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Executive Summary

This report translates the practical experience of LIFE Low2HighDH into targeted policy recommendations to improve the investment readiness and implementation of projects integrating low-grade renewable energy and waste heat into existing district heating systems. The recommendations focus on barriers encountered during project activities in Poland, Slovakia and Lithuania, complemented by measures addressing common challenges at EU level.

EU LEVEL	
Challenges	**Policy recommendations**
Insufficient sector coupling between electricity and thermal infrastructures	• Integrate thermal infrastructure into European and national electricity-grid planning • Reform electricity charges for flexible power-to-heat operation • Open electricity flexibility and capacity mechanisms to district heating assets
Fragmented planning between buildings, heating infrastructure and local energy resources	• Require a district-level assessment of heat demand, building characteristics, existing infrastructure and local renewable and excess heat before supporting major renovations or heating-system replacements • Allow building-renovation programmes to fund the water-based distribution systems, substations and other adaptations required for district heating connection
Efficient district heating criteria that change five times before 2050 and offer no route for systems built on recovered heat	• Admit waste heat towards the minimum renewable share of the combined criterion, or add a qualifying route for systems whose decarbonisation rests on recovered heat • Define what happens when a threshold moves: protection of status for networks implementing an approved plan, and a procedure and authority that determine status • Require support schemes to state the period over which a configuration keeps the status

Poland	
Challenges	**Policy recommendations**
The annual tariff cycle provides no horizon for multi-annual investment	• Allow district heating companies to opt for multi-year tariff periods, with a simplified track for small operators
Tariff adjustment lags changes in fuel, electricity and CO2 costs	• Introduce a transparent automatic adjustment mechanism • Establish a two-stage tariff settlement process • Simplify and accelerate tariff approval procedures
Efficiency gains cannot be retained long enough to recover the investment that produced them	• Make the existing efficiency bonus operational through published measurement, verification and retention rules • Link retained gains to approved investment and decarbonisation plans
The regulated return does not cover debt service on modernisation loans	• Remunerate efficiently incurred financing costs without duplicating the return on capital • Allow conditional progressive recognition of investments in the regulatory asset value
Grant programmes are technology-specific, calibrated to new-build performance and unpredictable in timing	• Move towards technology-neutral and outcome-based support • Express technical eligibility thresholds as improvement against a documented baseline • Provide predictable multi-year programmes • Link support to the transformation plan required under Article 26(5) EED • Identify an instrument for coal-exit projects without an immediate non-fossil alternative
Most Polish systems must prepare improvement plans under Article 26(5) EED, and no procedure exists to approve them	• Complete the plan obligation: submission deadline, published criteria, model structure, simplified track, time limit for the authority, link to eligibility for support

Slovakia	
Challenges	**Policy recommendations**
Providing regulatory certainty for major decarbonisation investments	• Introduce binding ex-ante regulatory agreements for major decarbonisation investments • Align regulatory depreciation with the technical and financing characteristics of district heating assets • Allow phased recognition of large investments in the tariff
Ensuring that renewable energy incentives can be applied at network level	• Assess eligibility for the renewable energy incentive at the level of each individual district heating network • Introduce a transitional mechanism for operators managing multiple networks
Managing disconnections from district heating networks undergoing decarbonisation	• Introduce transitional protection for networks implementing an approved decarbonisation plan • Require a system-level impact assessment before authorising disconnection
Avoiding conflicting public support for district heating and decentralised heat sources	• Introduce a district-heating compatibility assessment for public funding • Avoid supporting competing decentralised heat sources where an efficient or credibly decarbonising district heating network can provide the required service

Lithuania	
Challenges	**Policy recommendations**
Improving access to dedicated support for large-scale heat pumps in district heating	• Establish a predictable multi-year support framework for large-scale heat pumps in district heating • Introduce recurring, technology-neutral calls focused on system outcomes
Providing a stable multi-year tariff framework for long-term investment	• Introduce optional multi-year tariff periods linked to approved investment plans
Aligning electricity and heat-market signals to enable flexible heat pump operation	• Enable district heating operators to participate in electricity flexibility and balancing mechanisms • Develop operating incentives rather than general investment support
Overcoming limited engagement of industrial waste heat providers	• Introduce a mandatory waste heat assessment and cooperation requirement for large industrial installations • Require the consideration of waste heat recovery in major industrial permitting and factory investment decisions • Provide standard agreements for industrial waste heat cooperation

District heating regulation should move beyond short-term cost recovery and provide a credible framework for long-term investment. This requires predictable revenues, appropriate recognition of financing costs, incentives linked to measurable efficiency and decarbonisation outcomes, and closer coordination between regulators, public authorities, operators, industrial heat providers and financing institutions. KAPE, representing LIFE Low2HighDH, has already submitted comments in three national processes in Poland: on the proposed transposition of the revised Energy Efficiency Directive, on the draft Heating Transformation Strategy to 2040 (15 July 2026) and on the draft programme of the Heating Transformation Fund (30 July 2026), in each case drawing on the findings of the project.

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List of Acronyms and Abbreviations

CAPEX - Capital Expenditure

CHP - Combined Heat and Power

CO_2 - Carbon Dioxide

DH - District Heating

EED - Energy Efficiency Directive

EPBD - Energy Performance of Buildings Directive

ETS2 - Emissions Trading System for fuels used in buildings, road transport and additional sectors

EU - European Union

EUR - Euro

KAPE - Polish National Energy Conservation Agency (Krajowa Agencja Poszanowania Energii)

L2H - Low2HighDH

LIFE - Programme for the Environment and Climate Action

LŠTA - Lithuanian District Heating Association (Lietuvos šilumos tiekėjų asociacija)

NCIP - National Climate and Energy Integrated Plan

NFOŚiGW - National Fund for Environmental Protection and Water Management (Narodowy Fundusz Ochrony Środowiska i Gospodarki Wodnej)

PLN - Polish Złoty

RAB - Regulatory Asset Base (the Lithuanian designation; the Polish equivalent is WRA)

RED III - Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources, as amended by Directive (EU) 2023/2413

RES - Renewable Energy Sources

ROI - Return on Investment

SZVT - Slovak Association of Heat Producers (Slovenský zväz výrobcov tepla)

URE - Energy Regulatory Office (Urząd Regulacji Energetyki)

URSO - Regulatory Office for Network Industries (Úrad pre reguláciu sieťových odvetví)

VERT - National Energy Regulatory Council (Valstybinė energetikos reguliavimo taryba)

WACC - Weighted Average Cost of Capital

ZZK - Justified Return on Capital

1. Introduction

The LIFE Low2HighDH project aims to support the decarbonisation of existing high-temperature district heating systems through the integration of low-grade renewable energy and waste heat sources. Although these solutions can offer significant environmental and system-level benefits, their implementation depends not only on technical feasibility. Regulatory frameworks, tariff methodologies, public support mechanisms, electricity-market arrangements and access to finance also influence whether projects can be developed, financed and implemented in practice.

The purpose of this report is to translate the experience and lessons learned during the LIFE Low2HighDH project into practical policy recommendations. The analysis focuses on the barriers and enabling conditions encountered during the assessment of pilot and replication projects, the preparation of technical and financial analyses, and the engagement with district heating operators, public authorities and other relevant stakeholders. In this sense, the document moves from project implementation experience to policy recommendations, identifying measures that could facilitate the modernisation and decarbonisation of district heating systems and support the implementation and replication of solutions similar to those considered within the project.

The report is not intended to provide a comprehensive review of all policies and regulations affecting the district heating sector. Instead, it concentrates on the issues that demonstrated a direct and practical relevance during the project. This project-based approach ensures that the recommendations respond to barriers observed in practice and remain connected to the conditions affecting project development, investment readiness and implementation. Desk research and stakeholder consultations complement the project evidence by providing the regulatory and market context needed to assess the identified challenges and formulate the proposed measures.

The timing of this report is particularly relevant given the ongoing policy developments affecting the district heating sector in several of the countries covered by the project. In Slovakia, preparations for the next regulatory period create an opportunity to review tariff methodologies and regulatory incentives. In Poland, legislative amendments linked to the implementation of recent EU energy and climate requirements are under development, while the new Heating Strategy is undergoing public consultation. These processes open a policy window in which the practical experience generated by LIFE Low2HighDH can contribute to ongoing discussions on the future regulatory framework for district heating. By presenting recommendations grounded in real project experience, the report aims to support policy makers and sector stakeholders in designing measures that facilitate investment in low-carbon and renewable heat solutions.

The document is structured in four main parts. First, the Methodology and Scope section defines the boundaries of the analysis and explains the sources used to develop and validate the recommendations. Second, the EU Regulation section examines the European legislative instruments that had the most direct relevance for the project and establishes the common policy context for district heating decarbonisation. Third, the country sections analyse the district heating context and tariff frameworks in Poland, Slovakia and Lithuania, providing the factual and regulatory basis for the subsequent recommendations. Finally, the Policy Recommendations section presents the challenges identified during project implementation and proposes measures at EU and national level to address them.

2. Methodology and Scope

The policy recommendations developed under the Low2HighDH project are primarily based on the practical experience and lessons learned generated throughout the project's implementation. Accordingly, the scope of this report is limited to the policy, regulatory, technical and financial challenges encountered in practice during the implementation of project activities. The recommendations are intended to address these observed barriers and support the smoother implementation and replication of L2H projects. Desk research and targeted stakeholder consultation were used as complementary sources to support and validate the project findings.

The main evidence base comprises the experience generated through pilot-site assessments, technical and financial analyses, stakeholder engagement activities conducted through the Local Liaison Groups, consortium discussions and replication-oriented work. These lessons learned provided direct insights into the practical challenges faced by district heating operators, local authorities and other relevant market actors when seeking to integrate low-grade renewable energy sources and waste heat into existing high-temperature district heating systems. The analysis was further supported by contributions from the project's External Advisory Board (EAB), whose members provided additional market, regulatory and technical perspectives.

Desk research was conducted to complement the project evidence through a review of relevant secondary sources, including EU and national policy and regulatory documents, market and sectoral reports, technical literature, and publicly available information on district heating decarbonisation, low-grade renewable energy sources, waste heat integration, energy efficiency requirements and financing mechanisms. Rather than seeking to provide a comprehensive assessment of all potential barriers affecting the district heating sector, this review focused on contextualising and further examining the challenges identified during the project. Some of the documents consulted are shown in the table below.

Table 1. Key documents consulted

Document	Issuing organisation	Year	Country
Fit for 2050: Unleashing the Potential of Efficient District Heating and Cooling to Decarbonise Europe	Euroheat & Power	2023	European Union
Commission Recommendation (EU) 2024/2395 on the guidelines for the interpretation of Article 26 of Directive (EU) 2023/1791	European Commission	2024	European Union
New Tariffs for a New Era: Changes to District Heating Tariff Rules as a Prerequisite for Sector Transformation and Price Competitiveness	Forum Energii	2026	Poland
Draft programme of the Heating Transformation Fund, consulted 20 to 30 July 2026	NFOŚiGW	2026	Poland
draft Heating Transformation Strategy to 2040, public consultation closed 15 July 2026	Polish Ministry of Energy	2026	Poland
Proposed Theses for the Preparation of the New Regulatory Policy – 7th Regulatory Period (2028–2032)	Slovak Association of Heat Producers (SZVT)	2026	Slovakia
Investments in the Lithuanian Heat Sector	Lithuanian District Heating Association (LŠTA)	2025	Lithuania

In addition, targeted interviews and exchanges were conducted with relevant stakeholders to validate and complement the lessons learned from the project activities. These consultations provided country-specific perspectives and supported the assessment of the relevance, feasibility and potential impact of the proposed policy measures. The resulting recommendations therefore reflect challenges observed through the Low2HighDH project, supported by desk research and stakeholder input.

