exhibits a different pattern of centralization, with Westminster controlling most policy levers while devolved administrations in Scotland, Wales, and Northern Ireland pursue sometimes divergent approaches, and local authorities struggle with funding constraints and limited powers. Norway is also centralized (with Enova falling under the Ministry of Climate and Environment) but its implementation is fragmented, depending on the decisions of private individuals or housing cooperatives to carry out retrofits.

The role of municipalities emerges as crucially important yet often resource-constrained across all governance models. As the level closest to implementation, municipalities are responsible for building permit enforcement, local zoning, and often direct delivery of advisory services. However, as noted in the Austrian, Polish, and Hungarian reports, smaller municipalities frequently lack the technical capacity, financial resources, and administrative expertise to effectively implement complex retrofitting programs. This creates significant territorial inequalities in implementation quality and access to support services. Larger cities like Vienna,

Paris, Zurich or London often develop their own ambitious programs and additional funding streams, while rural and smaller urban areas struggle with basic implementation. On the other hand, case studies of ReHousIn revealed that even small cities may be frontrunners of residential building renovation as in smaller locations elected politicians are closer to their communities and political commitment matters more. Like in the case of Ajka (a city of 28,000 inhabitants in Hungary) where the mayor who leads the local authority since 2002 is strongly committed to the mission of residential building renovation and the municipality set up their own support system that operated when state funds were not available. As a result, nearly 90% of the multi-family building stock has already undergone different levels of energy efficient renovations. In a similar vein, Olot (40,000 residents in Spain) has begun to use targeted renovation schemes and EU-funded programmes to activate vacant stock and support energy-efficient retrofits in its historic centre, linking municipal regeneration tools with a growing, but still partial, focus on housing vulnerabilities in the historic core (Nucli Antic).

Horizontal coordination across policy sectors presents another persistent governance challenge. Energy retrofitting sits at the intersection of housing, energy, environmental, and social policies, requiring coordination across ministerial silos that proves difficult in practice. Austria's report notes how climate policy has historically been fragmented across different ministries, while France's DGALN represents an attempt to create joined-up governance across housing, planning, and nature policies. The integration of social and energy policies proves particularly challenging, with most countries struggling to align retrofitting programs with measures to prevent displacement, protect tenants, target subsidies to the most vulnerable or to social housing, and address energy poverty.

The European Union plays a crucial role as an agenda-setter and funder across all national contexts. EU directives like the EPBD and EED create common frameworks that member states must transpose, while EU funding through programs like the Recovery and Resilience Facility provides significant resources for retrofitting programs. However, the implementation of EU requirements varies significantly based on national institutional arrangements and political priorities. The Hungarian case shows how EU directives can be transposed with significant delay, while countries like Austria and France have developed more comprehensive approaches, albeit with their own implementation challenges.

Finally, the involvement of non-state actors creates complex governance networks that supplement formal state structures. Social housing providers in Austria and France, energy agencies in Switzerland, and private sector associations across all countries play important roles in implementation. Austria's limited-profit housing associations, regulated by national law but operating at the regional level, demonstrate how hybrid actors can implement comprehensive retrofitting programs while maintaining affordability. Similarly, France's ANAH operates as a national agency with decentralised regional offices, working through local partners to deliver renovation programs.

The multilevel governance of retrofitting reveals persistent tensions between policy ambition and implementation capacity, between centralized direction and local autonomy, and between sectoral specialization and integrated approaches. The most successful implementations appear to occur where clear national frameworks are combined with flexible local implementation, adequate capacity building for local authorities, and effective mechanisms for

cross-sectoral coordination. However, most countries continue to struggle with fragmentation, capacity constraints, and coordination challenges that limit the effectiveness and equity of their retrofitting policies.

For instance, the Orgues de Flandre project in Paris, benefited from substantial public co-financing through a complex multi-actor governance structure coordinated internally by the City of Paris urban planning department. Resident participation, though more substantial than in similar projects, has been mainly consultative, with co-design workshops informing—rather than deciding—key planning choices. Crucially, the long-term equity impacts of the green transition remain debated: while rent controls and social housing subsidies offer some protection for lower-income tenants, area-based anti-displacement tools are absent.

*Figure 3: table illustrating the repartition of roles in housing retrofitting policies across selected countries and governance levels. Governance levels are colour-coded as follows: national (red), regional (orange), sub-regional (yellow), intermunicipal (light blue), and municipal (dark blue). Roles are grouped into five categories, ranging from priority setting to monitoring and evaluation.*

| | **Roles** | | | | | |
|---|---|---|---|---|---|---|
| | Setting strategy, targets, priorities | Defining standards and obligations | Mobilising resources | Coordinating actors and levels of governance | Implementing and operationalising | Monitoring and evaluating |
| **Austria** | ● ● | ● ● | ● ● | ● ● | ● | ● ● |
| **France** | ● ● ● | ● | ● ● ● ● | ● ● ● ● ● | ● ● | ● ● |
| **Hungary** | ● | ● | ● ● | ● | ● ● | ● |
| **Italy** | ● ● | ● ● | ● ● | ● | ● | ● ● |
| **Norway** | ● | ● | ● | ● | ● | ● |
| **Poland** | ● ● ● | ● | ● ● | ● | ● ● | ● ● |
| **Spain** | ● ● | ● ● | ● ● | ● ● ● | ● ● | ● ● |
| **Switzerland** | ● ● ● | ● ● | ● ● ● | ● ● ● | ● ● | ● ● ● |
| **UK** | ● ● ● ● | ● ● | ● ● ● | ● ● ● | ● | ● ● ● ● |

LEGEND

- National level (corresponding to the federal state in Austria, the Confederation in Switzerland))
- Regional level (corresponding to the federal states in Austria, cantons for Switzerland, Devolved administrations in UK)
- Sub-regional level (corresponding to the departments in France, the provinces in Italy, the counties in Poland, GLA/combined authorities in UK)
- Intermunicipal level
- Municipal level (corresponding to local authorities in UK)

## 2.5 Achievements, assessment and challenges

A complex picture emerges regarding the outcomes and persistent obstacles in housing retrofitting policies across Europe, revealing significant gaps between climate ambitions and implementation realities, with profound implications for social equity.

A universal finding across all national contexts is the significant gap between policy targets and actual renovation rates. Despite ambitious goals set in national energy and climate plans, no country is on track to meet the renovation rates required for climate neutrality. Austria's experience is particularly illustrative: while the National Energy and Climate Plan targets a 3% annual renovation rate, the actual rate has stagnated at around 1.5%, with deep renovations representing only a fraction of this total. France similarly struggles to meet its targets, with deep renovations reaching only 66,000 in 2022 against a target of 370,000 annually. This implementation gap stems from multiple factors, including administrative complexity, capacity constraints in the construction sector, and the inherent challenges of incentivizing private homeowners.

In the St.Gallen case study, the implementation gap has resulted in a backlog of renovations, raising concerns among the city authorities about the degradation of housing stock. In the absence of housing market pressure that would make renovations profitable for landlords, the current level of subsidies does not appear to be lowering the barriers to energy refurbishments in St.Gallen sufficiently.

The quality and depth of renovations emerge as a critical concern. Across countries, there is a tendency toward "single-measure" renovations—particularly heating system replacements—rather than comprehensive deep retrofits that would achieve meaningful energy performance improvements. In France, only 6% of applications under MaPrimeRénov' were for comprehensive renovations, with nearly 70% focusing solely on heating systems. This pattern is repeated in Austria, Norway, and other countries, driven by the lower upfront costs and simpler decision-making processes associated with single measures.

In the Vienna case study, programmes such as WieNeu aim at promoting deep renovations through elaborated advisory services and subsidy programmes for retrofitting (such as Hauskunft, wohnfonds_wien). 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. However, the Vienna case of Innerfavoriten shows that some private building owners are hesitant to take up deep renovation and decarbonization retrofitting subsidies as these are bound to subsequent rent regulations and caps to avoid displacement of tenants.

State regulated but market-led energy efficiency measures are also resulting in the accomplishment of lower-hanging fruits in the renovation market, picking those renovation elements that pay off the most, while ignoring the issue of complex renovation. Partial renovations lock in suboptimal energy performance and may necessitate further interventions sooner, ultimately reducing cost-effectiveness and delaying progress toward climate goals. The case of study in Oslo further illustrates these dynamics in a cooperative housing context. Despite strong policy ambitions and relatively generous support schemes, energy retrofitting in housing cooperatives remains slow and uneven. Collective decision-making processes, high upfront costs, and uncertainty about long-term benefits often lead to prioritising incremental

measures over deep renovations. As a result, even in a high-capacity welfare state, retrofit policies risk reproducing inequalities between well-resourced cooperatives and those with more constrained financial and organisational capacities.

The social distribution of benefits from retrofitting policies exposes concerning patterns of inequality. In almost every country, financial incentives mainly benefit wealthier homeowners who already have the capital, creditworthiness, and property rights to carry out renovations. Italy's Superbonus programme gained notoriety for chiefly subsidising affluent homeowners and generating windfall profits for construction firms rather than tackling the most inefficient housing. Likewise, tax incentive schemes in various nations offer larger advantages to wealthier households with bigger tax liabilities to offset. This regressive distribution is further intensified by the phenomenon of "renovation inflation," where increased demand spurred by subsidies raises prices for construction materials and labour, potentially making renovations less affordable for those unable to access subsidies.

The private rental sector presents a particularly tough challenge for retrofit policies. The landlord-tenant dilemma, where landlords bear renovation costs and tenants receive benefits through lower energy bills, proves pervasive across all housing markets and might potentially discourage intervention, unless related costs can be passed on to tenants, like in Switzerland. Countries have attempted various approaches to address this split incentive, from France's (now weakened) ban on renting energy-inefficient properties to Austria's targeted schemes for multi-unit buildings and large-scale limited-profit housing associations. However, enforcement issues, political resistance from property owners, and the difficulty of coordinating renovations in buildings with multiple owners have limited effectiveness. Consequently, private rental sectors consistently show the slowest renovation progress and the highest levels of energy-inefficient housing among all nations.

Energy poverty remains persistently inadequately addressed despite rhetorical attention. While most countries have acknowledged energy poverty as a problem, especially after the 2022 energy crisis, responses have mainly centred on short-term measures like energy bill assistance rather than comprehensive solutions through substantial renovation of the housing stock occupied by vulnerable households. The implementation gap is particularly acute in the social housing sector, where providers face conflicts between renovation costs, rent affordability, and often insufficient public subsidies. As highlighted in the French and UK reports, social landlords are increasingly compelled to make difficult trade-offs between maintaining affordability and meeting environmental standard. In the case study of Vienna, municipal and limited-profit housing providers’ cost-coverage rules can translate efficiency gains into stable or lower net housing costs, but retrofits still face financing/regulatory hurdles and have fallen short of targets.

The implementation challenges are further worsened by governance fragmentation, especially in federal systems. Austria's report emphasises that the division of responsibilities between the federal and state levels hinders cohesive policy execution, and similar issues are evident in Switzerland. Even in more centralised states like France, the complex distribution of responsibilities across national, regional, departmental, and municipal levels creates coordination difficulties and implementation gaps. Capacity constraints at the local level,

particularly in smaller municipalities, further hinder effective implementation across all countries.

## 2.6 Conclusion

The comparative review of housing retrofitting policies across nine European countries shows a gap between stated climate goals and the social challenges of implementation. While many housing retrofitting policies followed broadly similar trajectories across many European countries, they risk producing unequal outcomes.

Housing retrofitting is framed as an essential pillar of decarbonisation, yet the heavy reliance on financial incentives, mainly subsidies, grants, and tax incentives, has tended to entrench inequalities rather than address them. Wealthier homeowners and higher-income regions are best placed to take advantage of these schemes, even more so users with higher capital and capabilities. Tenants, low-income households, and social housing providers often remain at a disadvantage. Despite decades of programmes and recent surges in funding linked to the European Green Deal and the Recovery and Resilience Facility, no country is on a trajectory to achieve renovation rates at the depth and scale required for climate neutrality.

The comparison also highlights how governance arrangements can compound these inequalities. In federal or decentralised systems such as Austria and Switzerland, fragmentation across government levels dilutes coherence, leaving smaller municipalities unable to match national ambitions. In more centralised systems like France and the United Kingdom, the challenges stem from instability and poor coordination between national programmes and local implementation. Hungary and Poland yet illustrate another dimension: weak institutional capacity and inconsistent absorption of EU funds limit progress and exacerbate regional disparities. Across all cases, governance weaknesses reduce policy effectiveness and undermine public trust.

Social outcomes are equally troubling. Retrofitting policies, when delivered through market-driven instruments, frequently generate unintended consequences such as rent increases, renovictions, and speculative real estate dynamics. Flagship urban projects in Spain , for example, have intensified gentrification pressures, in a context of compounding pressures on housing, including those driven by high tourist demand and digital nomadism. In the United Kingdom, area-based retrofit schemes have widened spatial inequalities. These dynamics underscore how technical energy upgrades can become vehicles for housing commodification, shifting benefits to property owners while displacing vulnerable tenants. In Switzerland, however, gentrification is driven less by flagship projects and more broadly by renovations in a tight housing market.

While some targeted programmes exist—such as Austria's *"Sauber Heizen für Alle" and "Wohnschirm Energie"* or, before being suppressed, France's "*Habiter Mieux Sérénité"* —they remain marginal, underfunded, and unable to offset the regressive distribution of mainstream subsidies. In some contexts, social and political resistance to green transition policies appears, particularly under conditions of economic instability and inflation.

At the same time, national trajectories reveal the imprint of the national governance system. Early movers such as Austria and Switzerland embedded retrofitting into energy policy decades ago but have struggled to overcome fragmentation. Central-period activists like France and Italy expanded fiscal incentives dramatically, but their generosity disproportionately rewarded wealthier households and fuelled market distortions. EU dependents , including Poland, Hungary, and Spain, mobilised primarily under EU pressure, often producing uneven outcomes shaped by administrative capacity and political will. Norway and the UK pursued distinct paths—one centred on voluntary innovation, the other on unstable market-first experiments—but both fell short of embedding equity into their strategies.

In conclusion, while all countries have established ambitious retrofitting policies and developed complex implementation architectures, the outcomes reveal significant shortcomings in both climate effectiveness and social equity. The achievements to date have primarily benefited wealthier owner-occupied households and rental housing owners and generated limited progress toward deep decarbonization of the housing stock. The challenges are systemic, rooted in market structures, governance arrangements, and policy designs that fail to adequately address the structural barriers to comprehensive, equitable retrofitting. Without significant policy redesign that strengthens regulatory measures, simplifies administration, targets resources more effectively to vulnerable households and the worst-performing buildings, and addresses the specific challenges of the rental sector, retrofitting policies risk exacerbating rather than mitigating housing and energy inequalities while failing to meet climate objectives.

# 3 Densification

Densification is defined as an urban (re)development process leading to higher use density (i.e. increase in the number of inhabitants per m2) or to a higher building density (i.e. increase in the number of buildings, apartments, office spaces, etc per m2) in order to limit urban sprawl and land consumption or to promote environmentally sustainable urban growth by reducing individuals' resources consumption. A distinction may be made between soft- and hard densification. Soft densification refers to building and construction measures that do not adapt, change, or add to the built urban form by keeping former built urban structures largely the same, while hard densification refers to building and construction measures that adapt, change, and add to the built urban form. This includes for example, construction on green- and brownfields, total replacement, new development at higher densities, adding floors to existing buildings. Densification policies (at the national, sectoral, regional, and municipal levels) include the full range of public and private law legislations aiming to achieve increased densification. Other policies, such as for example environmental policies (e.g., biodiversity protection laws) may affect densification performance directly or indirectly.

