REDUCING
HOUSING
INEQUALITIES

National report on the regulatory system of environmental and energy policies: Poland

An extract from Deliverable 3.2, *'National reports on the regulatory system of environmental and energy policies'*, of the ReHousIn project

August 2025

FOREWORD

This report is an extract from Deliverable 3.2, 'National report on the regulatory system of environmental and energy policies', of the ReHousIn project, which examines the economic mechanisms, norms, and institutional and contextual factors that shape the Environmental and Energy Policies (EEPs) in nine European countries.

The full version of the deliverable is available here.

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This document has been prepared in the framework of the European project ReHousIn – "Contextualized pathways to reduce housing inequalities in the green and digital transition".

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

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NATIONAL REPORT ON THE REGULATORY SYSTEM OF EEPs IN POLAND

1 Executive Summary

The main objective of this report is to provide a national assessment of the regulatory systems of Energy and Environmental Policies (EEPs) in Poland. The report specifically addresses housing retrofitting, nature-based solutions, and densification policies, all considered within the broader framework of national climate change mitigation and adaptation strategies. It explores the three core themes of the ReHousIn project: retrofitting residential buildings, implementing nature-based solutions (NBS) in urban areas, and promoting densification in and around urban centers. Each theme is addressed in a dedicated chapter, further divided into subchapters that examine the policy cycle, implementation processes, market dynamics, and multi-level governance.

The report highlights the significant progress and ongoing challenges in improving energy efficiency and living standards in the country's residential sector. The retrofitting initiatives, largely driven by EU funding and national programs such as Clean Air and Thermomodernization, have led to measurable reductions in energy consumption and substantial decreases in CO_2 emissions. Many buildings have undergone various degrees of modernization since 2018, including window replacement, insulation upgrades, and heating system improvements. Despite these successes, the report identifies persistent barriers, including limited outreach in rural areas, financing gaps for low-income households, and fragmented implementation. Strengthening coordination, simplifying procedures, and promoting integrated solutions are key recommendations to accelerate progress toward national and EU climate goals.

The report outlines the growing adoption of sustainable, ecosystem-driven approaches to urban and environmental challenges, with a focus on enhancing climate resilience, biodiversity, and quality of life. Key initiatives include the revitalization of urban green spaces, the restoration of riverbanks and wetlands, and the implementation of green roofs and rain gardens in cities. However, gaps remain in long-term financing, policy integration, and monitoring. Strategic scaling and mainstreaming of NBS into urban planning and climate adaptation strategies are recommended for maximizing impact.

In context of development densification in Poland the report examines national and local efforts to promote more compact urban growth as a response to urban sprawl and inefficient land use. Densification policies aim to improve the use of existing infrastructure, reduce environmental impact, and support more sustainable city development.

2 Introduction and methodology

This report attempts to understand how energy and environmental policies implemented in Poland affect housing inequalities. The starting point was an analysis of existing regulations and strategies, conducted from a multi-level governance perspective, considering actions at national, regional and local levels. As a Member State of the European Union (EU), Poland is committed to implementing common climate goals. Although the framework of these commitments is defined at the EU level, specific instruments and actions are taken by national and local governments, with local authorities playing a key role in implementing the strategy on the ground. There is a common consensus on the direction of energy transformation in Poland, but specific solutions are often met with resistance, which is reflected in numerous public discourses and disputes around individual actions.

The report focuses on three areas that are particularly important from the point of view of climate policy: housing retrofitting, implementation of nature-based solutions and densification of development, and which can support both adaptation and mitigation actions. Poland faces the challenge of massively improving the energy efficiency of buildings, especially in the residential sector. The current regulations and programs, such as "Clean Air", “My Electricity” or "Thermal Modernization Relief", create a framework for support for property owners, but their availability is uneven across different social groups. The problem remains the lack of real possibilities for their implementation by local governments and households, and the related limited availability of financing, especially for municipal and social resources.

In recent years, there has been growing interest in the use of nature-based solutions in cities, especially in the context of adaptation to climate change (e.g. stormwater management or counteracting heat islands). Despite this, NBS are still treated as optional measures, not standard elements of public investments. There is a lack of both a systemic approach in national policies and tools supporting long-term maintenance of green infrastructure at the local level.

Although spatial policies promote the idea of "compact cities", in practice, densification often takes place haphazardly and without appropriate infrastructure support. Legal conditions (e.g. lack of effective planning tools or too fragmented ownership structure) make it difficult for municipalities to act effectively in this area. At the same time, development pressure means that densification, instead of improving the quality of life, may lead to social conflicts and deepening territorial inequalities.

The report is based on the analysis of secondary data, including information, thematic studies, statistical data and evaluation reports available prepared by relevant public institutions, such as the Ministry of Development and Technology, the Ministry of Climate and Environment, the Central Statistical Office, and the National Fund for Environmental Protection and Water Management.

Poland’s Energy and Environmental Policies have evolved through EU directives, national plans (National Environmental Policy 2030, NEP2030, Energy Policy of Poland until 2040, EPP2040), and subsidy programs like 'Clean Air', 'My Electricity', and 'Stop Smog'. EEPs are partially aligned with housing policy, but integration is weak. Retrofitting efforts support energy-

poor households, but affordability and access issues remain, especially for large-scale or multi-unit retrofits. Programs target individual owners more than rental or social housing.

The review also used information on the applicable legal framework for energy transformation and environmental protection and spatial policy, both at the national and lower levels. Analyses of the mechanisms for implementing public policies were also included with an emphasis on the role of local governments, which in Poland bear a large responsibility for the implementation of many activities. The degree and manner of implementing policies differs significantly depending on local conditions, such as the financial situation of local governments, the availability of technical and human resources, local political priorities and the level of involvement of residents.

The study also considers available scientific literature focusing on the relationships between environmental and energy policies and housing inequalities. However, there are still relatively few studies of this type in Poland. The most attention is paid to the impact of thermal modernisation and revitalisation processes on the availability of housing stock, while issues related to the densification of development, or the implementation of nature-based solutions are less frequently analysed. Studies linking NBS with the issue of housing inclusiveness are exceptional and in most cases are limited to projects implemented under European grants.

While the study provides valuable insights into the regulatory systems of Energy and Environmental Policies in Poland, several methodological limitations should be acknowledged. First, the report is primarily based on desk research, relying on publicly accessible datasets, national legislation, and strategic documents. As such, the analysis is constrained by the availability, timeliness, and completeness of publicly available information. Important aspects of policy implementation, enforcement, or informal governance practices may not be fully captured in official documents. It is further informed by scientific assessments as well as the authors' own research and consultancy experience within the Polish context. Moreover, the research was complemented by the focus group Policy Lab #1, as well as free-form interviews with experts and policymakers.

Policy Lab #1 also made a valuable contribution to the report. They were conducted in two meetings - one in Łódź and one in Warsaw, to accommodate the geographical spread of the case studies and maximize stakeholder participation. The format combined plenary presentations with breakout group work. Each meeting began with an introduction to the ReHousIn project, covering its objectives, partners, and preliminary findings. Participants were then divided into mixed stakeholder groups (4–6 people) for three discussion rounds focused on key challenges related to retrofitting, urban densification, and NBS. Each round was introduced with a short presentation on the topic, followed by group work and a final plenary discussion where teams shared insights and engaged in collective reflection.

For the Polish case, a series of free-form interviews were conducted with key stakeholders from local government to explore the complex relationship between housing and environmental policies (Table PL1). These open-ended conversations, each lasting between 15 minutes to 1 hour, allowed for a flexible discussion of governance practices, inter-sectoral collaboration, and the use of policy tools and funding schemes.

Interview	Key informant/Institution	Focus
Interview 1	Nine representatives from the municipality of Pabianice	Energy retrofitting, nature-based solutions, densification and housing policy
Interview 2	One representative from the municipality of Radomsko	Energy retrofitting, nature-based solutions, densification
Interview 3	Four representatives from the municipality of Warsaw	Energy retrofitting, nature-based solutions, densification and housing policy

Table PL1. List of conducted interviews

Source: own elaboration.

The qualitative data collected through free-form interviews with experts and policymakers and focus group provide valuable context and stakeholder perspectives. However, these engagements were limited in number and scope, meaning that the findings may not fully reflect the diversity of opinions or experiences across all governance levels and regions in Poland. These limitations highlight the need for further empirical research, stakeholder engagement, and longitudinal studies to complement this assessment and support evidence-based policy development in Poland's energy and environmental governance landscape.

The report opens with an executive summary. Chapter 2 outlines the methodological framework, based on desk research using publicly available data, national legislation, and strategic documents, complemented by scientific assessments and the authors' own research and consultancy experience in Poland. Chapter 3 describes the general governance system, offering an overview of the institutional setup, key actors, and regulatory mechanisms that shape environmental and energy-related policymaking. Chapters 4 to 6 explore three core policy domains in detail:

- Chapter 4 focuses on housing retrofitting, assessing the policy cycle, implementation mechanisms, market dynamics, governance arrangements, and the outcomes achieved,
- Chapter 5 addresses NBS projects, examining how these initiatives emerge, are governed, and implemented across various administrative levels,
- Chapter 6 investigates densification projects, analyzing urban planning responses aimed at increasing spatial efficiency and the associated governance and market frameworks.

Each of these chapters is structured into 5 recurring sub-sections: (1) the emergence of the issue and policy decisions; (2) implementation processes; (3) the size and role of the market; (4) multilevel governance processes; and (5) achievements, evaluations, and challenges.

Finally, Chapter 7 provides a synthesis of findings, including a summary of changes in the EEP landscape and an analysis of the interactions, synergies, and trade-offs between EEPs and housing policies in Poland.

3 General governance system

Poland (Polska) is a democratic republic with a parliamentary system of government, which means that power is exercised by representatives elected by the citizens, and the parliament plays a key role in the governance process. This system is based on the principle of the separation of powers, which involves the division and mutual balancing of the three main branches of government: the executive, the legislative, and the judiciary.

When analysing the general governance system in Poland from a spatial perspective, it is essential to consider the profound political and socio-economic changes that began in 1989. This period marked a major shift from a centrally planned economy to a market-oriented one, significantly influencing the approach to spatial and land development (Bański, 2007). The post-1989 transformation was characterized by several critical developments: the decentralization of political authority and the revival of local self-governance; the privatization and decentralization of the economy; the alignment of spatial planning legislation with European Union standards; and, following EU accession, access to structural and agricultural funding (Węcławowicz et al., 2006).

A key milestone in this transformation was the administrative reform implemented on January 1, 1999, which replaced 49 smaller provinces with 16 larger voivodeships, further subdivided into counties (powiat) and municipalities (gmina). This reform aimed to establish a clearer allocation of responsibilities between central and local government, reserving national-level administration for matters of overarching state policy (Wendt, 2007).

During the 1990s, Poland also began receiving significant foreign investment and development aid, with a notable focus on regional development. The importance of these resources increased substantially after joining the European Union in 2004. Over the past decade, the country has experienced marked demographic concentration in major urban centres, improvements in technical infrastructure, and a relative decline in the industrial sector's prominence within the national economy. These trends have been accompanied by the adoption of numerous strategic documents shaping spatial development and regional policy at the national level (Bański, 2007; Borowska-Stefańska et al., 2018).

As of January 1, 2025, the administrative division of Poland comprised: 16 voivodeships (provinces), 314 counties (powiats) and 66 cities with county rights, and 2,479 municipalities, including 302 urban, 718 urban-rural, and 1,459 rural municipalities[1].

The foundations of Poland's political and legal system are defined by the *Constitution of the Republic of Poland* (1997), which is the highest legal act in the country. The Constitution not only guarantees democratic principles of governance but also ensures civil rights and freedoms, the independence of the judiciary, and mechanisms of checks and balances between the various organs of the state. It outlines, among other things, the procedures for appointing top state officials, their competencies, and the relationships between state institutions, thereby ensuring transparency and stability in the political system.

[1] https://stat.gov.pl/statystyka-regionalna/jednostki-terytorialne/podzial-administracyjny-polski/ [Last accessed on 31.05.2025]

In practice, this means that no single branch of power can dominate the others. The executive branch (the President of the Republic and the Council of Ministers) is responsible for directing the state and implementing internal and foreign policy. The legislative branch (the Parliament, composed of the Sejm and the Senate) creates laws, adopts the budget, and supervises the activities of the government. Meanwhile, the judiciary (courts and tribunals) safeguard the law and the constitutionality of state actions, ensuring the protection of citizens' rights (Grabowski, 2021).This system of government is designed to maintain a balance of power and protect against its abuse, which forms the foundation of the rule of law and a civil society.

The multi-level governance framework in Poland is based on a decentralized system of public administration, which ensures that powers and responsibilities are shared between the national, regional (voivodeship), county, and local/municipal levels. This system was reformed significantly in 1999 and reflects the principles of subsidiarity, decentralization, and partnership (Stec et al., 2018).

In Poland, the competences for ecological transitions, particularly in housing retrofitting, urban densification, and nature-based solutions (NBSs), as well as broader housing policies, are distributed across four main levels of governance: national, regional (voivodeship), county (powiat), and local/municipal (*gmina*). Each level plays a distinct role, shaped by its legal competences, administrative capacity, and proximity to local needs (Table PL2).

Level	Housing	Housing retrofitting	NBS	Densification
National level	Formulating national housing policy and strategy, including housing support programs Coordinating state-funded programs for social housing, rent subsidies, and energy efficiency in buildings Allocating EU funds and national grants to regional and local governments for housing projects Supervising state-owned housing institutions	Develops national programs and strategies for energy efficiency, climate action, and housing quality Sets national regulations and standards for building energy performance and retrofitting practices Allocates national budget funds and coordinates EU funding (e.g., from the Cohesion Fund, Recovery and Resilience Facility) Oversees grant and loan programs for individuals, housing cooperatives, and local governments	Formulates national environmental including climate adaptation and biodiversity strategies Implements EU directives related to environment and nature protection Establishes legal frameworks promoting ecosystem restoration, green infrastructure, and sustainable land use	Develops national spatial planning policies that encourage sustainable urban development and densification. Implements national strategies related to urbanization, housing, and infrastructure development Supports national programs for urban renewal and brownfield redevelopment Allocates funding for infrastructure projects supporting densification (e.g., transport, utilities)

Level	Housing	Housing retrofitting	NBS	Densification
Regional level (województwo)	Planning and coordinating regional housing development strategies, often linked to regional development and spatial planning Managing EU structural funds for housing renovation, energy efficiency, and social inclusion projects (especially in urban regeneration) Supporting and coordinating projects involving multiple counties or municipalities Conducting spatial analysis and regional forecasts to guide housing policy decisions	Allocates and manages regional Operational Programs, including ERDF funds for energy-efficient renovation of buildings Supports municipal projects and housing cooperatives applying for funding Incorporates retrofitting into regional development strategies and low-emission economy plans Coordinates regional-scale initiatives in collaboration with multiple municipalities	Integrates NBS into regional development strategies and environmental protection plans Coordinates ecosystem restoration, green infrastructure, and sustainable agriculture at the regional scale Oversees the implementation of protected areas (like Natura 2000) and compliance with environmental standards	Develops and implements regional spatial development plans that identify areas for urban densification Coordinates between counties and municipalities to ensure coherent regional development patterns
County level (powiat)	Limited direct role Managing housing support through social welfare institutions, including temporary accommodation or assisted housing	Limited direct role May retrofit housing units in social care or educational institutions	Limited direct role Provides technical support for environmental initiatives in schools, social institutions, and local infrastructure	Limited direct role Supports municipalities in managing secondary roads and services linked to densification
Local/municipal level (gmina)	Primary responsibility for housing provision and management Managing municipal housing stock Allocating social housing and setting rent levels based on income criteria	Retrofitting and energy modernization of municipal housing stock Applying for national or regional funding to finance projects Developing local energy plans, low-emission development programs, and spatial policies that prioritize	Establishes and maintains urban green spaces, parks, community gardens, and natural flood defenses Implements local flood prevention and water management solutions based on	Develops local spatial development plans or issues zoning decisions that regulate building density, land use, and redevelopment Grants building permits and controls compliance with urban planning rules Promotes infill development,

Level	Housing	Housing retrofitting	NBS	Densification
	Maintaining and renovating public housing units Creating local spatial development plans that determine where residential buildings can be constructed Cooperating with NGOs and private developers for affordable housing projects Managing housing subsidies and allowances for low-income residents	sustainable retrofitting Informing and assisting residents and housing cooperatives in accessing grants or loans (e.g., Stop Smog program)	natural ecosystems Manages local biodiversity, supports pollinator habitats, and tree planting initiatives Incorporates green infrastructure and NBS into local land-use plans and building regulations	brownfield redevelopment, and multi-family housing projects Ensures adequate local infrastructure (water, sewage, roads, public transport) to support higher densities. Engages in community consultation

Table PL2. Multilevel governance in housing, retrofitting, NBS and densification in Poland

Source: own elaboration.

The national level is responsible for setting the overall legal and policy frameworks, including building codes, energy efficiency standards, and strategic programs (e.g., “Clean Air” or the National Housing Program). It allocates national and EU funds, oversees implementation through state agencies, and ensures compliance with EU directives on climate and biodiversity.

The regional level adapts national policies to regional conditions by incorporating housing and ecological goals into development strategies, managing EU Operational Programs (e.g., for retrofitting or environmental protection), and coordinating projects involving multiple municipalities. Regions also play a role in spatial planning and environmental monitoring.

