District heating 2035: pathways to net-zero

How European cities can decarbonise district heating without compromising cost, reliability, or public acceptance.

Contents

Executive summary

In the span of only a few legislative cycles, the European Union has rewritten the operating context for every district heating network in Europe. What was once a stable, slow-moving sector is now on the front line of the continent's climate, energy security and policy agenda.

At the same time, a large majority of Europeans recognise climate change as a serious issue and support the EU's goal of climate neutrality. Heating currently pollutes as much as all the cars in Europe combined, making it a central focus of this transition 1.

The implication for operators and municipalities is profound: how to decarbonize without exposing systems to cost volatility, reliability risks, or political backlash.

Through frameworks such as the Green Deal, Fit for 55, and REPowerEU, combined with tighter carbon pricing and renewable heat obligations, fossil-based heating is becoming structurally less competitive. At the same time, a full portfolio of proven solutions such as heat pumps, waste heat, geothermal, thermal storage, and emerging options like small modular reactors (SMRs) are available to enable the shift 2.

District heating networks are a critical enabler of net-zero heat. Globally, they are expected to serve hundreds of millions of urban connections by 2030, positioning them as a cornerstone of zero-carbon heating systems 3.

However, decarbonization is not a single-technology transition. It is a system design challenge.

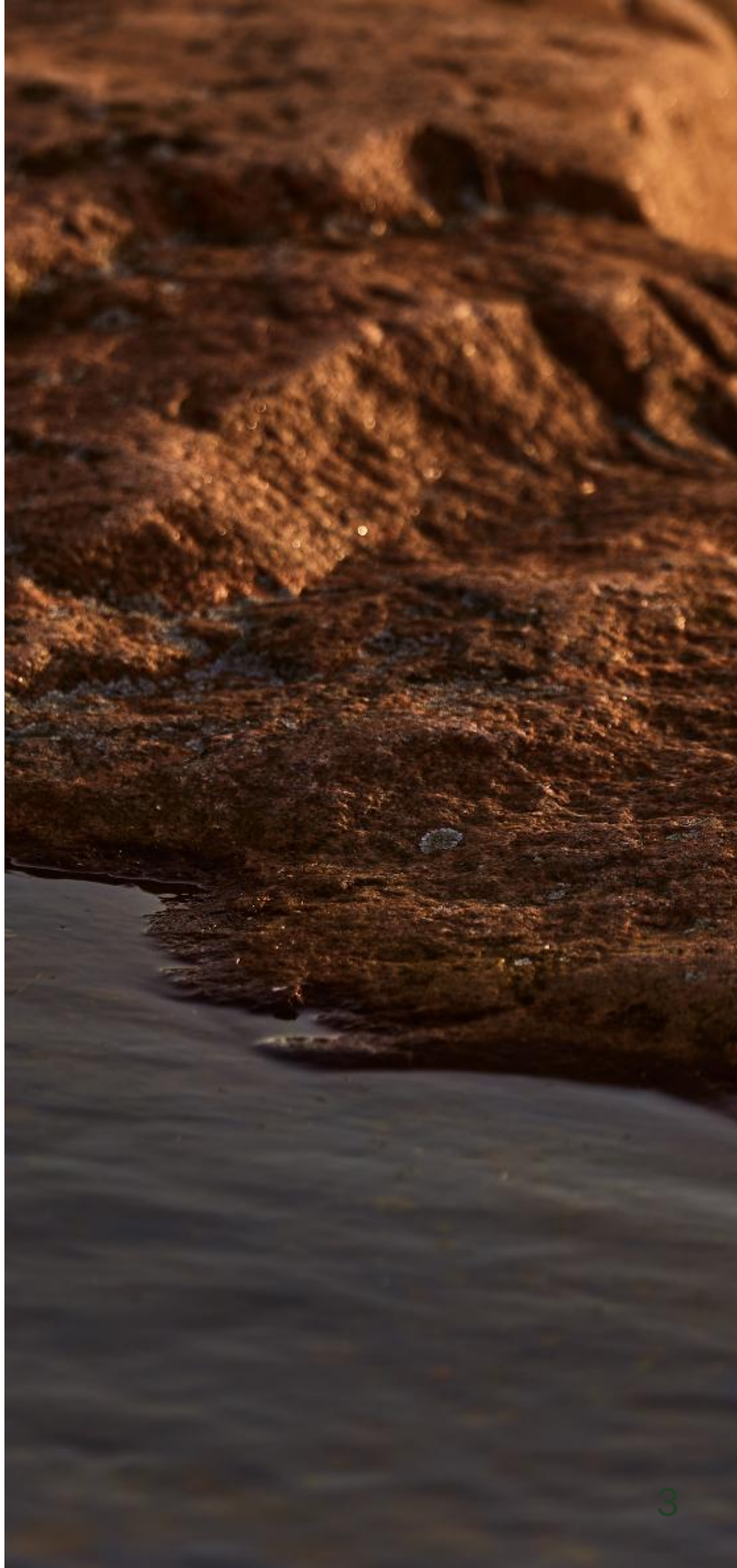
This report outlines three distinct pathways to 2035, each with different trade-offs in cost, risk, and system performance. It also highlights a critical constraint: winter peak demand. Systems that rely too heavily on electricity risk exposure to price volatility and grid stress, while balanced portfolios can deliver greater stability and long-term affordability.