Across the nine countries, densification is not always the primary conceptual frame guiding policy and planning. Different terms and policy traditions shape how similar objectives are articulated. For example, urban regeneration (rigenerazione urbana) are commonly used in Italy, soil artificialisation reduction frames the debate in France, brownfield conversion is prominent in Austria, Hungary, and Poland, and urban renewal is widely used in the UK. In contrast, densification itself functions as the principal planning framework in Norway and Switzerland, where it is closely linked to national strategies promoting the inward development and limiting urban sprawl and soil consumption. This terminological fragmentation reflects the different policy traditions and institutional entry points through which densification concerns have been addressed.

Densification emerged across three waves:

- early measures to contain urban sprawl (UK Green Belt Circular in the 1950s; Spain 1956; Switzerland in the 1960s),
- post-Brundtland consolidation of sustainability-oriented planning approaches (Norway in the late 1980s)
- ·post-2000 expansion of densification policies linked to land-use efficiency and environmental protection (France 2000; Austria 2002).

In several countries, particularly Hungary, Poland and Italy, **explicit densification policies do not exist at the national level**, although European Union directives—such as the "no net land take" initiative (NNLT)—and EU cohesion and spatial policies exert indirect influence at national level or more concrete influence at regional and municipal levels.

## 3.1 The policy cycle

As a policy strategy, densification emerged at different times across European countries and is not always explicitly framed using this concept. In some countries, including Italy, Hungary and Poland, the term remains rarely used or absent from official policy discourse.

**The UK was the first country to introduce legislation aimed at containing urban sprawl** through the Green Belt Circular in the 1950s. Spain followed with the 1956 Land Act, which distinguished between buildable and non-buildable land, and Switzerland introduced similar spatial planning measures in the 1960s. **These early initiatives were primarily motivated by the objective of protecting agricultural land and limiting uncontrolled urban expansion**.

In Norway, the concept of urban densification gained prominence in the late 1980s following the publication of the Brundtland Report and the growing influence of sustainable development in planning policy. France and Austria introduced their first policy instruments explicitly promoting densification in 2000 and 2002 respectively.

In Hungary, Poland and Italy, no explicit national densification policies exist. **Early efforts to curb urban sprawl were often only partially effective.** Over time, however, policies aimed at reducing soil sealing and land consumption have become increasingly restrictive across many countries, in part due to EU policy recommendations. Implementation remains uneven: while densification requirements are legally binding in countries such as the UK, Switzerland and France, enforcement remains weak or inconsistent in others, including Poland and Hungary. In Austria, attempts to introduce binding limits on soil sealing have so far failed despite clearly defined policy targets.

In Italy, the concept of densification is largely absent from policy discourse and there is no dedicated national or regional legislative framework. Nevertheless, densification occurs in practice under the label of **urban regeneration**, particularly through brownfield redevelopment and large-scale urban renewal projects. Such projects, however, do not necessarily result in higher urban density.

The **policy rationale for densification has also evolved over time**. Early policies focused primarily on protecting agricultural land and limiting urban sprawl. More recently, densification has increasingly been promoted as a means to protect biodiversity, reduce land consumption and support climate mitigation. In several countries—including the UK, France, Spain and Norway—densification forms part of broader strategies aimed at promoting low-carbon lifestyles, sustainable mobility and the development of 15-minute neighbourhoods. More broadly, densification policies are increasingly aligned with environmental and energy policy frameworks.

European policy initiatives influencing national debates on densification include:

- the **1972 European Soil Charter** (influencing initiatives such as the Austrian *Bodencharta* of 2014),
- the **Lisbon Strategy and Europe 2020 Strategy**,

- the **2011 EU objective of "no net land take" ;** the **Leipzig Charter on Sustainable European Cities (2007)**
- the **EU Urban Agenda (2016)**,
- the **EU Territorial Agenda (2023)**, which further strengthens the focus on urban density and sustainability.

**Densification Policies: Country trajectories**

Austria's densification policy trajectory spans three decades. The Austrian Strategy for Sustainable Development (NSTRAT, 2002) was a formative milestone, setting a target to reduce land sealing growth to one-tenth of its 2002 rate by 2010. Despite the strategy's ambitions — and the subsequent ÖSTRAT 2010 and the Austrian Spatial Development Concept ÖREK 2030 (2021) — a national Land Protection Strategy has repeatedly failed to be adopted due to resistance from the federal states. The resulting patchwork of non-binding frameworks and failed legislative attempts characterises Austria's densification policy as aspirationally strong but institutionally weak.

France presents the most legislatively ambitious trajectory among the nine countries. A sequence of laws has incrementally strengthened densification requirements: from the Loi SRU (2000), which first opened the door to densification policy without mandating it, through the Grenelle I and II laws (2009–2010) which defined densification as an environmental objective, to the Loi ALUR (2014) which reformed planning tools to facilitate densification, and finally the Loi Climat et Résilience (2021) with its binding ZAN target. The ZAN law has, however, generated intense political controversy between central government and local authorities over implementation burdens.

Hungary's densification agenda has been shaped by a contradiction between formal strategic commitments and weak institutional delivery. The National Development and Territorial Development Concept (2014) for the first time explicitly set an objective of creating a compact urban structure and highlighted densification of inner-city areas and brownfield reuse. However, since 2012, the legal environment governing municipal planning has become increasingly chaotic, with centralisation of planning decisions through 'state priority investments' effectively removing large numbers of developments from municipal planning oversight. The result is that densification processes are driven almost entirely by private developers, not public policy.

Italy lacks a designated national legislation or strategic framework on urban densification as such. The term itself rarely appears in Italian planning documents. Instead, densification is pursued implicitly through the broader concept of 'rigenerazione urbana' (urban regeneration), which has evolved substantially since the original 1942 planning law (Legge Urbanistica). The PINQuA programme (linked to the NRRP) explicitly identifying densification as an objective for the first time in a national funding instrument.

Norway is distinctive in having pioneered compact city concepts well before EU directives, drawing on the Brundtland Report (1987) and the NAMIT project (1988–1992), which introduced densification as a counterweight to urban sprawl. The Planning and Building Act explicitly endorses densification as the most sustainable urban development strategy, and national climate plans since the 1990s have embedded densification principles — protection of green and agricultural areas, brownfield redevelopment, transit-oriented development — as consistent planning norms. Norway is also notable for framing densification explicitly in relation to housing supply and the 'zero-traffic growth goal'.

Poland's densification policy cycle reflects the country's post-accession adaptation to EU frameworks. The Act on Spatial Planning and Development (2003) established the basic legal framework, supplemented by the National Urban Policy 2023 (2015, updated as NUP2030 in 2022) and the National Spatial Development Concept 2030 (2011). A significant milestone came with the 2023 reform of the spatial planning system, which introduced new tools specifically designed to limit suburbanisation and support urban compaction, including the 'Supplementary Development Area' and 'Downtown Development Area' concepts. However, Poland has not made quantified land take commitments.

Spain's densification trajectory reflects a long evolution from the post-Franco urbanisation era. The Land Law of 1956 (Ley del Suelo) established the basic zoning framework; the 1992 revision prioritised urban renewal over peripheral expansion; the Urban Planning Law of 2000 formally codified compact city principles. Post-2010 milestones include the National Housing and Land Use Plan (2011) and the Strategic Urban Agenda 2030 (2021). Barcelona's Superblock programme has become a globally referenced initiative. Spain's 17 autonomous communities introduce significant regional variation in implementation.

Switzerland's densification policy is anchored in the 1979 first Spatial Planning Act and its 2014 revision (SPA I), which introduced densification as a legally binding objective following a national vote. The revision was triggered by the 2008 Landscape Initiative, which highlighted continued urban sprawl despite decades of spatial planning. The Swiss Spatial Concept (2012) and Biodiversity Strategy (2012) complemented SPA I, and the Second Home Law (2012) added a specific density instrument for tourist areas. The 2023 second SPA revision extends controls to construction outside designated zones.

The United Kingdom's densification history is most distinctively shaped by the 1955 Green Belt policy, which established inner-city development as the preferred alternative to outward sprawl. The 2004 London Plan introduced 'Opportunity Areas' as large-scale densification zones, and subsequent mayoral London Plans have been a laboratory for densification governance. The 2023 Long-Term Plan for Housing under Michael Gove explicitly committed to 'a new era of regeneration and inner-city densification'. Unlike other countries, UK densification policy has been systematically linked to housing tenure transformation, with densification used as a mechanism to introduce private and intermediate tenures into areas previously dominated by social housing.

## 3.2 Implementation process

Measures to promote densification have been introduced primarily through policy instruments at the regional or local/municipal level. They include the removal of regulatory barriers that used to impede higher density buildings, financial instruments to promote brownfield conversion, for example for land de-contamination (e.g. UK, France, Austria, Spain), minimum density requirements (France, Austria), policy changes to allow the conversion of industrial sites and retail spaces into homes in city centres (UK), and taxes on new constructions that fail to meet minimum density (France).

France introduced monitoring tools to identify vacant properties and sectors, brownfields, and areas with densities below urban planning threshold. The reuse of vacant buildings, industrial sites and brownfields near public transport gained momentum after 2010 and became priority in 2021 in response to EU policies and is supported by a range of financial instruments. Urban development was contingent upon connection to public transport.

EU funding schemes for brownfield conversion along with federal subsidies to reduce land consumption are also mentioned in the case of Austria and Spain. In Italy planning agreements are negotiated between public authorities and private developers and funded through PPP. However, an overall planning framework is still missing, and densification happens on a plot-by-plot basis.

In Hungary and Poland, minimum density regulations are still absent and urban development remains chaotic. In the UK, densification occurred in a context of weakened local governments and empowerment of private actors. The role of local governments was reduced to enablers of private developer-led densification. In case of hard densification this entailed strong impacts on housing inequality and huge increases in land value in prime locations, near transport hubs. Speculative activities were triggered by poor regulations. In the UK there has been an increasing role of joint ventures between large non-profit housing providers and private developers taking the place of public-private partnerships (with a variable proportion of open market tenure and of affordable housing, as for example is the case at Holloway Park and Dagenham Green in London). Only recently, there have been signs of some municipalities regaining a role in the direct provision of social housing. In Poland densification projects are the result of legislative, financial and operational measures aiming at promoting sustainable development but is still not a clearly defined goal of spatial policy.

To conclude it may be said that the implementation of densification measures is enabled, regulated, promoted, and supported through various EU policies, national and local instruments, and mostly implemented through the private sector or through public private partnerships. In some countries (Spain, Switzerland, France and UK) and cities (Vienna and Linz, Austria) densification incentives are linked with quotas of affordable and/or non-profit housing and/or specifically targeted to non-profit housing providers. The degree of effectiveness in terms of creating or maintaining a tangible share of affordable housing depends, among others, on the definition of “affordability”.

**Regulatory and Planning Tools**

Spatial planning instruments form the core implementation mechanism across all nine countries, although the level of government exercising planning authority varies. In Austria, zoning plans (Flächenwidmungsplan) and development plans (Bebauungsplan) serve as the primary regulatory instruments at the municipal level, supported by Housing Subsidy Acts that can connect density requirements to funding. Vienna's introduction of a 'Subsidised Housing' zoning category in 2018 — requiring two-thirds of residential floor space in rezoned areas to be realised as subsidised housing, with land prices capped — stands out as one of the most integrated tools for combining densification with affordability objectives.

France's regulatory framework operates through the Schéma de Cohérence Territoriale (SCoT) at the intermunicipal level and the Plan Local d'Urbanisme (PLU) at the municipal level, both revised by the Grenelle II and ALUR laws to include density requirements, land consumption targets, and the identification of areas with densification potential. The Loi Climat et Résilience (2021) has imposed binding land artificialisation targets onto this system. However, the willingness of intermunicipal entities (EPCIs) to apply densification tools varies, and the PLU system offers less regulatory leverage than intermunicipal documents.

Hungary's planning framework, which is theoretically organised through national, county, and municipal land-use plans within a strict hierarchy, has been systematically weakened since 2012 by the proliferation of 'state priority investments' — government decrees that override municipal plans without requiring professional planning or public consultation. This mechanism has removed over 3,000 projects from normal planning regulation between 2010 and 2021. The government's use of emergency powers (declared in 2020 and 2022) to govern spatial planning by decree has further destabilised the system. As a result, formal regulatory tools for densification have limited practical impact.

Italy's regulatory tools for densification predominantly operate at municipal level through the Piano di Governo del Territorio (PGT), which can authorise land use changes, volumetric increases (density bonuses for social or environmental benefit), and simplify administrative procedures. However, regulatory provisions differ widely across regions and municipalities, and there is no national legislative framework for urban regeneration or densification. Lombardy's regional law LR 18/2019 and Emilia-Romagna's LR 24/2017 (which explicitly names densification as an intervention tool) represent more advanced regional frameworks.

In Norway, the national Planning and Building Act provides the overarching regulatory framework for planning, placing strong emphasis on municipal master plans and zoning regulations as the main instruments of implementation. A reform of the Act in 1985 allowed private actors to initiate detailed zoning plans, substantially increasing the role of private developers in shaping urban development and densification processes. Norwegian municipalities retain considerable autonomy in land-use decisions; however, in practice private developers often act as the main initiators of zoning plans and the primary providers of housing. While municipalities can regulate aspects such as the number, type and size of dwellings, they generally have limited capacity to impose affordability requirements.

Poland's 2023 reform of the spatial planning system has introduced important new regulatory tools: the General Plan of the Commune (replacing the previous fragmented approach), and the new concepts of 'Supplementary Development Area' (enabling intensification of partially built-up areas) and 'Downtown Development Area' (allowing higher densities with reduced green space requirements). These tools represent the most significant regulatory innovation in Polish densification policy in two decades. The earlier 'lex developer' Special Housing Act (2018) facilitated housing development outside designated zones but is now being replaced by Urban Development Agreements as part of the reform.

Spain's regulatory framework has evolved through successive revisions of the Land Law, culminating in the Urban Planning Law (2000) which established compact city principles as the governing norm. Localized densification plans, transit-oriented development zones, incentivised zoning reforms near transport hubs, and land readjustment schemes (particularly in Barcelona) are the primary regulatory tools. The multiple layers of regulatory authority across 17 autonomous communities create significant variations in how national densification objectives are applied at regional and municipal level.

Switzerland's regulatory implementation is anchored in the Spatial Planning Act (SPA I, 2014), which requires cantonal structure plans to align with federal densification objectives. Municipalities are required to develop utilisation plans (Nutzungspläne) that target brownfields, greenfields and gaps between structures in accessible locations. As of 2022, all 26 cantonal structure plans have been approved by the Federal Council.

## 3.3 Size and role of the market

In all countries, urban densification projects are primarily carried out by private investors, who benefit from a wide range of government incentives, such as tax breaks, density bonuses, and fast-track permits. In some cases, access to such benefits is linked to requirements of including a certain share of affordable housing (Austria, Switzerland, Spain, France and UK). In Austria, the influence of private market actors increased following policy changes concerning the building standards and the tenancy law. For example, densification projects such as attic

conversions are excluded from rent control, thereby increasing the influence of private-market actors.

The France report mentions the existence of different sub-markets, all regulated by national frameworks: BIMBY densification is promoted through public funding in peri-urban areas, while large-scale developers are more common in urban centres, e.g. in the framework of TODs.