The county level in Poland has limited but supportive functions. It often acts through social welfare institutions and may engage in small-scale retrofitting or infrastructure maintenance. Counties can also assist in coordinating efforts among municipalities, especially in areas like public transport or secondary infrastructure relevant to densification.

The local/municipal level has the most direct implementation role. Municipalities manage public housing, develop local spatial plans, issue building permits, and lead on-the-ground retrofitting projects. They also maintain urban green spaces, apply NBSs in flood management or biodiversity support, and ensure infrastructure is in place to accommodate higher urban density. Their proximity to residents allows them to tailor solutions to local needs and engage communities in planning and decision-making processes.

One of the key challenges in Poland's governance framework for ecological transition and housing policy is the fragmentation of institutional responsibilities. Various ministries and agencies are involved in related area, such as the Ministry of Climate and Environment, the Ministry of Development and Technology, and the Ministry of Infrastructure, often with overlapping or poorly delineated mandates. The absence of a strong, central coordinating authority or an integrated governance mechanism for ecological transition results in limited policy coherence across sectors. This fragmentation complicates efforts to design and implement cross-cutting initiatives such as housing retrofitting or NBS, which require collaboration across environmental, energy, and housing domains.

A significant governance challenge in Poland is the weak horizontal integration between sectors and policy areas, particularly at the national and local levels. Policies related to housing, energy efficiency, climate adaptation, urban planning, and environmental protection are often developed and implemented with limited coordination among responsible departments and agencies. As a result, initiatives such as densification or housing retrofitting are frequently planned without full consideration of ecological goals, NBS may be treated as stand-alone environmental projects rather than being integrated into broader urban development strategies.

4 Housing retrofitting

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

Housing retrofitting in Poland has gained increasing importance due to the country's energy dependency, poor air quality, and aging housing stock, much of which is energy-inefficient. Poland has been a signatory to the *United Nations Framework Convention on Climate Change* (UNFCCC) since 1994 and the *Kyoto Protocol* (KP) since 2002, thereby participating in efforts undertaken by the international community to mitigate climate change. In the first commitment period following Polish ratification of the KP, Poland committed to reducing greenhouse gas emissions by 6% between 2008 and 2012 compared to the baseline year (1988). Poland achieved this reduction target with a significant surplus (Bebkiewicz et al., 2023). In 2016, Poland ratified the so-called Paris Agreement. This agreement is the next stage in international climate policy, following the KP, and engages all parties to the UNFCCC in actions aimed at protecting the climate. Air protection in Poland improved significantly after the fall of communism in 1989/1990 due to economic reforms and heavy industry closures but disappeared from public focus for over a decade. It reemerged around 2008 as a household emissions issue from solid-fuel heating, sparking public debate and responses from various actors (Matczak et al., 2023).

Over time, several national policies in Poland directly or indirectly impact housing retrofitting (Figure PL1). These policies aim to address energy efficiency, air quality, and greenhouse gas emissions while supporting the social and economic needs of households. The most important regulations within the EU's climate policy are the new EU regulations from the '*Fit for 55*' package and the EU energy transformation plan *'REPowerEU'*.

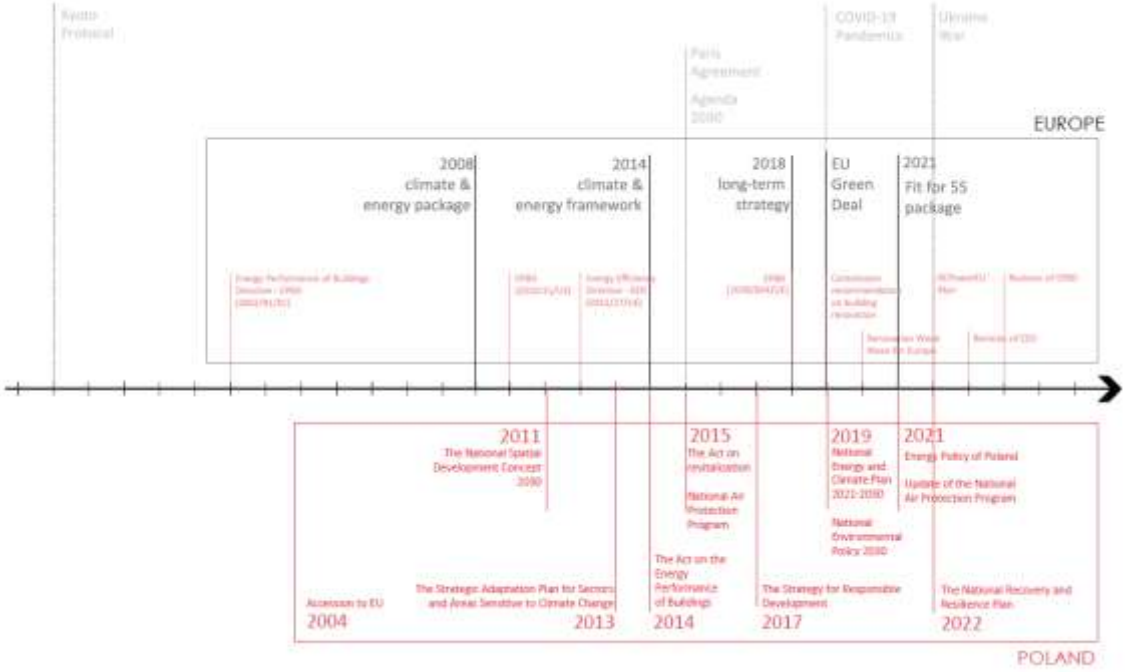

Figure PL1. Timeline with milestones for introducing housing retrofitting in Poland

Source: own elaboration.

In the case of Poland, the initial impetus for action to improve energy efficiency and air quality came largely from the European Union. It was EU directives, such as the Energy Performance of Buildings Directive (EPBD – first version in 2002 and updates in 2010 and 2018) and the 2020 and 2030 climate and energy packages, that established the legal and directional framework for the modernization of building stocks. Poland transposed these regulations gradually and often with delay, which translated into delayed implementation of national measures. The EU therefore played not only the role of initiator, but also of active corrector – through monitoring mechanisms, fund conditionality and proceedings before the Court of Justice of the EU. As a result, it is the European Union that remains the key driver for national modernization policy, both through regulatory pressure and financial support.

The ***Act on the Energy Performance of Buildings*** (2014) is Poland's key legal instrument implementing EU directives on building energy efficiency. It establishes national standards for calculating energy performance, defines requirements for nearly zero-energy buildings, and mandates energy performance certificates (EPCs) for new, sold, or rented buildings. The Act also introduces a central register of EPCs and inspections and regulates the control of heating and cooling systems. It supports both compliance with EU law and national climate goals by enabling oversight, improving building performance, and linking retrofitting projects to funding schemes.

Until 2014, Polish cities underwent intensive renovations and modernization. Their appearance improved, and the quality of life was enhanced. Since 2004, infrastructural changes began to be referred to as revitalizations. This shift in terminology resulted from changing conditions - EU funds were allocated for revitalization, so local authorities started using this term for their renovation efforts. The Polish government closely monitored local governments' activities and

achievements in the field of revitalization. Evaluating successes and failures led to the development of a series of solutions aimed at improving the process. A key tool in this effort was the adoption of the revitalization law. In 2015, the ***Act on Revitalization*** was introduced, establishing a legal framework to regulate the entire process. For the first time in Polish law, it defined revitalization as an initiative aimed at restoring degraded urban areas from crisis conditions. These areas are identified by severe socio-economic challenges, including high unemployment, poverty, and low entrepreneurial activity. The concentration of these issues within specific territories leads to social segregation, stigmatization, and the perpetuation of poverty across generations (Hughes et al., 2024; Popławska, 2019).

In Poland, ***revitalization*** applies to municipal areas facing crises due to social, economic, and environmental issues. The policy focuses on comprehensive interventions through integrated projects addressing local challenges holistically. Actions are concentrated in specific areas, ensuring complementarity in spatial and problem-solving terms while aligning with strategic programs. Additionally, revitalization efforts are co-financed through EU funds to enhance their effectiveness (Ciesiółka, 2018; Hajduga & Mempel-Śnieżyk, 2023; Kucharska & Piwowarczyk, 2023). Although retrofitting is not the primary objective of the Act on Revitalization, it may be supported indirectly, if it contributes to the implementation of revitalization objectives, especially by improving the quality of life and functionality of buildings in the areas covered by the activities. The period 2015–2019 was crucial for the implementation of the Act, which was the phase of its most intensive application, and the implementation of activities was often linked to the use of EU funds from the 2014–2020 financial perspective. EU cohesion policy funds were the main source of support for investments in urban renewal, including building modernization, especially when it was in line with social objectives, such as combating energy poverty or improving housing conditions.

An interesting example of revitalization efforts is Łódź. The degraded area undergoing revitalization is highly diverse in terms of spatial organization, consisting of residential, industrial, and storage areas, as well as parks and urban green spaces. Additionally, it includes a zone with architectural monuments and 19th-century urban heritage, such as the original land plots and morphogenetic units corresponding to early craft settlements established during the city's initial industrial development. Revitalization efforts in Łódź are carried out by both the public sector (municipal authorities and their designated agencies) and private capital (Kaczmarek, 2024).

In 2015, the ***National Air Protection Program until 2020*** was adopted. The program recommended the development and dissemination of technologies to improve air quality and increasing the energy efficiency of residential and public buildings through deep thermal modernization. The document aims to coordinate actions within the national air quality policy framework, linking it to sectors such as housing and municipal services, clean energy, heating, renewable energy sources, and transportation. In December 2021, an updated version of the ***National Air Protection Program until 2025 (with a perspective extending to 2030 and 2040)*** was published. This updated document continues to align air quality policies with key areas, including the residential and municipal sectors, clean energy, heating, renewable energy sources, and transportation.

In 2016, Poland adopted the ***Act on Energy Efficiency***. The Act introduced regulatory changes beneficial to both economic development and citizens. Its purpose is to allow anyone who meets specific requirements - such as conducting an energy efficiency audit for a particular investment - to receive benefits in the form of property rights derived from energy efficiency certificates, commonly known as white certificates.

In 2019, the Ministry of Environment published the ***National Environmental Policy 2030*** (NEP2030) strategy. The strategic goals of NEP2030 include eliminating sources of air pollution or significantly reducing their impact, managing geological resources through the development and implementation of a national raw materials policy, supporting eco-innovation, adapting to climate change, and managing disaster risks. NEP2030 serves as the foundation for investing European funds from the 2021–2027 financial perspective. The strategy also supports Poland's national and international commitments, including those at the EU and UN levels, particularly in the context of the EU's climate and energy policy goals for 2030 and the sustainable development goals outlined in the 2030 Agenda.

In 2019, Poland adopted the ***National Energy and Climate Plan for 2021–2030***. The plan outlines measures to adapt to climate change by promoting sustainable management of environmental resources and ensuring the economy and society function effectively under evolving climate conditions, as detailed in the *National Environmental Policy 2030*. It also defines key assumptions, objectives, policies, and actions in areas such as energy security, the internal energy market, energy efficiency, decarbonization, and research, innovation, and competitiveness. However, since 2020, the plan's implementation has faced significant disruptions due to unforeseen crises.

In 2021, Poland adopted the ***Energy Policy of Poland until 2040*** (EPP2040). The policy aims to ensure energy security while maintaining economic competitiveness, improving energy efficiency, and minimizing the environmental impact of the energy sector, all while optimizing the use of domestic energy resources. Key strategic directions for implementation in Poland include the optimal use of domestic energy resources, expansion of electricity generation and grid infrastructure, diversification of supply sources and expansion of network infrastructure for natural gas, crude oil, and liquid fuels, development of energy markets, implementation of nuclear energy, growth of renewable energy sources, advancement of heating and cogeneration, and improvement of the economy's overall energy efficiency.

The ***Energy Policy of Poland until 2040*** and the ***National Energy and Climate Plan 2021-2030*** determine the timeline for Poland's transition away from coal mining and its use in conventional energy production by 2049, as established by the signatories of the social agreement regarding the transformation of the hard coal mining sector. In 2022, ***The National Recovery and Resilience Plan*** was adopted. Due to the climate considerations, the expected outcomes of the interventions outlined in a plan include: an increase in the share of energy from renewable sources in total gross energy consumption, a reduction in exposure to air pollution from particulate matter (PM2.5 and PM10).

4.2 The implementation process

In Poland, several tools have been developed to support housing retrofitting, aimed at improving energy efficiency and reducing environmental impact. These tools include financial incentives and technical guidelines that facilitate the modernization of residential buildings while promoting sustainability and compliance with EU standards (Table PL3).

Tool	Structures of Implementation	Time Horizon
'Clean Air' Program *[Program 'Czyste Powietrze']*	Poland's first subsidy program aims to replace old furnaces and insulate single-family homes to improve air quality and reduce greenhouse gas emissions. The program co-finances projects covering tasks like replacing heating sources, insulating buildings, upgrading windows and doors, and installing renewable energy systems. The building must already exist, not be under construction, to qualify for the subsidy. Eligibility criteria: homeowners or co-owners of existing single-family houses; the building must not be under construction Targeting: strong income differentiation: three subsidy levels based on income brackets; not available to renters or multi-family buildings[2].	2018-2029
Thermal Modernization Relief	The thermal modernization relief is a financial support program that encourages single-family homeowners to improve energy efficiency. Taxpayers can deduct the costs of thermal modernization projects from their tax base, with the relief available. Eligibility criteria: owners/co-owners of existing single-family homes; capped at PLN 53,000 (12 550 EUR) per taxpayer. Targeting: no direct income targeting (available to all taxpayers), but those with higher tax base benefit more; only applicable to owner-occupied housing (not rentals); no support for tenants or social housing[3].	From 2019
'My Electricity' Program *[Program 'Mój prąd']*	Program supports prosumer energy development by providing subsidies for photovoltaic installations and energy efficiency devices. It targets owners of single-family homes planning to install photovoltaic systems. Since 2022, the program has also subsidized energy storage, heat storage, and energy management systems (HEMS/EMS). Eligibility criteria: residential building owners who register as prosumers. Targeting: no income differentiation; owner-occupiers only; excludes tenants and social housing[4].	From 2019
'Warm Apartment' Program *[Program 'Ciepłe mieszkanie']*	The program aims to improve air quality and reduce emissions by replacing heat sources and enhancing energy efficiency in multi-family residential buildings. It is directed at municipalities, which then recruit individuals with legal ownership or property rights to residential premises	2022-2026

[2] https://czystepowietrze.gov.pl/ [Last accessed on 28.05.2025]
[3] https://www.podatki.gov.pl/pit/ulgi-odliczenia-i-zwolnienia/ulga-termomodernizacyjna/ [Last accessed on 28.05.2025]
[4] https://mojprad.gov.pl/ [Last accessed on 28.05.2025]

Tool	Structures of Implementation	Time Horizon
	Eligibility criteria: owners of flats in multi-family buildings; via local government call. Targeting: income-based co-financing (up to 90%); includes rental units and potentially social housing; accessible to individuals with legal property rights[5].	
'My Heat' Program *[Program 'Moje ciepło']*	The program aims to support the development of individual heating and prosumer energy through the installation of air, water, and ground heat pumps in new single-family homes. It provides co-financing for the purchase and installation of these heat pumps for heating or hot water purposes. The grant covers up to 30% or 45% of eligible costs, with a maximum of PLN 21,000 (4 970 EUR) per investment. Eligibility criteria: owners/co-owners of new buildings (constructed after 2021) meeting energy standards. Targeting: only for owner-occupied housing; not available for rental or social housing; higher co-financing rate (45%) for holders of the Large Family Card (a support program for large families in Poland, which provides discounts and reliefs on various services and products)[6].	2022-2026
'Stop Smog' Program	Program helps replace or eliminate high-emission heat sources and modernize thermal systems in single-family homes. It is managed by municipalities that apply for funding from the National Fund for Environmental Protection and Water Management. The program aims to reduce pollution, improve air quality, and increase energy efficiency, particularly for low-income households. Key actions include replacing high-emission heat sources, thermal modernization, connecting to heating or gas networks, and providing access to renewable energy sources Eligibility criteria: households in energy poverty; property must be in a municipality that signed a cooperation agreement. Targeting: strong income targeting: focuses on the poorest households; housing tenure must be owner-occupied; does not include tenants or institutional landlords[7].	2019-2024
Energy Advisory System	Project, run by Provincial Funds for Environmental Protection and Water Management, employs Energy Advisors to promote and raise awareness about low-emission practices, energy efficiency, renewable energy, and circular economy principles. The Advisors' tasks include educational outreach, informational and promotional activities, training, investment advice, energy audit verification, and guidance on available funding sources for energy-related investments Eligibility criteria: Open to all interested citizens, municipalities, and SMEs.	From 2016

[5] https://mojprad.gov.pl/ [Last accessed on 28.05.2025]
[6] https://mojecieplo.gov.pl/ [Last accessed on 28.05.2025]
[7] https://czystepowietrze.gov.pl/inne-programy/stop-smog [Last accessed on 28.05.2025]

Tool	Structures of Implementation	Time Horizon
	Targeting: No formal eligibility criteria; primarily serves homeowners, public buildings, and SMEs; not specific to social groups or tenure types[8].	

Table PL3. Tools used in the introduction of housing retrofitting in Poland

Source: own elaboration.