Table 2. List of interviewees

Organization	Role	Country	Interview Date
LŠTA	President	Lithuania	02/02/2026
LŠTA	Energy Technology and Economy Expert Analyst	Lithuania	02/02/2026
Ministry of Economy	Representative of the Energy Section	Slovakia	11/02/2026
KAPE	Advisor to the board	Poland	20/05/2026
Veolia Energia Slovensko	Senior Manager for District Heating	Slovakia	21/07/2026
Veolia Energia Slovensko	Senior Manager for Institutional Relations	Slovakia	21/07/2026
Veolia Energia Slovensko	Strategic Pricing and Regulatory Affairs Manager	Slovakia	21/07/2026

The information collected through these three strands was analysed jointly to identify recurring barriers, enabling conditions and policy gaps. The resulting recommendations are therefore intended to be evidence-based, practical and actionable, supporting the creation of more favourable conditions for the integration of low-grade renewable energy sources and waste heat into district heating systems.

Polish stakeholder input was obtained mainly through the participation of KAPE, on behalf of the project, in three national consultation processes in 2026: on the draft act transposing the revised Energy Efficiency Directive, on the draft Heating Transformation Strategy to 2040 and on the draft programme of the Heating Transformation Fund. The positions submitted in those processes drew on the technical and financial analyses of the project, and the consultation documents and revised drafts issued by the responsible institutions were used as source material for the Polish section of this report.

3. EU regulatory framework

While several EU legislative instruments influence the heating sector, this analysis focuses on the policy frameworks that demonstrated the most direct and tangible impact during the course of our project: the Energy Efficiency Directive (EED), the Renewable Energy Directive (RED III) and the Energy Performance of Buildings Directive (EPBD). These three instruments are working together to transform the heating sector towards decarbonisation by 2050.

3.1 EED

The EED is the central regulatory framework shaping the transformation of the district heating sector in the EU.

A key feature of the revised directive is the introduction and reinforcement of legally binding definitions, particularly those related to “district heating and cooling” and, most importantly, “efficient district heating and cooling systems”. These definitions determine how systems are classified and, in practice, condition their access to support mechanisms, as well as their regulatory obligations.

The definition turns on the energy sources supplying the network. Article 26(1) of Directive (EU) 2023/1791 does not set a single test but six, applying in successive periods to 2050. In each period a system qualifies if it meets at least one of the alternative thresholds shown in Table 3.

Table 3. Criteria for an efficient district heating and cooling system, Article 26(1) of Directive (EU) 2023/1791

Period	Alternative thresholds, at least
until 31 December 2027	50 % renewable energy, or 50 % waste heat, or 75 % cogenerated heat, or 50 % of a combination of the three
from 1 January 2028	50 % renewable energy, or 50 % waste heat, or 50 % renewable energy and waste heat, or 80 % high-efficiency cogenerated heat, or 50 % of a combination of renewable energy, waste heat and high-efficiency cogenerated heat in which the renewable share is at least 5 %
from 1 January 2035	50 % renewable energy, or 50 % waste heat, or 50 % of the two together, or 80 % of a combination of renewable energy, waste heat and high-efficiency cogenerated heat with a renewable or waste heat share of at least 35 %
from 1 January 2040	75 % renewable energy, or 75 % waste heat, or 75 % of the two together, or 95 % of a combination with a renewable or waste heat share of at least 35 %
from 1 January 2045	75 % renewable energy, or 75 % waste heat, or 75 % of the two together
from 1 January 2050	100 % renewable energy, or 100 % waste heat, or 100 % of a combination of the two

The criteria for efficient district heating progressively tighten from 2028, particularly for cogeneration and mixed systems. Projects should therefore consider the requirements applicable throughout their operating life, not only at commissioning.

The revised directive addresses heating and cooling through Articles 25 and 26. Article 25 requires national assessments and local plans for municipalities above 45,000 inhabitants. Article 26 establishes three additional instruments: five-year improvement plans for non-compliant systems above 5 MW; mandatory waste-heat recovery from data centres above 1 MW, unless unfeasible; and installation-level cost-benefit analyses for new or substantially refurbished electricity, industrial, service and data-centre facilities above the applicable capacity thresholds.

Article 3 establishes the energy efficiency first principle. Member States must ensure that energy efficiency solutions, including demand-side resources and system flexibility, are assessed in planning, policy and major investment decisions above EUR 100 million, and must promote cost-benefit methodologies that capture the wider benefits of efficiency over the whole life cycle. The principle requires a documented comparison of options; it does not establish a general priority of building renovation over investment in heat supply.

Article 26(2)– (3) allows Member States to define efficient district heating through emissions per unit of heat delivered: 200 gCO_2e/kWh until 2025, falling to zero by 2050. Unlike the share-based criteria,

this route directly rewards network efficiency. However, Member States must notify the Commission before each period. As the deadline for 2026 passed in July 2025, Poland's draft applies this route only from 2035. The report should therefore clarify which test applies in each country, as this determines how "efficient" district heating is defined nationally.

Commission Recommendation (EU) 2024/2395 of 2 September 2024 sets out the guidelines on transposing Article 26 and is the document national administrations work from. It settles several points: shares are measured annually at the handover between the conversion technology and the network, on the energy injected; heat from renewable sources counts as renewable whether or not it comes from a cogeneration unit, while fossil-based heat counts only towards the cogeneration threshold; only biomass meeting the sustainability criteria is counted; and all heat from a heat pump that meets the efficiency condition of Annex VII to Directive (EU) 2018/2001 at installation counts as renewable, as recital 107 of the directive already states.

Three points remain open in both the directive and the guidelines, and each bears on the recommendations. Nothing is said about a system that holds the status and loses it when a threshold moves: there is no adjustment period and no protection for an investment made in reliance on the criterion then in force. The guidelines note that the criteria do not say when they are to be applied and that in practice they bite when public support is sought or a plan is required; there is no register, no certificate and no authority that declares the status, so an operator can learn that it has lost the status from a body assessing an application. And the guidelines say nothing about the electricity that drives a heat pump: two systems delivering the same heat with very different electricity consumption score the same, and the efficiency condition is tested at installation with no verification in operation.

To contextualise these regulatory requirements at EU level, the image below presents the evolution of the fuel mix of district heating systems in the EU.

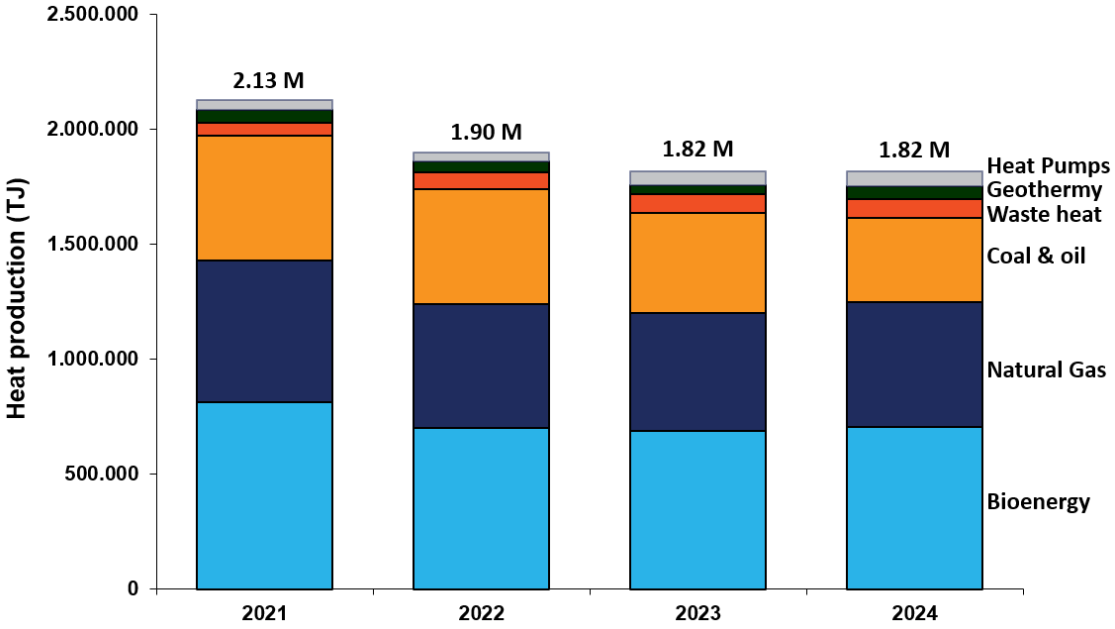


Figure 1. Evolution of EU DH heat production and fuel mix. Source: Eurostat

3.2 EPBD

The EPBD fundamentally alters the context in which district heating systems operate by acting directly on the demand side of the heat market. Its main objective is to reduce the energy consumption of buildings through renovation and stricter efficiency standards, which ultimately leads to a structural decrease in heat demand.

As buildings are progressively renovated and their thermal performance improves, the amount of energy required for space heating declines. This has a direct impact on district heating systems, which rely on a stable demand to distribute fixed costs.

The magnitude of this effect is illustrated in the graphic below.

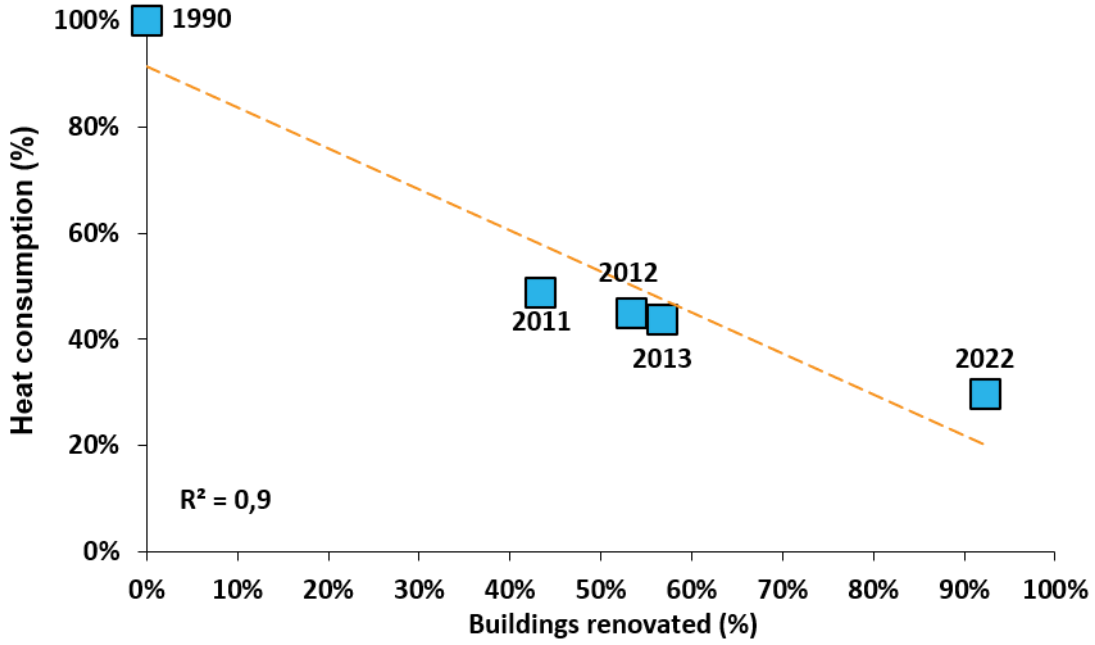


Figure 2. Measured heat consumption vs Buildings renovated for a Low2High pilot DH site

This creates a structural adaptation challenge. Lower heat sales reduce revenue while network, capacity and maintenance costs remain fixed in the short and medium term. Polish data show the mechanism within a single year: in 2025 the fixed costs of the licensed heat sector rose 7.22 %, from PLN 13.60 billion to PLN 14.58 billion, while contracted capacity fell 1.00 % (URE, Energetyka cieplna w liczbach 2025). The effect is not necessarily a permanent deterioration in system economics. Coordinated renovation, lower operating temperatures, network optimisation and the connection of new loads can reduce costs and improve the use of existing infrastructure, but only where demand reduction and network viability are planned together rather than in separate programmes.