Public-Private Partnerships (PPPs) are increasingly common in several countries (Spain, France, Switzerland, Poland and UK). Norway allows private entities to initiate area-based zoning plans. Their approval is contingent on infrastructure investments. In several countries, the financialization of housing increasingly involves international investors and is associated with declines in homeownership rates (Switzerland , Spain and UK). While not specifically mentioned, similar trends are likely to be found in other countries as well. In some cities in Switzerland and Austria, densification projects also involve the public sector as providers of social housing and non-profit organisations/providers of non-commodifiable housing, such as housing cooperatives.

## 3.4 The multilevel governance process

Regarding densification, the role of national governments varies across countries, with a major role in enforcing densification in France, Spain, Switzerland, and the UK. In Switzerland, national laws require densification, as the revision of the Spatial Planning Act took effect in 2014. Its implementation is coordinated at the national level, but more than 50% of communes have not yet completed the adaptation of their building zones. In France, densification is promoted at the national level and implemented through territorial governance instruments at the inter-municipal and municipal levels. Minimum density requirements are set at the intermunicipal level, but implementation remains optional. In Spain, national, regional, and local levels coordinate to ensure that national policies are effectively implemented. At the regional level, however, local authorities are granted significant autonomy to adapt national policies to local contexts, including housing needs. For example, in Barcelona's La Marina del Prat Vermell, large-scale brownfield densification is being coordinated through a dedicated municipal office and Pla Singular framework, combining mixed-tenure housing with new green and blue infrastructure on former industrial land.

UK densification is pursued primarily at the national level but entails tensions between central and local governments, each with different priorities. In London, after the 2008 GFC, densification is closely linked to the recommodification of the housing system. Also in Austria, densification goals are constrained by different interests at the local municipal level, leading to a lack of collaboration between federal and provincial governments in quantifying maximum land take.

In Italy, where the concept of urban regeneration rather than densification is used, objectives and intervention methods are defined at the regional and local level. In fact, there is no single national procedure regulating the redevelopment of vacant or underused land. Urban planning tools that directly or indirectly affect densification are defined by territorial governance legislation and vary across regions and municipalities. The city of Reggio Emilia, for instance, has incorporated ambitious provisions in its recent general town plan, emphasising

densification and the transformation of the existing urban fabric, while permitting new land development only under strictly limited and clearly defined circumstances.

Likewise, in Norway, municipalities have significant autonomy over land use and play a central role in implementing densification through Municipal Masterplans. Zoning plans are usually submitted by private developers and are approved by the city councils. In fact, even though Norway's national Planning and Building Act refers to densification as the most sustainable urban development strategy, it is not legally mandatory. However, the National Climate Plan promotes the redevelopment of brownfields, developments around transport hubs, and the protection of green areas. This is especially evident in Oslo, where densification follows a 'from the inner to the outer city' approach, prioritizing the redevelopment of brownfield sites, while a law safeguarding the surrounding forest establishes a clear urban growth boundary.

In Hungary, in theory, urban planning is the task of municipalities, but they have been increasingly disempowered by the national government through the approval of "national priority investments". The comparative assessment of case studies in Hungary revealed that primarily the major cities are exposed to the distortion of governmental priority investments as their housing market is tight. In Budapest the vast majority of brownfield investments are under this "priority" title, which disables the local municipalities to negotiate with the developer. In smaller cities like in Veszprém or Ajka the local municipalities are in a much better bargaining position. In Poland, national goals of compact development are not necessarily supported at the local level, where urban sprawl continues. However, investment processes, carried out mainly by developers, are particularly visible in the central parts of Warsaw (including Stara Praga and Powiśle), contributing to the increase in building density in these areas.

## 3.5 Achievements, assessment and challenges

### *Achievements*

Urban densification has contributed to a reduction of urban sprawl and the preservation of green spaces. This is specifically mentioned in the case of Spain, and Switzerland. In Switzerland, building zones remained stable, and soil consumption per capita decreased from 309 to 282 m2 between 2017 and 2022. In Spain, the compact city model has helped to curb urban sprawl and to preserve green spaces, and TODs have reduced car dependency. Furthermore, it has revitalised local economies by attracting businesses and tourism.

Renewal of degraded urban areas and the conversion of brownfields and abandoned industrial areas had a positive impact for the creation of urban amenities and the improvement of transport accessibility in several countries (Italy, Poland, Switzerland, UK, France, Austria, Norway and Spain). In Poland, the 2023 Spatial Planning Reform triggered a revitalisation of degraded parts of cities through urban renewal and the conversion of brownfields into multifunctional areas and green spaces. Over 3400 apartments for middle- and lower-income households were built in 18 cities. In the case of Austria, it is noted that, in urban centres, rising land prices triggered by policies promoting densification help reduce land consumption, even though such policies are not yet sufficiently effective, particularly in rural areas.

### *Challenges*

*Implementation challenges*

In several countries (Austria, Hungary, Poland, Italy, Switzerland), densification goals in terms of reduced soil consumption are not (sufficiently) being achieved due to the lack of political will, ineffective and contradictory policies, no specific densification agenda, or opposition at the local level (NIMBY). In most countries, the implementation of densification goals depends on political support at local level. Typically, **small and rural communes have fiscal dependence on new construction and/or on attracting wealthy residents seeking detached single-family houses,** which undermines sustainable land-use goals. In other words, housing density can be strategically used as a means to attract higher income taxpayers (Austria, France, Switzerland). In Switzerland, this is causing active and passive resistance to re-zoning, with the result that ten years after the introduction of legally mandatory densification policies less than 50 of the communes have revised their zoning plans.

*Governance challenges*

The implementation of densification policies is closely linked to the **complex multi-level governance structures** that characterize spatial planning and housing policies in European countries. In most cases, responsibilities are distributed across national, regional, and local authorities, creating coordination challenges and sometimes conflicting policy objectives.

A key governance issue concerns the **division of responsibilities between national and local levels of government**. In France, national legislation and planning frameworks promote densification as part of broader environmental strategies aimed at reducing land consumption. However, urban planning competences were largely decentralized in the 1980s, meaning that local authorities are responsible for implementing these policies through zoning plans and development regulations. As a result, the implementation of densification measures often depends on the political priorities and planning strategies of individual municipalities, leading to significant territorial disparities.

**In federal systems, governance challenges can be even more pronounced**. In Austria, spatial planning responsibilities are largely held by the federal states and municipalities, which can resist national policy initiatives aimed at reducing land consumption. Disagreements between levels of government have, for instance, prevented the adoption of stronger land protection measures intended to limit urban sprawl. Municipalities also face conflicting incentives, as new development can increase local tax revenues, potentially encouraging greenfield expansion rather than inner-city densification.

Another important governance challenge relates to the **growing role of private actors in urban development processes**. In many countries, densification projects are initiated or financed by private developers, who often propose zoning changes or redevelopment projects to municipalities. This dynamic is particularly evident in Norway, where private developers play a central role in proposing and financing housing developments, while municipalities negotiate planning approvals and infrastructure provision.

*Tensions between densification and housing affordability*

Across the countries analysed, an important policy tension concerns the **relationship between densification strategies promoted through spatial planning policies and housing policy frameworks addressing affordability and access to housing**. While densification is widely framed as a key instrument to support sustainable urban development and limit urban sprawl, the regulatory frameworks through which densification is implemented often rely heavily on market-led development processes and densification strategies frequently operate within contexts characterised by increasing **financialisation of land and housing markets**.

In many contexts, densification is pursued through planning instruments that **enable or encourage private redevelopment and higher densities**, but with limited policy mechanisms to ensure that housing provision within these developments contributes to affordable housing. In all nine countries, albeit to varying degrees - , densification processes are influenced by the interests of private developers as well as by the growing presence of corporate and speculative investors targeting higher-income market segments. This reflects planning frameworks that in most of the analyzed countries facilitate densification primarily through private development rather than through public or non-profit housing provision. Similarly, policy instruments that would require developers to contribute to affordable housing provision—such as binding quotas or inclusionary zoning—are unevenly developed across countries. In the second phase of the Nordbahnhof development (Vienna, Austria), for instance, a housing mix quota was initially determined through negotiated agreements between the City of Vienna and key stakeholders, comprising 30% subsidised, 30% price-capped affordable, and 30% market-rate housing. Limited-profit housing developers are the main providers of the subsidized and price-capped segments. Subsequently, in 2019, a dedicated zoning category for ‘subsidised housing’ was introduced in Vienna, coupled with rezoning in big urban developments at the city level, highlighting a shift from project-specific negotiations to more standardised regulatory instruments.

In some national contexts, this tension is also reflected in the **specific policy configurations through which densification is implemented**. In Hungary, for example, densification is not strongly embedded in comprehensive policy frameworks but occurs largely through developer-led projects. In Norway, densification involving private developers is frequently oriented towards market segments with higher purchasing power. In the United Kingdom, densification strategies have been linked to redevelopment approaches that reshape existing housing provision, including social housing, within broader land and housing market dynamics. Similarly, in Poland, densification processes are strongly shaped by market-driven development frameworks.

Finally, densification policies may also generate tensions with other planning objectives when **densification discourses are used to justify particular forms of development without corresponding housing policy safeguards**. In Norway, for example, debates around high-density housing projects point to policy concerns related to the reduction of green spaces and the construction of increasingly small apartments, in a context where specific measures to promote affordable housing are limited. Issues related to housing affordability within densification areas have emerged most prominently in the capital, Oslo, but are also evident

in medium- and small-sized municipalities such as Stavanger and Sogndal. In Stavanger, the proliferation of small apartments along the main transport corridor has made it increasingly difficult for families to access the housing market within the city. Furthermore, in the specific case of Svankevigå, an approved densification plan led to the displacement of cultural activities while promoting the development of high-end housing. More broadly, discussions around densification in several countries also point to redevelopment processes associated with demolition, eviction or gentrification—particularly in connection with transit-oriented development. For example, one of the case studies in Zurich (Altstetten) involved a first phase of densification comprising mostly brownfield development. More recently, however, densification has predominantly taken the form of demolitions and replacement constructions. Often, affordable housing is being replaced with considerably more expensive housing.

Taken together, the comparative analysis suggests that densification policies across many countries are **embedded in planning frameworks that prioritise compact urban development but remain only partially integrated with housing policy instruments**, thereby creating persistent tensions between spatial planning objectives and housing affordability.

## 3.6 Conclusion

This comparative analysis shows that urban densification has become an increasingly important strategy in European spatial planning, but its conceptualisation, policy design and implementation vary significantly across countries. While densification is widely promoted as a key instrument to limit urban sprawl, protect land resources and support sustainable urban development, it is not always explicitly framed using this concept. Instead, similar objectives are often pursued under different policy frameworks, such as urban regeneration, urban renewal, or brownfield redevelopment. These differences reflect distinct national planning traditions and institutional pathways through which concerns about land consumption and urban growth have been addressed.

European policy frameworks have played an important role in shaping national policy debates. Initiatives such as the Leipzig Charter on Sustainable European Cities, the EU Urban Agenda and the EU objective of achieving “no net land take” by 2050 have strengthened the emphasis on land-use efficiency and compact urban development across Europe. Even in countries where explicit national densification policies are limited—such as Hungary, Poland and Italy—European initiatives have influenced spatial planning debates and encouraged policy experimentation at regional and municipal levels.

The implementation of densification policies is characterised by complex multi-level governance structures. Although national governments often establish strategic objectives or regulatory frameworks, practical implementation typically occurs at regional and municipal levels through spatial planning instruments, zoning regulations and development agreements. This governance structure creates significant coordination challenges. Local authorities frequently possess substantial autonomy over land-use decisions, but they also face competing incentives, including fiscal dependence on new development and pressures to attract higher-income residents. As a result, the achievement of densification goals often

depends on political priorities and planning capacities at the local level, leading to considerable territorial variation in outcomes.

Another key finding concerns the prominent role of private actors in densification processes. In most countries analysed, densification projects are primarily initiated and implemented by private developers, frequently through public–private partnerships or market-led redevelopment processes. Governments support these initiatives through a range of incentives, including density bonuses, tax advantages, and subsidies for brownfield remediation. While such mechanisms have facilitated the redevelopment of vacant land and former industrial sites, they have also strengthened the influence of market actors in shaping urban development patterns.

This market-led character of densification contributes to a broader policy tension between spatial planning objectives and housing policy goals. While densification is widely promoted as a strategy to support sustainable urban development, its implementation often occurs within housing markets, which are increasingly shaped by financialisation and speculative investment. In many contexts, policy instruments ensuring that densification contributes to affordable housing provision remain weak or unevenly applied. Consequently, densification processes may be associated with rising land values, housing price increases, displacement pressures and redevelopment strategies targeting higher-income market segments. Although some countries attempt to link densification incentives with affordable housing requirements—such as inclusionary housing policies in France or non-profit housing quotas in Vienna (Austria) and Switzerland—these mechanisms remain unevenly developed across Europe.

Despite these challenges, densification policies have generated several positive outcomes. In Switzerland, for example, soil consumption per capita has decreased in recent years while the total size of building zones has remained stable. In Spain, the compact city model has contributed to limiting urban sprawl while supporting transit-oriented development and reducing car dependency. In several countries—including France, Norway, the United Kingdom and Poland—the redevelopment of brownfields and abandoned industrial areas has also contributed to the revitalisation of degraded urban neighbourhoods. At the same time, the analysis highlights important limitations. Implementation gaps remain significant in several countries due to insufficient political support, weak regulatory enforcement, fragmented governance arrangements and local resistance to higher-density development. Moreover, the limited integration between densification strategies and housing policy frameworks continues to create tensions between environmental objectives and social outcomes.

Overall, the findings suggest that while densification has become a central component of contemporary European urban policy, its effectiveness depends on stronger coordination between spatial planning, housing policy and multi-level governance systems. Future policy development will likely require more coherent regulatory frameworks, improved implementation mechanisms and greater public-sector involvement in housing provision to ensure that densification strategies contribute not only to environmental sustainability but also to socially inclusive urban development.

**Austria** Austria's Klimafitte Ortskerne – Flächenrecycling programme (€8 million, RRF-funded, 2022–2025) provides grants for brownfield conversion feasibility and planning. Vienna's Bauträgerwettbewerbe link housing subsidies to design quality and affordable rent requirements, while the EAFRD-funded Orts- und Stadtkernförderung supports the revitalisation of vacant rural and small-town buildings. Market dynamics show an increasing role of private developers in large brownfield projects. Since 2001, attic conversions and new constructions have been excluded from Tenancy Law regulation, meaning that newly created units are exempt from rent controls, limiting affordable densification in existing urban areas.

**France** operates several fiscal instruments: the Taxe sur les Logements Vacants (since 1999), the Versement pour sous-densité (2013–2021), the Taxe d'aménagement, the €750 million brownfield allocation under the Plan de Relance(2021–2022), and the 2024 Fonds vert (€2 billion) supporting ecological transition projects compatible with densification. Public land development companies (EPA, SEM, SPL) and land acquisition tools remain in place, but large private developers increasingly act as "ensembliers." BIMBY initiatives have become commercialised, and the Grand Paris Express has stimulated large-scale private development in the Paris periphery, with documented displacement effects.

**Hungary** Financial instruments for densification are limited. Public and municipal housing construction is negligible. VAT reductions for designated "brownfield areas" have had little effect, partly because designation authority remains centralised. EU Cohesion Funds have supported renewal projects such as Budapest's District VIII (Corvin Promenade), but centralised oversight has constrained public-benefit outcomes. Densification is dominated by private developers due to fragmented municipal land ownership and the removal of major projects from municipal planning oversight through "state priority investments," resulting in private-led projects concentrated in attractive locations and oriented toward upper-middle-class buyers.