Many entities at different levels of administration are involved in implementing instruments supporting building retrofits in Poland. The largest public institution established to finance environmental protection in Poland is the National Fund for Environmental Protection and Water Management. At the regional level, its functions are supplemented by Provincial Funds for Environmental Protection and Water Management operate which not only implement nationwide programs such as "Clean Air", "Mój Prąd" or "Moje Ciepło", but also provide direct service to beneficiaries and conduct activities adapted to local conditions (Burchard-Dziubińska & Burzyńska, 2023). EU requirements promoting the implementation of environmental protection principles across all sectors of the economy, including construction, implement a model aimed at eliminating non-renewable raw materials, particularly coal, natural gas, and crude oil, used for energy production, replacing them with energy from nuclear power plants and renewable sources like wind, solar, and water (Kempista & Gołębska, 2024).

The Ministry of Climate and Environment is responsible for shaping the policy and is in charge of the support system, while the Ministry of Finance is responsible for managing tax instruments, such as the thermal modernization relief.

In the case of programs aimed at low-income households, such as "Stop Smog" or "Warm Apartment", local governments play a key role as intermediaries - they prepare applications, conduct recruitment and implement investments in cooperation with residents. Additionally, technical and advisory support is provided by Energy Advisors, who support citizens, housing communities and companies in preparing investments, analyzing profitability and obtaining funding. Installation companies, energy auditors and tax advisors are also involved in the implementation of individual activities, supporting beneficiaries in meeting technical and formal requirements (Błasiak-Nowak & Rajczewska, 2015).

4.3 Size and role of the market

In Poland, the process of creating the energy market began with the enactment of the ***Energy Law*** in 1997. It included the demonopolization of the sector, dividing it into subsectors of generation, transmission, distribution, and energy trading, as well as market liberalization, which allowed independent companies to cooperate commercially. Additionally, the privatization of the energy sector involved transforming state-owned enterprises into state treasury companies, which were then sold to domestic or foreign investors. An important role in shaping the Polish energy market at this stage was assigned to the Energy Regulatory Office, established in 1997. The legal basis for the functioning of the energy market in Poland is the *Energy Law* and related executive acts (regulations), mainly from the Minister of

[8] https://doradztwo-energetyczne.gov.pl/ [Last accessed on 28.05.2025]

Economy and the Minister of the Environment. With Poland's accession to the EU, Polish legislation on the energy market was aligned with European legislation, primarily the EU Directive on the rules for the common electricity market. From the consumer's perspective, an important milestone was 2007, when every individual consumer (household) gained the right to purchase energy from their chosen supplier[9].

In 2007, the electricity market was liberalized. Since then, every consumer has been able to purchase electricity from a supplier (trading company) of their choice. The liberalization of the electricity market aimed to strengthen competition, which was expected to lead to lower prices. According to the principles of a free market, electricity suppliers are expected to compete for customers by reducing costs and offering electricity at optimal prices. The liberalization of the electricity market is associated with the introduction of the Third-Party Access (TPA) principle. TPA involves granting access to the electricity network infrastructure by the owner of the infrastructure to energy companies engaged in electricity trading, allowing them to deliver electricity to consumers[10].

The Government Solidarity Shield was introduced in Poland in 2023 as an umbrella protecting all individual customers from record-breaking electricity prices. Energy prices for individual consumers have been frozen at 2022 levels within specific electricity consumption limits. The energy voucher is a benefit that, in 2024, was due to every household meeting the income criterion, i.e., where the average monthly income for 2023 did not exceed PLN 2,500 (590 EUR), and for multi-person households, PLN 1,700 (400 EUR) per person. The energy voucher is a support measure introduced in response to rising energy prices, aimed at helping households, especially those in difficult financial situations, to cover energy costs. The energy voucher was part of a government support package that also included other forms of assistance, such as subsidies on energy bills (Figure PL2).

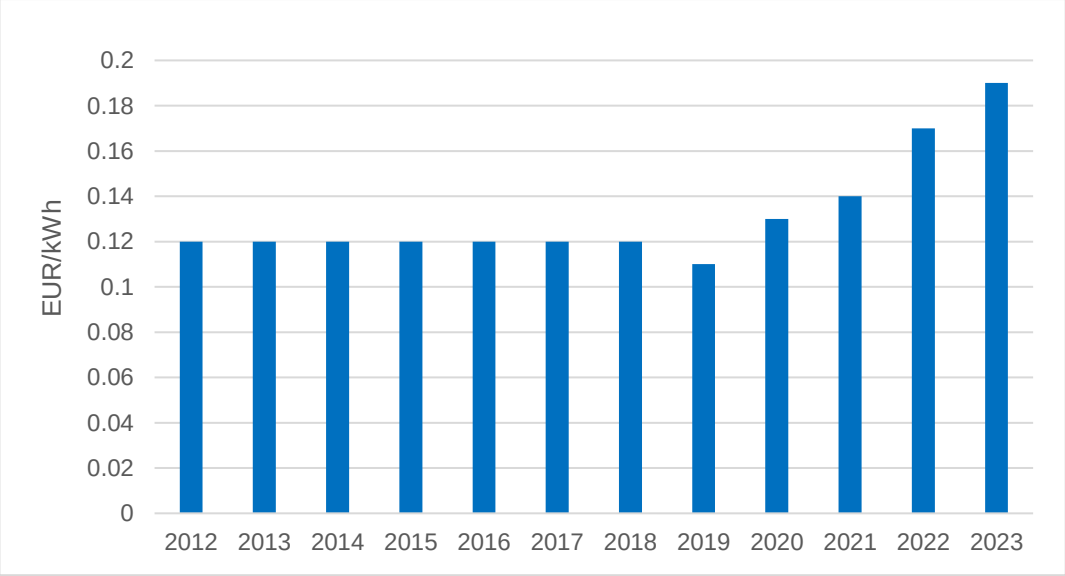

Figure PL2. The price of electricity for a household consumer in Poland between 2012-2023

[9] https://www.gov.pl/web/gov/zloz-wniosek-o-wyplate-bonu-energetycznego [Last accessed on 20.01.2025]
[10] https://www.gov.pl/web/klimat/taryfowanie-energii-elektrycznej [Last accessed on 20.01.2025]

Source: Energy Regulatory Office[11].

It is worth mentioning that, in 2022, the share of energy from renewable sources in Poland's gross final energy consumption was 16.81%, an increase of 1.2 percentage points compared to 2021. Coal accounted for 69.2% of electricity generation in Poland. Although the share of coal in Poland's energy mix decreased by 19.4 percentage points (from 98.4%) between 2000 and 2022, it remained the second highest in the European Union in 2022. While the share of coal in electricity production in Poland is currently among the highest in the EU, maintaining coal-based power plants is the least economically efficient solution in the long term[12].

Since the 1990s, the electricity market in Poland has undergone liberalization aimed at increasing market competition and creating better conditions for end consumers. Pro-environmental policies have led to a rise in electricity production from renewable energy sources. Several programs have been introduced to support renewables, reduce greenhouse gas emissions, modernize power grids, and promote the development of electromobility. Despite this progress, the Polish electricity market still faces numerous challenges, including the urgent need to modernize infrastructure, improve energy efficiency, and expand energy storage capacity (Sekuła et al., 2023).

The electricity market in Poland is a complex and evolving system influenced by national energy policy, EU regulations, and growing market liberalization. It includes the production, transmission, distribution, and trade of electrical energy. The key players in Poland's electricity market include a mix of state-owned energy groups, private investors, and regulatory bodies. The largest electricity producers and distributors are state-controlled companies such as PGE, Enea, Tauron, and Energa (now part of the Orlen Group), which dominate both the generation and distribution segments. The Energy Regulatory Office (URE) serves as the national authority responsible for overseeing the market, issuing licenses, and approving tariffs, particularly for household consumers. Together, these actors shape the structure, pricing, and future development of Poland's electricity sector (Thlon et al., 2024).

4.4 The multilevel governance process

Poland has an extensive system of institutions and programmes supporting activities for environmental protection, energy efficiency and sustainable development. At various levels, the activities are carried out by bodies and institutions that share a common goal (Table PL4). They consistently implement the sustainable development strategy, striving to improve air quality, reduce pollutant emissions and increase the energy efficiency of buildings.

Actor	Type	Level	Roles	Effects	Coordination Dynamics
Ministry of Climate and Environment	Public	National	Developing and implementing national environmental policies and programs and	Publishes key programs (e.g. "Clean Air"), oversees strategic	Coordination with local governments

[11] https://www.ure.gov.pl/pl/energia-elektryczna/ceny-wskazniki/7853,Srednia-cena-energii-elektrycznej-dla-gospodarstw-domowych.html [Last accessed on 20.01.2025]
[12] https://ozzzprc.pl/2023/11/18/miks-energetyczny-w-polsce-raport/ [Last accessed on 20.01.2025]

Actor	Type	Level	Roles	Effects	Coordination Dynamics
			overseeing funding coordination.	documents and EU fund programming.	improving but still inconsistent.
Banks and Investment Funds	Financial Institutions	National/ Regional/ Local	Offering loans, financial instruments, and co-financing for retrofitting and energy-efficient projects.	Support financing under programs. Some barriers to access for low-income groups.	Aligned with developers; weak formal coordination with public policy goals.
Operators	Public	Regional/ Local	Identifying beneficiaries, encouraging heat source replacement or thermal modernization, and guiding them through the subsidy application, implementation, and settlement process.	Key role in delivering projects. Efficiency depends on local capacity and clarity of regulations.	Strong collaboration with municipalities and energy advisors, though capacity varies by region.
Energy Advisors	Public	Local	Providing advice and guidance to households, businesses, and municipalities on energy efficiency, retrofitting, and renewable energy solutions	Often first point of contact for citizens. Crucial in improving local programs.	Frequently underfunded and undertrained. Limited integration into wider planning processes. Coordination with NGOs and municipalities often ad hoc.
National Fund for Environmental Protection and Water Management	Public	National	The key institution financing environmental protection and water management projects in Poland, offering loans, grants, and co-financing to local governments, enterprises, and individuals.	Central in financing programs.	Good cooperation with Provincial Fund for Environmental Protection and Water Management; tensions may arise with local governments over fund allocation and administrative burdens.
Provincial Fund for Environmental Protection and Water Management	Public	Regional	A strategic partner for local governments and others, providing financial support for environmental protection and	Ensure regional relevance of national programs; key interface for local beneficiaries. Effectiveness	Generally positive cooperation with municipalities; capacity to advise applicants still

Actor	Type	Level	Roles	Effects	Coordination Dynamics
			sustainable development projects.	varies by voivodeship.	under development in some regions.
Agency for Restructuring and Modernization of Agriculture	Public	Regional/ Local	Providing funding and support for rural environmental projects, including clean energy, retrofitting, and sustainable agricultural practices	Key funder in rural transition to low-emission systems (solar, biomass, insulation). Often underused due to procedural complexity.	Weak link to regional energy and spatial planning; coordination challenges with municipalities and advisors.
Main Office of Construction Supervision	Public	National/ Regional	Supervising construction activities; ensuring compliance with energy efficiency regulations and standards in new and retrofitted buildings.	Helps enforce energy regulations in new construction and retrofits. Limited role in proactive promotion of efficiency.	Works in isolation from planning offices. Reactive role; could be better integrated into regional strategies.
Municipalities	Public	Local	Implementing environmental programs at the local level; enforcing regulations and projects; engaging communities; promoting modernization and clean energy projects; coordinating consultation points	Critical implementers of programs. Differences in capacity between large and small municipalities.	Key interface for citizens but often lack staff and technical capacity. Increasing partnerships with NGOs and advisors. Coordination with regional and national actors inconsistent.
NGOs	Civil society	National/ Local	Increasing awareness of the need to take actions to support the improvement of the quality of the environment	Active in education and lobbying (e.g. Polish Green Network). Push for better access for energy-poor households.	Often fill coordination and outreach gaps. Limited formal role, but growing influence through campaigns and local partnerships.

Table PL4. Actors involved in housing retrofitting governance in Poland

Source: own elaboration.

The governance of housing retrofitting in Poland involves a range of actors, including government institutions, local authorities, and private investors, who collaborate to improve energy efficiency and sustainability in buildings. Their roles focus on policy development, funding, technical implementation, and ensuring alignment with environmental and economic goals.

However, while modernisation efforts are primarily aimed at improving energy efficiency and reducing emissions, they also intersect with broader societal challenges. One of the most pressing is energy poverty, which continues to shape household needs and vulnerabilities, particularly in the context of recent economic and geopolitical shocks.

Energy poverty has become increasingly visible in Polish political discourse, especially since 2022. Although the 2022 Russian invasion contributed to a spike in income-based energy poverty rates, this did not reverse the long-term downward trend. Instead, it reinforced the upward trend that began with the economic impoverishment of Polish society because of the COVID-19 pandemic. Energy poverty in Poland manifests unevenly across different types of regions, reflecting deep-rooted spatial and socio-economic disparities (Figure PL3).

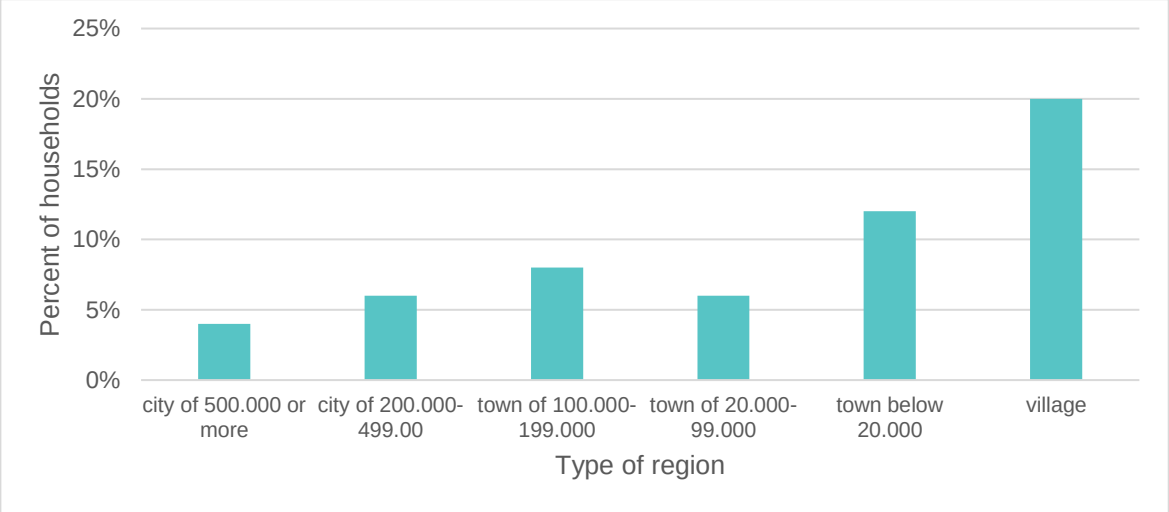

Figure PL3. The energy poor by type of region

Source: own elaboration based on *Lipiński & Juszczak (2023)*

In its research, the Polish Economic Institute (2023) has identified four main forms of energy poverty:

1. Fuel poverty (income poverty) – this form is defined by a high share of energy expenditure in the household budget. Depending on the adopted threshold (ranging from 10% to 25% of household income), it affects between 16% and 30% of households in Poland,

2. Structural poverty – affecting 8% to 12% of households, this type arises where energy-related costs deepen existing economic poverty. It results from both high energy expenditures and relatively low incomes,

3. Municipal poverty – this form impacts 3% to 5% of households that are unable to meet their energy needs due to infrastructural deficiencies or because they reside in energy-inefficient buildings,

4. Hidden energy poverty – affecting 13% to 16% of households, this occurs where energy expenditure is artificially low due to extreme limitation of energy use, often at the expense of health and comfort.

A key structural factor behind these challenges is the poor technical condition of Poland's housing stock. Widespread infrastructural deficiencies – especially the lack or poor quality of thermal insulation and outdated, inefficient heating systems – result in significant heat loss and high maintenance costs. These issues are particularly burdensome for low-income households, where energy bills consume a substantial portion of the household budget. It is estimated that as many as 70% of single-family houses in Poland lack any form of thermal insulation (Lipiński & Juszczak, 2023).

The issue of energy poverty has been acknowledged in several strategic national documents. *The National Energy and Climate Plan for 2021–2030* (2019) calls for the development of a comprehensive policy to address energy poverty, including efforts to expand heating networks and support thermal modernization of residential buildings. Similarly, the *Energy Policy of Poland until 2040* 2021) sets the goal of reducing energy poverty to 6% by 2030. Both documents emphasize the need for a clear and consistent definition of energy poverty, a task that was partially undertaken in 2022.

In response to these challenges, in December 2022, the *Act amending certain acts supporting the improvement of housing conditions* came into force. It introduced new financial support mechanisms and expanded existing tools for thermal modernization and the development of renewable energy sources in the housing sector – with particular emphasis on supporting households most at risk of energy poverty.

Vertical governance is essential in retrofitting in Poland because it links European vision, national strategy, and local action. Without strong coordination across these levels, retrofitting policies risk being underfunded, poorly implemented, or misaligned with broader climate goals.

A clear example of this is the City of Kraków, which has gone beyond national requirements by introducing a local ban on coal and wood in households in 2019, ahead of national deadlines, and actively supports retrofitting through local funding schemes and information centers. This demonstrates how local governments can translate national and EU policies into place-specific actions. In fuel combustion installations, only high-methane or nitrogen-rich natural gas is permitted. Additionally, the use of permanently installed heavy garden grills, such as brick grills permanently fixed to the ground or large grills operating continuously in one location, is prohibited[13].