For operators and municipalities, the story of the next decade begins with a simple observation: Time is now the defining factor. The next 24–36 months represent a narrow window in which cities and operators can make strategic investment decisions under relatively controlled conditions. Delaying action does not reduce uncertainty — it increases it, leading to higher costs, stranded assets, and reduced policy flexibility.

1 European Union: Survey

2 European Industrial Alliance on SMRs

3 IEA



The policy imperative: How EU is rewriting the future of heat

The European Green Deal has hard-wired decarbonisation into the EU's energy, climate and industrial policies. Energy production and use account for over 75% of EU greenhouse gas emissions, and reaching climate neutrality by 2050 requires a rapid phase-down of fossil fuels in heating.

The European Green Deal focuses on 3 key principles for the clean energy transition:

1. Ensuring a secure and affordable EU energy supply
2. Developing a fully integrated, interconnected and digitalised EU energy market
3. Prioritising energy efficiency, improving the energy performance of our buildings and developing a power sector based largely on renewable sources 1.

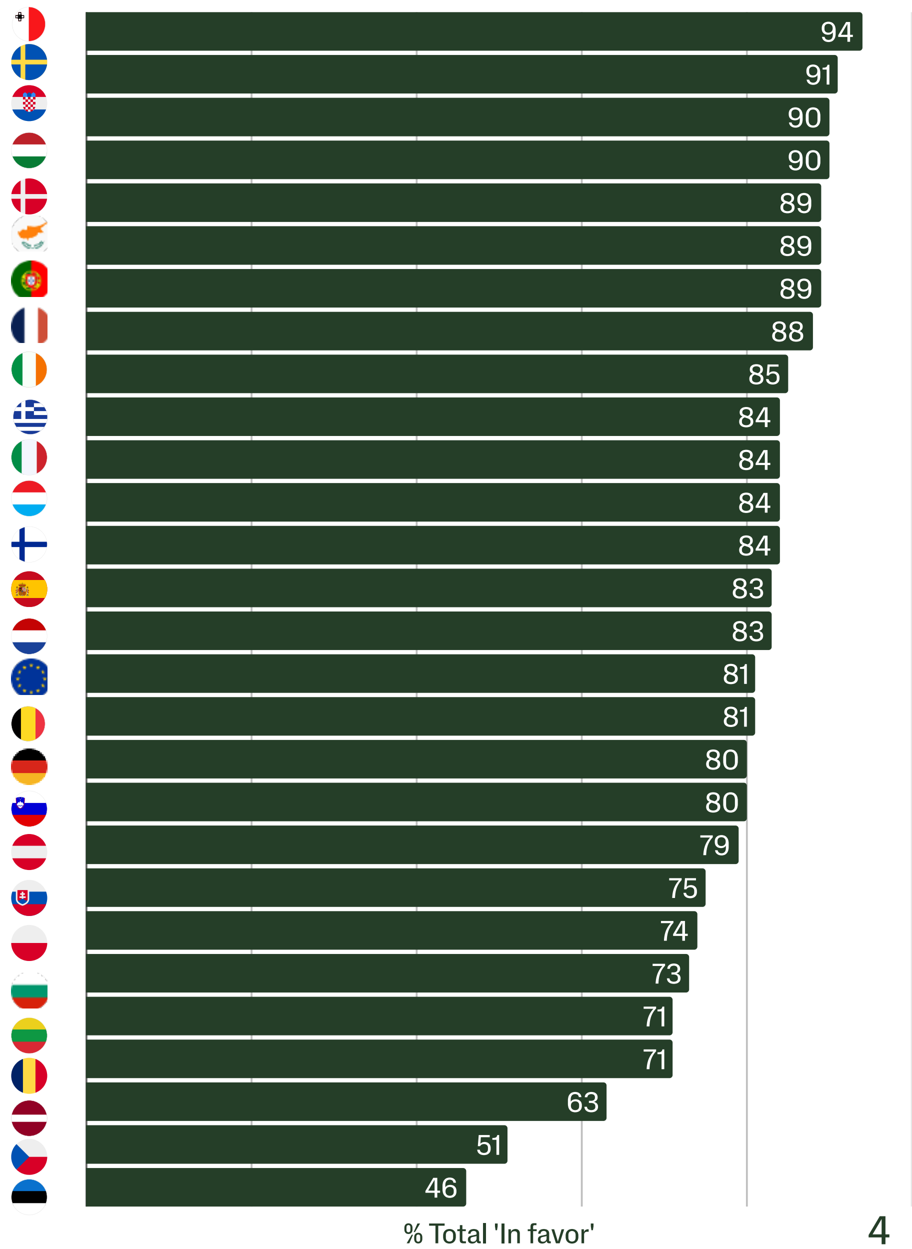
Europe's heating sector is indeed entering a decisive decade. Between 2025 and 2035, European Union legislation will fundamentally reshape how cities plan, operate and finance their heat networks. For district heating operators and municipal authorities, these policies collectively define a narrow and accelerating transition window.