**Italy** The main financial instrument is the PINQuA programme (€2.8 billion, NRRP), targeting urban quality and housing regeneration in municipalities over 60,000 residents. Earlier programmes—Contratti di Quartiere I (€300 million) and II (€800 million)—funded neighbourhood regeneration with mixed densification results. Large-scale brownfield developments rely primarily on private investment and land-sale proceeds. The market is characterised by a division between publicly funded regeneration of deteriorated public housing areas and developer-led projects aimed at affluent populations. Local authorities increasingly enable private investment through planning frameworks, and affordable housing requirements are often converted into cash payments.

Poland has combined regulatory reform and EU-supported investment in its approach to densification and urban regeneration. The 2023 Spatial Planning Reform aims to strengthen spatial coordination and stimulate the revitalisation of degraded urban areas, including the conversion of brownfields into multifunctional districts and green spaces. EU Cohesion Policy funds have supported renewal and housing projects in multiple cities, contributing to the construction of over 3,400 apartments for middle- and lower-income households in 18 cities. At the same time, market-driven residential development has expanded in major urban areas, with private developers playing a leading role in new high-density construction. This has been associated with growing disparities in access to affordable housing, particularly in dynamic metropolitan markets.

Norway There is no dedicated national densification subsidy programme. Municipalities may require developers to finance public infrastructure as a condition of planning approval. The absence of strong affordable housing financing mechanisms is identified as a structural gap. Although the public sector retains regulatory authority under the Planning and Building Act, declining public land ownership has shifted development power to private actors. There are no inclusionary zoning requirements mandating affordable units, and densification has been linked to the proliferation of micro-apartments sold at high prices per square metre.

Spain Densification is characterised by strong private sector involvement shaped by cyclical property booms and busts. Private developers have led high-density construction in Madrid, Barcelona, Valencia and Bilbao. Public–private partnerships are enabled by the 2017 Ley de Contratos del Sector Público. Land readjustment schemes, particularly in Barcelona, allow private landowners to consolidate plots for denser development, concentrating value gains among private actors. Green bonds and sustainability-linked financing instruments are emerging, notably in Valencia.

Switzerland Densification has contributed to significant land price increases, with rents rising by 30% and single-family home prices by 80% between 2000 and 2021. Private actors own 63% of urban residential properties. The revision of the Spatial Planning Act (SPA I), which made densification mandatory, has been criticised for legitimising land-value extraction following rezoning. Large-scale rezoning projects have stimulated investment speculation, and in Zurich new construction occurs far more frequently than refurbishment, with documented displacement of lower-income residents.

United Kingdom The densification framework—Section 106 agreements, Estate Regeneration schemes and Opportunity Areas—primarily catalyses private investment rather than directly delivering public housing. Private developers submit most zoning proposals, and local authorities have reduced their direct provision role. Large housing associations such as Peabody form joint ventures with real estate companies including Lendlease. Estate regeneration schemes have released social housing land to private development; in the London Borough of Southwark, redevelopment of the Heygate and Aylesbury Estates is projected to result in a net loss of 1,538 genuinely affordable homes.

# 4. Nature-based solutions

Nature-based solutions — understood broadly as actions that protect, sustainably manage, or restore natural and semi-natural ecosystems in ways that address societal challenges while delivering co-benefits for biodiversity and human well-being — have emerged as a central pillar of European environmental and climate policy over the past decade. The EU Green Deal, the EU Biodiversity Strategy 2030, and the 2024 Nature Restoration Law have all reinforced the role of NBS, creating a common supranational framework that has filtered into national policy-making, albeit at different speeds and with different emphases across the nine countries. In the ReHousIn project, we primarily focus on urban NBS and their implications for housing inequalities, recognizing that NBS outside cities often pursue different goals and rely on distinct policy instruments and planning traditions. For instance, Hungary developed relatively strong instruments early on to protect natural environments outside urban areas, with these ecological considerations barely implemented in cities until very recent years. However, this comparative analysis suggests that the translation of these European frameworks into national and local practice remains highly uneven, with significant implications for both environmental effectiveness and social equity.

NBS framings cluster around two benefit logics: ecological/climate functions (river restoration, flood management, heat mitigation) in Austria, Switzerland, Norway, Poland, Italy and Spain; and urban-quality investments (greener public spaces, schoolyards, estate regeneration) in Austria, France, Hungary, Italy, Spain, Switzerland and the UK.

Environmental outcomes (flood reduction, biodiversity, heat mitigation) are well-documented, but social outcomes remain underexplored. Green gentrification risks are acknowledged within academic and policy debates in Spain, Norway, France, and structurally embedded in the UK's net gain framework, yet systematic mitigation measures are rare. In Austria, green gentrification risks are also acknowledged, but considered low risk because of tenant protection for private rentals in the dense core ad the provision of social and affordable housing as a safety net against displacement. Hungary and Poland show under-provision in disadvantaged areas rather than price effects. No country has robust social monitoring metrics for NBS, and the NBS-housing nexus is largely unaddressed in policy design.

## 4.2 The policy cycle

Across the nine countries, NBS as an explicit policy concept is relatively recent, with most formal recognition occurring within the last decade. However, the trajectory of NBS's entry into national policy agendas varies considerably in pace, institutional route, and framing. Across the cases, we can distinguish three broad waves of NBS policy emergence, dominant framings that shape how NBS are understood and deployed, and critical turning points that have structured national trajectories.

### *Emergence and timing of NBS agendas*

We briefly trace when NBS agendas emerged across the nine countries, distinguishing early ecological restorers, climate-adaptation integrators and later, more explicit NBS adopters.

Across the nine countries, NBS-type agendas appear in three broad waves: an early-2000s ecological-restoration wave (Austria, Switzerland), a 2010s climate-adaptation and green-infrastructure wave (Norway, Poland, Spain, Italy, France), and a later wave in which the explicit NBS label and regulatory tools are consolidated (Italy, Spain, United Kingdom), while Hungary follows a more incremental path without a single NBS “moment”. These waves are associated with different initial “green” focuses and policy document families, ranging from river and floodplain restoration to urban greening, biodiversity strategies and development-control instruments.

Taken together, these trajectories reveal three main initial "green" focuses in cities:

- Ecological restoration and flood risk management (Austria, Switzerland, Norway, Poland, Spain)
- Urban greening and livability ("nature en ville", pocket parks, schoolyards) in France, Hungary and parts of Italy and Spain
- Biodiversity and planning instrument-centred approaches in Italy, Spain, France and especially the UK via biodiversity net gain and Local Nature Recovery Strategies

They also show that NBS first appear mainly in climate adaptation or sustainability strategies (Austria, Switzerland, Norway, Poland, Spain), biodiversity and green-infrastructure strategies (France, Italy, Spain, UK), and, to a lesser extent, in planning and environmental law instruments (Norway, Spain, UK, and urban regeneration or revitalization programs in Italy, Poland and Hungary).

Early ecological restorers (Austria, Switzerland), that initially focused on river restoration but in the 2010s also shifted towards adaptation/green infrastructure adopters, together with countries like (Norway, Poland, Spain, Italy, France), and late explicit NBS label adopters (Italy, Spain, UK) thus form partly overlapping clusters, while France and especially Hungary stand out for more implicit, incremental NBS adoption.

Taken together, these framings cluster NBS around two broad benefit logics:

- On the one hand, several countries emphasise ecological and climate functions: Austria, Switzerland, Norway and Poland prioritise river and floodplain restoration, flood risk management and heat mitigation structures, while Spain, Italy and France strongly link NBS to biodiversity protection and compact city, low emission models.
- On the other hand, France, Hungary, parts of Italy and Spain, and to a degree the UK, frame NBS as urban-quality investments for residents, focusing on greener public spaces, schoolyards, estates and image-driven regeneration that promise improved livability, health and social mix, even where climate effects are less explicitly foregrounded.

Across these groups, integration with housing redevelopment is most explicit where NBS are embedded in large regeneration schemes or social housing programs (for example in Austrian, French, Italian, Spanish and Norwegian estates). BBy contrast, in Hungary and in much of Poland and Switzerland, NBS in and around working-class and housing-estate areas are traditionally well equipped with green spaces; however, their quality has lagged behind, and

their revitalisation has often taken the form of project-based or EU-funded interventions that are not yet anchored in broader housing or adaptation strategy, even though these neighborhoods can be as green, or even greener than, many high-prestige areas. In Switzerland, meanwhile, there is limited evidence to support that NBS is distributed unevenly across income groups or neighbourhood types, but to date, NBS and housing are rarely considered jointly or as a systematic component of housing policy.

### *Trajectories and turning points*

Across the nine countries, a set of cross-national patterns emerges in the emergence and institutionalisation of nature-based solutions (NBS), highlighting how legal frameworks, policy integration, climate pressures and governance levels shape divergent trajectories. Countries can be grouped into:

- Early ecological restorers (Austria, Switzerland), where river/floodplain renaturation was established early and later broadened to urban adaptation.

- Climate-adaptation integrators (Norway, Spain, Poland), where adaptation strategies and planning guidelines act as key turning points.

- Late but explicit NBS adopters (Italy, UK), where NBS labels entered strategy in the late 2010s and are tied to green infrastructure and development regulation.

- Fragmented or project-based contexts (France, Hungary, parts of Poland and Switzerland) where rhetoric or isolated pilots exist without a fully coherent NBS policy cycle.

This clustering reveals that the presence or absence of binding legislative frameworks is a critical differentiator: Spain's Law 33/2015 and the UK's 2021 Environment Act provide enforceable national mandates, while countries relying on non-binding strategies (France, Austria at the federal level) show greater variability in implementation.

In most countries, NBS do not emerge as standalone instruments but as add-ons or reframings of existing environmental agendas, such as river restoration, urban renewal, traffic calming, densification, and retrofitting. Austria, Spain, Italy, France, Norway and the UK particularly integrate NBS into broader projects of brownfield redevelopment, estate regeneration and compact city planning, while in Hungary and many Polish and Swiss municipalities, NBS remain more often as discrete greening or pilot projects attached to limited retrofit or public space upgrades.

Trajectories are also shaped largely by the dominant climate stressors and geographical conditions that initially sparked NBS policy development: flood prone river systems and alpine valleys in Austria, Switzerland and Poland first favored early river/floodplain based NBS, but urban heat has since become an increasingly central drive of NBS, especially for larger cities. Coastal and heat stressed Mediterranean and Atlantic cities in Spain and parts of France have driven adaptation oriented NBS tied to compact city models; and high latitude rainfall and stormwater challenges in Norway and the UK have pushed blue green infrastructure and SuDS into national guidance and planning rules. By contrast, Hungary's more limited policy attention

to climate adaptation and its strongly centralised governance help explain why NBS remain incremental and small-scale despite exposure to heat and drought.

Across the clusters, national governments and EU frameworks typically set the initial agenda through adaptation, biodiversity or green infrastructure strategies, but large cities and regions are often the first to operationalise NBS on the ground. Vienna, Paris, Barcelona, Milan, Oslo, Zurich and London act as early initiators translating national or EU discourses into concrete NBS programs, whereas in Hungary and parts of Poland and Switzerland, local governments' weaker fiscal and regulatory position means that NBS initiatives depend more on top-down funding windows and remain harder to consolidate into durable policy cycles. In Switzerland, by contrast, municipalities enjoy substantial fiscal autonomy, but especially smaller municipalities often struggle to develop and implement NBS because of limited administrative capacity and political priorities, making NBS integration contingent on local political orientation. Taken together, these patterns underscore that NBS trajectories reflect the interaction of legislative force, policy integration, climatic context, and multi-level governance capacity rather than a single linear diffusion model.

## 4.3 The implementation process

Across countries, municipalities are the main delivery hubs for NBS, working with varying mixes of sectoral departments, housing actors, private developers and funding streams; We examine who implements NBS, how typical projects are put together and which funding channels they use at the project level. A persistent cross-national finding is the gap between strategic ambition and on-the-ground delivery, with implementation often fragmented, under-resourced, and unevenly distributed across territories.

### *Implementation modes and actors*

We describe who delivers NBS in practice, how typical projects are assembled, and which funding channels underpin implementation on the ground, and it synthesises the main similarities and differences in governance arrangements for NBS delivery across the nine countries, highlighting common municipal leadership alongside variation in legal leverage, funding dependence and scale of implementation.

Across the nine countries, implementation is generally decentralised and municipal-led, but within national or regional frameworks that differ in strength.

Across contexts, **municipalities are the central actors,** typically coordinating planning, environment, housing and public-works departments to embed NBS in regeneration, adaptation and public-space projects, often with support from EU or national funding and, in many cases, in partnership with social landlords or private developers. However, important differences emerge in institutional strength and delivery mechanisms: Austria and Switzerland combine strong planning traditions, though smaller towns rely more on pilots; France, Italy, and Spain embed NBS prominently in urban-renewal and redevelopment schemes, with Spain showing particularly integrated climate–mobility approaches in leading cities; Norway institutionalises NBS through blue-green structure planning and national adaptation guidelines;

Poland depends heavily on EU-funded adaptation and revitalisation programmes with marked capacity gaps between cities; Hungary remains more project-based and incremental in the absence of a dedicated national framework; and the United Kingdom stands out for using development control tools, biodiversity-net-gain and SuDS-type obligations to secure NBS through private development, making delivery especially sensitive to local market conditions and planning capacity. Overall, while NBS governance everywhere relies on multi-actor municipal coordination, the balance between binding regulation, project-based funding and market-led mechanisms produces distinct national and local trajectories.

Across the cases, however, municipalities are the central hubs for NBS delivery, but their room for manoeuvre depends on whether they can mobilise housing providers, utilities, cooperatives and developers as active partners rather than passive recipients of regulations. Where planning, housing and environment departments work together around concrete projects (Austria, France, Italy, Spain, Norway, UK), NBS are more easily integrated into standard development routines, while in settings that rely on single departments or ad hoc project teams (Hungary, many Polish and smaller Swiss municipalities) NBS tend to remain small, scattered and difficult to scale.

### *Typical project pathways*

We outline the typical pathways through which NBS are implemented—such as regeneration schemes, brownfield redevelopments, and street spaces reallocation—and discusses who benefits from each. Regeneration and estate upgrade projects: In France, Italy, Spain, Norway, Austria, and the UK, many NBS are delivered as part of broader urban renewal or housing regeneration schemes, where energy retrofits, demolitions/new builds, and public space redesigns are combined. NBS provides cooling, flood protection, and improved outdoor spaces for estates.

- **Brownfield and waterfront redevelopments:** Projects such as Vienna's Nordbahnhof, Paris's Clichy-Batignolles, Milan's Porta Nuova, Oslo's riverfront schemes, Warsaw's Vistula riverfront, and London's Dagenham Green exemplify a recurring pathway in which NBS are embedded within large-scale brownfield or riverfront masterplans led by planning departments and private developers, often with strong branding and real-estate objectives. These flagship projects tend to concentrate NBS investment in high-value locations. In Spain, for example, Barcelona's La Marina del Prat Vermell and Can Batlló illustrate how extensive blue-green infrastructure and new parks are integrated into major brownfield redevelopments, combining NBS with dense mixed-tenure housing while simultaneously raising concerns about future affordability and green gentrification.

- **Traffic calming and street space reallocation:** Barcelona's superblocks, low traffic schemes in other Spanish and some UK, Austrian or French cities, and Norwegian stormwater management streets illustrate NBS delivered through mobility and public works departments, where trees, rain gardens and pocket spaces are added as part of road space reallocation. These interventions can deliver significant climate and livability benefits but are unevenly distributed across cities.