4.5 Achievements, assessments, and challenges

Housing retrofitting in Poland has emerged over the past few decades as a response to several challenges (Table PL5). A large proportion of residential buildings were constructed before the 1990s, many of which lack modern insulation, energy-efficient windows, or advanced heating systems. This results in high energy consumption and high costs for homeowners and tenants.

Impact Area	Measured impacts	Potential impacts
Energy Efficiency	There is a decrease in the annual primary energy demand index in residential buildings	Further reduction of energy consumption and CO_2 emissions on a regional and national

[13] https://powietrze.malopolska.pl/antysmogowa/krakow/ [Last access on 4.06.2025]

Impact Area	Measured impacts	Potential impacts
	(Table PL6), as well as an increase in the share of renewable energy sources in the energy balance (Figure PL4)	scale; increase of the share of renewable energy sources in powering buildings
Environmental Impact	Reducing greenhouse gas emissions because of activities related to improving energy efficiency and thermal modernization (Figure PL5) The effect of the first recruitment in 2019: Niepołomice, Pszczyna, Rybnik, Skawina, Sosnowiec, Sucha Beskidzka and Tuchów. Currently 26 municipalities, including Warsaw and Łódź and 11 cities of the Upper Silesian Industrial Region, where pollution in Poland is considered the highest	Long-term improvement of the quality of the natural environment, reduction of low emissions and pollution; adaptation of buildings to climate change and energy standards
Economic Impact	Creation of local jobs in construction and HVAC sectors; increased demand for certified installers and energy auditors	Development of the energy efficiency sector (construction industry, renewable energy technologies)
Social Impact	Increased household comfort and reduced energy poverty in targeted retrofitting schemes	Raising public awareness of sustainable energy consumption; better living conditions for lower-income households
Policy and Regulations	Strengthened monitoring and evaluation via EPC registry	The potential to increase the effectiveness of policies by increasing subsidy opportunities and introducing regulations that support the sustainable development of buildings, achieving national climate goals

Table PL5. Impacts of housing retrofitting policies on housing inequalities in Poland

Source: own elaboration.

Poland has some of the highest levels of air pollution in Europe, particularly in urban areas where coal-based heating is common in residential buildings. Retrofits that replace coal-based heating systems with more energy-efficient and cleaner alternatives are seen as critical for reducing emissions and improving air quality[14].

[14] https://powietrze.malopolska.pl/baza/jakosc-powietrza-w-polsce-na-tle-unii-europejskiej/ [Last accessed on 25.01.2025]

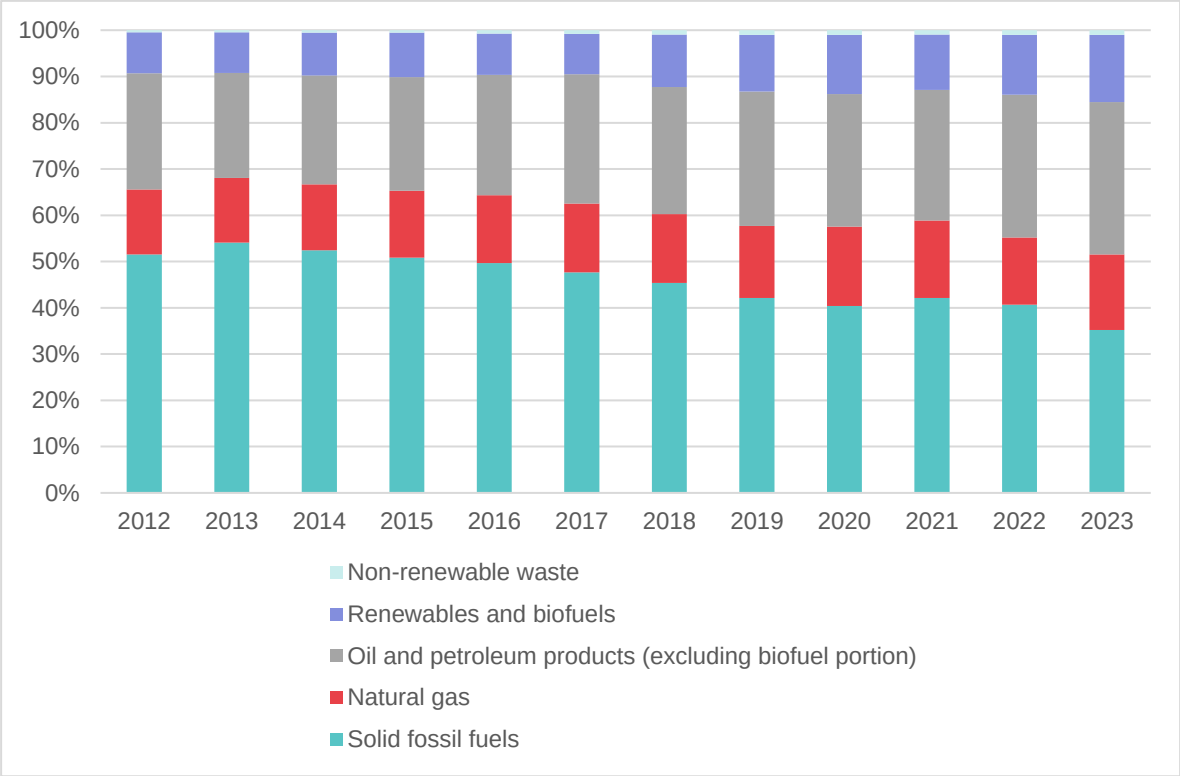

Figure PL4. Total energy supply by product in Poland between 2012 and 2023

Source: Eurostat.

The table no. PL6 presents the median values of EP indicators for buildings of different categories, determined based on energy performance certificates prepared using the Central Register of Energy Performance of Buildings.

	<1994	1994-1998	1999-2008	2009-2013	2014-2016	2017-2018	2019-2020
single-family building	263,7	147,9	143,5	126,3	109,1	94	89,3
multi-familiy building	258,9	139	110	142,7	97,5	87	84,9

The shades of the table fields correspond to the levels of the indicator: from the highest (red) to the lowest (blue).

Table PL6. Median value of the annual primary energy demand indicator for residential buildings depending on the purpose of the building and the year of commissioning [kWh/(m² year)]

Source: own elaboration based on Central Register of Energy Performance of Buildings

The inefficiency of residential buildings contributes to health risks, particularly in terms of poor indoor air quality and exposure to cold in winter. Housing retrofitting can improve living conditions, reduce fuel poverty, and enhance overall public health. It also addresses economic and social dimensions, as many low-income households are especially vulnerable to energy poverty due to high heating costs. Retrofitting programs can help alleviate this issue, especially in the context of rising energy prices. Housing retrofitting policies in Poland have generally contributed to reducing housing inequalities by improving living conditions and reducing energy costs for vulnerable populations.

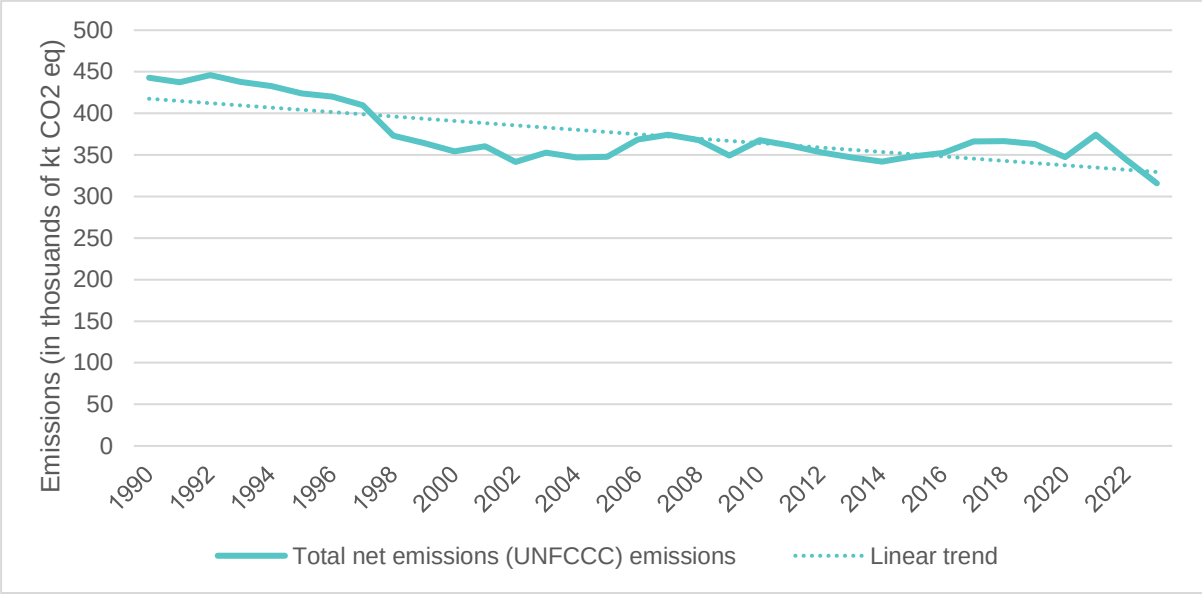

Figure PL5: Emission of greenhouses gases in Poland

Source: based on https://www.eea.europa.eu/en/analysis/maps-and-charts/greenhouse-gases-viewer-data-viewers [Last access on: 02.06.2025].

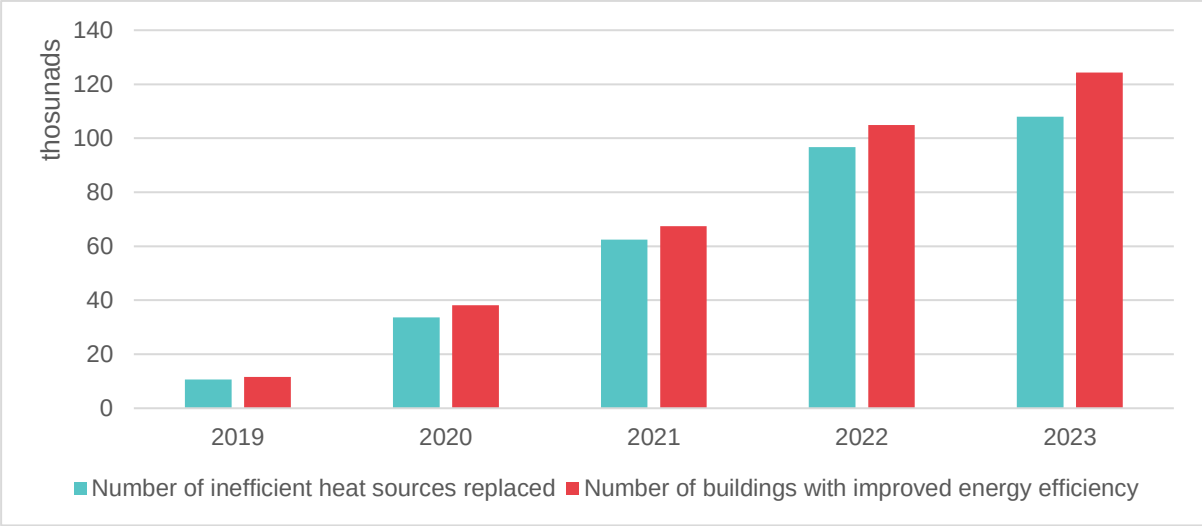

Figure PL6. Effects within priority programmes

Source: Statistics Poland (2025).

In the context of retrofitting in Poland, several corrective public policies have been designed to mitigate social and economic inequalities, particularly by ensuring that low-income households can access financial tools and benefit from energy efficiency upgrades. These policies use income-based eligibility criteria, targeted subsidies, and simplified procedures to support vulnerable groups.

The **Clean Air Programme** and the **Stop Smog Programme** are two key corrective public policies in Poland that aim to reduce energy poverty and environmental inequality through targeted support for building retrofits. The Clean Air Programme provides financial assistance for homeowners to replace outdated heating systems and insulate buildings, with subsidy

levels adjusted based on household income. The Stop Smog Programme complements this by focusing on the most vulnerable groups in highly polluted municipalities, offering 100% financing for retrofitting projects such as thermal insulation and boiler replacement. Eligibility is strictly income-based and includes property value limits, ensuring that aid reaches those most in need. Both programs exemplify how public policy can promote fair access to clean energy solutions, helping to mitigate inequalities, reduce household energy bills, and improve living conditions for economically disadvantaged populations.

It is worth mentioning that rural Poland faces entrenched housing and energy inequalities, which are both shaped and perpetuated by the uneven rollout and accessibility of EEP. While energy efficiency is a national priority, rural areas often lack the resources and infrastructure to benefit from these policies in practice. Rural areas in Poland typically have older, poorly insulated buildings, many constructed before modern energy standards. These homes often rely on inefficient coal or wood-burning stoves for heating, contributing to higher energy consumption and air pollution. Despite this, they are less likely to be targeted by retrofitting programs due to logistical and economic challenges.

Most EEPs, such as the Clean Air Programme, offer partial subsidies that still require co-financing, which is unaffordable for many rural residents. Moreover, many residents do not have the technical capacity or support to meet the eligibility criteria (e.g., legal property ownership, building standards, tax documentation). Rural populations in Poland are often older, lower-income, and more reliant on subsistence agriculture or pensions. These groups are less resilient to climate and policy shocks, and without targeted interventions, they are systematically left behind in the green transition.

5 Nature-Based Solutions

One of the actions for adapting to climate change involves physical transformations in space, such as increasing the number of green areas. Such actions are recommended by the EU, the UN, the International Union for Conservation of Nature, and other leading international organizations. In this context, particular emphasis is placed on so-called nature-based solutions (Ćwiklińska & Dudzińska-Jarmolińska, 2020).

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

The emergence and implementation of Nature-Based Solutions (NBS) in Poland reflect the complex interplay between national policy-making and European Union directives. This chapter examines the governance processes that have shaped Poland’s approach to NBS, with a focus on how EU policies influenced national agendas. By analyzing the dynamics of these processes, the chapter sheds light on the evolution of goals and coalitions that underpin Poland's commitment to NBS (Figure PL7).

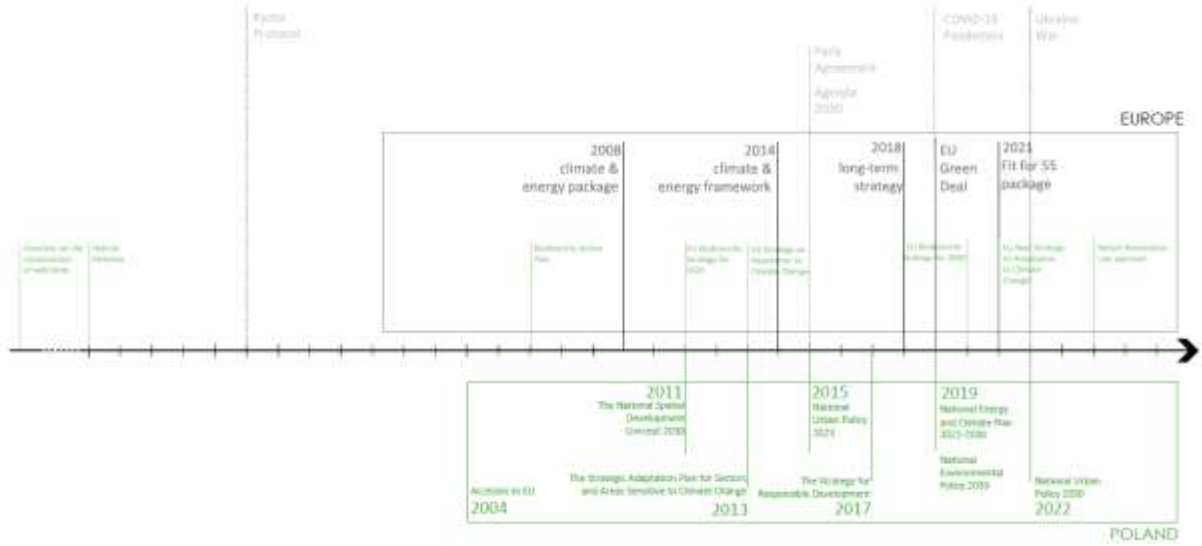

Figure PL7. Timeline with main milestones for introducing NBS in Poland

Source: own elaboration.

Since 1999, at the municipal level, tasks related to broadly understood environmental issues have been carried out by the municipal council, the head of the commune, the mayor, or the city president. The obligations of municipal bodies performing tasks in the field of environmental protection arise primarily from the ***Environmental Protection Law*** (2001) and the ***Nature Conservation Act*** (2004). In the area of environmental protection, the executive body of the commune prepares local legal acts, including the commune environmental protection program. In Poland, environmental protection programming at the municipal level takes place in many municipalities, particularly those located in areas with environmental threats (Dumieński et al., 2019).

In the Polish policy context, NBS are most often associated with green areas. However, their conceptual scope is gradually broadening. While many local and regional planning documents still identify NBS with urban parks, green corridors or rain gardens, the more comprehensive understanding promoted by the European Union – including blue infrastructure, ecosystem-based adaptation and multifunctional land use – is only partially integrated into national policy frameworks. In earlier policy and planning discourses, the concept of green infrastructure dominated and was widely used in spatial planning and urban regeneration programmes (Surma, 2015). In contrast, the term ecosystem services were mainly used in scientific research and environmental assessments, especially in the context of strategic environmental assessments. The concept of nature-based solutions is a relatively recent addition, introduced mainly through international policy programmes, and has not yet been fully institutionalised in Polish governance structures.