Key elements affecting district heating and municipal heat planning include:

- Tighter EU ETS caps for power and industry, driving up the cost of fossil-based heat and CHP 2.
- A recast Renewable Energy Directive (RED III) with higher renewable targets, including in heating, cooling and buildings 3.
- An upgraded Energy Performance of Buildings Directive (EPBD) that effectively ends public subsidies for new fossil heating systems and accelerates renovation obligations 4.

1 Energy and the Green Deal
2 EU emissions trading system
3 Renewable Energy Directive
4 Energy Performance of Buildings Directive

In nearly all EU Member States, more than half support the EU objective of becoming climate-neutral by 2050.



For district heating operators, the signal is clear: networks that remain dependent on coal, oil or gas will face rising compliance costs, stricter efficiency rules, and a tightening permitting environment well before 2035.

Renewable heat targets – What they mean for district heating operators

The REPowerEU plan, launched in response to the gas crisis, aims to dramatically cut EU gas demand well before 2030. District heating expansion and decarbonisation are identified as key strategies for eliminating gas in buildings.

On the technology side, REPowerEU and the EU Heat Pump Action Plan call for a massive scale-up of heat pumps — an additional 20 million units by 2026 and 60 million by 2030, roughly doubling installed stock every four years. For cities, this implies electrification of heat at scale and a strong shift towards low-temperature systems that can integrate large heat pumps, waste heat and geothermal. Today, Europe has around 24 million heat pumps installed 1.

At the same time, the RED III (Directive (EU) 2023/2413) adopted in 2023, raises the bar across the board for renewable energy, heating and cooling. By 2030 the directive establishes a binding EU-wide target of at least 42.5% renewables in gross final energy consumption, with an aspirational 45% 2. More importantly for urban heat systems, RED III introduces sector-specific requirements: buildings, heating & cooling, and district heating/cooling networks must progressively increase their share of renewable (or recovered) energy 3.

These paraller tracks (REPowerEU's heat-pump & electrification push, and RED III's binding renewable-heat obligations) converge to create a powerful policy signal: the future of heat in Europe is renewable, recovered or electrified.

1 REPowerEU and the EU Heat Pump Action Plan
2 Renewable Energy Targets
3 EUR-Lex
4 European Industrial Alliance on SMRs

For district heating operators and city planners alike, the impact could be transformative:

- New investments in fossil-fired boilers, high-temperature CHP or heat-only plants become increasingly difficult to justify, not only because of climate commitments but because legislation will make alternatives technically and economically preferable.
- To make large heat pumps, waste heat, geothermal or other renewables cost-effective and compliant, networks must shift to lower supply temperatures, re-design sub-stations and interface units, and adopt long-term low-temperature (e.g. 4th- or 5th-generation) district-heating architectures.
- Building-level heat pumps can displace district heating demand where networks fail to decarbonise or remain cost competitive.
- Meeting RED III/REPowerEU targets will likely require systematic integration of heat from multiple sources — renewables, waste, electricity-based heat pumping — leaving "mono-fuel, high-temperature fossil heat" a legacy option, not a future one.
- For municipalities, building and zoning regulations, renovation plans and connection rules must be aligned with these heating-system obligations to effectively embed the heat transition into urban planning.

While the 2020s will be dominated by heat pumps, waste heat, and geothermal, the 2030–2040 horizon may see the emergence of heat-only SMRs as an additional baseload option to complement renewables. Ongoing EU-level work on SMR industrial alliances and future regulatory frameworks suggests that nuclear heat may become a viable addition to the renewable-based heat mix 4.

What this means for operators

- Fossil-based heat = structurally declining asset
- Electricity-dependent solutions = system risk in winter
- Investment window = now–2030

Escalating cost of fossil heat

The EU Emissions Trading System 2 (ETS2) marks one of the most consequential regulatory shifts for Europe's heating sector. The newly introduced trading system extends carbon pricing to buildings and road transport, alongside selected additional sectors, with the explicit objective of reducing emissions in these domains by 42% by 2030 compared to 2005 levels. For heat networks that still rely on fossil fuels, ETS2 represents a structural and predictable increase in operating costs. In 2028, ETS2 will become fully operational, with auctioning of allowances and compliance obligations placed on fuel suppliers. ETS2 will cover and address the CO2 emissions from fuel combustion in buildings, road transport and additional sectors not covered by the existing EU ETS 1.

Although compliance formally rests with fuel suppliers, the economic reality is that carbon costs will be passed through the supply chain to district heating plants, commercial buildings, and households using fossil-based heating fuels. Industry analyses already anticipate sizeable fuel-price uplifts under plausible carbon-price scenarios, significantly affecting the competitiveness of district heating systems that still rely on gas, coal, or oil 2.

For district heating operators and municipalities, the implications are immediate and far-reaching:

- Fossil-based heat becomes structurally more expensive relative to renewable and electrified alternatives, independent of fuel-market volatility.
- Carbon-price exposure increases tariff volatility, making long-term heat-pricing stability harder to maintain and raising concerns about consumer acceptability.
- Decarbonisation investments become financially urgent. Accelerating the deployment of heat pumps, waste-heat recovery, geothermal and low-temperature network upgrades reduces future exposure to ETS2 pass-through costs.