- **Micro-scale pilots in schools and estates:** In Hungary, Poland, some Austrian, French, Spanish, Swiss and UK municipalities, schoolyard greening and estate courtyard projects are typically initiated by education, housing or environment departments (often with NGOs) as relatively low-cost pilots that can be replicated but are rarely yet systematised. These projects often reach disadvantaged neighbourhoods but remain under-resourced compared to flagship schemes.

Project pathways shape who benefits: NBS delivered via flagship brownfield and waterfront redevelopments often coincide with new or upgraded housing and transport for higher-income groups, while NBS linked to estate regeneration, schoolyards, and courtyards are more likely to reach existing residents in working-class or peripheral areas. Because large regeneration and traffic-calming schemes are unevenly distributed, many disadvantaged neighbourhoods still rely on piecemeal pilots rather than on the systematic inclusion of NBS in the biggest investment cycles. Overall, the mode of project delivery emerges as a key determinant not only of where NBS are implemented, but of whose needs they ultimately prioritise within urban transformation processes.

### *Project-level funding channels*

We clarify the funding architectures that support NBS projects, highlighting interplay between EU, national, municipal and develop resources and the inequalities this creates across territories.

Across countries, municipal budgets remain essential for everyday NBS—tree planting, pocket parks, schoolyards—even when initial capital works are EU or nationally funded, with maintenance usually falling on local green space services, housing providers or cooperatives. Long-term maintenance funding is rarely secured, creating risks for NBS quality and durability.

- In Central and Southern Europe (Hungary, Poland, Spain, parts of Italy), large NBS projects are commonly financed through EU cohesion, regional or recovery funds, combined with national co-financing; municipalities or regional agencies then manage the calls and contracts for concrete schemes such as riverfronts, parks or estate revitalisations. This creates structural vulnerability to shifts in EU financial perspectives and disbursement conditions.

- In Austria, Norway, Switzerland and parts of Spain and Italy, national climate/adaptation or green infrastructure programs provide grants for river restoration, blue-green infrastructure or municipal greening projects, which local planning or environment departments translate into specific NBS interventions. Norway's Klimasats programme (2016) and Austria's Biodiversity Fund exemplify this approach. In both Austria and Switzerland, however, national-level NBS funding remains relatively limited and often concentrated on large-scale or pilot projects, while everyday NBS implementation is expected to occur within the competencies and budgets of regional and local administrations, drawing primarily on allocated municipal (and in some cases regional) budgets.

- In more market-driven redevelopment contexts (Italian sustainability-oriented urban developments, UK housing developments, some Austrian and Spanish flagships),

developers finance on-site NBS as part of planning gain or regulatory obligations (biodiversity net gain, SuDS, green roof requirements), sometimes complemented by public investment in adjacent public spaces. The UK's biodiversity net gain policy explicitly creates a compliance market, requiring developers to achieve 10% net gain as a condition of planning permission.

Project-level funding patterns reinforce these differences: EU and national programs tend to underwrite large, high-visibility NBS in cities with enough capacity to apply, while everyday tree planting, pocket parks and estate-scale NBS depend on tight municipal budgets and, in some contexts, on developers' willingness to finance NBS through planning obligations. This means that places with weak administrative capacity or low land values struggle most to secure durable NBS, even where environmental and social needs are high.

Overall, the configuration of EU, national, market and municipal funding streams emerges as a decisive factor structuring not only the volume but also the spatial and social distribution of NBS investments.

### *Types, rationales and market uses of NBS*

We can distinguish several main types of NBS interventions observed across countries and explains how their selection reflects problem pressures, funding logics and strategic positioning. Type of interventions:

- River and floodplain renaturing is central in Austria, Norway, Poland, Spain, Switzerland and the UK, and present in some French contexts. The Thur/Rhine restoration in Switzerland exemplifies large-scale adaptation-oriented NBS.

- Coastal and waterfront NBS appear in Spain, France and the UK, often tied to tourism, flood risk and waterfront redevelopment.

- Green rings and corridors (Vienna's green/open space structure, Oslo’s Green Ring, and Tarragona's green rings, Swiss and Polish peri-urban corridors, UK eco-town/river corridor plans) express landscape scale NBS.

- Street-level NBS and traffic calming (notably Barcelona's superblocks, but also similar schemes in other cities) combine livability and climate adaptation aims. Barcelona's program is the most developed example, though its distributional consequences remain contested. Vienna’s planning approach, as with other planning approaches in main cities in Austria, recently shifted to increasingly focus on implementing Street-level NBS, counteracting increased urban heat.

- Stormwater-focused NBS (sponge city Gmunden, Norwegian open stormwater systems, UK SuDS, Blackpool and estate-scale rain gardens) show a convergent "blue-green" logic.

- Green roofs/façades and urban forests are institutionalised in Vienna, some Italian projects, Norwegian and Swiss cities, and elements of UK and French urban greening. Zurich and Basel's pioneering green roof requirements (1991/1999) remain influential models.

- Estate courtyards, schoolyards and pocket parks are key "everyday NBS" in Hungary, French and Italian estates, Norwegian densified areas, Polish revitalization, Spanish social housing contexts and UK council/HA estates.

These intervention types reflect a mix of problem-driven priorities. River and floodplain renaturing, coastal projects, and stormwater-focused NBS are often prioritised where flood risk, heatwaves, or water management problems are urgent, and where existing river restoration or adaptation agendas have made them politically and technically familiar (Austria, Switzerland, Norway, Poland, Spain, parts of the UK and France).

They also reflect opportunity and funding-driven choices. Street-level schemes, estate courtyards, schoolyards, and pocket parks tend to emerge where municipalities seek relatively low-cost, quickly visible improvements to everyday livability, particularly for heat and public health, or where EU and national regeneration funds specifically target areas with minimal greenery or socially disadvantaged neighbourhoods (France, Italy, Hungary, Poland, Spain, Norway, UK, Austria).

Finally, some interventions are tied to strategic planning and urban development agendas. Large green rings, sustainability-oriented urban development parks, and iconic green roofs/façades are usually linked to strategic planning or flagship redevelopment or growth areas. These areas serve simultaneously as basic green infrastructure, everyday recreational landscapes and visible signals of ecological transition and are prioritised where cities and developers aim to brand new districts, attract investment, and signal ecological transition (Vienna, Barcelona, Milan, Zurich, London). This can explain their prominence despite higher upfront and maintenance costs than small-scale or street-level NBS. In some contexts, these projects are woven into market-driven redevelopment and place-branding strategies, which can shape which neighborhoods they are located in and how they are designed. Overall, the distribution of intervention types shows how NBS are shaped by environmental risk, institutional familiarity, funding structures, and urban competitiveness strategies.

### *Project-level constraints and enablers*

Across countries, **limited technical capacity** and staff time in smaller municipalities, and in Hungary, Poland and parts of Switzerland, constrain the ability to plan, coordinate and maintain NBS beyond small pilots. Even where national strategies exist, a lack of specialised expertise in blue-green infrastructure, monitoring and cross-sectoral planning makes it difficult to integrate NBS into everyday development management.

**Multi-level and sectoral fragmentation** in Austria, France and Poland complicates integrated NBS for housing, mobility and water, as responsibilities are split across departments and tiers with weak coordination. Centralised, politically constrained contexts (Hungary, parts of the UK) further limit NBS because local governments have restricted fiscal and regulatory room to manoeuvre and are often dependent on higher-level political priorities that may favour short-term growth over ecological or social aims.

Capacity problems are compounded by **tight local budgets and uncertain funding streams**, especially in Hungary, Poland and smaller Swiss, Austrian and Spanish municipalities, where NBS compete with other urgent spending priorities. In more market-driven settings like Italy,

Norway, Spain and the UK, NBS in new developments are often treated as costs to be traded off against affordable housing or other obligations in viability negotiations, which can limit ambition or shift NBS to high-value locations. The UK report explicitly notes that biodiversity net gain can be traded against affordable housing contributions in viability assessments.

**Strong municipal planning traditions and clear national guidance** in Norway, and in leading Spanish and Austrian cities, help embed NBS into standard plans and development control, turning them from exceptional projects into routine requirements. Targeted national and EU funds (for example, National Recovery and Resilience Plan (NRRP)-linked regeneration programs in Italy and Spain, adaptation funds in Poland and Austria) underwrite more substantial NBS in urban regeneration and river restoration schemes, particularly where local co-funding is possible.

**Intermediary actors** such as housing associations, cooperatives, NGOs and city networks play an important enabling role by championing NBS, developing pilot projects and sharing know-how. In several countries, **local environmental or neighbourhood groups** have advocated for greener public spaces, river daylighting or park protection in regeneration areas—which, together with professional networks, have helped open windows of opportunity for NBS in estates, brownfield redevelopments and traffic calming schemes in cities like Vienna, Paris, Barcelona, Milan, Oslo and some UK and Swiss municipalities. The role of housing cooperatives in maintaining NBS in Norwegian and Austrian estates is particularly notable.

### *Marketing and branding of NBS*

We explore how NBS are used as branding tools in flagship projects and eco-districts, and how this can simultaneously raise political support and risk reinforcing speculative, exclusionary development patterns. In many cities, NBS also function as branding and marketing tools, especially in high-profile sustainability-oriented urban developments and waterfront or riverfront redevelopments. Projects such as Clichy-Batignolles in Paris, Porta Nuova in Milan, Barcelona's superblocks, selected free-market developments around the Vienna's Freie Mitte/Nordbahnhof in Vienna, Oslo’s Nydalen and flagship riverfront schemes in Spain, Switzerland and the UK are promoted in city strategies, prize applications, and tourism or investment materials as symbols of ecological modernity, livability, and competitiveness. The discourse typically highlights attractive parks, green façades, car-free streets and "resilient" blue-green landscapes, which can raise the profile of NBS but also risk aligning them more with city branding and real estate value than with everyday environmental justice. Vienna’s Freie Mitte/Nordbahnhof, for instance, some free-market housing projects use the central “urban wilderness” as a marketing asset, even though the wider development also includes substantial non-profit housing and is not solely geared towards inter-urban competitiveness. France's report explicitly notes that green labels and awards can become "territorial marketing tools, contributing to the attractiveness of a territory — often to the benefit of more affluent population groups."

## 4.4 Size and Role of the Market

We compare the relative roles of public authorities and private developers in financing and delivering NBS, and discuss how different mixes affect distributional and procedural justice. The market dynamics of NBS vary significantly across the nine countries, though a clear cross-national pattern emerges: purely market-driven NBS interventions remain limited, and public sector actors are the primary funders, planners, and implementers. The degree to which private investment is mobilised, and the mechanisms through which this occurs, differ substantially and have important implications for equity.

### *Public and private roles*

The ownership and financing models of NBS vary as well as the balance among public leadership, private participation, and the long-term sustainability of funding arrangements.

- Public / publicly regulated NBS dominate in Austria, France, Spain, Norway and Switzerland, where municipalities and public agencies lead and private actors operate within strong regulatory frameworks. Austria's federal states and municipalities play the dominant funding and implementation role, with private engagement mainly through regulatory compliance.

- Mixed public–private NBS with strong developer roles are characteristic of Italy (high-end projects, such as the case of Porta Nuova in Milan), the UK (net-gain and SuDS obligations) and appear in some Austrian and Spanish flagships, where NBS can be linked to marketing and land-value strategies. In Austria, however, NBS delivery in new developments remains largely publicly steered with private actors contributing financially through planning obligations and compliance with local greening requirements rather than using NBS as a primary tool for value capture. The UK's biodiversity net gain policy represents the most market-oriented framework, explicitly aiming to raise £500 million per year of private investment in nature recovery by 2027.

- Public/EU-funded micro-projects with weak private engagement are typical in Hungary and much of Poland, where NBS remain small-scale and dependent on external funds. Hungary lacks a system-based financing framework, with EU funds covering upfront costs but not maintenance. In Poland, micro-projects are grassroots initiatives (Radomsko and Stara Praga in Warsaw) or are part of revitalization activities (Stara Praga, Warsaw).

**Initial funding vs. long-term maintenance**: In most countries, the initial capital costs of NBS are covered by public investment (EU, national, municipal) or, in more market-driven contexts, by developers as part of regeneration or planning obligations. Ongoing maintenance, however, is typically assumed by municipal services, housing providers or estate cooperatives, and is rarely secured by dedicated, long-term funding streams, which can limit the quality and durability of NBS, especially in fiscally constrained municipalities and social housing areas. This capital/maintenance split is a universal structural weakness across all nine countries.

**Regulations and incentives for private funding**: Several countries use regulations or incentives to require or encourage private actors to fund NBS at least partially. In the UK, biodiversity net gain rules and SuDS requirements make NBS a condition of planning

permission, effectively obliging developers to finance on-site or off-site NBS. Italy's negotiated planning instruments often use planning gain to secure parks, green roofs or corridors from developers, while Austrian, Spanish and Norwegian cities sometimes require trees, green roofs or blue-green factors in new projects through local planning rules and building codes. Co-funding schemes for green roofs and the greening of courtyards also appear in Austrian cities to stimulate private investments into NBS instead of using legal requirements partially shifting costs to private owners. In many Swiss municipalities, by contrast, green roofs on flat roofs are mandated directly through building and planning regulations, with no financial or fiscal incentives, making roof greening a routine legal obligation rather than a subsidised option.

Overall, differences in public–private balance, regulatory leverage, and maintenance funding reveal how institutional design shapes not only who pays for NBS but also its long-term resilience and equity outcomes.

### *Funding patterns*

Cross-national financial mixes differ, as reflected in the relative weights of EU, national, private, and civic funding sources for NBS, which clarify how these mixes shape implementation dynamics.

- Heavy EU dependence in Central and Southern Europe (Hungary, Poland, Spain, parts of Italy) for large NBS schemes within adaptation and revitalisation programs. Italy's National Recovery and Resilience Plan (NRRP) allocation of €1.69 billion for NBS is the largest single dedicated funding stream among the nine countries.

- National and regional climate or green funds in Austria, Norway, Spain and Switzerland, complement alongside municipal budgets for everyday greening. In Austria and Switzerland, such extra funds are politically contested and typically provide only limited, project-based support , with the bulk of NBS financing flowing through regular regional and municipal budgets. Norway's Klimasats programme and Austria's Biodiversity Fund exemplify this pattern.

- Strong involvement of private capital in Italy's high-end sustainability-oriented urban developments, in UK developments, and, to a lesser degree, in some Austrian, Spanish and Norwegian redevelopment projects. However, even in the UK, private investment is channelled through a compliance framework set by public regulation rather than emerging spontaneously from market demand.

**Role of non-profits and civic groups:** Non-profit organisations, cooperatives and civic groups rarely fund a large share of NBS in strict budgetary terms, but they are important in initiating and co-managing smaller projects. In several countries, NGOs and neighbourhood associations contribute labour, small grants or stewardship for community gardens, pocket parks and schoolyard greening, and in cooperative or limited-profit housing (notably in Norway, Austria, Switzerland), resident organisations can be key to maintaining courtyards and small-scale NBS.

In Switzerland, one of our case studies, the City of Zurich, launched a programme providing financial support for ecological enhancements in 2024. Besides funding for measures on public

land, the programme includes subsidies to climate-friendly adaptation of private properties (vertical greening, green roofs, ecologically valuable upgrading of outdoor spaces, etc.), thus supporting not only non-profit housing providers, but also for-profit landlords and homeowners.

Taken together, these patterns show that while large-scale NBS are primarily shaped by EU, national and regulated private finance, civic actors play a complementary but strategically important role in initiating, anchoring and sustaining everyday, community-based interventions.