In this context, the EPBD introduces a long-term structural constraint that must be considered alongside supply-side decarbonisation policies. While other regulations focus on transforming the energy sources used in district heating, the EPBD reduces the underlying demand, requiring systems to adapt not only to cleaner energy inputs but also to a future with lower and more uncertain levels of heat consumption.

3.3 RED III AND ETS2

Directive (EU) 2018/2001 as amended by Directive (EU) 2023/2413 (RED III) and the emissions trading system for fuels used in buildings, road transport and additional sectors (ETS2) introduce two complementary mechanisms. RED III raises the obligations on renewable energy in heating and cooling; ETS2 raises the cost of fossil fuels outside the existing EU ETS. Together they create a strong incentive to transform how heat is produced and supplied.

RED III sets the obligations in three places. Article 23(1) requires each Member State to increase the share of renewable energy in heating and cooling by an annual average of at least 0,8 percentage points over 2021 to 2025 and 1,1 points over 2026 to 2030, with national top-ups in Annex Ia. Waste heat may be counted towards that increase up to 0,4 points, but doing so raises the required increase itself by half the points used, which is worth noting in a report that treats waste heat throughout as an unqualified asset. Article 24(4) sets an indicative objective for district heating and cooling of an annual average increase of around 2,2 percentage points over 2021 to 2030; that is the benchmark against which the three national systems can be measured. Article 24(4b) and (5) require Member States to encourage operators of systems above 25 MW to connect third-party suppliers of renewable energy and waste heat and allow the operator to refuse on four grounds: lack of capacity, technical parameters of the heat, cost to final customers, and the fact that the operator's system is an efficient district heating and cooling system. The transposition deadline expired on 21 May 2025.

ETS2 was established by Chapter IVa of Directive 2003/87/EC, inserted by Directive (EU) 2023/959, with a launch planned for 2027; Regulation (EU) 2026/667 of 11 March 2026 postponed it to 2028, and several national planning documents still assume the original date. It does not extend carbon pricing to district heating as such. Larger heat-production installations already fall under the existing EU ETS; ETS2 applies upstream to fuels released for consumption in buildings, road transport and smaller installations outside the existing system. For district heating the effect therefore depends on the size of the plant and on the national fuel structure, and this section should distinguish existing EU ETS exposure from the future effect of ETS2 on fuels used by smaller heat sources.

The key issue lies in how Member States manage the additional costs and revenues associated with carbon pricing:

- In some countries, public support schemes are used to finance the decarbonisation and modernisation of district heating systems. Examples include Germany’s BEW programme and projects supported through the EU Modernisation Fund
- In other cases, part of the additional carbon cost may be reflected in heat tariffs paid by final consumers.
- In some countries, district heating operators are allowed to retain part of the value generated by CO2 pricing and reinvest it in the modernisation of their systems.
- In other cases, the cost is mainly transferred to the final consumer.

The difference in regulatory treatment has a significant impact on the financial situation of district heating systems. Systems with a high share of fossil fuels are the most exposed and this can either lead to increased financial pressure or to create an opportunity to accelerate decarbonisation through reinvestment.

4. Poland

District heating in Poland is undergoing regulatory changes linked to the alignment of national legislation with EU energy and climate policy. The sector is regulated under the Polish Energy Law and related secondary legislation covering tariffs, system operation and market supervision. Within this framework, the Energy Regulatory Office (URE) supervises the sector and monitors compliance with regulatory requirements.

The regulatory framework has traditionally focused on security of supply, consumer affordability and the financial stability of energy companies. Tariffs, investment plans and certain operational decisions are therefore subject to regulatory review and approval.

The framework is changing on several fronts at once. The draft act transposing the revised Energy Efficiency Directive, which reproduces the six periods of Article 26(1) unchanged and offers the emissions route from 2035, was consulted in May 2026 and is not yet before the Sejm; a separate draft amendment to the RES Act transposing the heating provisions of RED III is at the same stage. Consultation on the Heating Transformation Strategy to 2040 closed on 15 July 2026, with adoption planned for the first quarter of 2027. The draft Strategy puts the investment requirement at PLN 197 to 231 billion to 2040 and sets 2040 indicators of up to 52.2 % renewable share, up to 5.5 GWt of power-to-heat capacity, 576 GWh of thermal storage and 10 PJ of waste heat; it also records that about 22 % of Polish systems currently hold efficient status, most of them through cogeneration. Its indicators are ceilings without baselines or interim values, its financing plan is deferred to the 2027 to 2030 period, and ETS2 and the Social Climate Fund do not appear in it. The first national instrument dedicated to district heating, the Heating Transformation Fund at NFOŚiGW, was consulted between 20 and 30 July 2026 and is described in the recommendations below. And the deregulation act of June 2026 (Dz. U. 2026, item 900), in force since 21 July 2026, gave heat and cold storage a statutory definition and brought storage and the use of waste heat within the justified costs recognised in tariff calculation, with effect eighteen months after publication. These processes open a policy window in which the experience of the project can be used; they also mean that the figures and statements in this section refer to the position as at mid-2026.

This regulatory framework applies to a sector whose demand patterns and generation mix have evolved over time. As shown in the figures below, district heating demand has reduced over time, while the fuel mix has gradually moved towards a lower share of fossil fuels. However, coal continues to account for a significant part of heat generation, and the change in the generation mix has been gradual.

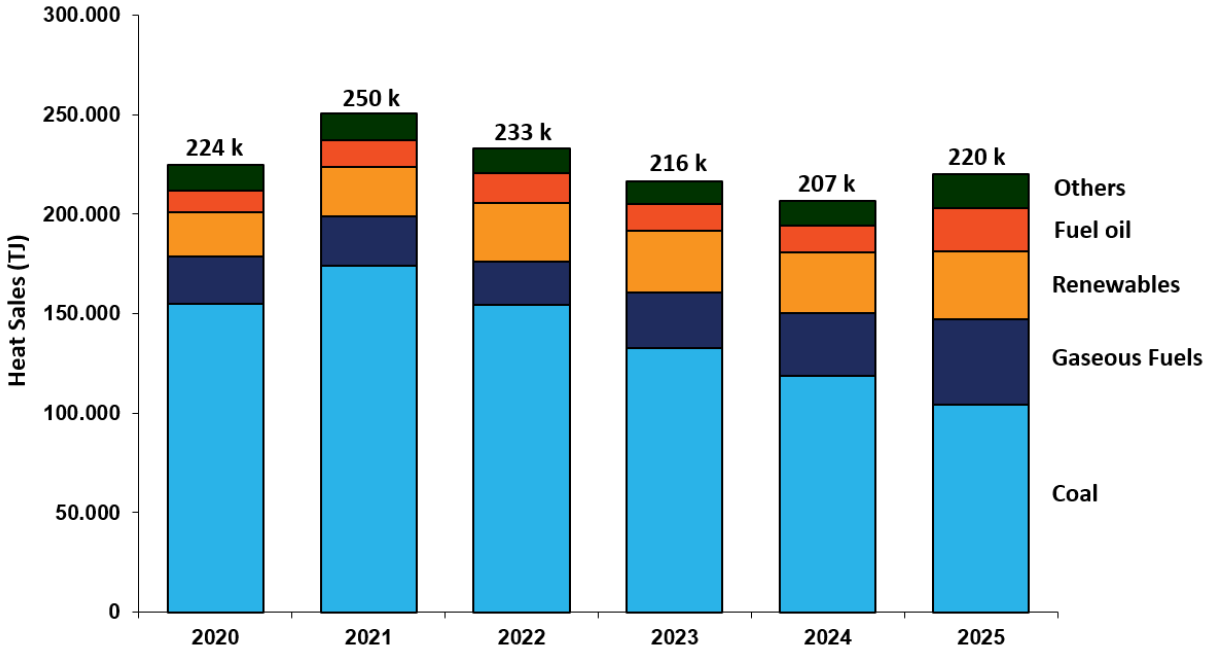


Figure 3. Evolution of DH heat sales and its fuel mix for Poland. Source: URE

Against this sectoral background, legislative amendments linked to the implementation of recent EU energy and climate requirements are under development, consultation on the Heating Transformation Strategy to 2040 closed in July 2026 with adoption planned for early 2027, and the first national fund dedicated to district heating was consulted in the same month.

4.1 Structure of the tariff system

In Poland, licensed heat generation, transmission, distribution and trading are subject to tariff regulation by the President of the Energy Regulatory Office (URE). Tariffs comprise fixed and variable charges, with generation and transmission charged separately; the detailed structure depends on the licensed activity and the customer group. The rules are set in the Energy Law and in the Regulation of the Minister of Climate of 7 April 2020 on detailed rules for shaping and calculating tariffs and settlements for heat supply, as amended. The framework rests on justified costs and a justified return on capital; it does not guarantee full cost recovery in every tariff period.

The framework is not a "zero-profit" regime. Polish regulation does not prohibit profit; it caps the justified return and defines how it is calculated. Under the cost-based method the return is the product of the regulatory value of assets and a WACC parameter, plus an efficiency bonus:

$$ZZK(PLN) = WACC(\%) \cdot WRA(PLN) + p(PLN)$$

Where:

- ZZK: Justified return on capital in business activities related to heat supply
- $WACC$: Weighted average cost of capital before tax (formula below)
- WRA: The planned regulatory value of net fixed assets used for the licensed heat-supply activity, determined from book values and including planned investments in heat generation

or distribution infrastructure designed to meet strategic energy-policy objectives set out in the development plan.

- p: Efficiency bonus that may be granted for savings achieved by lowering an energy company's operating costs through improvements in its operational efficiency. This value may constitute a maximum of 50% of the savings achieved in the company's planned justified revenue and must be approved by URE.

The WACC is calculated using the following formula:

$$WACC\ (\%) = R_d \cdot \frac{D}{D+E} + R_e \cdot \frac{1}{1-t} \cdot \frac{E}{D+E}$$

Where:

- R_d: Cost of borrowed capital (%)
- D: Debt capital (PLN)
- E: Equity capital (PLN)
- R_e: Cost of equity (%)
- t: Income tax rate applicable in Poland (%)

The Polish tariff system creates important limitations. Once tariffs are approved, any change requires a new approval process, which may take from several weeks to several months. Any revision only applies prospectively, meaning that the company must absorb any losses incurred before the new tariff takes effect, including those resulting from higher fuel prices or CO_2 costs.

District heating projects generally require significant upfront investment and long cost-recovery periods, particularly for renewable energy and other low-carbon technologies. Under the current framework, the recognition of these investment costs in future tariffs is determined through the tariff approval process. Companies therefore make investment decisions without prior certainty regarding the proportion of costs that will be recognised or the period over which they will be recovered. As the figure below shows, the sector operated at a loss in the years to 2024, with gross profitability of minus 22.00 % in 2022, minus 9.51 % in 2023 and minus 0.49 % in 2024. In 2025 it returned to profit, with gross profitability of 9.80 % and a profit above PLN 2.5 billion (URE, Energetyka cieplna w liczbach 2025). The improvement was driven principally by fuel prices, which fell 22.9 % for coal and 35.3 % for gas, and by sales rising 6.62 %, rather than by structural change. Capital expenditure of PLN 5.59 billion covered approximately one third of the estimated annual investment requirement, and half of the sector's assets remain depreciated. The recovery therefore widens the window for investment without closing the gap this section describes.