ETS2 shifts carbon pricing from a peripheral factor to a central design parameter for district heating.

1 Climate Action: ETS2 explainer
2 Enerdata

Read more: "Are We Failing to Reach the European Sustainability Goals?"

Infrastructure choices made between now and 2030 will determine whether networks remain affordable and compliant, or become locked into high-carbon, high-cost trajectories that burden both operators and end users.

Why small modular reactors matter in the decarbonisation equation

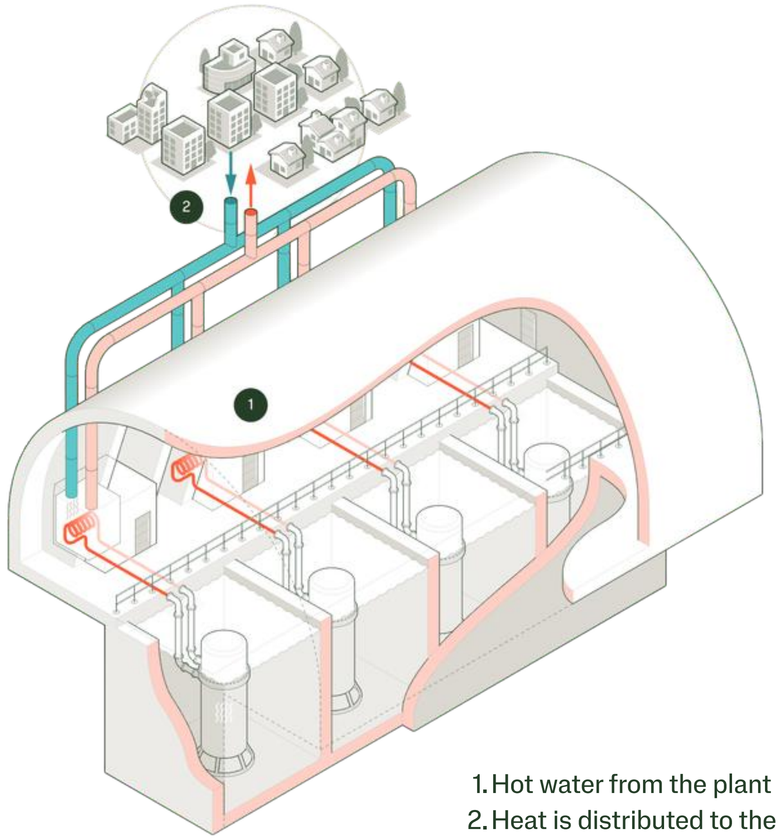
SMRs fit excellently into the role of providing large quantities of heat to either district heating networks or for industrial needs. SMRs are able to provide 24/7 heat regardless of the weather and cause noticeably less strain to the electrical grid compared to electrification solutions. Their ability to deliver continuous baseload output makes them technically attractive in a future system where demand for clean electricity, industrial steam, hydrogen production, and district heating is expected to rise substantially. By co-generating heat and electricity, SMRs could support the stability of renewable-rich power grids while providing predictable thermal energy to urban and industrial networks. Simplified, smaller, and less capital-intensive heat-only SMR solutions can prove to be a viable option for cities with smaller district heating networks and markets where electricity prices remain low.

The European Union has begun to prepare the regulatory and industrial foundations for SMR deployment. Momentum increased significantly in 2023–2025.

- Under the Net-Zero Industry Act (NZIA), SMR technologies are recognised as net-zero technologies, enabling coordinated EU-level actions to accelerate their development.
- In April 2023, the European Commission and stakeholders signed the EU SMR 2030 Declaration, signalling commitment to SMR and advanced modular reactor (AMR) innovation, licensing readiness, and skills development.
- The European Parliament's 2023 report on SMRs acknowledged their potential role in the energy transition and called for strengthened supply chains and first-of-a-kind deployments in Europe in the early 2030s.
- In February 2024, the Commission's communication on Europe's 2040 climate target announced the creation of the European Industrial Alliance on SMRs, formalising a platform to accelerate industrial capacity, harmonised licensing approaches, and future deployment routes 1.

For district heating operators and municipal planners, the relevance is strategic: SMRs represent a potential future high-capacity baseload heat source in regions where geothermal, waste heat, or large-scale heat pumps cannot fully meet long-term demand.

As Europe moves toward deeply integrated, multi-source heating systems, SMRs may offer an additional tool in the decarbonisation toolkit — complementing the renewable and electrified heat sources that dominate the 2020s.



1. Hot water from the plant
2. Heat is distributed to the district heating network

Figure: SMR heat plant integrated into a district heating network.

1 European Industrial Alliance on SMRs

The Cost of Delay: Operational, Financial & Political Risks

Delay is not neutral, it is a strategic decision with compounding cost. Under the combined pressure of carbon pricing, renewable-heat obligations and building-sector reform, postponing decarbonisation decisions systematically increases risk. For both operators and municipalities, the cost of inaction compounds across operational, financial and political dimensions.