### *Impact on property and land prices*

We consider how NBS influence property and land values, highlighting risks of green gentrification and displacement alongside cases where social safeguards and housing policies mitigate these effects.

In cities like Vienna, Paris, Milan, Oslo, Barcelona, parts of London and other UK cities, flagship NBS have the potential to increase property values and rents, especially where they coincide with high-quality new housing and transport improvements. This effect is explicitly documented in multiple national reports. This could be the case for example in Dagenham Green and Holloway Park in London, where green space is understood to support sales values for cross-subsidising affordable housing delivery.

Evidence or concerns about green gentrification and displacement are most explicit in Norway, Spain and parts of France, and in UK debates where NBS/net-gain and design standards interact with viability and can be traded against affordable-housing contributions. Spain's report notes that "environmental gentrification is already evident in major cities like Barcelona," while the UK report identifies this risk as "structurally embedded" in a model that ties biodiversity provision to private development economics.

In places where NBS remain small-scale and patchy (Hungary, many Polish), the main problem is under-provision and unequal access to quality green infrastructure rather than price inflation caused by NBS. Hungary's analysis of green intensity changes in Budapest between 1990 and 2020 actually shows a net loss of green areas in many urban zones, driven by private development and urban sprawl dynamics.

The extent to which NBS are combined with robust social-housing or rent-control measures varies widely, with Vienna or some continental cases offering more safeguards than more market-driven contexts in Italy, Spain, Norway and the UK. Austria's Vienna report notes that less effective rent regulation in the private rental segment heightens the risk of gentrification in dense, central urban areas, even as social housing provides structural safeguards in other parts of the market.

Beyond impacts on prices and displacement, countries also differ in the extent to which procedural equity and participation are embedded in NBS planning.

- In Austria, France, Italy, Spain, Norway and Switzerland, public participation and consultation requirements in planning law or regeneration programs formally create opportunities for residents to influence NBS design, but the depth of engagement varies greatly between flagship projects and everyday estates.

- In more centralised or capacity-constrained contexts such as Hungary and parts of Poland and the UK, participation around NBS tends to be more limited or project-based, often relying on ad hoc consultations or NGO-led initiatives rather than systematic co-production with working-class residents.

Overall, procedural inclusion is more explicit in discourse than in practice, and only a few cases—such as selected Austrian, Spanish or Nordic projects—show consistent attempts to involve diverse tenants and neighbourhood groups throughout NBS planning and implementation.

## 4.5 The multilevel-governance process

We focus on the formal distribution of powers, coordination mechanisms and diffusion of innovations that shape how NBS are framed and upscaled.

### *Governance families*

We compare the main governance families and show how federal, decentralised and centralised systems condition who has the authority and resources to mainstream NBS at scale. Across the nine countries, three governance families can be distinguished, each with characteristic implications for NBS, as summarised in Table 1.

Table 1. Governance families and NBS implications

| Governance family | Countries | Core institutional features | Typical NBS implications |
|---|---|---|---|
| Federal / high-autonomy systems | Austria, Switzerland | Federal state sets climate/biodiversity goals; Länder/cantons and municipalities hold strong powers over housing subsidies, spatial planning, nature conservation and local greening. | High sub-national decision-making autonomy discretion enables context-sensitive NBS (e.g. Vienna, Zurich, Basel) but also leads to fragmented responsibilities and uneven NBS uptake between regions and municipalities. |
| Decentralized unitary systems | France, Italy, Spain, Norway, Poland, UK | National authorities define climate, environment and housing frameworks; regions/autonomous communities and especially municipalities lead on detailed spatial planning and NBS delivery. | Cities and regions (e.g. Barcelona, Milan, Oslo, Paris, London) can become strong NBS pioneers, yet ambition and capacity vary sharply, and local governments carry a heavy implementation burden, particularly in Poland and parts of the UK. |
| Centralized / constrained local systems | Hungary (and, in some respects, | Agenda-setting and major funding concentrated at the national level; | NBS initiatives depend heavily on centrally designed programs or EU projects; |

| | | | |
|---|---|---|---|
| | parts of Poland and the UK) | municipalities have limited fiscal and regulatory room, and responsibilities have been recentralized in key policy fields. | local authorities struggle to develop sustained, locally tailored NBS strategies, so implementation remains small-scale, project-based and uneven across territories. |

Overall, in federal and decentralised systems, strong municipal powers can support ambitious, context-sensitive NBS but also produce uneven coverage and under-provision in weaker jurisdictions, while more centralised systems can set clear national goals yet often lack the local autonomy and capacity needed to turn those goals into equitable, widely distributed NBS outcomes.

### *Coordination and innovation*

We assess how multilevel coordination, sectoral integration and local innovation interact, and why some cities manage to embed NBS into routine planning while others remain stuck in small, fragmented pilots.

- In federal settings such as Austria and Switzerland, high autonomy at sub-national levels enables context-sensitive NBS experimentation in cities like Vienna, Zurich and Basel, but also leads to policy fragmentation and spatially uneven implementation. Vienna's sophisticated NBS governance (as it is region and municipal at once) contrasts with limited uptake in smaller municipalities.

- In more centralised or administratively complex systems such as France and Poland, frequent coordination difficulties between sectoral policies (housing, environment, transport, water) and levels of government can delay or dilute NBS and complicate integrated approaches in regeneration areas, even where pioneering cities like Paris push ambitious agendas. The 2023 "Fonds vert" attempts to address this but is not NBS-specific.

- Italy and Spain rely heavily on regional plans and urban regeneration frameworks to manage multilevel coordination; in the best cases, these support integrated strategies that combine NBS, density and mobility—visible in cities such as Milan and Barcelona —yet outcomes vary sharply across regions and municipalities. Spain's autonomous communities are required to develop their own GI strategies aligned with the national ENIVCRE; some (Catalonia, Madrid, Valencia) have been proactive.

- Norway, by contrast, benefits from relatively clear national planning guidelines and strong municipal planning traditions that underpin cross-sectoral blue-green plans, facilitating diffusion of NBS practices from pioneers like Oslo and Stavanger to other municipalities, even if alignment with social and housing goals is not always systematic. The Blue-Green Factor tool supports quantitative assessment and comparison across projects.

- In more constrained contexts such as Hungary and parts of the UK, strong central control, tight fiscal conditions and limited local capacity mean that ambitious NBS initiatives in places like Budapest, London or Bicester eco-town remain difficult to replicate elsewhere, as local authorities struggle to orchestrate coherent NBS and housing strategies despite formal planning tools. The UK report explicitly flags the risk of "responsibility dumping" onto underfunded local authorities.

Overall, the capacity to upscale NBS is strongest where clear national guidance, empowered municipalities and workable coordination mechanisms come together; where one of these elements is weak, NBS tend to remain project-based add-ons rather than integrated components of housing, transport and climate strategies.

### *Role of EU frameworks and diffusion of innovations*

EU directives and strategies on climate adaptation, water, biodiversity and green infrastructure provide important agenda-setting and funding frameworks, particularly in Central and Southern Europe (Hungary, Poland, Spain, Italy), where national NBS policies have often followed EU requirements and financing opportunities. The EU Nature Restoration Law (2024) is expected to further accelerate this convergence.

Cities such as Vienna, Paris, Barcelona, Milan, Zurich and London act as pioneers, interpreting EU and national frameworks creatively, developing advanced NBS strategies and projects that are then circulated through European and national city networks. EU research programs (Horizon, LIFE) and city networks (Eurocities, ICLEI) play crucial roles in this diffusion.

In some countries (notably Spain and Austria), national planning guidance and inter-municipal networks actively support the diffusion of these innovations, whereas in more centralised or fiscally constrained contexts (Hungary, parts of Poland and the UK), local pilots remain more isolated because there are fewer mechanisms or resources to replicate them elsewhere. Hungary's Green Infrastructure Jury for investment evaluation is an innovative tool, but it operates in a context of weak systemic financing.

Taken together, EU frameworks, governance families and coordination arrangements condition not only how quickly NBS diffuse, but also where benefits and risks concentrate. When enabling EU and national instruments to meet capable municipalities and strong diffusion channels, pioneering practices can be translated into broader gains in environmental performance and access; where capacity or coordination is weak, NBS tend to remain unevenly distributed and their contributions to housing equality and social justice are much harder to secure.

Across countries, micro-scale NBS—schoolyard greening, pocket parks, rain gardens in streets and squares, small retrofits in estates—play an important role as relatively low-cost, replicable interventions, especially in Hungary, Poland, Spain, the UK and smaller Austrian, French and Swiss municipalities. These projects can significantly improve everyday comfort and environmental quality for residents of working-class and peripheral areas, but they often remain scattered and under-resourced compared to the large, highly visible NBS delivered through flagship sustainability-oriented urban developments, riverfronts and superblocks in high-value locations such as Vienna, Paris, Milan, Oslo, Barcelona or London.

This pattern raises clear equity tensions: while big metropolitan NBS tend to coincide with new or upgraded housing and can contribute to rising values and social selectivity, many disadvantaged neighbourhoods rely on small, incremental NBS that may not fully offset heat, flood and pollution risks.

At the same time, where estate-scale NBS are systematically linked to social housing regeneration (as in parts of Austria, France, Italy, Spain and Norway), they show that it is possible to align environmental improvements with better living conditions for lower-income residents, if tenure security and affordability are maintained.

## 4.6 Achievements, assessment, and challenges

The assessment of NBS performance across the nine countries must navigate a fundamental evidential challenge: robust, systematic monitoring and evaluation of NBS outcomes—particularly their social and distributional impacts—is the exception rather than the rule. Most national reports acknowledge a significant gap between strategic ambitions and measurable outcomes.

### *Environmental and social outcomes*

NBS are widely regarded as effective environmental instruments, particularly for flood management, biodiversity enhancement, and urban cooling. Co-benefits for active travel and emissions reduction appear where NBS are tied to compact-city or traffic-calming strategies, particularly in Spanish, Italian and some Norwegian cities. **However, the depth of monitoring and the attention paid to social and housing impacts vary considerably.** Northern and Western European countries tend to report more systematic environmental evidence, while Central and Southern European cases often highlight project-based improvements with limited evaluation of distributional effects. Concerns about equity and green gentrification are most visible in contexts where NBS are closely tied to high-value redevelopment, whereas in less affluent settings, the dominant issue is under-provision rather than displacement.

Across the nine countries, environmental outcomes are reported much more consistently than social ones. The most common environmental benefits are reduced flood and surface water risks (Austria, Norway, Poland, Spain, Switzerland, UK), improved river ecology and biodiversity (Austria, Poland, Spain, Switzerland, UK), and urban climate effects such as heat mitigation and improved air quality or comfort (Austria, France, Italy, Spain). These gains are most evident where adaptation strategies, biodiversity laws or green infrastructure plans give municipalities a mandate and funding channels to integrate NBS into river corridors, public spaces and housing areas. Many reports also emphasise co-benefits for active travel and reduced emissions when NBS are tied to compact-city or traffic-calming strategies, especially in Spain and some Italian and Norwegian cities.

By contrast, social outcomes are more unevenly documented. When discussed, countries highlight improved livability, recreation, and perceived quality of public space, and, in some cases, support for social mix or neighbourhood reputation (France, Italy, Spain, Austria, Norway). At the same time, several reports flag concerns about green gentrification,

displacement, and unequal access to high-quality NBS in high-value districts (Norway, Spain, parts of France, Italy, and the UK), while others underscore under-provision in disadvantaged areas rather than price effects (Hungary, much of Poland). These patterns reveal a core governance gap: while policy frameworks and monitoring systems are relatively well developed for environmental performance, they rarely require systematic assessment of who benefits by income, tenure or migration status, meaning that NBS are weakly institutionalized as tools for social and housing justice.

### *Trade-offs and conflicts*

The governance and policy configurations that enable these achievements also generate significant **trade-offs and conflicts in implementation**. In high-pressure housing markets and central or waterfront districts, flagship NBS frequently coincide with rising property values and heightened risks of displacement or exclusion of low-income households. This is particularly the case where NBS are embedded in market-driven regeneration programmes or used as place-making tools in upscale redevelopment, without strong housing or tenure safeguards. Elsewhere, particularly in Hungary, many Polish cities, the central problem is the opposite: chronic under-provision of NBS in disadvantaged neighborhoods and small towns despite evident environmental and social needs. Here, weak national guidance, limited local fiscal capacity and dependence on competitive project funds mean that municipalities struggle to move beyond scattered pilots. By contrast, in Switzerland, there is currently no clear evidence that NBS are systematically under-provided in disadvantaged areas; instead, under-provision often reflects the fact that some (especially smaller) municipalities cannot or do not prioritise NBS implementation.

These distributional tensions are reinforced by governance and funding trade-offs. NBS often expose frictions between environment, housing and transport authorities, for example where river restoration or new parks require changes to road layouts, densification plans or existing estates, leading to delays or diluted schemes. Where NBS rely on development-gain mechanisms, negotiations between municipalities and developers over how “value” is allocated—between NBS, affordable housing and other contributions—can limit ambition in lower-value areas and concentrate higher-quality NBS in already attractive districts. Under tight local budgets, NBS also compete with basic services and retrofit needs, making it difficult to move widely supported projects beyond the pilot stage. In practice, these conflicts highlight how existing governance and financing models systematically prioritise certain projects, locations and beneficiary groups over others.

### *Structural challenges*

Taken together, these patterns point to deeper structural challenges. Governance fragmentation, under-funding and limited local capacity constrain the ability of many municipalities to plan, maintain and monitor NBS beyond a few flagship projects, while evidence gaps on long-term maintenance, displacement and tenure change make it hard to assess their contribution to housing equality and social justice. The risk that NBS may deepen existing spatial inequalities is clearest where they are tied to market-driven redevelopment with weak social safeguards and where planning and viability regimes treat NBS, affordable housing and other contributions as competing claims on land-use value. In addition, the

absence of binding requirements to integrate NBS into routine housing, regeneration and infrastructure programmes means that implementation often depends on motivated departments or individual champions, making advances fragile and uneven across territories. Future NBS policies will therefore need to combine robust environmental monitoring with explicit distributional and housing-equity metrics, so that climate and biodiversity gains go hand in hand with improved everyday security and wellbeing for lower-income residents. Equally, more coherent governance arrangements—clarified mandates, stable funding streams and stronger integration between planning, housing and environment—will be crucial to move from isolated achievements to systemic, just implementation.

## 4.7 Conclusion

This comparative analysis of NBS across nine European countries reveals a landscape of significant ambition, growing policy institutionalisation, and persistent implementation gaps. The nine national reports, taken together, tell a coherent story of a policy domain that has moved rapidly from the margins to the mainstream of environmental governance, driven in large part by EU frameworks, but that has not yet achieved the structural depth, financial sustainability, or social integration needed to deliver on its full potential.

The comparative analysis shows that while all nine countries have adopted NBS-type measures, they differ significantly in policy timing, dominant framings, implementation capacity, market involvement, governance arrangements and the scales at which NBS are deployed. Some contexts (such as Norway, Spain and parts of Austria, Italy and the UK) demonstrate relatively advanced integration of NBS into planning and climate policy with clearer legal levers, stronger interdepartmental coalitions and more routinised project assembly practices, whereas others (notably Hungary, but also parts of Poland and Switzerland) rely on scattered, small-scale projects with limited institutional anchoring and highly project-based funding.