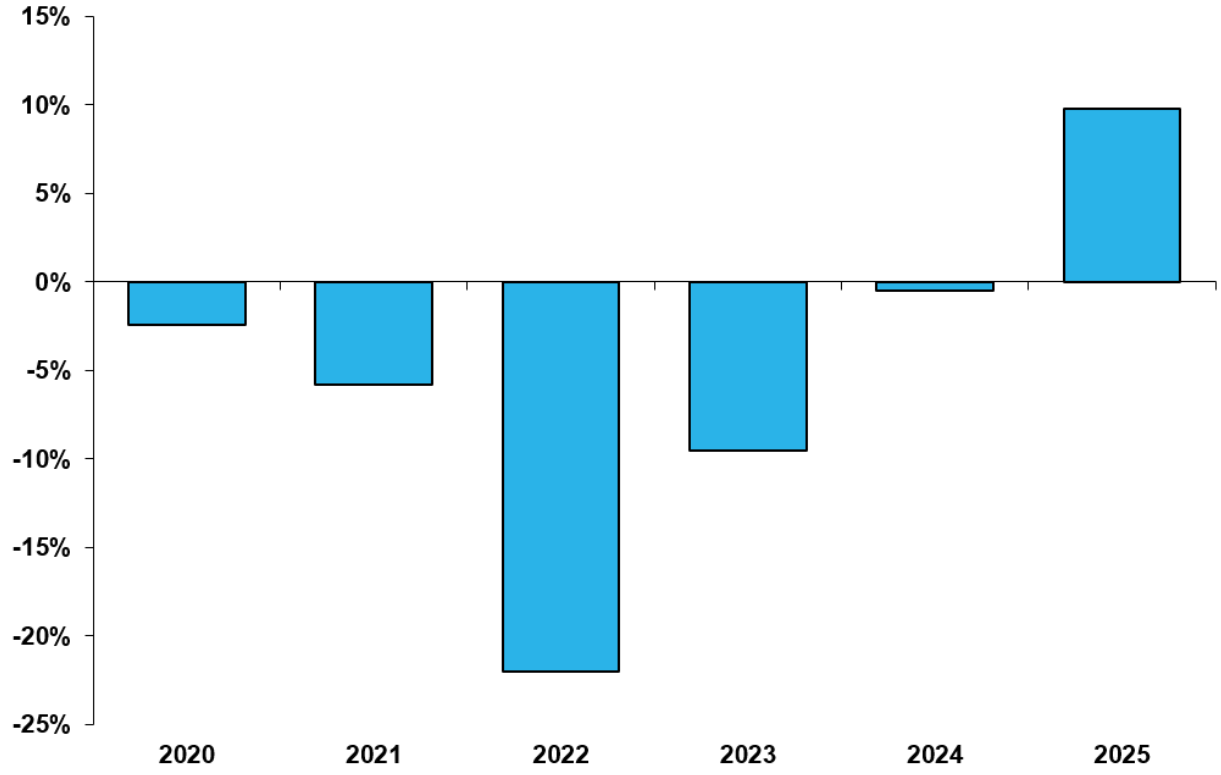


Figure 4. Evolution of the profitability of the Polish DH sector. Source: URE

The tariff framework also operates alongside EU requirements for increasing the share of renewable energy and improving the efficiency of district heating systems. However, tariffs are not differentiated according to the carbon intensity of heat generation and do not include specific remuneration for operational flexibility or sector coupling.

In addition, tariffs do not vary according to time of use or real-time system conditions. The framework does not include specific pricing mechanisms for flexibility services, the integration of external heat suppliers or coordination between district heating and electricity systems. Consequently, these activities are managed within the same cost-recovery framework as conventional heat generation and supply.

Heat pumps are treated differently depending on the purpose. For the purchase obligation, only the renewable fraction counts, while for efficient-system status, the entire heat output counts if the efficiency condition is met. At Rogoźno, this results in renewable shares of 35.38% and 51.04%, respectively, meaning the Low2High variant remains efficient until 2034 or 2039 depending on the method used. Applications should therefore clearly specify the methodology.

Under the RES Act, operators must purchase renewable and waste heat until the network qualifies as efficient. The price cap is linked to conventional heat costs and therefore decreases as the network decarbonises. The regulation must be replaced by July 2027, providing an opportunity for reform. Efficient status also limits customer disconnections, which can reduce sales density and weaken network economics.

The 2026 deregulation act recognises thermal storage and waste heat as eligible tariff costs. However, storage is not credited under the efficient-system criteria despite supporting renewable and waste-heat integration. Finally, non-efficient systems above 5 MW must prepare an improvement plan, but no detailed approval procedure, deadlines or assessment criteria have been established.

4.2 IMPLICATIONS FOR POLICY RECOMMENDATIONS

The analysis above highlights five structural issues affecting the modernisation and decarbonisation of Poland's district heating sector.

- Tariffs are approved without a multi-year revenue path, which gives operators limited visibility for multi-annual investment and leaves the timing and extent of cost recognition uncertain.
- Tariff adjustment lags changes in fuel, electricity and CO2 costs, particularly during periods of market volatility.
- Efficiency gains cannot be retained long enough to recover the investment that produced them; the mechanism that would allow it exists but has no operating rules.
- The regulated return, calculated on a low regulatory asset value, does not cover debt service on modernisation loans, while support instruments are technology-specific and unpredictable in timing.
- Tariff regulation, public funding and company investment planning are not organised around one approved, monitorable transformation pathway, although most Polish systems are already obliged to prepare one under Article 26(5) of the directive

These issues form one package and none of the remedies works alone. A multi-year tariff without gain-sharing gives no incentive; gain-sharing without recognition of financing costs does not restore bankability; recognition of financing costs without predictable grant timing does not close the gap. The recommendations below are therefore to be read together, and the Conclusions separate what requires an amendment to the tariff regulation from what can be done now through regulator guidance and programme design.

5. Slovakia

In Slovakia, district heating is governed by a legal framework combining primary legislation with detailed secondary regulation. The Act on Regulation in Network Industries establishes the general basis for the regulation and supervision of network industries, while the Energy Act defines the organisation of the energy sector and the roles and responsibilities of heat producers, distributors and suppliers. It also sets out the conditions applicable to licensing, system operation and heat supply.

The Regulatory Office for Network Industries (URSO) is the central authority responsible for supervising the district heating sector and monitoring compliance with the applicable legislation. Other public authorities, including municipalities, also have responsibilities related to local energy planning and the development of heat supply systems.

District heating tariffs are regulated within multiannual regulatory periods, which currently last five years. The ongoing transition towards the next regulatory period provides an important opportunity to review and update the regulatory framework, including tariff-setting methodologies and incentive mechanisms, to better support the decarbonisation and modernisation of district heating systems.

This regulatory framework applies to a sector whose heat demand and generation mix have evolved over time. As shown in the figure below, district heating demand has reduced, while the share of fossil fuels in heat generation has gradually declined. Nevertheless, fossil fuels continue to represent a big part of the generation mix, and the transition towards renewable and other low-carbon heat sources has been progressive.

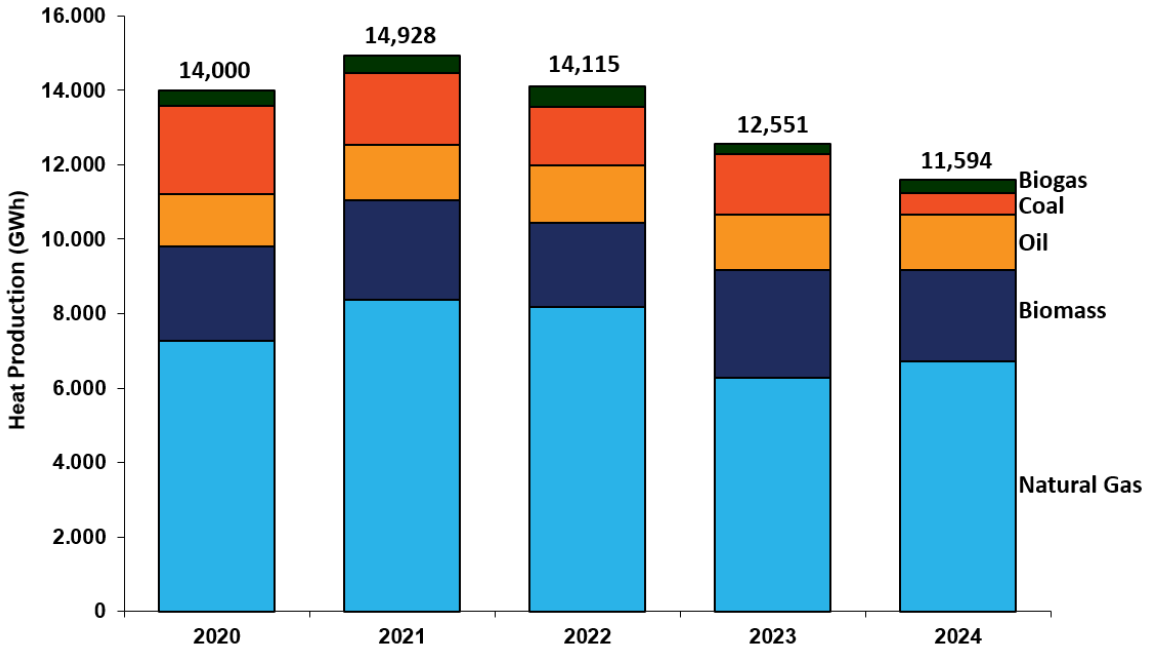


Figure 5. Evolution of DH heat production and fuel mix for Slovakia. Source: ÚRSO

Recent regulatory developments have focused on incorporating EU requirements into the Slovak framework, including provisions concerning efficient district heating and cooling systems, energy efficiency and the integration of renewable energy and waste heat. These developments affect the criteria applicable to district heating systems and their role within national and local energy planning, in line with the EED.

The Slovak framework also regulates connection to and disconnection from district heating networks. Consumers may disconnect under specified conditions, including when the alternative heat supply solution complies with the applicable energy-efficiency or renewable-energy requirements. Different conditions apply to networks classified as efficient district heating and cooling systems under the relevant legislation.

5.1 Structure of the tariff system

In Slovakia, the heat tariff established by the Regulatory Office for Network Industries (URSO) follows a two-component structure designed to reflect both fixed and variable cost elements of heat supply. Profit is also regulated and is charged to the consumer via the fixed component. Decree No. 312/2022 Z.z. establishes price regulation in the thermal energy sector.

The system is designed to ensure that companies recover their costs and obtain a limited and controlled profit, while keeping prices stable for consumers.

- Variable component: Depends directly on the amount of heat consumed. It reflects mainly fuel and energy costs and it is based on metered consumption. This means that changes in fuel prices, especially natural gas, are quickly reflected in the heat price. The operator does not absorb these changes but passes them through to the final consumer.
- Fixed component: It does not depend on consumption. It is paid regularly and ensures that the system can always operate. It is based on contracted heat capacity, and it covers maintenance, operation and personnel costs and depreciation of assets. The contracted capacity is calculated using heat demand from previous years.

The profit that companies managing district heating networks are allowed to obtain is regulated and passed on to consumers through the fixed component. This profit is calculated based on the regulatory capacity, which is set every five years according to heat demand from two years earlier. Currently, the capacity is defined for the period 2023 to 2027 and was calculated using demand data from 2021. Although this regulated capacity is fixed, any disconnections or new connections do affect its value and it is updated any time they happen.

The regulated profit consists of two components: fixed and variable. The fixed component is capped at €18/kW, while the variable component depends on the power-to-value ratio of the net (non-depreciated) non-current assets used for heat generation and can reach a maximum of €4/kW. Table 4 shows how the variable component is assigned.