Operational risks

- Rising carbon cost exposure as ETS and ETS2 progressively increase the operating cost of gas-, coal- and oil-based heat.
- Reduced system flexibility, with high-temperature networks limiting the integration of heat pumps, waste heat and geothermal.
- Compressed transition timelines, forcing rushed retrofits or emergency capacity replacement later in the decade.
- Misalignment with power systems, reducing the ability of district heating to support grid flexibility and renewable integration.

Financial risks

- Stranded assets, as fossil boilers and CHP units lose economic viability well before the end of their technical lifetime.
- Tariff volatility, driven by fuel price and carbon price pass-through, undermining long-term price stability.
- Higher future CAPEX, as delayed action leads to fewer options and higher costs under regulatory pressure.
- Lost access to funding, as EU and national support increasingly prioritise shovel-ready, low-carbon projects.

Political risks

- Failure to meet state deadlines, including local heating and cooling planning obligations and climate targets.
- Public backlash over affordability, if rising heat prices are passed on without a credible transition strategy.
- Reduced credibility with regulators and investors, weakening the city's ability to secure future support.
- Reactive decision-making, shifting from planned transitions to crisis-driven interventions.

Time has become a strategic resource. Cities and utilities that begin structured transition planning now, retain flexibility, protect affordability and align investment cycles with policy requirements. Those that wait risk being forced into compressed, high-cost transitions under regulatory and social pressure. The next chapters explore the available technology toolkit and how different heating-mix scenarios perform within this tightening framework, and how early technical analysis can turn regulatory obligation into a controlled, future-proof transition. For both operators and municipalities, the coming decade is defined less by whether decarbonisation will happen than by how deliberately and how early it is planned.

Further resources:

- EU heating & cooling policy overview
- Guide to decarbonising district heating (EIB/JASPERS)
- ETS2 Unpacked: What Businesses Need to Know
- EU policy background on SMRs
- Wärtsilä: District heating: the key to affordable and flexible decarbonised energy

Technology Toolkit

No single technology solves district heating decarbonisation. Rather, it's a portfolio issue.

Decarbonising district heating is not a question of identifying a single "winning" technology. It is a system challenge shaped by peak demand, electricity system constraints, fuel availability, investment cycles, and long-term climate targets. We think that credible decarbonisation pathways rely on portfolios of complementary heat sources, each addressing different operational needs across seasons and time scales. There are many main heat supply technologies available to district heating operators.

This section aims at summarising their strengths, limitations, and system roles. The assessment reflects recent Nordic system level analyses, including the Tampereen Energia study on non-combustion-based and carbon negative district heating, which emphasises the importance of peak load management, electricity–heat coupling, and cost-effective emissions reduction at scale.

Electric boilers

Electric boilers provide direct conversion of electricity into heat and are technically simple and highly responsive.

System role

- Short-duration flexibility
- Utilisation of excess or very low-priced electricity

Key characteristics

- Fast ramping and low capital cost
- Low efficiency compared to heat pumps
- Unsuitable as primary heat source during system-wide electricity scarcity
- One key limitation has to do with electrical grid connections & capacity

Electric boilers are best understood as system balancing tools, not standalone decarbonisation solutions.

Large-scale heat pumps

Large heat pumps convert electricity into heat by upgrading low-temperature sources such as ambient water, sewage, or waste heat. Their efficiency (COP) makes them central to many decarbonisation strategies.

System role

- Flexible mid-load and baseload production
- Integration of low-carbon electricity into heating

Key characteristics

- Strong performance when electricity is abundant and low-carbon
- Electricity demand increases during cold periods
- Indirect emissions depend on the marginal electricity mix

System studies show that large-scale heat pumps are most effective when combined with other technologies that reduce reliance on electricity during peak winter demand.

Waste heat

Waste heat from industry, data centres, wastewater treatment, and energy conversion processes is among the most efficient low-carbon heat sources available. When connected to district heating networks, waste heat transforms otherwise lost energy into useful output, often with minimal marginal emissions.

System role

- Baseload or mid-load heat supply
- Sector coupling between industry, digital infrastructure, and heating

Key characteristics

- Very low operating emissions
- Often requires heat pumps to upgrade temperature
- Availability depends on local industrial structure and long-term host stability

Waste heat is highly attractive where available, but it is geographically constrained and cannot alone guarantee supply during cold, high-demand periods.

SMRs for heat production

Heat-only SMRs, such as LDR-50, are specifically designed for heat production: delivering stable, predictable baseload heat without adding pressure to the electricity system.

System role

- Long-term baseload heat supply
- Decoupling heat production from electricity system stress

Key characteristics

- Very high capacity factor
- Near-zero operational emissions
- Long asset lifetime and strong alignment with district heating infrastructure

Nuclear heat directly addresses the core challenge identified in system studies: meeting winter peak demand without overloading the electricity system or relying on fossil fuels.

Thermal energy storage

Thermal storage, ranging from short-term hot water tanks to large-scale seasonal storage, plays a central role in decarbonised district heating systems.