Moreover, the social dimensions of NBS are unevenly addressed. In countries where NBS are deeply entwined with real-estate development or iconic urban projects (Spain, UK, parts of France and Norway), there is an emerging recognition of green gentrification and displacement risks, but systematic mitigation measures remain rare; elsewhere, the central challenge is inadequate or absent NBS in precisely those areas that would benefit most, reflecting weak social mandates in national frameworks, constrained municipal capacities and governance arrangements that make ambitious interventions hardest in lower income and smaller jurisdictions.

# 5. First insights on housing inequality mechanisms

## 5.2 Gaps and Misalignments in Policy Timelines

The evolution of energy and environmental policies (EEPs) across nine European countries reveals a complex, heterogeneous policy landscape. Core strategies such as retrofitting, nature-based solutions (NBS), and densification are determined by distinct institutional contexts, economic incentives, and normative traditions. Although all countries are in line with the European Union's central climate objectives, they diverge in terms of policy timing, governance models, and the social impacts on housing systems.

Renovation policies (RP) are the only EEP that closely resemble a conventional policy cycle, with defined objectives, dedicated funding streams and relatively coherent implementation chains from national or supranational levels to final beneficiaries. By contrast, urban densification is less the result of a unified policy field and more an outcome of land-market dynamics, planning regimes and property-led development processes. Nature-based solutions (NBS), in turn, constitute a broad and heterogeneous assemblage of initiatives, ranging from climate adaptation and biodiversity strategies to urban regeneration and public space projects, often embedded in diverse sectoral agendas.

Retrofitting became integral to national climate strategies in most countries between the early 2000s and 2010s, frequently in response to European directives or international agreements such as the Kyoto Protocol and the Paris Agreement. Initial retrofitting efforts prioritised energy efficiency and emissions reduction. Over time, issues of housing affordability and social exclusion rose in prominence, yet these concerns were insufficiently integrated into policy design. Austria, France, Spain, and the United Kingdom led early retrofitting initiatives, whereas Hungary, Poland, and Italy exhibited slower or more fragmented progress. Governance models differ markedly: Austria and Switzerland employ decentralised structures with subnational governments as primary implementers, facilitating local adaptation but resulting in varied ambition and outcomes. In contrast, the United Kingdom, France, and Spain favour more centralised approaches, often characterised by fragmented implementation and weak coordination across governance levels. Hungary and Poland encounter persistent challenges due to weak institutional frameworks and inadequate funding. Across all cases, the European Union's regulatory environment, the Green Deal, and post-2020 recovery funding have served as critical catalysts, further reinforced by energy price volatility following the 2022 geopolitical crisis in Eastern Europe.

Densification was started in the post-war period but has become a prominent strategy for sustainable urban development in recent decades, with objectives including reducing urban sprawl, improving infrastructure efficiency, and promoting compact living. Nevertheless, the social outcomes of densification remain contested. In the United Kingdom, Norway, and Italy, densification is predominantly market-driven, frequently implemented through public-private partnerships or speculative development. This has resulted in the proliferation of micro-unit housing, increased prices per sqm, and the displacement of long-term residents. In contrast, Austria, France, and certain regions of Spain have maintained stronger public oversight, incorporating affordability and spatial equity into planning frameworks. Poland has recently

enacted statutory planning reforms to better align densification with public green spaces and housing requirements. Despite these regulatory efforts, enforcement is often inconsistent and socio-spatial contestation persists. Cultural preferences further shape outcomes: in Austria, a strong attachment to single-family homes presents ongoing challenges to densification, while in Spain, such projects are perceived either as opportunities for revitalization or as threats to community identity.

Nature-based solutions in urban areas (NBS) have gained prominence since the 2010s, with notable expansion after 2020 as components of climate adaptation and biodiversity strategies. Adoption patterns differ significantly across countries. Austria (notably Vienna), Switzerland (Basel and Zurich), and Norway (Oslo) have developed comprehensive local frameworks, driven by municipal innovation and experimental planning tools such as green roof mandates and climate corridors. Conversely, in Poland, Hungary, and Italy, NBS integration remains largely symbolic, characterized by limited budgetary allocations and weak policy support. Norway represents a hybrid model, where national planning documents endorse NBS but actual implementation depends on local government capacity and commitment. While NBS are consistent with the European Union's biodiversity and adaptation goals, they frequently lack strong enforcement mechanisms and adequate national funding. The absence of explicit social targeting within NBS frameworks has resulted in unintended consequences, including increased housing costs in high-demand areas such as Vienna and Oslo.

## 5.3 Main challenges

These diverse approaches to EEPs have created various trade-offs.

Retrofitting efforts may boost property values, resulting in higher rents and possible displacement; in Spain and the United Kingdom, such measures have driven gentrification and spatial exclusion. Densification often increases competition for land, favouring developer profits over social inclusion, and can decrease the availability of public and green spaces. While NBS enhance environmental resilience, they can also raise real estate prices and worsen segregation, particularly where access to green amenities is unequal.

Retrofit efforts reveal a significant disconnect between climate goals and real implementation. No country is on track to carry out renovations at the necessary depth and scale for climate neutrality. Market-based tools often produce unintended effects, such as rent hikes, renovictions, speculation, and green gentrification—seen in Spain, Switzerland, and the UK. Although targeted schemes like Austria's Sauber Heizen für Alle or Wohnschirm Energie and France's Habiter Mieux Sérénité exist, they remain marginal and underfunded. These cannot counteract the regressive impacts of mainstream subsidies.

Austria's experience is particularly illustrative: while the National Energy and Climate Plan targets a 3% annual renovation rate, the actual rate has stagnated at around 1.5%, with deep renovations representing only a fraction of this total. France similarly struggles to meet its targets, with deep housing retrofitting supported by ANAH reaching 66,000 in 2022 against a target of 370,000 annually which includes all types of retrofitting measures across the overall housing stock).

Urban densification has helped limit urban sprawl and preserve green spaces in Spain, and Switzerland. Compact city models and inward development policies have reduced land consumption and, at times, supported regeneration and local economic vitality. Brownfield redevelopment and the renewal of degraded areas have improved urban quality in several nations. Recent planning reforms in Poland have combined revitalisation with housing for middle- and lower-income households. However, densification often falls short of sustainability and equity goals. In many contexts, it is poorly implemented due to limited political support or local resistance. In high-demand cities, private developers mainly drive it. This contributes to rising land and housing prices, financialisation, and gentrification. Without strong public intervention and binding affordable-housing requirements, densification risks reinforcing housing inequalities. Debates in Austria and Switzerland highlight that simply increasing building density targets does not always reduce land take if housing use patterns stay the same.

NBSs exhibit several consistent patterns across all nine countries. The EU has been the main driver of NBS policy development, providing both regulatory frameworks and financial instruments. Municipalities are the primary implementers but face systemic constraints regarding capacity, knowledge, and finance—especially in smaller cities. Purely market-driven NBS initiatives remain limited, underscoring the need for public sector leadership and funding. The gap between strategic frameworks and enforceable, financed, monitored implementation programmes remains substantial. The link between NBS and housing inequalities is systematically underexplored and under-monitored.

Smaller municipalities face systematic disadvantages in implementing complex, equity-focused policies. National EEP frameworks are becoming more ambitious. However, local authorities have limited capacity to design, implement, monitor, and sustain programmes. This challenge is especially clear in countries with high municipal fragmentation (Hungary, Switzerland), where national support is lacking (France), or where policy designs assign complex responsibilities without sufficient resources (UK). The risk of 'responsibility dumping' is considerable, especially as climate pressures grow.

Country-level analysis illustrates these patterns in concrete terms. Austria demonstrates innovation in Vienna's zoning and densification policies, yet federal fragmentation and uneven municipal capacity limit overall coherence. France combines ambitious legislation with weak implementation, hampered by political instability and local resistance to densification. Hungary stands out for developer-led densification with little regulatory oversight, resulting in affordability neglect and weak integration of environmental objectives. Italy relies heavily on retrofit tax incentives that disproportionately benefit wealthier households and regions, while NBS remain fragmented. Norway excels in NBS and densification planning, but retrofitting lags owing to voluntary, non-binding instruments. Poland has developed a promising toolkit—social housing companies (TBS), land-value capture, Social Housing Initiatives (SIM)—but rural areas and vulnerable households remain underserved. Spain has advanced retrofitting through national programs such as PREE, but faces territorial disparities and risks of green gentrification in flagship urban projects. Switzerland illustrates the limits of direct democracy for climate ambition, where compromises dilute policy while renovictions and speculation intensify in urban centres. The United Kingdom epitomises a market-first approach in which

biodiversity net gain requirements and densification strategies ultimately displace social housing and channel benefits into higher-value areas.

Ultimately, across all countries and all three models, four themes emerge with direct policy implications. First, the commodification of housing fundamentally shapes how EEPs interact with affordability and accessibility, and this dynamic must be directly addressed through redistributive safeguards. Second, EEPs are typically aligned with market logic rather than public interest, and redistributive mechanisms must be embedded rather than treated as optional additions. Third, spatial disparities persist, with urban centres more likely to benefit from EEPs while rural and post-industrial areas face systematic neglect; spatially targeted investment is therefore essential. Fourth, policy fragmentation undermines coherence; energy, housing, and spatial planning are too often treated in silos, and effective reform requires sustained horizontal coordination across these domains. Despite the pressures of climate targets and European integration, governance remains fragmented and unevenly equipped to manage the complex relationship between energy transition and housing justice. The most effective models are those that combine strategic national planning with empowered local implementation and robust social protections—yet across the nine countries studied, such integration remains more the exception than the rule.

## 5.4 Inequality Mechanisms

Underlying these dynamics are several structural mechanisms that shape the implementation and distributional outcomes of EEPs across the three models.

Retrofitting is shaped by financial thresholds, ownership structures, and administrative burdens. Financial instruments dominate across all countries—subsidies, grants, and tax incentives—including Austria's Sanierungsoffensive, France's MaPrimeRénov' (with its shift from tax credits to upfront subsidies for low-income households), Italy's tax superbonuses, Poland's income-tiered Clean Air Programme, and Norway's universal Enova/Husbanken grants, though very limited in resources. Energy prices act as primary market drivers: post-2021 price surges stimulated demand but simultaneously trapped low-income households lacking the capital for efficiency upgrades. In countries such as Norway and Austria, market signals—particularly energy prices—have been more influential than regulatory mandates. Financialization advances through green mortgages, energy obligation schemes (France's CEE certificates, with poverty-targeted quotas), and emerging green financial products, though private lenders naturally prioritise creditworthy borrowers, potentially excluding the most vulnerable. White certificate schemes create hybrid markets but tend toward least-cost compliance rather than comprehensive renovation. Construction sector capacity constraints create bottlenecks, with the private sector preferring profitable single-measure interventions (e.g., heating replacements) over deep renovations. The liberalisation of energy companies creates inherent tensions between efficiency obligations and core business models. Administrative complexity consistently deters uptake, particularly among vulnerable groups lacking digital literacy or upfront capital. The landlord-tenant dilemma remains structurally unresolved across rental sectors; France's weakened regulatory prohibition on inefficient rentals illustrates the depth of political resistance. Tenure bias overwhelmingly favours homeowners, while multi-owner buildings and condominiums face collective-action problems.

Energy poverty receives palliative rather than structural responses—emergency bill subsidies rather than deep renovation of the worst-performing dwellings occupied by vulnerable households. Social housing providers face acute dilemmas in balancing affordability against rising renovation costs. Institutional fragmentation in Hungary and Poland continues to impede the absorption of EU funds and coordinated implementation. Four implementation models are identifiable: centralised grant-led with regulatory pressure (France, Italy, Spain); decentralised federalist with targeted funding but fragmentation (Austria, Switzerland, Norway); market-led with weak enforcement (Norway, Hungary, Poland); and unstable market-plus-supplier obligations (UK).

Densification is largely influenced by urban land values, developer leverage, and governance asymmetries. In the UK, the conversion of public land into high-density, market-rate developments has reduced social housing stock and increased segregation. In Norway, densification has contributed to 'hyblification,' whereby extremely small apartments command high market prices. Social resistance to densification is evident in multiple national contexts, driven by concerns about overcrowding, infrastructure strain, and the erosion of neighbourhood identity.

NBS adoption is shaped by soft regulation, market appeal, and normative alignment with global sustainability agendas. Nevertheless, limited economic returns and significant maintenance requirements reduce private-sector engagement, particularly in areas without immediate speculative interest. In Austria, rising utility fees linked to greening measures highlight the unintended fiscal pressures on low-income tenants. The EU acts as a key agenda-setter and funder through mechanisms such as the EPBD, EED, and RRF, but implementation varies dramatically across national institutional capacities—as evidenced by Hungary's minimal transposition compared to France's more comprehensive, if challenged, approaches.

Transversally, both vertical and horizontal governance dynamics strongly shape implementation. Federal systems face inherent coordination challenges: Austria's nine Länder hold housing subsidy powers, creating a patchwork of regional policies, while Switzerland's cantonal variation persists. Even centralised states navigate complex multi-level landscapes: France exemplifies a paradox of centralised policy design combined with decentralised implementation. Municipalities emerge as crucial yet resource-constrained implementers everywhere; smaller municipalities systematically lack technical capacity, generating territorial inequalities. Horizontal coordination across policy silos—housing, energy, environment, and social policy—remains persistently difficult. Non-state actors such as social housing providers and energy agencies supplement formal governance but cannot substitute for state capacity.

## 5.5 Comparative Lessons

The comparative analysis highlights several country and city models that offer valuable lessons, while emphasising the lack of a single European template. These differences suggest that there is no single European model, but rather clusters of approaches shaped by institutional structures, market regimes, and political priorities.

Three major themes emerge across all models and countries. First, the commodification of housing fundamentally distorts the intended benefits of EEPs, channelling them toward capital

accumulation rather than public welfare. Second, the prevailing governance logics favour market mechanisms over redistributive approaches, with affordability safeguards often absent or insufficient. Third, spatial disparities are intensifying: urban cores absorb the majority of EEP benefits, while rural and peripheral zones remain underfunded and underserved. Fragmented policy regimes—in which energy, housing, and planning remain in silos—exacerbate these tensions and limit systemic transformation.

The three EEPs differ significantly in origin, structure and policy logic, yet they are equally relevant for advancing the ecological transition and addressing housing inequalities. They do not stem from a common governance framework, nor do they operate through comparable institutional pathways. Rather, they reflect distinct problem framings and intervention traditions, which, in turn, shape their instruments, target actors, and scales of action.

These different origins are reflected in the predominant policy instruments. In the case of RP, tools mainly consist of incentives and subsidies directed at end users—households, homeowners and, in some cases, housing providers—to stimulate building-level interventions. Densification, by contrast, relies primarily on land-use regulation, zoning reforms and land-value mechanisms, operating through planning frameworks and development rights. NBS are typically supported through public programmes, grants and regulatory requirements, often combined with planning obligations in specific development contexts.

The differences also shape the main addressees of policy action. RP primarily targets individuals and families as decision-makers regarding their dwellings. Densification strategies engage primarily market actors—developers, landowners, and investors—who determine urban form through their investment decisions. NBS involve a broader constellation of actors, though predominantly public authorities at municipal or regional levels, alongside utilities, housing providers and, in some cases, civic organisations.

Finally, the unit of intervention varies across the three domains. RP is centred on the individual building or dwelling as the core investment unit. Densification and NBS, in contrast, operate at wider territorial scales, addressing neighbourhoods, districts or entire urban areas. These scalar differences further explain their distinct implications for environmental performance and housing inequality, as well as the varying degrees of public steering and market influence embedded in each field.