Since around 2017, NBS has started to appear more systematically in national discussions, especially in relation to climate change adaptation strategies (e.g. Urban climate change adaptation plans) and in scientific papers (Kronenberg et al., 2017). However, the concept is still not binding in the current Polish legal and regulatory framework. NBS often get equated with urban greening due to their visibility and easier policy framing.

In 2011, some recommendations to NBS were included in ***The National Spatial Development Concept 2030*** which planned to introduce an obligation to retain rainwater in agglomeration areas in order to reduce flood surges in densely built-up areas, and to use the obtained resource to maintain the green infrastructure of urbanized areas and – as the value of water abstracted for the living needs of the population increases – for other uses.

In 2013, Poland adopted ***The Strategic Adaptation Plan for Sectors and Areas Sensitive to Climate Change by 2020, with a Perspective to 2030*** developed by the Ministry of the Environment. Incorporating climate change considerations into urban spatial policy was identified as one of the plan's key actions. It was the first strategic document to directly address the issue of adaptation to ongoing climate change. The plan's main objective is to ensure sustainable development and the effective functioning of the economy and society in the context of a changing climate. The document identifies priority areas for adaptation actions, focusing on sectors most sensitive to climate change, such as water management, agriculture, forestry, biodiversity, health, energy, construction and spatial management, urban areas, transport, mountainous regions, and coastal zones. Financing for climate adaptation measures is sourced from national public funds, such as the National Fund for Environmental Protection and Water Management (NFEPWM), provincial environmental and water management funds, the state budget, revenue from the sale of Assigned Amount Units (AAUs), and local government budgets. Local governments are also encouraged to leverage EU funds under the New Financial Perspective, which supports instruments for sustainable urban development. The document emphasizes the inclusion of green and water areas, ventilation corridors, and sustainable heating methods in urban development plans, along with stormwater management and natural revitalization initiatives. Key recommendations include restoring degraded green areas and water reservoirs, enhancing small retention in cities, and replacing impermeable surfaces with permeable ones to support climate adaptation.

In 2019, the Ministry of Environment published the strategy called the ***National Environmental Policy 2030*** (NEP2030). The strategic projects of *NEP2030* include clean air, landscape audits, the development and implementation of a coherent and comprehensive State Raw Materials Policy, a green technology accelerator, forest coal farms, wooden construction, adaptation to climate change, a comprehensive program for the adaptation of forests and forestry to climate change, and water for agriculture. *NEP2030* serves as the basis for investing European funds from the financial perspective for 2021–2027. The strategy also supports the implementation of Poland's goals and commitments at the international level, including at the EU and UN level, particularly in the context of the EU's climate and energy policy goals until 2030 and the sustainable development goals outlined in the 2030 Agenda.

Poland developed the ***National Urban Policy 2023*** (NUP2023) as a strategic document for urban development. NUP defined the framework and indicated key directions and areas of urban development. As the newest of public policies, urban policy has moved away from a sectoral approach towards an integrated and interdisciplinary approach (Rzeńca & Sobol, 2020). In 2022 new ***National Urban Policy 2030*** (NUP2030) was introduced. In principle, the essence of conducting national urban policy is to face development challenges and create conditions for strengthening the capacity of cities and urban functional areas for sustainable development, improving the quality of life of residents and building resilience to observed climate change. A green city is defined in NUP2030 as opposing the deepening climate crisis,

counteracting the effects of climate change, reducing air pollution emissions and rebuilding ecosystems in urban areas (increasing green areas and the continuity of ecosystems interpenetrating urban areas).

The term "Nature-Based Solutions" in Poland is increasingly present but still unevenly adopted across sectors and institutions. The term is more common in English-language materials (EU reports, academic publications) than in Polish-language documents. In Polish, it is often translated very loosely or kept as the acronym NBS in technical texts. At local level only municipal departments in cities Involved in EU projects, dealing with climate adaptation, green infrastructure, and urban development may reference NBS in strategies and tenders. Smaller towns and rural municipalities rarely use the term, even if they implement NBS-like practices (e.g., wetland restoration, tree planting).

5.2 The implementation process

The need to implement actions to adapt to the effects of climate change and, consequently, the use of NBS has two reasons: the lack of sufficient and effective steps to stop climate change and the increasingly rapid emergence of the negative effects of this process (Karaczun et al., 2022). Tools that implement NBS in Poland are crucial for addressing climate change and urbanization challenges by integrating natural processes into urban planning and development (Table PL7).

Tool	Structures of Implementation	Time Horizon
Urban climate change adaptation plans	Prepare climate change adaptation plans for the 44 largest urban centres in Poland. Plans are based on climate vulnerability assessments, including risk mapping (e.g., heat islands, flooding). Criteria include population density, land sealing, and exposure to climate risks. Identification priority zones used GIS analyses.	2017-2019
Water Retention Project	The "My Water" Project has funded 20,000 home retention installations. The 2021-2027 Retention Development Program, with a perspective to 2030, focuses on rebuilding and expanding land improvement systems, constructing new retention reservoirs, desludging and maintaining existing reservoirs, and creating local small retention systems. Priority areas identified based on hydrological risk, agricultural needs, and infrastructure capacity. Criteria include flood and drought exposure[15].	2020-2027
Urban greening	The National Fund for Environmental Protection and Water Management will transfer funds from the European Funds for	2024-2027

[15] https://www.gov.pl/web/nfosigw/moja-woda--wsparcie-dzialan-realizowanych-przez-wfosigw [Last accessed on 2.06.2025]

Tool	Structures of Implementation	Time Horizon
	Infrastructure, Climate, Environment 2021-2027 program for the "deconcreting" of areas in cities. Calls for projects encourage targeting highly sealed areas and urban heat islands. Municipalities are expected to provide justification based on environmental data. Pilot projects in Łódź and Poznań aim to restore natural soil functions in overbuilt districts. Project selection based on environmental audits.	
Forestation Initiatives	Strategic Plan for the Common Agricultural Policy for 2023-2027 - The intervention is dedicated to agricultural land characterized by low suitability for agriculture, constituting a potential area for establishing forest plantations, as well as shaping the landscape structure of rural areas. Focus on agricultural lands with low production potential. Priority given to degraded areas and regions with low forest cover.	2023-2027
Cities adaptation to climate change and Green-Blue Infrastructure	In 2024 change of the act – Environmental Protection Law was adopted. The Act provides that cities with more than 20,000 inhabitants will develop municipal plans for adaptation to climate change. Municipalities required to assess vulnerability and propose location-specific adaptation measures. Guidelines encourage the use of spatial data and participatory tools.	2024-2028
Clean Transport Zone	A clean transport zone is an area designated in the city center that is accessible only to vehicles that meet the required emission standards. The possibility of establishing such zones was introduced by the amendment to the Act of January 11, 2018 on electromobility and alternative fuels. Priority areas are high-density, high-traffic city centers with poor air quality. Assessment based on emissions monitoring and health risk Warsaw introduced Poland's first clean transport zone on July 1, 2024.	From 2024

Table PL7: Tools used in introduction of NBS in Poland

Source: own elaboration.

In connection with *The Strategic Adaptation Plan for Sectors and Areas Sensitive to Climate Change by 2020, with a Perspective to 2030* (2013), the Ministry of the Environment decided to prepare climate change adaptation plans for the 44 largest urban centres in Poland. The aim of the preparation of *Municipal Climate Change Adaptation Plans* for cities with more than 100 thousand inhabitants was to increase the resilience of cities to climate threats, and thus to prepare these cities for modern shaping of local policy in response to the identified and predicted negative consequences related to climate change (Dumieński et al., 2019; Sachanbińska-Dobrzyńska, 2024).

Between 2018-2020 the project called '*Climate Mitigation Through Nature-Based-Solutions in Urban Poland - Fostering Awareness and Capacity (ClimateNBS Polska)*' was introduced. Its aim was to build awareness of how NBS can contribute to mitigating climate change in the city and to increase the knowledge and skills of city officials, local government employees, planners and landscape architects in the design and implementation of NBS in Polish cities. Based on the developed materials, an original training program was created, addressed to city officials and designers of blue-green infrastructure. The project was financed by the European Climate Initiative[16]. The adaptation plans developed in 2019 for the largest Polish cities – Warsaw, Krakow, Wroclaw, Poznan, Gdansk, Szczecin, Bydgoszcz or Białystok – highlight the potential of greenery in helping cities adapt to climate change. Particular emphasis is placed on blue-green infrastructure, including greening walls (Ćwiklińska & Dudzińska-Jarmolińska, 2020).

The National Energy and Climate Plan 2021-2030 (2019) focuses on enhancing climate resilience and improving urban ecosystem functioning in Poland. It aims to increase the percentage of city residents covered by urban adaptation plans and raise the country's forestation level. The concept of green-blue infrastructure is to be integrated into urban spatial development plans to strengthen ecosystem resilience. Additionally, the plan emphasizes natural revitalization, including the restoration of degraded green areas and water reservoirs to their original functions, with a particular focus on small-scale water retention in cities. It also highlights the importance of replacing impermeable ground surfaces with permeable ones to improve water management and mitigate climate impacts.

The National Urban Policy 2030 (NUP2030) adopted in 2022 emphasizes the need to integrate NBS into urban development, specifically through the protection and expansion of greenery. It recommends the implementation of legal standards to assess and compensate for ecosystem service losses using blue-green infrastructure of equal or greater value. The policy advocates for preserving existing trees during construction, ensuring their long-term protection, and requiring detailed tree inventories in building permit applications. Tree removal in urban areas should be restricted, only permitted when unavoidable, and compensated by planting new trees that provide equivalent environmental benefits.

In Poland's spatial planning system**,** up until September 2023, the standard measure for biologically active areas was defined as the percentage of biologically active land relative to the total surface area of a building plot. These requirements were specified in local spatial development plans established by cities or municipalities. In areas without such plans, the indicator was determined through administrative decisions on building and land development conditions issued by municipal authorities. However, as of autumn 2023, new regulations have been introduced. These regulations require biologically active areas to feature surfaces that support natural plant growth and facilitate rainwater retention, broadening the definition to include surfaces beyond native soil (Michalik-Śnieżek et al., 2024).

NBS are increasingly referenced in national and regional water strategies, particularly in the context of flood risk reduction, retention, and stormwater management. However, the terminology varies, many documents refer to 'natural retention' or 'blue-green infrastructure'.

[16] https://www.ecologic.eu/16115 [Last accessed on 10.01.2025]

In Poland, there is currently no national standardized framework for identifying priority areas for Nature-Based Solutions implementation. While several cities and regions have begun incorporating spatial criteria, such as flood risk, heat island intensity, or tree canopy deficits, into their local planning processes, these efforts remain fragmented and context-specific, often shaped by the availability of EU funding or participation in international pilot projects. As a result, the selection of NBS intervention areas tends to vary significantly across municipalities, depending on local expertise, technical capacity, and access to environmental data. The absence of a unified national approach or toolkit limits the broader scalability and comparability of NBS planning across Polish cities and territories.

5.3 Size and role of the market

The market framework for NBS in Poland is shaped by a combination of public funding, private sector engagement, and EU-driven initiatives. NBS are promoted within national frameworks like the *National Energy and Climate Plan* (2021–2030), urban adaptation strategies, and EU, which encourage integration of NBS in spatial planning and climate resilience measures. Growing awareness of climate challenges has increased demand for sustainable urban solutions, such as green infrastructure, permeable surfaces, and biodiversity conservation. Financial support comes from a mix of EU funds, national environmental programs, and local budgets. Private investments are incentivized through subsidies and public-private partnerships. NBS are increasingly embedded in urban spatial development plans, with a focus on green-blue infrastructure, water management, and ecosystem restoration.

The National Fund for Environmental Protection and Water Management operates under the Environmental Protection Law, playing a key role in financing environmental protection in Poland. In 2024 *Action Strategy of the National Fund for Environmental Protection and Water Management for 2025-2028* was elaborated. Due to this document NBS initiatives can be financed from various types of financial sources supported by National Fund for Environmental Protection and Water Management (Figure PL8).

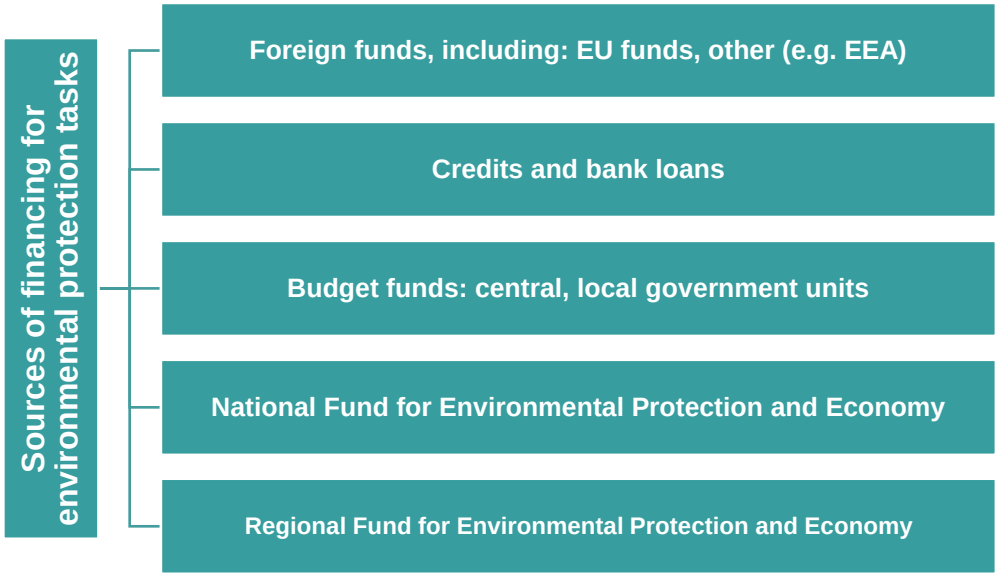

Figure PL8: NBS funding sources by The National Fund for Environmental Protection and Water Management

Source: own elaboration based on *Action Strategy of the National Fund for Environmental Protection and Water Management for 2025-2028, (2024)*.

An example of the method of financing NBS in Poland can be the “Kłodzko NBS” project financed from the EEA funds and from the state budget, under the "Environment, Energy and Climate Change" Programme, the "Climate Change" programme area. In 2021, the Municipality of Kłodzko, in partnership with the International Development Norway, started implementing a 3-year project. The aim of the project was to prepare the city and its inhabitants for changing climatic conditions by mitigating climate change and adapting to its effects. The tasks completed included: introducing new plantings of plants resistant to climatic conditions, tidying up the accompanying infrastructure, greening the "concreted" market square, supplementing the plantings of plants resistant to climate change, including droughts, introducing pocket green areas in built-up areas, greening the courtyards, creating urban vegetable gardens, introducing a rainwater collection system in market square to water the urban greenery, creating a rainy playground, building absorption basins in city parks, introducing an electric bicycle system, introducing air pollution measurements in educational institutions together with an air purifier system[17].

In Poland private actors, particularly in the construction, real estate, and water management sectors, promote NBS-compatible practices such as green roofs, retention systems, and landscape-integrated infrastructure, often in response to EU regulations, investor pressure, or certification schemes. These interests are represented by urban development chambers, architecture and planning associations, and environmental consultancies, which serve as intermediaries between the private sector and the state, advocating for regulatory reforms that facilitate green infrastructure integration in planning codes. In parallel, environmental NGOs and think tanks, such as the Sendzimir Foundation or Polish Green Network, function as both watchdogs and facilitators, mediating between civil society, municipalities, and businesses.

[17] http://nbs.klodzko.pl/ [Last accessed on 20.01.2025]

5.4 The multilevel governance process

The multilevel governance of NBS policies and strategies in Poland involves a collaborative approach between national, regional, and local levels of government, with various actors playing complementary roles. Below is an analysis of the division of roles, resources, and coordination between these levels (Table PL8).

Actor	Type	Level	Roles	Effects	Coordination System
Ministry of Climate and Environment	Public	National	Leads national climate policy, oversees biodiversity conservation, and coordinates NBS-related strategies and programs.	Coordinates national NBS efforts, influences environmental regulations and funding allocation.	Works with other ministries, regional authorities, and EU institutions to align climate and biodiversity goals with NBS strategies.
Ministry of Agriculture and Rural Development	Public	National	Oversees sustainable land use, agroforestry, and initiatives promoting ecosystem services in rural areas.	Shapes urban development policies that integrate NBS, contributing to sustainable urban growth.	Coordinates with agricultural advisory services, rural stakeholders, and EU CAP programs to promote NBS-aligned practices.
Ministry of Development and Technology	Public	National	Responsible for urban planning and development policies, including green and blue infrastructure in cities	Promotes rural NBS applications such as agroforestry, supporting ecosystem services in rural landscapes.	Interfaces with municipalities, developers, and urban planning bodies to implement NBS in spatial planning.
General Directorate for Environmental Protection	Public	National	Manages Natura 2000 sites and supports NBS implementation in protected areas	Enforces biodiversity conservation through NBS, promotes ecosystem protection in designated sites.	Cooperates with environmental agencies, local governments, and NGOs in managing protected areas.
National Fund for Environmental Protection and Water Management (NFOŚiGW)	Public	National	Provides funding for NBS projects, such as flood management, wetland restoration, and urban greening.	Finances NBS projects, enabling implementation of environmental protection and climate adaptation measures.	Collaborates with ministries, municipalities, and project implementers to disburse funds and monitor outcomes.