System role

- Peak shaving and load shifting
- Enabling higher shares of variable electricity and waste heat

Key characteristics

- Enables affordable large-scale energy balancing
- Improves resilience and system efficiency
- Enables decarbonisation without overbuilding generation capacity

Nordic experience shows that large thermal storage is a critical enabler for integrating low-carbon heat sources at scale. One limitation, however, is that thermal energy storage does not produce energy; it only stores it and is subject to storage losses.

Bioenergy

Sustainably sourced bioenergy remains widely used in district heating, particularly for peak demand and dispatchable capacity.

System role

- Peak and backup generation
- Dispatchable supply independent of weather

Key characteristics

- Availability of sustainable biomass is limited
- Lifecycle emissions depend on feedstock and sourcing
- When combined with carbon capture (BECCS), can deliver carbon-negative heat

The Tampereen Energia analysis suggests that BECCS could play an important role in achieving climate targets and may represent one of the most cost-effective technical carbon removal solutions. However, current investment costs remain very high, and the lack of mature markets and stable policy support makes large-scale deployment economically difficult.

Geothermal energy

Deep geothermal systems offer the potential for continuous, low-carbon heat production.

System role

- Baseload heat supply

Key characteristics

- Very low operational emissions
- High upfront risk and capital intensity
- Site-specific geological constraints

While promising, geothermal remains location-dependent and uncertain in many European contexts.

Hydrogen and synthetic fuels

Hydrogen and synthetic fuels can be used as combustion fuels in district heating systems, particularly for peak demand.

System role

- Long-duration storage and peak supply

Key characteristics

- High production cost and efficiency losses
- Best reserved for limited, strategic use
- Competes with higher-value applications in industry and transport

These fuels are best viewed as niche or transitional options rather than primary heat sources.

A consistent conclusion across Nordic and European system analyses is that no single technology can deliver reliable, affordable, and fully decarbonised district heating on its own. The most robust pathways combine low-carbon baseload (e.g. waste heat, geothermal, nuclear heat), flexible electricity based production (heat pumps, electric boilers), thermal storage for peak management, and/or dispatchable capacity for extreme conditions

For district heating operators, the strategic question is therefore not which technology to choose, but how to assemble a portfolio that remains cost-effective, resilient, and climate-aligned over multiple decades.

Technology	Primary System Role	Key Strengths	Key Limitations	Best Use Case in Decarbonised DH
Waste & Excess Heat	Baseload / mid-load	Very low emissions; high efficiency; strong sector coupling	Location-specific; dependent on third-party processes	Anchor low-cost, low-carbon baseload where industrial or digital heat sources exist
Large-Scale Heat Pumps	Baseload / mid-load	High efficiency (COP); scalable; mature technology	Increases electricity demand during cold periods; dependent on power system	Convert low-temperature heat using low-carbon electricity, especially off-peak
Electric Boilers	Flexibility / short-term balancing	Fast response; low CAPEX; simple integration	Low efficiency; unsuitable for sustained peak demand	Absorb excess or very low-cost electricity and support system balancing
Thermal Energy Storage	System enabler (all load levels)	Very low cost per MWh; improves resilience; reduces peak capacity needs	Requires space and integration planning	Shift heat production in time and enable higher shares of variable supply
Bioenergy (without CCS)	Peak / backup	Dispatchable; weather-independent; mature	Sustainability constraints; limited scalable supply	Cover peak demand where alternatives are unavailable
Bioenergy with CCS (BECCS)	Peak / negative emissions	Carbon-negative potential; dispatchable	High complexity; policy and infrastructure dependent	Offset residual emissions and deliver net-negative system outcomes
Geothermal Energy	Baseload	Continuous supply; zero operational emissions	High upfront risk; site-specific geology	Long-term baseload where geological conditions are favourable
SMRs / Nuclear Heat	Baseload	Weather-independent; very high capacity factor; long asset life	Regulatory lead times; upfront capital	Provide stable, zero-emission baseload heat at scale
Hydrogen & Synthetic Fuels	Peak / strategic reserve	Long-term storage; dispatchable	High cost; efficiency losses; competing demand	Limited use for rare peak events or transitional phases

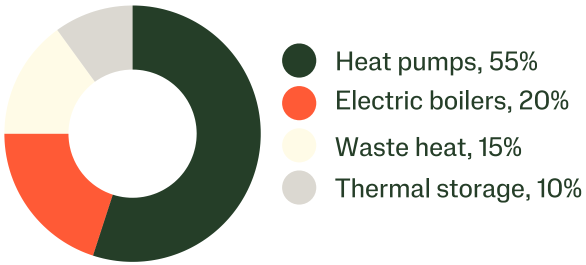
Heating Mix Scenarios to 2035: Three Pathways for European Cities

Decarbonising district heating is not a single-technology transition but a system design challenge shaped by policy, cost, infrastructure, and peak demand. The following scenarios illustrate three pathways to 2035, highlighting the trade-offs cities and operators face when choosing how to transition away from fossil-based heat.

Scenario 1: Electrification led pathway

A system dominated by large-scale heat pumps, electrification, and renewable electricity integration.