Table 4. Variable profit calculation. Source: URSO

Ratio of net non-current assets (EUR/kW)	Variable profit (EUR/kW)
< 65	0.00
65 - 200	1.00
200 - 370	2.50
>370	4.00

There is one exception. Where three conditions are met together, the variable price charged to the consumer below EUR 0,09/kWh, the fixed price below EUR 270/kW and at least 20 % of the heat

supplied from renewable sources, the profit cap does not apply and the company may set its profit at its discretion (Decree No 312/2022 Z.z.). This acts as an incentive to use renewable sources, as it rewards companies including at least 20 % of renewable heat in their networks.

In networks that rely on natural gas boilers for heat generation, there is an additional opportunity to generate profit through what is known as “saved natural gas.” Each year, URSO sets efficiency benchmarks for these boilers, which are then used to calculate the variable component of the heat price. If a site manages to operate its network more efficiently than the benchmark, it consumes less natural gas than expected. The resulting savings can be retained as profit by the operator. This profit is not ensured and greatly varies year to year depending on the efficiency parameters achieved by the operator, so it is not reliable. A profit component that depends on beating an annually reset benchmark also extinguishes itself, because this year's achievement becomes next year's benchmark; the Polish efficiency bonus described above has the same structural weakness.

As with the Polish case tariffs do not vary according to time of use or real-time system conditions. The framework does not include specific pricing mechanisms for flexibility services, the integration of external heat suppliers or coordination between district heating and electricity systems. Consequently, these activities are managed within the same cost-recovery framework as conventional heat generation and supply.

5.2 Implications for policy recommendations

The Slovak regulatory framework incorporates several mechanisms intended to support network modernisation and renewable energy integration. However, the analysis identifies several areas where their practical application may limit investment activity.

- The treatment of renewable energy incentives may not fully reflect the reality of operators managing multiple district heating networks under a common tariff framework.
- Investment decisions can be affected by uncertainty regarding the future regulatory treatment of depreciation, eligible costs and regulated returns.
- Consumer disconnections may create financial challenges for networks that are still undergoing decarbonisation and have not yet achieved efficient district heating status.

Public support schemes may unintentionally promote competing heating solutions within the same service area, affecting the long-term viability of district heating investments.

6. Lithuania

In Lithuania, district heating is governed by a comprehensive legal framework combining primary legislation with detailed regulatory methodologies. The main legal instrument is the Law on the Heat Sector, which establishes the organisation, regulation and development of district heating and defines the roles and responsibilities of heat suppliers, consumers and other sector participants.

This framework is complemented by the Energy Law, which sets out the general principles governing the energy sector, including state regulation, market organisation and supervision. Other legislation, including the Law on Energy from Renewable Sources, the Law on Electricity and the Law on Natural Gas, regulates related energy markets and their interaction with the heat sector. The National Energy Regulatory Council (VERT) is responsible for supervising the sector and implementing the corresponding regulatory methodologies.

At the strategic level, the development of district heating is guided by the National Energy Independence Strategy. This strategy establishes long-term objectives related to renewable energy, electrification, energy efficiency and the modernisation of heat generation and distribution infrastructure.

This framework applies to a sector whose heat demand and generation mix have changed substantially over time. As shown in the figure below biomass has replaced natural gas and other fossil fuels to become the main source of heat generation.

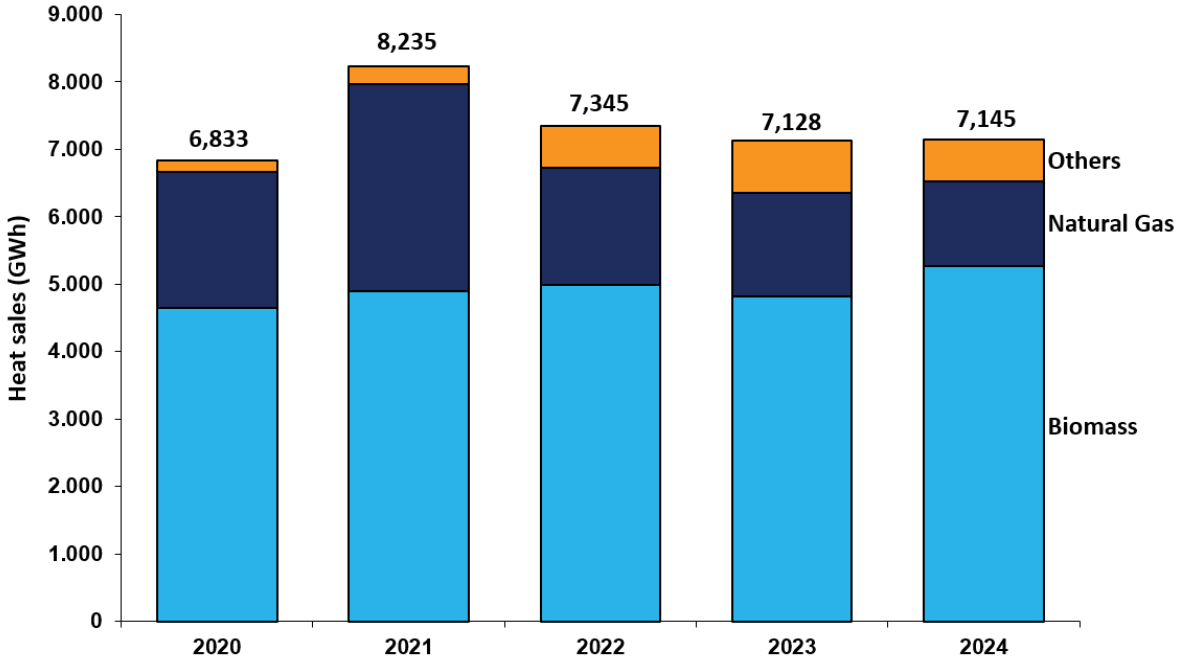


Figure 6. Evolution of DH sales and fuel mix of Lithuania. Source: VERT

The expansion of biomass has been supported by its comparatively low cost and the availability of domestic resources. Its use has reduced the role of imported fossil fuels—particularly natural gas, which was historically supplied mainly by Russia—and has therefore contributed to greater energy independence and lower exposure to international fuel markets and external suppliers. Biomass-based production is commonly complemented by natural gas or liquid fuels for reserve and peak capacity.

The current regulatory and strategic framework also covers the further integration of renewable energy, waste heat and electricity-based technologies, together with the modernisation of networks and heat production facilities, in line with the EED.

6.1 Structure of the tariff system

In Lithuania, district heating prices are regulated under the Law on Heat Sector and the Heat Pricing Methodology approved by the National Energy Regulatory Council (VERT). The regulatory framework establishes the principles for determining regulated costs, revenues, and the return on regulated investments. Its objective is to ensure the recovery of justified costs and an adequate regulated return while protecting consumers from excessive or unjustified charges and providing incentives for the reliable operation and modernisation of district heating infrastructure.

The regulated heat price is based primarily on fixed and variable price components. The fixed component reflects costs that do not directly depend on the amount of heat supplied, including relevant operation and maintenance costs, depreciation, and other regulated costs associated with the operation and availability of district heating infrastructure. The variable component reflects costs that depend on the amount of heat supplied, primarily fuel and purchased heat costs.

The variable component is linked to the metered quantity of heat consumed and is normally expressed in EUR/MWh. The applicable price structure and individual price components are determined in accordance with the VERT methodology and the relevant decisions of the competent authorities.

When a company operates multiple networks, heat prices are calculated based on the combined costs of all these networks, meaning that every resident connected to any of the company's networks pays the same tariff.

An important feature of the Lithuanian district heating system is that the final heat price applied to consumers is calculated and published monthly. The monthly price is calculated by the heat supplier based on the applicable regulated price components and changes in relevant cost factors, particularly fuel prices and purchased heat prices. Consequently, the price paid by consumers may change from one month to another, even though the underlying base price and regulatory framework apply over a longer regulatory period. VERT publishes information on the heat prices applied by individual heat suppliers monthly. This distinction is important: the base heat price is a longer-term regulatory parameter, whereas the final monthly heat price reflects changes in relevant cost components. The base price is established for a regulatory period of not less than three and not more than five years, while the applicable monthly price can change in response to changes in fuel and purchased heat prices.

District heating companies do not operate under a conventional market-based profit-maximisation model. Their regulated activities are subject to a regulatory framework that determines the allowable level of revenues and the regulated return on investments. Therefore, the existence of an accounting profit does not mean that the company can freely increase future heat tariffs by the amount of that profit. The financial result generated by heat supply activities is determined based on the company's accounting results and the revenues and costs attributable to its regulated activities. In the regulatory process, VERT assesses relevant costs and revenues and applies the mechanisms established in the Heat Pricing Methodology. Where differences arise between the revenues and costs incorporated into regulated prices and the amounts actually incurred, these differences may be taken into account in

subsequent regulatory calculations and price adjustments in accordance with the applicable methodology.

Accordingly, it is more accurate to refer to regulated cost recovery and regulated return on investments rather than to a "zero-profit" principle. The regulatory framework is designed to provide heat suppliers with sufficient revenues to cover justified costs and obtain a regulated return while preventing excessive returns from being transferred to consumers through regulated tariffs. This return is governed by the "*Methodology for setting heat prices*" dated 8 July 2009 using a WACC methodology detailed in the "*State Price and Energy Control Commission Decision on the Approval of the Methodology for Setting the Investment Return Rate"* dated 22 September 2015.

The return on investment is calculated using the following formula:

$$ROI = r \cdot (RAB + \Delta RAB)$$

Where:

- r: Interest rate calculated by the WACC methodology
- RAB: Residual value of regulated assets allocated to the regulated service
- ΔRAB: Residual value of new assets allocated to regulated services

The value of equipment obtained through European and national grants is subtracted from the CAPEX when calculating the regulatory asset value.

The interest rate is calculated using the WACC methodology, based on the following formula:

$$r\ (\%) = WACC\ (\%) = R_d \cdot W_D + R_e \cdot \frac{1}{1-m} \cdot W_E$$

Where:

- R_d: Cost of borrowed capital (%)
- W_D: Weight of borrowed capital
- R_e: Return on equity (%)
- m: Income tax rate applicable in Lithuania
- W_E: Weight of equity capital

As an incentive for sustainable investments, those aligning with Lithuanian NCIP objectives, VERT may grant an additional +1 percentage point to the regulatory return for investment projects that implement Lithuania's climate-change mitigation and environmental objectives in regulated sectors.

District heating projects generally require significant upfront investment and long cost-recovery periods, particularly for renewable energy and other low-carbon technologies. Under the current framework, the recognition of these investment costs in future tariffs is determined through the tariff approval process. Companies therefore make investment decisions without prior certainty regarding the proportion of costs that will be recognised or the period over which they will be recovered.

In addition, tariffs do not vary according to time of use or real-time system conditions. The framework does not include specific pricing mechanisms for flexibility services, the integration of external heat suppliers or coordination between district heating and electricity systems. Consequently, these activities are managed within the same cost-recovery framework as conventional heat generation and supply.

Another relevant aspect is the regulation of connection and disconnection from district heating systems. While disconnection is legally possible, it is subject to strict technical and administrative

requirements and is generally only allowed when the alternative solution improves energy efficiency or increases the share of renewable energy.

6.2 IMPLICATIONS FOR POLICY RECOMMENDATION

Lithuania has achieved significant progress in reducing the use of fossil fuels within district heating. Nevertheless, the analysis identifies several challenges that may affect the next phase of sector decarbonisation.

- Current support mechanisms do not provide a clear and predictable route for the deployment of large-scale heat pumps integrated into district heating systems.
- The regulatory framework may not provide sufficient long-term certainty for investment decisions involving capital-intensive low-carbon technologies.
- Electricity network charges and market arrangements may limit the competitiveness of large-scale heat pumps and other power-to-heat technologies.

The absence of established frameworks for industrial waste heat cooperation may prevent technically viable opportunities from progressing beyond the initial assessment stage.