## 5.6 Recommendations

Given the ongoing implementation gaps, regressive distribution effects, and governance weaknesses seen in renovation, densification, and NBS policies, the need for an integrated, multi-level and EU-coordinated framework becomes even more pressing. The following recommendations address the structural issues identified across these three areas, offering first insights and reflections for governance coordination and relatioins with housing policies.

**1. Introduce strong social conditionality and anti-displacement safeguards.** To counter regressive subsidy effects and renovation-driven rent increases, EU-supported schemes should require rent caps, long-term affordability guarantees or tenant-protection measures where public funds are used. In the private rental sector, minimum energy performance

standards must be coupled with enforcement capacity and mechanisms to prevent cost pass-through that exacerbates housing inequality.

**2. Rebalance incentives towards low-income households and non-profit providers.** Tax-credit models favouring high-income homeowners should be progressively replaced or complemented by upfront grants, on-bill financing, or zero-interest loans aimed at vulnerable households and social or cooperative housing providers. This would shift public expenditure to segments with the highest energy inefficiency rates and the lowest capacity for renovation.

**3. Link densification to binding affordability and land-value capture rules.** Given that densification is predominantly market-driven and associated with rising land values, EU cohesion and investment funds should require inclusionary zoning, quotas for genuinely affordable housing and land-value capture mechanisms in supported projects. Public land disposal and rezoning gains should systematically finance affordable housing and green infrastructure.

Austria's limited-profit housing associations, regulated by national law but functioning at regional and local level, show how hybrid actors can carry out comprehensive retrofitting programmes while keeping affordability. Similarly, France's ANAH operates as a national agency with decentralised regional offices, working through local partners to deliver renovation schemes.

**4. Enhance free access and reduce barriers to EEPs.** Across countries, ambitious renovation and land-use targets coexist with weak implementation. Technical assistance and the lack of qualified professionals are key barriers to scaling up renovations and administrative simplification—especially for small municipalities—and are essential to close the gap between plans and realised projects. The EU should expand technical assistance platforms, standardised toolkits and peer-learning mechanisms, particularly targeting smaller or fiscally constrained municipalities. Funding allocations could incorporate capacity-building components as mandatory elements.

**5. Secure successful tools, long-term financing and maintenance of EEPs.** To overcome the structural reliance on short-term project funding, EU instruments should support multiannual maintenance funds, green municipal investment facilities and co-financing schemes tied to long-term stewardship commitments. The implementation of energy obligation schemes, particularly White Certificate schemes such as France's *Certificats d'Économies d'Énergie* (CEE), represents a hybrid approach that leverages market mechanisms to achieve policy goals. Italy's Superbonus program led to uneven results due to a dubious design but mobilised a vast range of private actors of all sorts quickly. Without stable maintenance funding, NBS risk deterioration and loss of public trust. The UK's market-driven biodiversity net gain model is the most distinctive governance design, significantly diverging from the mainly public-sector approaches common in continental Europe; Spain's legally binding requirement for regional green infrastructure strategies is an outlier in terms of regulatory enforcement; Norway's 'comply or explain' approach—requiring municipalities to justify non-use of NBS—is unique; and Italy's NRRP-funded urban forestry programme is the largest dedicated national NBS investment.

**6. Prioritise deep, area-based renovation over single-measure subsidies.** Given the widespread bias toward heating replacements and other partial upgrades, EU funding should privilege comprehensive, staged deep-renovation strategies at building-block or neighbourhood scale. Financial support could be conditional on integrated renovation roadmaps that prevent carbon lock-in and improve long-term cost-effectiveness. This would also facilitate coordination with densification and NBS interventions at the district level.

**7. Integrate NBS with housing and land-use regulation.** The NBS–housing nexus should be explicitly embedded in EU guidance and funding criteria. Large-scale NBS investments must be accompanied by monitoring of housing prices, tenure shifts and displacement risks in affected areas. Environmental impact assessments could be expanded to include social and housing indicators to ensure that green investments do not unintentionally reinforce segregation.

# 6. References


Báthoryné I.; Gerőházi É.; Szabó J.; Somogyi E. (2025). *National report on the regulatory system of EEPS in Hungary*. *Deliverable 3.2, "National report on the regulatory system of EEPs"*. ReHousIn: Contextualized pathways to Reduce Housing Inequalities in the green and digital transition

Duyne Barenstein J.; Rohner S.; Widmer H. (2025). *National report on the regulatory system of EEPS – Switzerland. Deliverable 3.2, "National report on the regulatory system of EEPs"*. ReHousIn: Contextualized pathways to Reduce Housing Inequalities in the green and digital transition

Cavicchia R.; Cucca R.; di Marino M. (2025). *National report on the regulatory system of EEPS – Norway. Deliverable 3.2, "National report on the regulatory system of EEPs"*. ReHousIn: Contextualized pathways to Reduce Housing Inequalities in the green and digital transition.

Friesenecker, M.; Lehner, J. M. (2025). *National report on the regulatory system of EEPS – Austria. Deliverable 3.2, "National report on the regulatory system of EEPs"*. ReHousIn: Contextualized pathways to Reduce Housing Inequalities in the green and digital transition

Leśniewska-Napierala K.; Mikolajczyk T. (2025). *National report on the regulatory system of EEPS in Polans. Deliverable 3.2, "National report on the regulatory system of EEPs"*. ReHousIn: Contextualized pathways to Reduce Housing Inequalities in the green and digital transition

Matheney A.; Madácsi F. Rosa B.; Kotsila P., Anguelovski I., Timsit E. (2025). *National report on the regulatory system of EEPs – Spain. Deliverable 3.2, "National report on the regulatory system of EEPs."* ReHousIn: Contextualized pathways to Reduce Housing Inequalities in the green and digital transition.

Rotondo, F.; Guironnet, A.; Cremaschi M. (2025). *National report on the regulatory system of EEPS in France. Deliverable 3.2, "National report on the regulatory system of EEPs"*. ReHousIn: Contextualized pathways to Reduce Housing Inequalities in the green and digital transition

Stirling P.; Arbaci S., (2025). *UK National report on the regulatory system of EEPS. Deliverable 3.2, "National report on the regulatory system of EEPs"*. ReHousIn: Contextualized pathways to Reduce Housing Inequalities in the green and digital transition

Wolfgring C. (2025). *National report on the regulatory system of EEPs in Italy. Deliverable 3.2, "National report on the regulatory system of EEPs"*. ReHousIn: Contextualized pathways to Reduce Housing Inequalities in the green and digital transition.

# 7. Glossary

**15a-agreemtents (Austria)** in the Austrian Federal Constitutional Law (Bundesverfassungsgesetz), agreements according to Article 15a (Art. 15a B-VG agreements) regulate until today the competences and implementation procedures between the state and the federal states (on diverse matters such as energy or environmental quality standards in housing).

**ANRU** – Agence Nationale pour la Rénovation Urbaine, *National Agency for Urban Renewal (France)*

**CLT(s)** – Community Land Trust(s)

**EEP(s)** – Environmental and Energy Policies

**EMVS** – Empresa Municipal de Vivienda y Suelo (Madrid, España), *Municipal Housing and Land Company (Madrid, Spain)*

**EED** – Energy Efficiency Directive

**Enova** – operating under the Ministry of Climate and Environment, promotes technological innovation and energy savings but offers modest support for deep renovations.

**Husbanken** – operating 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.

**EPBD** – Energy Performance of Buildings Directive

**INCASOL** – Institut Català del Sòl (Espagne), *Catalan Land Institute (Spain)*

**LPHA** – Limited-Profit Housing Association

**LIFE** – EU financial instrument supporting environmental and climate projects

**MaPrimeRénov'** – French grant for energy renovation

**NBS(s)** – Nature-Based Solutions

**PNC** – Piano Nazionale Complementare (Italia), *National Complementary Plan (Italy)*

**RRF** – Recovery and Resilience Facility, *Recovery and Resilience Facility*

**RP** – Retrofitting policies

**TOD(s)** – Transit-Oriented Developments

**UFI** – Umweltförderung im Inland, National support for energy efficiency measures (Austria)

**"Raus aus Öl und Gas"** – Austrian program for phasing out fossil fuels

**Sanierungsbonus** – Austrian renovation bonus

**Zone d'aménagement concerté (ZAC)** – public urban development operation aimed at carrying out, or commissioning, the servicing and preparation of building land, with a view to its subsequent sale or concession to public or private users

# 8. Annex: Land use and market trends

A consistent finding across all nine countries is that market-driven densification contributes to worsening housing affordability conditions, leading in some cases to various forms of displacement and gentrification. The mechanisms differ: in the UK and Hungary, estate regeneration projects and brownfield developments directly displace lower-income communities; in Norway, housing produced in densification areas is often positioned at the high end of the market, pricing out lower-income groups and creating displacement pressures. ; in France, the Grand Paris transit-oriented development increases land values in the Paris periphery, displacing working-class communities; in Italy, urban regeneration of former industrial sites produces housing targeted at affluent populations in formerly mixed neighbourhoods; in Spain, TODs and the Superblock programme drive up property values in targeted areas; in Switzerland, TODs displace low-income households near transport hubs; in Poland, revitalisation projects in Warsaw, Lodz and Gdansk produce gentrification through rising prices and displacement of long-term residents; in Austria, market-rate attic conversions and new constructions exempt from rent control allow private developers to extract value from densification in established residential areas without affordability obligations.

Only Austria (via Vienna's Subsidised Housing zoning category and developer competitions) and France (via the ZAC public land development mechanism and social housing quotas in some planning documents) have developed specific regulatory tools to capture densification value for affordable housing at the planning or development stage. Inclusionary zoning requirements — requiring a fixed proportion of affordable units in all new developments — are present in a weakened form in the UK (S106), largely absent in Norway, and not systematically applied in Hungary, Italy (at the discretion of municipalities), Poland, Spain or Switzerland.

### *National Frameworks*

Norway stands out as the country with the most operationally effective national framework: the Planning and Building Act creates binding expectations for densification at the national level, which cascade to regional and local plans. State planning guidelines explicitly link densification to transport planning, and national climate plans have embedded consistent densification principles since the 1990s. The result is a coherent national framework with genuine normative force, even though implementation remains substantially decentralised to municipalities.

Switzerland's SPA I (2014) is the most structurally binding densification legislation in the sample, as it was passed by popular vote and requires cantonal structure plans to be approved by the federal government before rezoning is permitted. The absolute freeze on building zones from 2019 until all cantonal plans were approved demonstrates the coercive potential of the Swiss system. However, only 43% of municipalities had fully adapted their land-use plans to cantonal structure requirements as of 2022, indicating that even binding national frameworks face implementation delays at the municipal level.

France's ZAN framework (Loi Climat et Résilience 2021) represents an ambitious attempt to set binding national targets for the artificialisation of land. However, the law's implementation has been contested by local authorities, who argue that the uniform regional-level reduction targets fail to account for territorial disparities and that local governments lack the financial

tools to achieve ZAN objectives without restricting housing development in ways that exacerbate housing costs. The law has undergone further revision and remains subject to ongoing political controversy.

Austria's national densification framework — centred on ÖREK 2030 and the government programme 2020–2024 — operates as a recommendation without binding legal force. The failure to adopt a national Land Protection Strategy (Bodenschutzstrategie) due to resistance from the federal states illustrates the limits of voluntary coordination in a federal system without strong central steering mechanisms. Individual federal states retain full autonomy in spatial planning.

Hungary presents the clearest case of formal national densification objectives coexisting with systematic institutional incapacity to achieve them. The 2014 National Development and Territorial Development Concept set compact city objectives, but the 2014 background document acknowledged that implementation of the previous 2005 plan was 'close to zero', with 'governmental will to enforce the objectives of territorial development policy missing'. Since 2012, increasing central government control over planning through state priority investments and emergency decree powers has paradoxically made systemic densification less, not more, achievable.

The UK's national framework differs structurally from all other countries: rather than seeking to build up municipal planning capacity for densification, central government has consistently weakened local authority financial and institutional capacity (through HRA borrowing caps, reduced central grants, forced land disposal requirements) while using national-level strategies (the 2003 Sustainable Communities Plan, the 2016 Estate Regeneration National Strategy, the 2023 Long-term Plan for Housing) to direct private and non-profit investment into designated densification zones. The national level thus acts as a facilitator of market-led densification rather than a counterweight to it.

### *Regional Tiers*

The strength and role of the regional tier vary considerably. Spain's 17 autonomous communities exercise significant regulatory autonomy and have adapted national densification objectives to local contexts: Catalonia has introduced TOD legislation; Andalusia focuses on historic urban core revitalisation; the Basque Country (Bilbao) has provided substantial regional and city-level subsidies for brownfield regeneration. This regional variation introduces both dynamism and inequality — more resourced regions implement more effectively.

Italy's regional divergence in urban regeneration legislation is marked, with regions like Lombardy, Emilia-Romagna and Puglia having adopted specific urban regeneration laws, while others have not. The absence of a national urban regeneration law means that regional frameworks are the primary regulatory instrument, producing high variation in how densification is governed.

In Switzerland, cantons are the primary intermediate tier, and their structure plans are the key instrument through which federal densification objectives are operationalised. Cantonal approval by the federal government provides a meaningful quality control mechanism. However, cantonal approaches to densification vary considerably, with rural cantons

(particularly those dependent on tourism) historically hostile to densification goals, as illustrated by the geographic distribution of the 2013 SPA I vote.

In Austria, the nine federal states have full legislative authority over spatial planning, and the failure to achieve binding national land protection legislation reflects state-level resistance. Regional spatial planning departments at the state level set planning objectives that bind municipalities, but are themselves not bound by national spatial goals.

In Norway and Poland, the regional tier (county level) plays a secondary role. Norway's regional plans are less significant than municipal master plans for day-to-day governance of densification. Poland's voivodeships prepare regional spatial plans that can influence municipal planning, but the primary locus of action is the municipality.

### *Municipal Implementation and Capacity Gaps*

Across all nine countries, municipalities are the primary implementers of densification, and municipal capacity — financial, technical, and political — is identified as a critical bottleneck. The gap between national ambition and municipal delivery is most acute in countries with large numbers of small municipalities: Hungary (average population per municipality: 3,000), Switzerland (many small rural communes), Poland (high fragmentation), and Austria (276 municipalities in Vienna's metropolitan area).

Switzerland's ARE (Federal Office for Spatial Developmet) explicitly identifying municipal capacity constraints as one of the primary factors limiting the implementation of densification: municipalities must develop new competences to manage dense, high-quality settlements, but limited resources lead to reliance on external experts, slowing knowledge transfer and locally adapted solutions. Only 43% of municipalities have fully adapted their plans to cantonal structure requirements.

Austria's Brownfield Dialogue programme and Klimafitte Ortskerne subsidy scheme represent attempts to build municipal capacity for brownfield activation, but they are small-scale relative to the systemic challenges posed by land sealing and urban sprawl. The political economy of municipal land use — in which municipalities benefit financially from new construction tax revenues and resist binding limits on land consumption — creates a structural misalignment between national environmental objectives and local fiscal incentives.

The UK has seen a systematic weakening of local authority housing capacity since the 1980s, through loss of housing stock (Right to Buy), financial ring-fencing (HRA), borrowing caps, and pressure to dispose of public land. The Mayor of London's Council-led Housing Network, Housing Development Academy, and Land for Council Homes Revenue Fund represent recent attempts to rebuild local authority capacity but remain small relative to the scale of housing need.

Hungary's municipalities are constitutionally responsible for local planning but are practically unable to exercise this responsibility due to financial pressure, the prevalence of state priority investments overriding local plans, and the fear of compensation lawsuits if they tighten previously lax planning permissions. The result is that municipalities are passive observers of private developer-led densification rather than active shapers of urban form.