Mix in 2035



Strengths

- Aligns with EU electrification and renewable energy targets
- Proven, scalable technologies available today
- Enables sector coupling with power markets

Risks & limitations

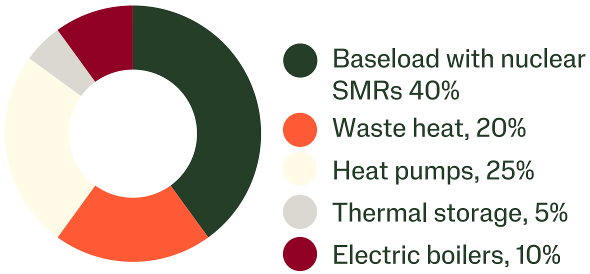
- High exposure to price volatility
- Increases system stress during winter demands
- Requires significant additional investments in renewable power generation, storage, and grids
- Dependent on availability of low-carbon electricity

Electrification can deliver rapid emissions reduction, but without firm baseload, it can introduce structural exposure to electricity system constraints.

Scenario 2: Balanced portfolio with nuclear

A diversified system combining electrification, waste heat, and firm, zero-carbon baseload sources.

Mix in 2035



Strenghts

- Reduces dependency on any single energy source
- Improves system resilience
- Limits exposure to electricity price spikes
- Enables cost optimisation across seasons

Risks & limitations

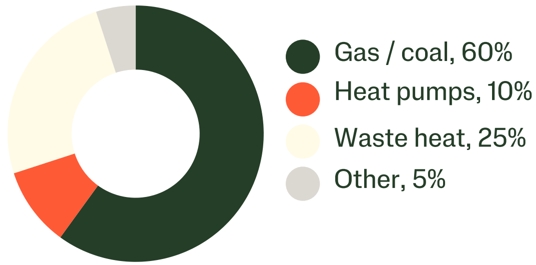
- More complex investment strategy
- Requires coordinated planning

In balanced systems, firm baseload heat typically covers 30–40% of annual demand, reducing exposure to electricity price volatility and ensuring system stability during winter peak periods.

Scenario 3: Delayed transition/Fossil lock-in

Incremental changes with continued reliance on fossil fuels and high-temperature legacy systems.

Typical mix in 2035



Strenghts

- Low short-term capital expenditure
- Operational familiarity

Risks & limitations

- Rapidly increasing ETS2 carbon cost exposure
- Stranded assets before end of technical lifetime
- Rising heat price volatility for consumers
- Regulatory non-compliance risk
- Reduced access to public funding
- Imported fuels increase the impact of global crises and market volatility

Delay does not reduce cost, it shifts it forward, increasing financial, operational, and political risk. Infrastructure choices made between now and 2030 will determine system cost for decades.

In systems where electrification and waste heat cannot fully meet long-term demand, heat-only SMRs provide a scalable, ultra-low-carbon baseload solution that complements renewable and electrified heat sources.

Small Modular Reactors in Europe's Long-Term Decarbonisation

"Ultimately, nuclear is a thermal energy source — this is not true for other fuels."

SMRs are increasingly discussed as a means of meeting Europe's growing demand for clean electricity, low-carbon hydrogen and, more recently, heat. Designed to complement both renewable energy and existing nuclear technologies, SMRs offer the potential to deliver reliable, continuous supplies of low-carbon energy, supporting Europe's long-term climate mitigation and sustainability objectives 1.

District heating decarbonisation is ultimately constrained by winter peak heat demand and by the realities of system operation: when it is coldest, electricity systems are often most stressed, renewable output can be variable, and the value of dispatchable capacity rises sharply.

In this context, Small Modular Reactors (SMRs) are emerging in Europe not only as an electricity option, but increasingly as a heat option. The European Industrial Alliance on SMRs explicitly positions SMRs within integrated energy systems that can provide low-carbon electricity and/or heat, with the goal of accelerating deployment by the early 2030s. SMRs can contribute to decarbonising sectors with hard-to-abate emissions such as transport, chemical and steel industry, and district heating 2.

What makes SMRs particularly relevant for district heating is their system function: they can provide firm baseload heat that reduces dependence on electricity during peak winter conditions, while thermal storage, heat pumps, waste heat recovery, and electric boilers provide flexibility and optimisation around that baseload.

In fact, European industry platforms and project group selections increasingly include district heating among their target applications, signalling that heat is moving from a "future possibility" to a mainstream deployment case within Europe's SMR agenda 3.

1 European Industrial Alliance on SMRs
2 European Industrial Alliance on SMRs
3 Nuclear Europe

Strategic industrial and fuel supply asset

EU recognises Europe's nuclear fuel cycle and supply chain as a strategic asset, underpinning energy security.

Supplying zero-carbon heat and steam

SMRs are recognised as a potential source of low-carbon heat and steam. Their ability to deliver continuous, high-availability thermal energy positions them as a complementary option alongside electrification.

Contributing to grid stability alongside renewables

Beyond heat, SMRs are acknowledged for their potential to improve grid stability, particularly in systems with high shares of variable renewable energy.

Heat-only operation tailored to district heating needs

SMRs can be designed for heat-only operation, allowing them to run at lower temperatures and pressures reducing integration complexity and reinforcing SMRs' relevance as a dedicated heat source rather than solely a power technology.