Actor	Type	Level	Roles	Effects	Coordination System
Voivodeships Offices	Public	Regional	Oversees regional planning, sustainable development, and implementation of NBS policies.	Implements NBS policies at the regional level, supports the integration of green infrastructure in regional plans.	Coordinate with municipalities, regional planning boards, and national ministries to align strategies.
Municipalities	Public	Local	Responsible for urban planning, integration of NBS in public spaces, and environmental governance.	Directly implements NBS in cities, improving urban resilience, air quality, and biodiversity in urban areas.	Engage with residents, private developers, and national programs to co-finance and deploy local NBS.
Ecological NGOs	Civil Society	National/ Local	Advocate for environmental protection, green infrastructure, and policy reform on NBS	Raises public awareness, influences policy, and supports grassroots NBS initiatives.	Collaborate with local communities, schools, municipalities, and EU-funded projects to advance NBS.
Construction and Development Companies	Private investors	National/ Local	Incorporate NBS into new development projects (e.g., green roofs, rain gardens).	Advances urban NBS integration, promotes green building practices in urban development.	Coordinate with municipalities and planners, often through public-private partnerships.
Community-Based Organizations/ Citizens and local communities	Civil Society	Local	Implement grassroots NBS projects like tree planting and river clean-ups.	Directly contributes to local NBS projects, fostering community engagement in environmental protection.	Collaborate with NGOs, local authorities, and schools through participatory planning and volunteering.
Banks and Investment Funds	Financial Institution	National/ Regional/ Local	Provide green financing options for NBS projects, including sustainable urban development.	Support private sector investment in NBS, helping to scale up green infrastructure initiatives.	Work with developers, municipalities, and international donors to structure financing and de-risk NBS investment.

Table PL8. Actors involved in NBS governance in Poland

Source: own elaboration.

NBS and housing affordability policies are not always fully coordinated, as these two areas typically fall under different ministries with distinct priorities. Housing affordability is primarily managed by the Ministry of Development and Technology, focusing on affordable housing construction and urban renewal, while NBS policies are often driven by environmental and climate ministries like the Ministry of Climate and Environment.

In Poland, the governance of Nature-Based Solutions (NBS) operates through a mix of vertical and horizontal coordination mechanisms, although these remain uneven and often project-driven. Vertical governance connects the national level (e.g. Ministry of Climate and Environment, National Fund for Environmental Protection) with regional (Voivodeship Offices) and local authorities (municipalities), mainly through the implementation of EU-funded programs, national climate strategies, or urban adaptation plans. For instance, Lublin's Green City Action Plan aligns with national climate goals and EU financing criteria, illustrating how local planning integrates upward policy frameworks. However, gaps persist due to unclear mandates or limited capacity at lower levels. Horizontal governance, on the other hand, is increasingly visible among municipalities, NGOs, and the private sector, particularly in co-designed urban greening and stormwater management projects.

5.5 Achievements, assessments, and challenges

During the socialist period in Poland, Nature-Based Solutions were implemented through ecological corridors designed to improve air exchange in cities. Green spaces were also used for noise and pollution isolation, particularly around hospitals and schools. Despite efforts to protect these areas, they faced constant pressure from urban expansion, which intensified after the fall of socialism and the weakening of urban spatial planning due to deregulatory activities (Kronenberg et al., 2017).

The main achievements of NBS policy in Poland include the successful utilization of EU funding mechanisms to support NBS projects, such as small-scale water retention systems and reforestation efforts. Additionally, NBS policies have contributed to raising public awareness about the importance of nature-based solutions in addressing climate challenges, fostering collaboration between local governments, the private sector, and civil society (Table PL9). The adoption of NBS in Poland often requires significant public sector involvement, as market forces alone typically do not provide sufficient incentives for large-scale implementation. Private sector participation is still developing and often depends on subsidies or regulatory requirements. Market-based tools, such as subsidies, incentives for eco-friendly infrastructure, and funding for small retention systems, are essential to attracting private actors, highlighting the need for public financial support.

Impact Area	Measured Impacts	Potential Impacts
Improved Access to Green Spaces	Many cities are implementing "deconcreting" programmes, often using EU funds. Examples: Łódź has become an example of integrating deconcreting into broader urban revitalization, especially in the historic central district.	NBS could significantly improve access to green spaces in underserved urban areas, especially for low-income housing.

Impact Area	Measured Impacts	Potential Impacts
	City is transforming over-paved courtyards, streets, and squares into green, permeable, and socially inclusive spaces.	
Air Quality	In Warsaw and Krakow, projects involving green belts along streets and pocket parks were implemented, which reduced the concentration of suspended dust in the vicinity of communication artillery.	In the future, widespread implementation of NBS could significantly lower air pollution, benefitting low-income neighbourhoods that often face poor air quality.
Flood Risk Reduction	Rain gardens and permeable surfaces were used in housing estates, which reduced local flooding after heavy rains (e.g. Gdańsk, Katowice)	NBS like rain gardens, permeable surfaces, and restored wetlands could provide significant flood risk reduction in vulnerable housing areas.
Community Engagement	In larger cities (e.g. Łódź, Katowice, Gdańsk), "green civic budgets" have been introduced, and projects chosen by residents include initiatives such as planting trees, creating community gardens, and managing greenery.	Future NBS policies could increase social cohesion by encouraging community-led green space initiatives, which could improve neighbourhood relations in marginalized housing areas.
Aesthetic Value	The transformation of urban space using NBS improved the aesthetics and attractiveness of the space (e.g. revitalization of Łódź, Gdańsk, Radomsko).	In the future, NBS could transform neglected areas, potentially leading to a rise in property values.
Housing Affordability	There are pilot programs with green roofs in municipal buildings (e.g. Krakow).	Future policies could incorporate NBS in affordable housing development, improving living conditions without raising rent prices.

Table PL9. Impacts of NBS policies on housing inequalities in Poland

Source: own elaboration.

Changes introduced at the local level must be the result of close cooperation of all entities responsible for creating and implementing urban policies related to climate, directly and indirectly. An important actor in this cooperation should be residents. The process of implementing climate change adaptation activities must be continuous, not sporadic, to be effective. Both climate change and adaptation activities are subject to constant transformation, so conclusions developed once may cease to be relevant in the shorter or longer term. Therefore, it is worth repeating activities aimed at learning opinions and developing recommendations and solutions for adaptation to climate change (Rzeńca et al., 2024).

Due to the *National Urban Policy 2030* (2022) one of the key challenges is increasing water retention. In urban areas and their functional zones, it is essential to gradually expand the share of permeable surfaces, particularly biologically active ones. To manage rainwater safely and economically while enhancing retention, the development of blue-green infrastructure is crucial.

Polish cities face worsening environmental problems due to spatial policies that fail to support climate change adaptation strategies. This has weakened their climate resilience. Key issues include insufficient monitoring of urban surface sealing, neglect of resilience-building in urban planning and construction decisions, downplaying climate change risks amidst growing investment pressures and exclusion of climate change adaptation in spatial policy models. These shortcomings hinder the cities' ability to cope with climate challenges (Rynio et al., 2023; Sobol, 2023).

In the context of NBS in Poland, there have been several corrective public policies that have aimed, with varying degrees of success, to mitigate socio-spatial inequalities, especially those related to the geographical distribution of green spaces and their associated benefits. EU-funded urban regeneration programs have supported revitalization efforts in post-industrial cities by integrating green infrastructure into socially deprived areas. The National Urban Policy promotes sustainable development and equity by encouraging integrated revitalisation strategies that combine housing improvements with the creation of green spaces.

At the municipal level, cities like Warsaw, Wrocław, and Poznań have adopted green infrastructure strategies that prioritize interventions in underserved districts, while participatory budgeting has empowered residents, especially in marginalized communities, to propose and vote for small-scale greening projects. These efforts have helped narrow environmental disparities, but challenges remain, including uneven implementation, limited long-term funding, and the risk of green gentrification. Ensuring more equitable outcomes will require stronger coordination between housing policy, environmental planning, and social protection measures.

6 Densification

Urbanization is a global phenomenon that poses significant challenges to cities seeking to increase density through sustainable development. In Poland, these challenges are exacerbated by suburbanization processes and the lack of a comprehensive spatial development policy. Densification, a key strategy for achieving sustainable urban development, has become a critical objective in addressing these challenges. This approach aims to optimize land use, limit urban sprawl, and create more compact, efficient, and environmentally friendly cities. However, its implementation requires careful consideration of social, economic, and environmental factors, as well as alignment with broader policy frameworks.

This chapter examines the policy cycle surrounding densification projects in Poland, exploring how the problem emerged, the policy decisions taken, and the interplay between EU and national policies. It highlights the importance of strategic planning and legal frameworks in achieving a sustainable spatial order.

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

Densification projects in Poland, as well as in many other countries, are a response to growing urban populations, the need for sustainable development, and the efficient use of land. The

main challenge in Poland is the lack of a coherent spatial development policy and clear principles for shaping development. Urban policy and development are shaped by interconnected EU and national policies, with EU guidelines often acting as a catalyst for national reforms, while local adaptations reflect the unique needs of urban development in Poland. With the growing importance of spatial order and sustainable development and following Poland's accession to the EU and the adoption of EU documents, there was a need to take action to adopt or update legal and strategic documents (Figure PL9).

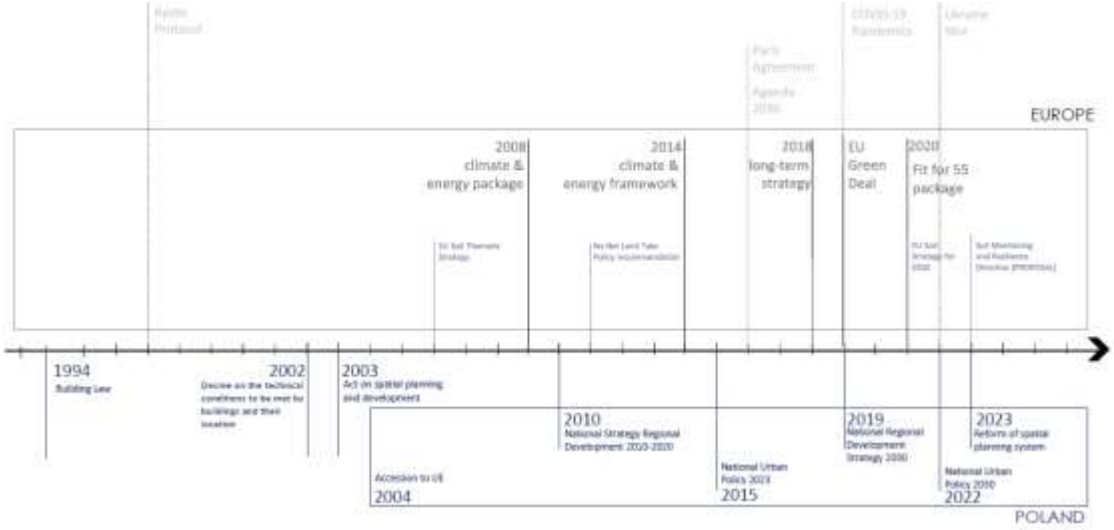

Figure PL9. Timeline with main milestones for development of policies related to densification projects in Poland

Source: own elaboration.

EU cohesion and spatial policies have significantly influenced urban development in Poland, especially through financial support (European Regional Development Fund, Cohesion Fund) as well as strategic frameworks. The 2023 national planning reforms, including revisions to zoning laws and the introduction of integrated planning instruments, have aimed to streamline urban development and support revitalization, but implementation remains uneven across regions. In practice, municipal-level initiatives, such as city-led revitalization programs and changes to local zoning plans, are often the most immediate drivers of densification. However, a strong private developer presence, combined with a weak public housing sector, has raised concerns about gentrification and affordability.

The legal status of densification projects is regulated primarily by the ***Act on spatial planning and development*** (2003)**,** as well as ***the Act of Building Law*** (1994) and regulations issued for this act. The particular importance in the implementation of the investment is the ***Decree of the Minister of Infrastructure on the technical conditions to be met by buildings and their location*** (2002). It should be noted that these acts are constantly being amended, also for the purposes of adapting them to EU law, in particular these changes were visible after Poland’s accession to the EU in 2004.

Issues concerning the role of urban areas at the European level have appeared in the European Commission's communications since the 1990s. Several EU initiatives have had an impact on cities and development. Also, the last dozen or so years of meetings of EU countries

have resulted in many adopted documents defining the vision, priorities and framework for creating urban policies in the Member States for sustainable development. The need to strengthen the role of cities in shaping future EU policies is emphasised specially by: The Urban Agenda for the European Union, The New Leipzig Charter (November 2020).

The ***Act on the principles of development policy*** (2006) is a key legal act that regulates the planning, coordination and implementation of development policy in Poland. It provides a legal framework for the integration of various political and financial activities at the national, regional and local levels. Based on this act, two documents at the national level were adopted*:* ***National Urban Policy 2023*** (NUP2023) in 2015 and updated in 2022 – ***National Urban Policy 2030*** (NUP2030). In relation to the current NUP2030, it is indicated that sectoral policies relating to cities and their functional areas should be coordinated. The discrepancies still result from the lack of correlation between policy actions taken after the political transformation at the end of the 20th century and Poland's accession to the EU in 2004. European Union policy towards cities focuses on the role of cities in economic development as well as in achieving sustainable development. Therefore, to adapt the administration at the national level to the European level, Poland has implemented many actions aimed at improving the condition of Polish cities. In relation to Polish legal acts and the implementation of policy in this area, the above-mentioned National Urban Policy is of particular importance. The preparation of this document indicates the challenges that Polish cities face in various aspects, but considering the issue of densification projects, it is in this document that one can find information and principles regarding these projects. One of the main assumptions of urban policy is to strive to develop urban areas (in structural compactness) in a sustainable and responsible manner and to rationally use space and available resources within the concept of a compact city.

In 2011 some recommendations supporting the densification process were included in the now-defunct ***The National Spatial Development Concept 2030.*** The document argued that settlement trends resulting from lifestyle changes – such as spontaneous suburbanisation, dispersal of development in rural areas, development of second-home colonies functionally disconnected from existing settlements, and anthropopressure in coastal zones – threaten the spatial order and require intervention through integrated spatial planning.

In 2019, **the National Strategy for Regional Development 2030** was adopted. The main assumption of the document is the effective use of the internal potentials of territories and their specializations to achieve sustainable development of the country, which will create conditions for the growth of incomes of Polish residents while achieving cohesion in the social, economic, environmental and spatial dimensions. The main objective of regional policy is implemented based on three complementary specific objectives: a) increasing the cohesion of the country's development in the social, economic, environmental and spatial dimensions, b) strengthening regional competitive advantages, c) improving the quality of management and implementation of territorially oriented policies. These actions will result in a more coherent development of regions and an increased level of urbanization, including urban centres.

In 2023, an ***Act amending the Act on Spatial Planning and Development and certain other acts*** was adopted. The document regulates: a) changes in the regulations concerning building law, environmental protection, and spatial development; b) the organisation of the system of spatial planning acts; c) the limitation of suburbanisation by more precisely regulating decisions

on development conditions and introducing the possibility of a development supplement area; d) support for better use of urbanised areas and investment areas in accordance with the principles of sustainable development; and e) linking planning documents with public and private investment planning to enable more coherent local development. EU influence has been crucial, driving regulatory harmonization and providing financing mechanisms in line with policy priorities. The 2023 Act represents a significant milestone, streamlining planning tools, limiting suburban sprawl and optimizing existing urban areas. This comprehensive and adaptive policy approach underlines Poland's long-term commitment to creating resilient and competitive urban environments.

The evolution of spatial planning and urban development policy in Poland illustrates the continuous adaptation to EU standards and commitment to sustainable development. Key legal acts and strategies have gradually improved the planning framework, improved the management of urban density, influenced the implementation of densification projects and addressed environmental and infrastructure challenges. This evolution reflects Poland's response to both domestic needs and international frameworks. Early reforms prioritized the establishment of spatial order and sustainable development principles, laying the foundation for integrated urban management. Later strategies introduced more advanced urban renewal instruments and compact city models, emphasizing cooperation, efficient land use and coordinated investment planning.

Despite many strategic documents, significant gaps in policy coordination remain. While national strategies such as the National Urban Policy 2030 (NUP2030) advocate territorial integration, they often lack effective enforcement mechanisms. Provincial spatial development plans are often inconsistent with local spatial development plans prepared by municipalities. Furthermore, although Functional Urban Areas (FUAs) are formally recognized, they still lack a solid institutional framework to support integrated spatial planning – especially in rapidly growing peri-urban zones, where coordination challenges are most evident.

6.2 The implementation process

In Poland, densification is not a clearly defined goal of spatial policy, but is indirectly implied by spatial planning, revitalization activities and guidelines related to the protection of agricultural land. There are differences in the available tools and methods of their implementation depending on the territorial level and type of area.

Public interventions in densification projects involve legislative, financial, and operational strategies at multiple governance levels. Each category represents a set of tools and approaches designed to manage urban space more efficiently and promote sustainable growth. The nature of individual tools and their importance for implementing densification policy is presented in this section (Table PL10).