7. Policy recommendation

7.1 EU LEVEL

The EU-level recommendations are addressed to the Commission as an input to the forthcoming Heating and Cooling Strategy, on which a call for evidence opened on 28 August 2025 and which has not been published at the time of writing, and to the next revision of the guidelines on Article 26 of the Energy Efficiency Directive. Efficient district heating criteria that move against the systems they are meant to transform.

7.1.1 Efficient district heating criteria that move against the systems they are meant to transform

Challenge:

The criteria of Article 26(1) are the gate to public support and to statutory advantages in the Member States, and they change five times before 2050. Three consequences were met directly in the project.

First, from 2028 the combined criterion requires at least 5 % renewable energy and gives waste heat no credit towards it. The comparative variant analysed at Rogoźno reaches 66,81 % from waste heat and high-efficiency cogeneration together with a renewable share of zero, and does not qualify. It is also the variant with the better net present value and internal rate of return, so an operator applying ordinary investment appraisal would choose it. A second effect runs alongside: a heat pump drawing on the plant's own cogeneration circuit earns no renewable credit, because engine cooling water and exhaust gas are not ambient energy within Article 2(2) of Directive (EU) 2018/2001, while the same machine drawing on treated sewage counts in full, because sewage is named in that definition. The criterion requires a token renewable input whether or not a renewable resource exists at the site.

Second, neither the directive nor the guidelines provide for a system that holds the status and loses it when a threshold moves. There is no adjustment period, no protection for an investment made in reliance on the criterion then in force, no register and no authority that declares the status. A network halfway through the work that would carry it over the next threshold stands where one that has done nothing stands.

Third, Article 24(5)(d) of Directive (EU) 2018/2001 lets a Member State allow an operator to refuse third-party access on the ground that its system is efficient. Poland has turned that permission into an automatic statutory exclusion (Article 116(2b) of the RES Act), so that reaching the status the directive encourages removes the statutory route for an external supplier of waste heat at the point where the network is best placed to absorb it. The national obligation itself sits above the EU floor; the objection is to the construction, since the directive contemplates a refusal decided case by case, with reasons given and an appeal.

Two variants of the same modernisation, appraised on the same price paths, the same discount rate and the same carbon cost, thus differ in a way no financial indicator captures: one holds no status under the criteria applying from 2028, the other holds it to the end of 2039. The period of compliance is as calculable as net present value, and nobody currently calculates it.

Policy recommendations:

- **Admit waste heat towards the minimum renewable share in the combined criterion, or add a separate qualifying route for systems whose decarbonisation rests on recovered heat**. Either change belongs in the directive. Until it is made, the guidelines should state expressly which recovered heat streams qualify as waste heat and which as ambient energy, so that a heat-pump project can be designed to a known rule.
- **Reconsider efficient-system status as a stand-alone ground for refusing third-party access.** The same provision already covers the reasons that justify refusal: capacity, technical parameters and cost to final customers. Where a Member State has converted the permission into an automatic statutory exclusion, the exclusion should be replaced by a reasoned refusal subject to appeal.
- **Require applicants for public support to state the period over which the proposed configuration satisfies the criteria, in force and in draft, and treat that period as an appraisal criterion alongside the financial indicators.** Support schemes and public appraisal methodologies can do this without legislative change.
- **Close the heat-pump gap in the guidelines**. Account for the electricity that drives the heat pump, and verify the efficiency condition in operation and not only at installation. Both can be done in guidance without amending the directive.

7.1.2 Insufficient sector coupling between electricity and thermal infrastructures

Challenge:

District heating and cooling can support the electricity system through large-scale heat pumps, electric boilers, high-efficiency cogeneration and thermal storage. These technologies can convert surplus renewable electricity into heat, shift electricity consumption across time and provide balancing and demand-response services. Thermal storage also allows energy to be retained over longer periods and can reduce the need for electricity storage and grid reinforcement.

However, electricity and thermal infrastructures continue to be planned and regulated largely in isolation. High electricity network tariffs, taxes and levies can undermine the business case for power-to-heat technologies, even when their operation would support renewable electricity integration. Electricity-market arrangements also do not consistently remunerate the flexibility and balancing services provided through district heating assets.

The contribution of thermal technologies is not yet fully represented in EU energy-system modelling or network-planning exercises. This can result in infrastructure strategies that understate the potential of district heating to reduce renewable curtailment, manage peak demand and strengthen system resilience.

The Commission's Electrification Action Plan of 17 July 2026 (COM(2026) 595) sets an objective of an electricity-to-gas price ratio of no more than 2,5 for households and 2,0 for industry by 2030, and identifies waste heat recovery as a source of 11 % of EU heat demand by 2050. The recommendations below ask for that objective to be applied to thermal assets; they do not require a new one.

Policy recommendations:

- **Integrate thermal infrastructure into European and national electricity-grid planning.** Systematically assess power-to-heat, cogeneration, thermal storage and district cooling as alternatives or complements to electricity-network reinforcement and electrical storage.
- **Reform electricity charges for flexible power-to-heat operation.** Introduce dynamic tariffs or targeted reductions in network charges, taxes and levies when heat pumps and electric boilers operate during periods of renewable electricity surplus or provide verified system services.
- **Open electricity flexibility and capacity mechanisms to district heating assets.** Enable district heating operators, thermal storage facilities and high-efficiency cogeneration units to participate on equal terms where they meet the applicable performance requirements.
- **Support the planning stage below the threshold.** Most towns with district heating fall under 45 000 inhabitants; in Poland these are the systems with the weakest planning capacity and the highest share of coal. A model methodology, technical assistance and financing for the planning stage itself cost little and follow directly from the argument of this section

7.1.3 Fragmented planning between buildings, heating infrastructure and local energy resources

Challenge:

Building renovation, individual heating-system replacement and district heating infrastructure development are frequently addressed through separate policy and investment processes. While the Energy Efficiency First principle appropriately prioritises the reduction of building energy demand, renovation and heating-system replacement decisions should also consider the broader local heat-supply context. Without this coordination, building-level decisions may be taken without sufficient consideration of locally available renewable energy and excess heat, existing or planned district heating infrastructure, or future network-development needs.

Although Article 25(6) of the Energy Efficiency Directive requires local heating and cooling plans at least in municipalities with more than 45 000 inhabitants, these plans should adopt an integrated, area-based perspective that assesses individual and collective heating solutions at neighbourhood level, including the development or expansion of district heating where technically and economically justified. Clear implementation arrangements, monitoring mechanisms and links to building-renovation programmes, infrastructure planning and local investment decisions are also needed to ensure that the plans lead to coordinated action rather than remaining stand-alone planning documents.

Policy recommendations:

- **Apply a district-level assessment before supporting major building renovations or heating-system replacements.** Assess local heat demand, building characteristics, existing infrastructure and available renewable and excess heat sources before selecting the preferred heating solution.
- **Integrate heating infrastructure into building-renovation programmes.** Allow renovation schemes to cover building-level adaptations required for connection to district heating, including water-based distribution systems and substations.
- **Translate local heating and cooling plans into binding implementation frameworks.** Connect the plans to municipal land-use decisions, infrastructure investment programmes and the territorial allocation of public support.

- **Support the planning stage below the threshold.** Most towns with district heating fall under 45 000 inhabitants; in Poland these are the systems with the weakest planning capacity and the highest share of coal. A model methodology, technical assistance and financing for the planning stage itself cost little and follow directly from the argument of this section

7.2 POLAND

The preceding analysis, together with the practical experience gained during the implementation of the LIFE Low2HighDH project, identified several challenges that were directly encountered by project partners and stakeholders in Poland. These challenges relate primarily to tariff predictability, the recognition of investment-related costs, incentives for efficiency improvements and the design of public support schemes. The policy recommendations presented below are therefore not intended to address all possible barriers affecting the Polish district heating sector, but rather those that proved most relevant during the development of the project and that were found to affect the modernisation, decarbonisation and investment readiness of district heating systems.

7.2.1 Introducing a stable framework for multi-year tariffs

Challenge:

The prevailing annual tariff-setting practice does not provide district heating companies with a sufficiently stable regulatory horizon to plan and finance long-term modernisation. Where an investment reduces operating costs, the resulting savings may lead to a lower cost base in the following tariff year. Operators therefore have limited time to retain the financial benefits generated by efficiency improvements, even where the investment has not yet been fully recovered.

Policy recommendations:

- **Allow district heating companies to opt for multi-year tariff periods**. Operators should be able to select a tariff period of three or more years, subject to the submission and approval of a binding investment and efficiency plan setting out investments, performance objectives and monitoring arrangements. A simplified track should be available for small operators, for whom the binding plan requirement would otherwise put the option out of reach.

7.2.2 Improving the responsiveness and efficiency of tariff setting

Challenge:

District heating tariffs are based largely on projected costs and historical market information. When fuel, electricity or CO_2 prices change significantly, the approved tariff may remain unchanged until a new tariff or adjustment is authorised. Lengthy approval procedures further delay the transmission of market signals, exposing operators to financial losses when costs increase and consumers to above-market prices when costs decline.

The problem is particularly significant for cogeneration tariffs based on reference prices from previous periods. Delayed adjustments weaken the alignment between regulated revenues and actual costs,

reduce cash-flow predictability and may require repeated administrative interventions during periods of market volatility.

Policy recommendations:

- **Introduce a transparent automatic adjustment mechanism.** Material changes in fuel, electricity and CO_2 costs should be reflected through predefined indices and thresholds, reducing the need for full tariff proceedings in each case.
- **Establish a two-stage tariff settlement process.** An initial tariff based on forecast costs should be followed by a reconciliation based on actual results, with clear limits and smoothing mechanisms to prevent excessive price volatility.
- **Simplify and accelerate tariff approval procedures.** Introduce standardised application templates and a fast-track review for operators whose proposed prices remain below regularly updated reference levels, allowing regulatory scrutiny to focus on material tariff increases and exceptional cases.

7.2.3 Creating effective incentives for efficiency improvements

Challenge:

The current cost-plus tariff model provides limited incentives for district heating operators to reduce operating costs, improve efficiency or introduce innovative technologies. Most justified costs can be passed on to consumers, while cost reductions achieved through modernisation may lead to a lower tariff in the following period. Operators are therefore unable to retain the financial benefits of efficiency improvements for long enough to recover the related investment or finance further modernisation.

This creates a structural mismatch between the objective of protecting consumers and the need to reward operators for delivering durable cost reductions. Without operating rules for the mechanism that exists, investments that reduce network losses, improve generation efficiency or optimise system operation may remain financially unattractive despite their long-term benefits. This also limits operators' ability to implement their decarbonisation plans: structured, long-term investment roadmaps setting out the measures required to progressively replace fossil-fuel generation, integrate renewable energy and excess heat, improve system efficiency and meet applicable climate and energy targets.

Policy recommendations:

- **Make the existing efficiency bonus operational.** The gain-sharing mechanism already exists: the component p of the justified return, up to 50 % of the savings achieved, in the model applied by the President of URE. It is not used at scale because nothing says how savings are measured, against what baseline, for how long they may be retained or what happens to them at the next tariff. Secondary guidance should define the measurement baseline, the verification method, a retention period extending across more than one tariff period, and the treatment of retained savings in the following tariff calculation, so that the mechanism can be relied on when the investment decision is taken.
- **Link retained gains to approved investment and decarbonisation plans.** Additional revenues should be used to repay investment financing or support further modernisation, with clear monitoring and reporting requirements.

7.2.4 Ensuring regulated heat prices support investment and access to finance

Challenge:

The current regulated heat price does not adequately reflect the actual financing costs of capital-intensive modernisation projects. Interest on investment loans is assumed to be covered through the regulated return on capital, calculated on the basis of the regulatory asset value and the applicable WACC. In practice, this return may be insufficient to cover actual bank interest and debt-service requirements.