Key Considerations

Europe's district heating sector has entered a decisive decade. Policy, carbon pricing, and energy system transformation are no longer gradual forces; they are structural drivers reshaping how heat must be produced, delivered, and financed. The evidence presented in this report leads to four clear conclusions.

01

The transition is unavoidable and time-bound

Between now and 2035, district heating systems must fundamentally change.

- EU policy frameworks (ETS2, RED III, EPBD) are systematically phasing out fossil-based heat
- Carbon pricing is turning cost uncertainty into predictable cost escalation
- Electrification and renewable integration are redefining system architecture

The question is no longer whether to decarbonise, but how early and how deliberately it is done.

02

There is no single-technology solution

Across all credible studies and system models, one conclusion is consistent: No single technology can deliver reliable, affordable, and fully decarbonised district heating on its own.

The most resilient systems combine:

- Electrification (heat pumps, electric boilers) for flexibility
- Low-cost baseload (waste heat, nuclear heat etc.) where available
- Thermal storage to optimise system performance
- Firm, zero-carbon heat to ensure reliability during peak demand (heat-only SMRs)

03

System reliability is defined by winter peak demand

The defining constraint is not average heat production, but the ability to reliably meet demand during the coldest periods when electricity systems are most constrained and costs are highest.

Electrification alone cannot fully solve this challenge.

Balanced systems that include firm, weather-independent baseload heat:

- reduce exposure to electricity price volatility
- improve long-term cost predictability
- strengthen resilience under extreme conditions

04

Delay increases cost, risk, and complexity

Postponing decisions does not reduce uncertainty – it compounds it.

Cities and operators that delay face:

- Rising carbon cost exposure
- Stranded assets and compressed investment timelines
- Reduced access to funding and regulatory flexibility
- Increased political and affordability risks

Time is now a strategic resource. Early action preserves options, delay removes them.

What this means for decision-makers? The strategic question is no longer "Which technology should we choose?" but "How do we design a system that remains affordable, resilient, and compliant through 2035 and beyond?" This requires moving from high-level strategy to site-specific system design, evaluating technology portfolios, not individual assets, and aligning technical, financial, and political stakeholders early.

The transition to decarbonised district heating will ultimately be decided at the network level through real-world constraints, infrastructure, and demand profiles. The next step for cities and utilities is a structured feasibility assessment that translates strategy into actionable system design. And those that wait may be forced into faster, more expensive, and less flexible transitions.

From strategy to decision

Decarbonizing heat isn't just about technology — it's about making the right choices for the right place at the right time. Every city, district, and energy system is unique, with its own network, demand patterns, and future ambitions. The next step is understanding what works in your specific network. Feasibility study turns questions into a clear picture of what is possible.

Many vendors offer paid or free feasibility studies to help with decision making. A feasibility study gives you the confidence to move forward (or not) with full visibility of the risks, opportunities, and trade-offs involved.

The feasibility study is often based on a description of the client's existing heating system, typically including historical heat consumption data, potential heat production, local heat market dynamics, and other factors relevant to simulating or modeling the operation of the LDR-50 SMR within the client's heat network.

You can ask for a free feasibility study with Steady Energy here.

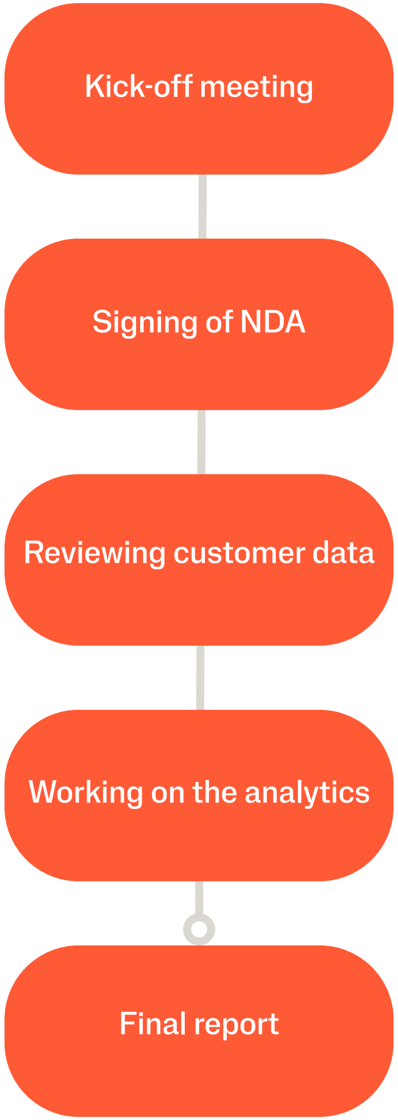
A feasibility study should give you:

Informed decision
Gain a clear, detailed report on whether the LDR-50 is the right solution for your needs, giving you the confidence to make the right energy investment.

Technical fit
Verified compatibility with your network, demand, and local conditions.

Figure out the costs
Gain a strong understanding of investments that deliver lower levelized heat costs and improved operational efficiency.

Impact potential
Discover the quantified benefits in emissions reduction, energy security, and community value.



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