Tool	Structures of Implementation	Time Horizon
Local plans of development	Municipalities introduce local development plans regulating the intensity of development for individual areas. Specific indicators of land development and development shaping	From 2003

Tool	Structures of Implementation	Time Horizon
	have an impact on the implemented densification projects and investments. Universal tool applied across all territorial types.	
Revitalizations programmes	Revitalization projects are of key importance for degraded areas. Thanks to the Local Revitalization Program, local governments can use urban space more effectively, improving the technical condition of buildings and multifunctionality. Such actions improve the quality of life, influence urban processes and contribute to the revitalization of historical areas. Revitalization projects are often co-financed from EU funds. Predominantly used in medium and large urban centres. Less prevalent in rural municipalities due to limited administrative capacity and fewer degraded zones.	From 2015
The Apartment Plus [‘Mieszkanie Plus’]	This program focuses on building apartments for rent at moderate prices, particularly aimed at low- and middle-income groups. It supports the creation of affordable housing in urban areas, mainly on city centres. Targeted mostly at urban/metropolitan contexts.	2016-2019
Special Housing Act	The special housing act, known as "lex developer", became an effective tool for cooperation between city authorities and developers. It was intended to simplify and speed up the implementation of housing investments in areas that, according to the Local Spatial Development Plans (MPZP), were designated for another purpose - e.g. industrial or service. For investors, the most valuable areas are those in cities, which contributed to an increase in the number of investments in larger cities in areas that had not been developed until then. Mainly implemented in larger cities, where market demand is strong, and land is scarce. Limited applicability in rural areas.	2018-2025
National Urban Policy 2030	It is the key document at the national level shaping the vision and directions of urban development in Poland. The challenges in NUP are primarily taking care of spatial order and leveling the processes of chaotic suburbanization. Conceptually relevant to all settlement types, but implementation varies.	2022-2030
Supplementary Development Area	This area is designated in the General Plans of Communes according to a strictly defined procedure, based on an analysis of the existing development. In practice, the concept of the development supplementation area is based on the intensification of construction within already partially developed zones, instead of expansion onto green or agricultural areas. The designation of such an area must be	From 2023

Tool	Structures of Implementation	Time Horizon
	supported by an urban analysis that demonstrates the spatial and economic justification for the investment - primarily through location in the vicinity of existing development. This area cannot include areas devoid of appropriate types of development or be spatially separated from the designated zone. Any changes to its area are verified at the stage of preparing the draft plan, and exceeding certain parameters prevents the creation of the project. This approach supports planning oriented towards intensification, not expansion, and promotes more efficient use of existing infrastructure. Universal tool applied across all territorial types. Targeted at medium-sized and growing suburban municipalities where infill development is more feasible.	
Downtown Development Area	The Downtown Development Area is a special type of area designated in the General Plan of the Commune, corresponding to the city center or other high-intensity areas. Its purpose is to support compact, intensive development of development by using more flexible planning parameters that favor investment and reurbanization. The designation of this area is associated with lower standard requirements for biologically active area, the possibility of increasing the intensity of development and simplified technical standards. The Downtown Development Area is used primarily in large and medium-sized cities.	From 2023
Urban Development Agreements	Urban development agreements are a tool for regulating the relationship between the investor and the commune in the case of investments implemented under Integrated Investment Plans – a new form of local plans, prepared at the investor's request. They are a mandatory civil law agreement, concluded before adoption and specifying, among other things, the scope of public investments (e.g. construction of roads, schools, technical networks), the investor's obligations in terms of their implementation or co-financing, as well as deadlines for completion and conditions for withdrawal from the agreement. This instrument replaces the expiring so-called lex developer, offering a more transparent and predictable planning procedure. Urban development agreements allow for balancing public and private interests in the investment process, while at the same time enabling communes to plan social and technical infrastructure more effectively. They can also be a tool for negotiating the implementation of green infrastructure, such as parks, woodlots or retention systems, provided that they are included in the investor's obligations. Universal tool – Primarily used in urban/metropolitan areas with active development pressure	From 2023

Table PL10. Tools used in development of compaction densification projects in Poland

Source: own elaboration.

The Act on spatial planning and development (2003) is the basic legal act concerning spatial development. In 2023, there was a reform of the spatial planning system in Poland, which introduced a new act of local law - the *General Plan of the Commune*, which is developed for the entire commune. This act is an important element in shaping the spatial policy of the commune, dividing the commune into planning zones for which urban standards and access to social infrastructure are determined. It is important that during the reform, the possibility of designating the *Supplementary Development Area and the Downtown Development Area* was also introduced, which is of particular importance in the case of densification projects. Other tools regulated by the Act are:

a) *Local spatial development plan* - is a planning act that specifies in detail the purpose of land, the principles of its development and the conditions of development. The plan includes functions and purpose of land, building lines (they define the area where a plot can be located), height and dimensions of buildings, protection of green areas, cultural heritage objects and the environment. In Poland, in 2023, local spatial development plans were created for 32.3% of the country's area[18],
b) *Decision on building conditions* - is a planning instrument used in the absence of a local spatial development plan, which specifies the parameters for the planned building (mainly for residential buildings) and land development. It allows for the implementation of the investment while meeting specific conditions in relation to the existing neighbourhood,
c) *Permission for special public investment* - serves to determine the conditions for locating investments related to the implementation of public purposes, and its issuance is associated with the determination of technical and environmental conditions.

Each of these tools plays an important role in the spatial planning system, enabling the balancing of private and public interests and ensuring control over urbanisation processes and development density, while protecting the environment and cultural heritage.

The Act on Building Law (1994) is a fundamental regulation in Poland governing construction activities, including urban densification projects. It provides a framework for the design, construction, and maintenance of buildings, setting procedures for obtaining permits and defining technical and safety standards. Recent amendments have simplified permitting processes for smaller housing units and mixed-use developments, accelerating urban densification while aligning with EU sustainable building directives. The Act specifies requirements like building height, setbacks, and land use, influencing the feasibility of high-density projects. Together with related decrees, it ensures compliance with energy efficiency, safety, and sustainable design standards, promoting the quality and safety of urban environments.

The Decree of the Minister of Infrastructure on the technical conditions (2002) to be met by buildings and their location is one of the most critical legal regulations in Poland governing construction standards. It establishes detailed requirements for the safety, functionality and location of buildings to ensure the orderly development of construction. This regulation plays a key role in densification policy, influencing the way new developments integrate with existing

[18] https://bdl.stat.gov.pl/ [Last accessed on 20.01.2025]

urban environments, in terms of the daytime sunlight of apartments, as well as specifies minimum distances between buildings and plot boundaries, streets, and neighbouring structures. Updates to this regulation are often due to technological progress, changes in urban policy or adaptation to EU directives on sustainable construction and energy efficiency.

The Act on Revitalization (2015) plays a key role in projects targeting the renewal and reconstruction of urban areas. It provides a legal framework for comprehensive revitalization actions aimed at improving the quality of urban spaces, enhancing city functionality, and addressing socio-economic issues in degraded areas. The Act establishes clear guidelines for the preparation and implementation of local revitalization programs, often incorporating densification strategies. By focusing on degraded urban areas, revitalization projects can increase urban density by transforming old industrial, railway, or brownfield sites into residential or mixed-use spaces (Stangel, 2013). The Act supports public-private partnerships (PPPs) and fosters collaboration between public authorities, private investors, and local communities, while also aligning with EU-funded regeneration programs focused on sustainable urban development. It enables municipalities to provide financial incentives and subsidies for revitalization actions consistent with densification objectives, integrating effectively with broader planning regulations, building codes, and national urban policy goals.

The Act on facilitating the preparation and implementation of housing investments and accompanying investments (2018), known as the "special housing act", significantly influenced densification processes in Polish cities by simplifying and accelerating procedures for constructing new apartments. It facilitated housing projects on previously unregulated areas, including post-industrial and abandoned urban spaces, making less attractive locations more desirable for developers. These investments improved city aesthetics, revitalized neglected areas, and increased service availability in city centres. The act supported the intensification of urban development, particularly through multi-family housing projects (Szlachetko et al., 2021). Initially set to remain in force until 2028, the act has been replaced by new spatial planning tools, such as urban planning agreements and Integrated Investment Plans, as part of broader reforms. These new tools aim to continue supporting urban densification and sustainable city development.

6.3 Size and role of the market

The market framework of densification involves interactions between planning systems, private sector actors, and market-based mechanisms. The degree to which purely market-based interventions dominate densification efforts depends on the legal, economic, and social context of a given city or commune. Depending on the specifics of the project and local conditions, project can be financed in various models.

In Poland, property law is strongly protected by the Constitution and other regulations, which means that densification of buildings requires the consent of the owners. However, in the centres of large cities, there is fragmentation of ownership, which makes it difficult to implement larger densification projects. This often requires lengthy negotiations or land purchases by investors.

The real estate market mechanism and densification projects can be implemented using practices:

- Local authorities develop local spatial development plans, setting development limits and intensification,
- Local governments issue decisions on development conditions in places without local spatial development plans, which provides great flexibility but also leads to chaotic development,
- Urban development agreements **–** as part of the spatial planning reform, the urban planning agreement tool was introduced – an agreement between the commune and the investor that allows for the expansion of public infrastructure (e.g. schools, greenery, communication) as part of a private investment. Many cities still lack examples of signed and implemented agreements – the tool is new and requires refinement of procedures. Cities fear legal conflicts and difficulties in enforcing conditions. The urban planning agreement can counteract the negative effects of densification by including investors in the costs of social infrastructure, but it provides an opportunity for better integration of housing development with public services – if it is effectively implemented,
- Commercial investments in public-private partnership (PPP) **–** this is a formula thanks to which local governments and other public entities can implement investments. Commercial investors see the opportunity to generate profits by developing plots of land in central locations**.** It allows for the effective delivery of public services, based on the infrastructure created as part of the project.

In Poland, densification processes are most often initiated by the real estate market, not by a coherent, long-term planning policy. They are particularly visible in the largest cities, where the increase in land value stimulates investment pressure. Market dominance is balanced by the participation of local governments and public funds.

Over the last two decades, the real estate market in Poland has undergone significant changes, closely linked to the processes of gentrification and densification of development, which is particularly visible in large cities.

Gentrification is visible in Warsaw, Łódź and Gdańsk, among others. This phenomenon leads to changes in their character, social structure and local infrastructure. Investments in revitalization and development of infrastructure play a key role here, but this process often results in an increase in real estate prices and living costs, leading to the displacement of previous residents with lower incomes (Jakóbczyk-Gryszkiewicz et al., 2017).

Densification of development is another trend in Polish cities. It particularly concerns estates built in previous decades, which are subject to modernization and densification. The aim of these activities is to use urban space more effectively, but without proper planning they can disrupt the original urban layout and social ties. These processes are part of broader urban changes in Central and Eastern Europe. Research shows that the pace and nature of gentrification depend not only on globalization and liberalization of the economy, but also on local conditions - historical development and state policy. In post-communist cities/countries, the so-called gentrification of newly built housing estates often occurs, which differs from

classic gentrification. This is a specific mechanism driving the growth of real estate values and profits on the housing market, closely linked to the development of financial and credit markets. State actions are of key importance in this process (Holm et al., 2015).

The development of the real estate market in Poland is strongly linked to the financial situation. The increase in the availability of mortgage loans in 2004-2008, driven by low interest rates and the liberalization of the banking sector, contributed to the dynamic growth of housing prices. The financial crisis in 2008 caused a slowdown, but in 2014-2020 a strong increase in real estate prices was noted again, which was the effect of, among others: low interest rate policy, which increased the availability of mortgage loans, foreign investment and speculative purchases of real estate, development of the rental market, including the so-called "flipping" of apartments, i.e. their quick purchase, renovation and sale at a profit (Adamkiewicz, 2016; Czerniak et al., 2021).

In the Polish context, urban regeneration processes are increasingly shaped by the strong influence of private investors, especially developers who play a key role in defining development priorities and shaping urban space. Urban development is no longer understood as a process of rebuilding local potential and adapting to new civilization challenges but is increasingly becoming a mechanism for “reclaiming” land with high investment potential (Markowski, 2023). The strong position of developers on the housing market translates into a significant influence on shaping spatial policy and densification processes. Through relations with political parties and participation in legislative work on spatial planning and development, the developer lobby often pushes for solutions that facilitate investment. As a result, planned changes to regulations may limit the tools for protecting the public interest and reduce the availability of housing due to cooperation with banks.

Market-led densification in Poland exerts influence on national legislation through well-organized developer, that advocate for streamlined administrative decisions and reduced regulatory constraints. These groups fund research and commission policy papers urging amendments to spatial planning law, framing looser regulations as necessary to alleviate Poland’s persistent housing shortage. In turn, Poland adopted these proposals, enacting lex specialis laws that relax zoning and procedural requirements, often bypassing detailed local spatial plans. Consequently, Poland’s spatial-planning framework increasingly reflects market-led priorities, tilting the balance of power toward developers at the expense of local comprehensive planning (Havel, 2022; Havel & Zaborowski, 2025; Polanska, 2014).

The processes of gentrification, densification of buildings and financial policy interpenetrate each other, influencing the shape of the real estate market in Poland. On the one hand, they support the modernization of cities and the growth of real estate values, but on the other hand, they lead to an increase in the cost of living and speculation on the housing market. State policy, including regulations on loans, the rental market and spatial planning, will be of key importance in the coming years.

6.4 The multilevel governance process

The governance of densification policy in Poland involves a complex, multi-level framework, in which roles and resources are shared between national, regional and local levels. These levels

coordinate different strategies, with potential trade-offs between densification and housing availability. The nature of densification processes in Poland reflects interactions between authorities as well as different stakeholders, including private investors, citizens and urban planners. Policy management is carried out by different actors who have specific goals at different levels and types (Table PL11).

Actor	Type	Level	Roles	Effects	Coordination Dynamics
Ministry of Development and Technology	Public	National	Regulations of policy frames.	Initiated major spatial planning reform in 2023, enabling better land-use planning and densification.	Often poorly coordinated with sectoral ministries. Top-down approach with limited feedback from local level.
Voivodeships Offices	Public	Regional	Develops regional spatial development plans.	Limited influence on densification due to weak enforcement of regional plans.	Weak vertical coordination with municipalities.
Local authorities	Public	Local	Responsibility for local urban planning - determination of development conditions and preparation of local spatial documents Implementation of housing strategies, public space projects, and implementation of infrastructural investments.	Direct impact on urban planning, development conditions, and investment approval; local tax revenues; public-private partnerships (PPP); and urban development agreements	Often under pressure from developers; dependent on fiscal income from property tax.
Social housing managers	Public	Local	Management of social housing projects and municipal housing resources.	Implemented limited densification in degraded areas (e.g. via SIMs), but small-scale and underfunded.	Weak integration with spatial planning; lack of long-term coordination with private developers or regeneration programmes.
Private developers	Private	National/ Regional/ Local	Invest in residential and commercial real estate projects.	Strong driver of high-density housing (e.g. in Warsaw's Wola). Prioritize profit over urban quality and affordability.	Often dominate local planning processes; exert influence via land ownership and lobbying. Conflict

Actor	Type	Level	Roles	Effects	Coordination Dynamics
					with social housing goals.
Banks and financial institutes	Private	National/ Regional/ Local	Provide financing for construction and buyers.	Support densification by financing large residential projects.	Aligned with developers; no strong coordination with public policy goals (e.g. affordable housing).
NGOs	Civil Society	Local	Monitor policy impacts and lobby for inclusive urban policies.	Active in bigger cities like Warsaw (Miasto Jest Nasze); lobby against over-densification and gentrification.	Often in conflict with developers or passive municipalities. Limited formal role but increasing visibility.
Citizens and local communities	Civil Society	Local	Participate in public consultations.	Protest against high-density projects; low trust in planning system.	Often excluded from real influence; participation frequently symbolic. Conflictual relations with both public and private actors.

Table PL11. Actors involved in densification governance in Poland

Source: own elaboration.

Multilevel governance of densification strategies in Poland aims to balance economic, environmental and social priorities. However, the tensions between financial benefits for key players and compact urban growth require careful coordination of policies and cooperation between actors at all levels.

Horizontal governance involves collaboration among municipalities, sectors, or stakeholders at the same administrative level to ensure cohesive planning and resource sharing. In practice, densification in Poland is challenged by weak vertical integration, national goals promoting compact development are not always supported by local land-use plans or administrative capacity. For example, some municipalities continue issuing permits for scattered housing despite national policies advocating for containment of sprawl. Meanwhile, horizontal coordination is limited.

6.5 Achievements, assessments, and challenges

Among the main achievements of densification in Poland are the reform of the spatial planning system in 2023, which implemented new regulations supporting densification projects. The adoption of the ***National Urban Policy 2030*** focused on addressing problems with inefficient use of urban spaces and proposing programs to reduce issues in cities. Additionally, revitalization projects have been implemented in post-railway and post-industrial areas in degraded parts of cities, supporting the renewal of urban spaces by creating multifunctional areas that enhance the quality of life and functionality (Table PL12).