The constraint is particularly significant for operators with old and heavily depreciated assets. Their low regulatory asset value results in a limited regulated return, even where substantial investment is needed to replace obsolete infrastructure and deploy clean heat technologies. As a result, the tariff may cover day-to-day operating costs but does not necessarily generate sufficient cash flow to service new debt. This weakens operators' creditworthiness, restricts access to commercial finance and increases dependence on grants and limited own resources.

Policy recommendations:

- **Remunerate efficiently incurred financing costs without duplicating the return on capital.** Interest on loans for approved modernisation projects is in principle covered by the WACC-based return. Where the return calculated on a heavily depreciated asset base does not cover debt service, the tariff methodology should provide a transparent allowance, whether through the return itself, a project-specific financing allowance or the 7 % minimum return already applicable to renewable and waste-heat installations. Direct recognition of interest as a tariff cost should apply only where the same cost is not already remunerated through the return.
- **Allow conditional, progressive recognition of major investments in the regulatory asset value**. For long-term, capital-intensive projects, eligible expenditure could enter the asset value at predefined and independently verified construction milestones rather than only after commissioning, subject to safeguards on cost efficiency, delivery risk, cancellation and consumer protection. This would improve liquidity and financing capacity without transferring all construction risk to heat consumers.

7.2.5 Making grant programmes more flexible and aligned with investment needs

Challenge:

Grant calls for district heating investments are often designed around narrowly defined technologies, project configurations or eligibility requirements. Such an approach can exclude technically sound projects that contribute to decarbonisation and modernisation but do not correspond precisely to the conditions of a particular call.

Short or unpredictable application windows can also encourage operators to develop or redesign projects in response to available funding rather than on the basis of long-term system needs. This may delay mature investments, fragment investment pipelines and favour solutions that comply with programme requirements but are not necessarily the most appropriate for the local heating system.

The Heating Transformation Fund at NFOŚiGW, consulted between 20 and 30 July 2026, is the first national instrument dedicated to district heating in Poland: PLN 3,0 billion, of which up to PLN 1,2 billion in grants and up to PLN 1,8 billion in loans, grants up to 50 % of eligible cost and PLN 50 million

per project, loans up to PLN 200 million at 3M WIBOR plus 50 basis points, contracting until 29 December 2028. Against the PLN 197 to 231 billion identified in the draft Strategy this is 1,3 to 1,5 % of the need. The Fund also supplies a named example of the eligibility problem this section describes: its network measure supports reduction to 70 °C supply and 25 °C return, while typical Polish return temperatures exceed 40 °C, so as drafted the measure will attract no applications. Systems that must leave coal but have no immediate non-fossil alternative fall outside the Fund, which excludes fossil-fuelled cogeneration, and their treatment under section 4.30 of the taxonomy delegated act and the revised General Block Exemption Regulation is unresolved. For what is by volume the largest transition movement in the Polish sector, coal exit in medium-sized systems, there is currently no active national instrument.

Policy recommendations:

- **Move towards technology neutral and outcome-based support.** Grant calls should focus on defined policy outcomes such as greenhouse gas reduction, renewable and waste-heat integration and energy efficiency rather than prescribing a narrow set of eligible technologies.
- **Provide predictable, multi-year funding programmes.** Support schemes should establish indicative multi-year budgets, regular application windows and sufficiently broad eligibility conditions, enabling operators to prepare mature investment pipelines and secure co-financing.
- **Express technical eligibility thresholds as improvement against the system's starting point.** Where a scheme sets network parameters, they should be stated as a required improvement, for example a reduction in return temperature of at least 10 K against a documented baseline, or set at a level attainable by the target population. Thresholds calibrated to new-build performance exclude the systems the scheme is meant to transform.
- **Link public support to an integrated transformation plan**. The plan that most operators must already prepare under Article 26(5) of the Energy Efficiency Directive should serve as the basis for support. It should cover the baseline heat balance, the demand outlook, local renewable and waste-heat potential, source and network investments, temperature and hydraulic constraints, building-side interfaces, investment sequencing, financing, tariff impact and the milestones for meeting the efficient district heating criteria.
- **Identify an instrument for transitional projects**. Coal exit in medium-sized systems without an immediate non-fossil alternative needs a named route, with conditions consistent with Article 26(4) of the directive; otherwise the largest part of the transition will proceed without support, or not at all.

7.2.6 Completing the plan obligation for systems above 5 MW

Challenge:

Since 1 January 2025, operators of systems above 5 MW that do not meet the efficient district heating criteria have been required by Article 26(5) of the Energy Efficiency Directive to prepare a plan to improve primary energy use, reduce distribution losses and raise the renewable share, and to have it approved by a competent authority. With efficient systems at about 22 % of the Polish population, this reaches most of the sector, and it falls on the operators with the least analytical capacity. The directive and the guidelines supply the obligation without a procedure: no submission deadline, no approval criteria, no time limit for the authority, no appeal, and no consequence specific to the plan beyond the

directive's general penalties clause. An obligation that most operators cannot see how to discharge is not a planning framework.

Policy recommendations:

- **Complete the obligation that exists rather than adding a new planning requirement.** The transposing legislation and its secondary instruments should set a submission deadline, published approval criteria and a model plan structure, a simplified track for small operators, a time limit for the authority and a link between approval of the plan and eligibility for public support, including protection of efficient-system status for the duration of an approved plan.

7.2.7 Network parameters that decide whether low-grade heat can be integrated

Challenge:

Return temperature is the parameter most directly within an operator's control and the one that most strongly determines whether low-grade sources can be integrated. Auditing the substations that inflate it and correcting their control settings is frequently the least costly measure opening a high-temperature network to renewable and waste heat, and it can be done without replacing generation assets. No current Polish instrument supports it as a measure, and the Heating Transformation Fund sets its network parameters at values the target systems cannot reach.

Policy recommendations:

- **Recognise substation audits and control correction as eligible stand-alone measures.** Support schemes should admit the audit of substations and the correction of their control settings as a measure, not only as an accessory to generation investment.
- **Express network parameter requirements as staged improvements against a documented baseline rather than as fixed target values**. This can be implemented through programme design without legislative change and gives the report a technical recommendation to sit alongside the regulatory and financial ones.

7.3 SLOVAKIA

The analysis of the Slovak district heating framework, complemented by the experience gathered throughout the LIFE Low2HighDH project, highlighted several challenges that were repeatedly identified by project stakeholders during the assessment of pilot and replication activities. In particular, the project revealed barriers related to investment certainty, the practical application of renewable energy incentives, the management of network disconnections during the transition towards efficient district heating, and the coordination of public support schemes. The policy recommendations below focus specifically on these challenges, as they emerged directly from the implementation of the project and its stakeholder engagement activities.

7.3.1 Providing regulatory certainty for major decarbonisation investments

Challenge:

The Slovak regulatory framework recognises investment costs, depreciation and a regulated profit through the fixed component of the heat tariff. However, the return available for renewable and major modernisation investments remains dependent on parameters approved through the tariff-setting process. In particular, incentives linked to higher renewable shares may only become available after the investment has been completed and the qualifying conditions have been achieved.

This creates an ex-ante financing gap. District heating operators must commit significant capital before having sufficient certainty regarding the depreciation profile, eligible cost base and regulated return that will apply over the investment's lifetime. The uncertainty is particularly relevant for projects requiring substantial upfront expenditure, such as renewable heat generation, network renovation and the transition towards efficient district heating.

The risk could increase if regulatory depreciation periods are determined using standardised technical lifetimes that do not reflect the actual characteristics of district heating assets. Longer regulatory depreciation periods would delay cost recovery and could create a mismatch between regulated cash flows and the repayment profile required by commercial lenders. As a result, technically viable decarbonisation projects may remain difficult to finance even where their costs are expected to be recognised eventually.

Policy recommendations:

- **Introduce binding ex-ante regulatory agreements for major decarbonisation investments.** Before an operator reaches financial close, the regulator could confirm the eligible investment amount, depreciation schedule, treatment of operating costs and methodology for calculating the regulated return. The agreement would remain valid provided that the project is delivered within the approved scope and milestones.
- **Align regulatory depreciation with the technical and financing characteristics of district heating assets.** Asset lives could be established by technology category and supported by independent technical evidence, avoiding standardised periods derived from other regulated sectors where these do not reflect district-heating equipment.
- **Allow phased recognition of large investments in the tariff.** Eligible expenditure could enter the regulated cost base once predefined construction or commissioning milestones are achieved, rather than only after full completion. This would improve cash-flow visibility and facilitate debt servicing during implementation.

7.3.2 Ensuring that renewable energy incentives can be applied at network level

Challenge:

The Slovak tariff framework provides an incentive for the integration of renewable energy sources into district heating. Where the applicable price thresholds are respected and at least 20% of the heat supplied comes from renewable sources, the standard cap on regulated profit no longer applies. This can improve the business case for investment in renewable heat generation.

However, the incentive is difficult to access for large operators managing multiple district heating networks. Where heat prices and compliance conditions are assessed jointly across the operator's

portfolio, the renewable share achieved in an individual network may not be sufficient to activate the incentive. In practice, an operator may invest in and substantially decarbonise one network but remain unable to benefit from the incentive until the conditions are met across the wider portfolio.

This creates a mismatch between the level at which investments are implemented and the level at which the incentive is assessed. It may delay renewable investments, particularly where operators manage networks with different technologies, starting points and investment cycles.

Policy recommendations:

- **Assess eligibility for the renewable energy incentive at the level of each individual district heating network.** Compliance with the renewable heat threshold and the applicable price conditions could be determined separately for each technically and economically distinct system. This would allow the financial benefits of an investment to be recognised in the network where the renewable energy is generated and supplied.
- **Introduce a transitional mechanism for operators managing multiple networks.** Where portfolio-level tariff calculation is maintained, operators could benefit from a proportional incentive reflecting the renewable heat delivered by each qualifying network. This would enable gradual portfolio decarbonisation without requiring all networks to reach the threshold simultaneously.

7.3.3 Managing disconnections from district heating networks undergoing decarbonisation

Challenge:

The Slovak framework allows consumers to disconnect from district heating networks under specified conditions, including where the proposed alternative complies with applicable energy-efficiency or renewable-energy requirements. Different conditions apply once a network qualifies as an efficient district heating and cooling system.

This creates a transitional risk for networks that have not yet completed their modernisation. Before a network reaches the required efficiency or renewable-energy status, consumers may have greater incentive to disconnect, even where the operator is preparing or implementing an investment programme that would substantially improve the system's environmental performance.

Each disconnection reduces the demand and contracted capacity available to recover the network's fixed costs. The remaining consumers may consequently bear a higher share of infrastructure, maintenance and operational expenditure. This can encourage further disconnections, weaken the operator's capacity to finance modernisation and undermine the investment needed for the network to achieve efficient status.

Policy recommendations:

- **Introduce a legally defined, time-limited status for networks implementing an approved decarbonisation plan.** Networks that have not yet reached efficient status but are implementing a credible, financed and monitored programme with measurable milestones, such as the plan required under Article 26(5) of the Energy Efficiency Directive, would be recognised as "networks in transition", and proposed disconnections would be assessed against the expected performance of the network on completion of the approved investments. The status should not amount to a general prohibition on disconnection; each case would remain subject to proportionality and to the applicable consumer-protection rules. The gap

this fills is not Slovak alone. Poland's withdrawal right under Article 7b(3e) of the Energy Law creates the same exposure, and the EU-level recommendation above proposes the same mechanism at the level at which the gap arises.

- **Require a system-level impact assessment before authorising disconnection.** The assessment could consider the environmental performance of the alternative heat source, the effect on remaining consumers, the impact on the viability of planned district heating investments and consistency with municipal heat planning. The objective would be to ensure that individual decisions do not create disproportionate costs for the wider system.

7.3.4 Avoiding conflicting public support for district heating and decentralised heat sources

Challenge:

Public support is essential to accelerate the modernisation and decarbonisation of district heating systems. However, funding programmes may produce conflicting outcomes where public resources support both the renovation of a district heating network and the installation of decentralised heat sources in buildings that are already connected, or could reasonably be connected, to that network.

Supporting competing decentralised solutions within an existing district heating service area can reduce the network's heat demand and customer base. Since infrastructure, maintenance, staffing and system-operation costs are largely fixed, these costs must then be recovered from a smaller volume of heat sales and a reduced number of consumers. This may increase prices for the customers who remain connected and weaken the financial viability of publicly supported district heating investments.

The issue is therefore not double funding in the narrow sense of financing the same expenditure twice, but rather a lack of coordination between support schemes pursuing potentially conflicting heat-supply solutions in the same area.

Policy recommendations:

- **Introduce a district-heating compatibility assessment for public funding.** Applications for decentralised heat sources in areas served or planned to be served by district heating could be assessed against municipal heat plans and the technical capacity of the existing network. Support would prioritise the solution delivering the strongest overall contribution to decarbonisation, affordability and efficient use of existing infrastructure.
- **Avoid supporting competing decentralised heat sources where an efficient or credibly decarbonising district heating network can provide the required service.** Exceptions could remain available where connection is not technically feasible, is demonstrably disproportionate in cost, or where the district heating operator cannot provide a credible pathway towards compliance with efficiency and decarbonisation requirements.

7.4 LITHUANIA

Lithuania has already achieved substantial progress in reducing the use of fossil fuels in district heating and has established a regulatory framework that supports investment and renewable energy deployment. Nevertheless, the implementation of the LIFE Low2HighDH project revealed a number of practical challenges that continue to affect the deployment of low-grade renewable energy and waste

heat solutions. These challenges include access to support for large-scale heat pumps, long-term regulatory certainty for investment decisions, the interaction between electricity and heat-market signals, and the mobilisation of industrial waste heat sources. The recommendations presented below are specifically designed to address the barriers identified during project implementation and should therefore be understood within the scope and objectives of the project.

7.4.1 Improving access to dedicated support for large-scale heat pumps in district heating

Challenge:

Lithuania has continued to provide public support for selected district heating modernisation measures. However, the funding opportunities identified after 2024 have not provided a predictable and dedicated route for the deployment of large-scale heat pumps supplying district heating networks. Previous support for district heating investments was made available through instruments including Cohesion Policy funds, the Recovery and Resilience Facility and the Modernisation Fund.

Recent measures have addressed areas such as the modernisation of small heat-generation systems, adaptation of networks to fourth-generation district heating and metering. Separate funding has also supported heat pumps for individual households, but this support does not apply to large-scale heat pumps integrated into district heating generation.

This creates a financing gap for projects integrating low-grade renewable energy or waste heat, for which heat pumps are a key enabling technology. Such projects typically combine high upfront costs with long development and repayment periods. In the absence of a predictable combination of grants and long-term financing, technically viable projects may be postponed or remain dependent on ad hoc funding opportunities.

Policy recommendations:

- **Establish a predictable multi-year support framework for large-scale heat pumps in district heating.** National authorities could publish an indicative calendar of funding opportunities, expected budgets and eligible project categories. This would allow operators to prepare mature project pipelines and coordinate grant applications with technical design, investment planning and regulatory approval.
- **Introduce recurring, technology-neutral calls focused on system outcomes.** Support could be awarded according to measurable contributions to greenhouse gas reduction, low-grade renewable energy and waste-heat integration, network efficiency, flexibility and affordability. Eligibility criteria would allow large-scale heat pumps to compete with other solutions on the basis of their system-level benefits.

7.4.2 Providing a stable multi-year tariff framework for long-term investment

Challenge:

Current tariff-setting does not provide district heating operators with a sufficiently stable regulatory horizon to plan and finance capital-intensive investments. Projects involving renewable heat generation, waste-heat recovery, large-scale heat pumps and network modernisation require long implementation and repayment periods, while the revenues available to recover their costs depend on tariff decisions.

This creates uncertainty regarding the future recognition of investment costs, operating expenditure and the applicable return on capital. Operators may therefore need to commit capital before obtaining sufficient visibility on the revenues that the investment will generate throughout its useful life. This uncertainty can weaken investment appraisals, reduce access to external financing and increase reliance on public grants.

Lithuanian district heating companies operate within a regulated return framework based on the regulatory asset base and a WACC methodology. Although the framework provides mechanisms to recognise eligible investments, tariff decisions may still limit long-term revenue predictability.

Policy recommendations:

- **Introduce optional multi-year tariff periods linked to approved investment plans.** District heating operators could apply for tariffs covering a period of three to five years where they submit a credible investment and efficiency plan. The plan could specify the investment programme, expected costs, performance targets and monitoring arrangements for the regulatory period.

7.4.3 Aligning electricity and heat-market signals to enable flexible heat pump operation

Challenge:

Large-scale heat pumps face a structural disadvantage in Lithuania because their operating costs include electricity transmission, distribution, connection and capacity-related charges. These costs can prevent heat pumps from competing with biomass and cogeneration, even during periods when electricity prices are low or the power system has surplus generation.

The Lithuanian heat market does not currently provide a clear route for recognising the flexibility that heat pumps and electric boilers can offer to the electricity system. These assets could increase electricity consumption during periods of oversupply and convert this electricity into heat, particularly when combined with thermal storage. However, heat procurement arrangements primarily compare the cost of the heat supplied and do not separately remunerate grid-balancing or flexibility benefits.

Heat pumps are therefore unlikely to operate competitively as continuous baseload technologies under current conditions. Their near-term role may be better suited to specific operating windows and heat sources, including low-price electricity periods, summer operation, sewage heat, industrial waste heat and flue-gas heat recovery.

Policy recommendations:

- **Enable district heating operators to participate in electricity flexibility and balancing mechanisms.** Heat pumps, electric boilers and thermal storage could be treated as controllable demand capable of providing services to the electricity system, creating an additional revenue stream beyond heat sales.
- **Develop operating incentives rather than general investment support.** Support could reward heat generated during qualifying periods or from specified low-grade sources, encouraging heat pumps to operate when they provide the greatest system value rather than promoting their use as continuous baseload generation.

7.4.4 Overcoming limited engagement of industrial waste heat providers

Challenge:

During the LIFE Low2HighDH project, two industrial installations with potential to supply waste heat to nearby district heating networks were identified. However, neither industrial operator was willing to participate in an initial assessment of the technical and economic feasibility of the solution.

This experience demonstrates that the availability of a technically suitable heat source does not automatically create a viable project pipeline. For industrial companies, waste heat supply is generally outside their core business and may be associated with additional operational, contractual and administrative complexity. Concerns may include interference with industrial processes, confidentiality, long-term commitments, liability and uncertainty over future heat availability.

Preparing a waste heat project requires sufficiently reliable information on heat volumes, temperature profiles, operating schedules and continuity of the industrial process. Without initial cooperation from the industrial operator, even a preliminary assessment cannot be completed. A lack of clear incentives and standard arrangements for allocating risks and responsibilities may therefore prevent promising sources from being evaluated.

Policy recommendations:

- **Introduce a proportionate waste-heat assessment and cooperation requirement for large industrial installations, building on the obligation that exists.** Article 26(7) of the Energy Efficiency Directive already requires an installation-level cost-benefit analysis of waste heat use where industrial installations above 8 MW and service facilities above 7 MW are newly planned or substantially refurbished. Facilities above defined thresholds could in addition be required to disclose standardised information on recoverable heat and to cooperate in a preliminary feasibility assessment when a nearby district heating operator or competent public authority identifies a credible opportunity, with confidentiality and trade-secret safeguards. Where the assessment confirms that recovery is technically feasible and economically proportionate, the industrial operator would either enter into good-faith negotiations or provide a substantiated justification for not proceeding. Framed in this way the recommendation is an implementation measure for an existing obligation rather than a new one.
- **Require the consideration of waste heat recovery in major industrial permitting and factory investment decisions.** New industrial installations and major refurbishments located within a defined distance of an existing or planned district heating network could be required to assess waste heat recovery and connection as part of the permitting process. Where the solution is technically feasible and delivers a positive system-level cost-benefit result, the permit could require the installation to preserve access to the heat source and implement the necessary technical provisions for future recovery.
- **Provide standard agreements for industrial waste heat cooperation.** Model clauses could address confidentiality, data sharing, asset ownership, supply interruptions, heat-quality requirements, liability and contract termination, reducing transaction costs for both parties.
- **Apply the data-centre obligation.** Article 26(6) of the directive already requires data centres with a total rated energy input above 1 MW to use their waste heat unless they show that this is not technically or economically feasible. Member States should designate the authority that receives the feasibility demonstration and link it to local heating and cooling planning.

8. Conclusions

This report translates the practical experience generated through LIFE Low2HighDH into a focused set of policy recommendations for facilitating the integration of low-grade renewable energy and waste heat into existing district heating systems. Its main contribution lies in connecting the barriers encountered during project implementation with the regulatory, financial and institutional conditions that influence whether technically viable solutions can progress towards investment and implementation.

The findings confirm that district heating decarbonisation cannot be addressed through technology deployment alone. The development of renewable heat, large-scale heat pumps, waste heat recovery and more flexible district heating systems also requires tariff frameworks capable of supporting long-term investment, predictable and appropriately designed public support, coordination between the electricity, heating and building sectors, and clearer arrangements for cooperation between the different actors involved. Where these enabling conditions are absent or insufficiently aligned, technically sound projects may remain difficult to finance or may fail to progress beyond the assessment stage. The Lithuanian analysis also yields a technical judgement that applies beyond Lithuania: heat pumps suit defined operating windows and stable low-grade sources better than baseload duty. The Rogoźno analysis supports it from the other side, where the Low2High variant reaches 51,04 % of annual production from heat pumps because the sewage source is stable year-round and the remaining load sits on cogeneration and peak boilers, not because the pumps carry the peak.

At the same time, the project experience shows that there is no single policy response applicable across all participating countries. Poland, Slovakia and Lithuania have different district heating structures, generation mixes, tariff methodologies and stages of decarbonisation. The recommendations therefore combine common EU-level priorities with measures tailored to the specific barriers observed in each national context. They are not intended to constitute a comprehensive reform agenda for the district heating sector, but to provide practical and targeted responses to the issues that proved relevant during the implementation of LIFE Low2HighDH.

The value of these recommendations will ultimately depend on their capacity to inform regulatory development and support concrete implementation. Their application will require continued dialogue between national authorities, regulators, municipalities, district heating operators, industrial heat providers and financing institutions. It will also require policy measures to be assessed against their combined impact on decarbonisation, consumer affordability, system viability and the ability of operators to mobilise the investment needed for modernisation. In this respect, the report should be understood not only as a final output of the project, but also as a basis for further engagement with the institutions responsible for shaping the future development of district heating.

This engagement has already begun in Poland. KAPE, representing LIFE Low2HighDH, has submitted comments in three national processes in 2026: on the proposed transposition of the revised Energy Efficiency Directive, on the draft Heating Transformation Strategy to 2040 and on the draft programme of the Heating Transformation Fund. In each case the comments drew on the technical and financial analyses of the project, and they show how its lessons can be carried into a national policy process while that process is open.

Overall, LIFE Low2HighDH has provided a practical basis for understanding how policy and regulation can either enable or constrain the integration of low-grade renewable energy and waste heat. The recommendations set out in this report provide a reference for addressing the barriers identified during the project and for creating more stable, investable and implementation-oriented conditions

for similar projects. Their broader relevance lies in supporting the transition from technically viable concepts to projects that can be developed, financed and implemented within the European district heating sector.