Impact area	Measured Impacts	Potential impacts
Efficient use of space	Rational use of already built-up urban areas through the revitalization of degraded post-industrial areas. Examples: New Center of Łódź, revitalization of post-mining areas in Katowice	The National Urban Policy encourages the efficient use of urban land, helping to maximize space in already developed urban areas through the strategies contained in this document. Regeneration projects aim to reuse abandoned or underutilized land, promoting a more efficient urban layout.
Multifunctionality	Examples of revitalization of the post-shipyard areas show that spaces combining housing, services and recreation are being created there. Examples: "Young City" [Młode miasto] – revitalization of approx. 73 ha of post-shipyard areas in Gdańsk	Regeneration of post-industrial and post-rail areas focuses on creating multifunctional spaces with improved quality of life.
Quality of life	As a result of densification projects with multi-family housing and services in cities, access to housing, work and public spaces in city centres has improved Examples: Powiśle Power Plant [Elektrownia Powiśle] in Warsaw, Fusion Complex in Łódź	Densification through mixed-use development can improve the quality of life in city centres by offering better access to housing, jobs, public spaces and amenities.
Increasing financialization	The “Apartment Plus”, “Apartment for Young” and other programmes have led to an increase in the number of rental apartments targeted at middle- and low-income groups as a result of increased investment pressure. Results: A total of 3,468 premises were built in 18 cities, most of them in Katowice (513) and Kraków (481)[19].	The Apartment Plus [‘Mieszkanie Plus’] project aims to increase the number of apartments for rent at moderate rents, focusing on low- and middle-income groups. The reform of the spatial planning system encourages higher-density development on public land, potentially improving affordability through new opportunities for financing and implementing public investments.
Green space availability	Urban Policy points to the need for better management of urban spaces, which can be seen, for example, in projects to revitalize parks and create green public spaces in many Polish cities.	The National Urban Policy proposes better management of urban spaces, encouraging a balance between green areas and development zones.

[19] https://bank.pl/mieszkanie-plus-ile-udalo-sie-wybudowac-przez-7-lat/ [Last access on: 03.06.2025]

Impact area	Measured Impacts	Potential impacts
		Revitalization projects include greening urban spaces, mitigating the loss of public green areas in degraded zones.

Table PL12. Impacts of densification policies on housing inequalities in Poland

Source: own elaboration.

Densification policies in Poland, as elsewhere, present both opportunities and challenges. Measured effects show that densification has improved the quality of space but also led to higher housing prices and reduced green areas. Potential future effects suggest that densification may either mitigate or exacerbate housing inequalities, depending on how policies are designed and implemented. In recent years, growing disparities in access to and affordability of housing have prompted policymakers in Poland to seek remedies that promote greater spatial and social equity. While market-driven development has dominated urban development since the early 1990s (Ogrodowczyk & Marcińczak, 2021), several public policy instruments have emerged to counteract its exclusionary effects. These policies aim to moderate land speculation, expand access to affordable housing, and ensure more efficient urban regeneration (Table PL13).

Instrument	Type	Description	Potential for Reducing Inequality
TBS (Social Housing Associations)	Social rental housing	Public-private model delivering below-market rental units for middle-income groups.	Moderate to high – offers tenure stability for non-wealthy households.
Housing Cooperatives (pilot initiatives)	Cooperative housing	Community-based models offering shared ownership or long-term leases.	High, if legal and financial barriers are addressed.
Municipal revitalization programs	Integrated urban policy	EU-funded revitalization combining building upgrades with social services.	Moderate – needs strong social safeguards to protect vulnerable residents.
SIM (Social Housing Initiatives)	Public-Private Partnerships	Affordable housing developments on public land led by local governments and BGK.	High – good potential if kept affordable and insulated from market pressures.
Local plan of developments	Land Use Regulation	Local land of developments that set development rules, limit building intensity, and protect public spaces.	Can support spatial equity if used to protect affordable areas and promote mixed-income neighbourhoods.
Land Value Capture [Opłata Planistyczna]	Fiscal Tool	Captures part of increased land value after zoning changes for public reinvestment.	High if revenues are used for affordable housing or community facilities.

Table PL13. Policies and tools to correct housing inequalities in Poland

Source: own elaboration.

Although the housing system in Poland is still largely based on market mechanisms, selected public policies, such as social housing programmes, cooperative initiatives and regulatory tools, show the potential to mitigate spatial and socio-economic inequalities. However, to ensure that these reforms effectively balance the goals of density with housing affordability and social integration, careful planning and ongoing coordination at local, regional, and national levels will be necessary.

Densification in rural Poland is a promising but under-implemented approach to sustainable rural development. While national strategies promote more compact rural settlement forms, structural barriers, such as weak planning capacity, fragmented land ownership, and demographic decline, limit practical achievements. In many rural areas, especially in eastern and northern Poland, population decline results in vacant or underused buildings, making densification less urgent or economically viable. For densification to succeed, targeted incentives, enhanced local planning capacity, and community engagement are essential.

7 Summary and discussion of results

7.1 Summary of changes in EEP

Environmental and energy policies (EEPs) in Poland have evolved significantly in recent years, driven by EU directives, environmental concerns, and energy security goals. Initially focused on meeting EU energy targets, Poland has gradually shifted toward more comprehensive policies aimed at reducing carbon emissions and improving energy efficiency across residential, industrial, and public sectors.

The changes introduced from 2016 by the *Act on energy efficiency* are aimed at optimizing energy consumption and improving conditions for the development of new energy services. They are therefore consistent with the assumptions of climate and energy policy. Environmental objectives and projected energy deficits related to the growing demand for energy in Poland translate into the need to both optimise energy consumption and introduce measures aimed at maximising energy savings. The new regulations allow obligated entities to implement non-repayable subsidy programs to co-finance projects involving the connection of end users to the heating network or the replacement of heat sources. This solution also speeds up the process of modernizing individual heat sources.

In Poland, around 10% of the population consists of energy-poor households that are unable to properly heat and light their homes or use electrical appliances. The most common causes of energy poverty include low energy efficiency of buildings and heating systems, high energy costs, and low incomes (Sokołowski & Frankowski, 2021).

The Polish energy sector is undergoing a significant and dynamic transformation. There is a noticeable disparity between the expectations of stakeholders, current industry practices, and regulatory requirements, highlighting the challenges and complexities of this transition. Poland shall update its energy efficiency policies for the residential building sector and increase all relevant stakeholders' preparedness. The *Directive on the energy performance of*

buildings recast in 2024 promotes equal access to financing for energy-poor citizens and social housing while considering affordability (Attia et al., 2022).

Key changes include the introduction of programs like "*Clean Air*" to subsidize building retrofits, stricter energy performance standards for new constructions, and expanded use of renewable energy sources. Poland has serious international obligations in the field of environmental protection, including combating climate change and limiting emissions of pollutants that can travel long distances into the air, which require it to systematically and significantly reduce emissions of carbon dioxide, nitrogen oxides, dust and other substances characteristic of energy using fossil fuel resources.

Due to the *Energy Policy of Poland until 2040 (2021)* in 2040, more than half of the installed capacity will be zero-emission sources. A special role in this process will be played by the implementation of offshore wind energy into the Polish power system and the launch of a nuclear power plant. In parallel to large-scale energy, distributed and civic energy will develop – based on local capital. The transformation also requires increasing the use of renewable energy technologies in heat generation and increasing the use of alternative fuels in transport, also through the development of electromobility and hydromobility.

In Poland, economic factors such as the availability of EU funding and national subsidies (e.g., the Clean Air Programme) significantly shape the design and implementation of EEPs, often prioritizing cost-effectiveness over social equity. Normative influences, including growing public awareness of air pollution and climate change, have increased pressure on policymakers to adopt greener solutions, although uptake remains uneven across regions. Institutionally, a fragmented governance system, where responsibilities are split between national ministries and under-resourced local governments, often hampers coherent policy execution. Contextual factors such as the legacy of coal dependence, aging housing stock, and regional disparities further complicate the local adaptation of national EEPs. As a result, while Poland has made progress in formalizing energy efficiency goals, actual outcomes vary widely depending on local capacity, infrastructure, and socio-economic conditions.

The evolution of EEP in Poland has been shaped by complex socio-economic and institutional dynamics, influencing housing inequalities across the country. A delicate balance exists between market forces and institutional interventions within Poland's housing and energy sectors. While the market largely dictates housing supply and demand, public policy tools such as subsidies, grants, and incentive programs aim to mitigate inequalities by making energy efficiency retrofitting more affordable. However, these tools have uneven reach and impact, highlighting ongoing tensions between profit-driven housing provision and socially oriented policy goals.

Local authorities occupy a pivotal position in translating national EEP goals into practice. Nevertheless, their role is constrained by insufficient financial resources, reducing their capacity to effectively address housing inequalities rooted in energy inefficiency. Enhancing empowerment and support for local governments is critical to improving policy outcomes at the ground level. Coordination challenges remain a persistent obstacle. There is often a misalignment between national objectives for energy efficiency and local implementation capacities, compounded by weak integration between energy policies and affordable housing

strategies. These contradictions and sectoral conflicts reduce the effectiveness of both housing and energy programs, particularly when governance structures fail to provide clear coordination mechanisms. While national-level evidence on such conflicts may be limited, local case studies reveal tangible struggles in harmonizing goals.

Spatially, the impact of EEPs and housing policies varies across territorial scales. Urban areas often face rising housing costs linked to retrofitting requirements, potentially exacerbating affordability problems. Conversely, rural areas struggle with limited access to energy efficiency programs and financial support, deepening regional inequalities. More detailed spatial analysis is needed to understand these differential effects fully. In response, Poland has begun adopting corrective and innovative measures aimed at reducing housing inequalities. These include energy performance labeling, targeted retrofitting grants, and programs specifically focused on disadvantaged communities. Despite their promise, these initiatives still face challenges in reaching the most vulnerable groups, particularly low-income households who may lack the resources or knowledge to benefit fully.

In summary, while Poland's EEP landscape reflects growing recognition of the need for energy-efficient and equitable housing, significant gaps persist in balancing economic, institutional, and spatial factors. Strengthening local governance, improving policy coordination, and tailoring interventions to vulnerable populations are essential steps toward achieving more inclusive and effective energy efficiency outcomes in housing.

7.2 Relations and trade-offs between EEPs and housing policies

In Poland, the relations and trade-offs between EEP and housing policies are shaped by the need to balance energy efficiency improvements with housing affordability and accessibility. EEPs focus on reducing energy consumption and carbon emissions, often through retrofitting initiatives supported by government programs. The trade-offs arise from the tension between implementing ambitious EEPs and addressing social concerns like energy poverty and housing quality. While retrofitting programs aim to lower long-term energy costs, they often require subsidies or financial incentives to avoid excluding vulnerable populations. Balancing these priorities requires coordinated policies that align energy efficiency goals with broader housing and social welfare objectives.

In Poland housing policies increasingly support the integration of renewable energy technologies like solar panels, heat pumps, and electric vehicle charging stations, aligning with broader EEP goals. Moreover, housing policies intersect with EEPs in addressing energy affordability. Subsidies or incentives for energy efficiency upgrades help households, especially low-income ones, reduce energy bills.

While retrofitting existing settlements to meet EEP goals may be environmentally preferable, it can be more expensive than demolishing, and rebuilding, especially in areas rich in industrial buildings, creating challenges for policymakers balancing costs and sustainability. Subsidies for energy-efficient housing can encourage green development but may distort housing markets, driving up costs in certain areas. Additionally, housing policies focused on expanding supply sometimes prioritize quantity over quality, resulting in energy-inefficient developments

that conflict with EEP goals. Balancing these policies requires coordinated planning to ensure that energy efficiency improvements do not inadvertently exacerbate housing inequalities.

Improving housing conditions is a necessary condition for a just transformation of the energy sector in Poland. Reducing energy consumption and emissions without losing the quality of living conditions should be the overarching assumption of decarbonizing the economy. It is reasonable to maintain or increase funds earmarked for renovation of municipal housing stock, as well as to provide compensation for higher energy expenditure among the poor (Sokołowski & Frankowski, 2021).

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10 List of abbreviations

AUUs	Assigned Amount Units
EEA	European Economic Area
EEPs	Environmental and Energy Policies
EPBD	Energy Performance of Buildings Directive
EPP2040	Energy Policy of Poland until 2040
EU	European Union
HEMS	Home Energy Management System
EMS	Energy Management System
ERDF	European Regional Development Fund
KP	Kyoto Protocol
NBS	Nature Based Solutions
NEP2030	National Environmental Policy 2030
NFEPWM	National Fund for Environmental Protection and Water Management
NUP2023	National Urban Policy 2023
NUP2030	National Urban Policy 2030
PLN	Polish Zloty
PPP	Public-Private Partnership
PV	Photovoltaics
TPA	Third Party Access
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change

11 Annex

EUROPEAN LEVEL		
2002	Energy Performance of Buildings Directive (EPBD) https://eur-lex.europa.eu/eli/dir/2002/91/oj/eng	The 2002 EPBD did not impose common, precise numerical targets. It required each Member State to develop a national methodology for calculating the energy performance of buildings. It required members states **to set national minimum requirements on the energy performance of new buildings and only existing buildings with a total useful floor area over 1000 m² that are undergo major renovation**[20]**.** Member States may decide not to set or apply the requirements for the residential buildings (new and existing) which are intended to be used less than four months of the year.
2010	EPBD revision https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32010L0031	The 2010 EPBD did not impose common, precise numerical targets but it included some changes with respect to the 2002 version. It established mandatory national minimum requirements on the energy performance of new buildings and **only existing buildings that are undergo major renovation, regardless of their surface area.** Mandatory national minimum requirements have to be updated every five years and are set with a view to achieving cost-optimal levels Member States shall ensure that: by 31 December 2020, all new buildings are nearly zero-energy buildings; and after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings Member States may decide not to set or apply the requirements for "*residential buildings which are used or intended to be used for either less than four months of the year or, alternatively, for a limited annual time of use and with an expected energy consumption of less than 25 % of what would be the result of all-year use*".
2012	Energy Efficiency Directive (EED) https://eur-lex.europa.eu/eli/dir/2012/27/oj/eng	The 2012 EED set out a number of energy efficiency targets, referring not only to the residential or building sector but more broadly to all sectors.

[20] According to the Directive: "*Major renovations are cases such as those where the total cost of the renovation related to the building shell and/or energy installations such as heating, hot water supply, air-conditioning, ventilation and lighting is higher than 25 % of the value of the building, excluding the value of the land upon which the building is situated, or those where more than 25 % of the building shell undergoes renovation*"

		The EU aimed to reduce energy consumption by 20% by 2020. Each Member State was required to set indicative national energy efficiency targets. Member States also had to renovate each year at least 3% of the total floor area of centrally owned public buildings.
2018	EPBD revision https://eur-lex.europa.eu/eli/dir/2018/844/oj/eng	Each Member State shall establish **a long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, into a highly energy efficient and decarbonised building stock by 2050**, facilitating the cost-effective transformation of existing buildings into nearly zero-energy buildings, in particular by an increase in deep renovations. The long-term renovation strategy shall include indicative milestones for 2030, 2040 and 2050, and specify how they contribute to achieving the Union's energy efficiency targets in accordance with Directive 2012/27/EU.
2023	EED revision https://eur-lex.europa.eu/eli/dir/2023/1791/oj/eng	2023 EED defines higher targets for energy efficiency and introduces the "Energy-efficient first principle" as a key element, meaning that energy efficiency must be prioritised by member states across all policy and investment decisions **Public bodies at national, regional and local level should fulfil an exemplary role as regards energy efficiency.** Each Member State shall ensure that at least 3 % of the total floor area of heated and/or cooled buildings that are owned by public bodies is renovated each year to be transformed into at least nearly zero-energy buildings or zero-emission buildings **Member States shall establish and achieve a share of the required amount of cumulative end-use energy savings among people affected by energy poverty, vulnerable customers, people in low-income households and, where applicable, people living in social housing**
2024	EPBD revision https://eur-lex.europa.eu/eli/dir/2024/1275/oj/eng	**2024 EPBD objective is the reduction of greenhouse gas emissions from buildings within the Union, with a view to achieving a zero-emission building stock by 2050** **Member States shall establish a national building renovation plans that also includes a roadmap with targets and indicators, including the reduction of the number of people affected by energy poverty.** Member states must implement measures to reduce average primary energy consumption of the national residential building stock by at least 16% compared to 2020

		by 2030; and by at least 20-22% compared to 2020 by 2035. Member States shall ensure that at least 55 % of the decrease in the average primary energy use referred to in the third subparagraph is achieved through the renovation of the 43 % worst-performing residential buildings
NATIONAL LEVEL - POLAND		
2014	Act on the Energy Performance of Buildings	It introduces the obligation to issue energy performance certificates for buildings and requirements for energy standards, including nearly zero-energy buildings. It establishes a central register of energy certificates. The aim is to improve the energy efficiency of buildings and reduce CO_2 emissions.
2016	Act on Energy Efficiency	It introduces a system of white certificates, which allow entities meeting certain requirements (e.g. conducting an energy audit) to obtain property rights. It supports investments in energy efficiency, improving both economic development and benefits for citizens.
2019	National Energy and Climate Plan	It sets out Poland's goals for reducing greenhouse gas emissions, increasing the share of renewable energy sources and improving energy efficiency by 2030. The plan is the basis for the national climate and energy policy and contains measures to achieve these goals.
2021	Energy Policy of Poland until 2040 (EPP2040)	Long-term strategy defining the directions of Poland's energy transformation, including increasing energy efficiency, developing renewable energy sources and reducing emissions. It indicates actions aimed at adapting the construction and energy sectors to EU requirements.