Energy Efficiency Hub

Decarbonising district heating

By 2050, around 2.6 billion people will require both heating and cooling, underscoring the need to rapidly decarbonise district heating. Today, district systems provide about 10% of global building heat demand, with 90% still supplied by fossil fuels. Low-carbon sources such as recovered heat from data centres offer significant potential; recovered heat alone could meet roughly 10% of Europe's space-heating needs by 2030.

Barriers to the decarbonisation of district heating include limited data on available low-carbon heat sources, the challenge of reducing emissions from waste incineration, and resilience concerns during periods of low wind and solar output. Developing district heating infrastructure in already built up metropolitan areas represents a challenge.

Selected lessons

- District heating and cooling can help accelerate decarbonisation and improve energy affordability, especially when projects and new users can transition away from higher cost single building systems.
- Measures such as fiscal incentives can help strengthen the business case and mitigate risk, facilitating private investment in low carbon district heating.
- Engaging and effectively communicating with consumers, local stakeholders, and authorities is key for building acceptance and trust.
- Price transparency and monitoring bodies can address concerns over rising costs, where regulation is not already in place.
- District heating can provide flexibility and thermal capacity to support power systems, where they have been adequately integrated into markets.
- Digitalisation and related data collection enable better planning, building, and operating of district heating and cooling systems.
- Integrating district heating and cooling into spatial planning, zoning, and building codes helps secure sufficient demand density and avoids costly retrofits later.
- Policies encouraging connection in designated zones (e.g. heat planning areas) help ensure sufficient load density for efficient network operation.
- Coordinating building efficiency upgrades with network deployment helps optimise system sizing and avoids stranded assets.

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Examples of policies to address these issues include the following:

China's development of heating network is currently guided by its 15th Five-Year Plan (2026-2030). Central heating was introduced in northern cities, covering about 15 billion m². Decentralised systems were also introduced in northern rural areas and southern regions, covering 11 billion m². System intelligence is a core element of this strategy. In Ordos City, for example, a project developed with intelligent systems delivers zero-carbon heating for 11 000C m² using a closed-loop system that combines photovoltaic and solar thermal cross-seasonal heat storage.

Denmark aims to fully decarbonise district heating by 2030. Excess heat, which was 3-4% of the mix in 2024, is expected to reach 12% by 2035. The country is exploring temperature-adjusted controls, smart meters, and expanded data collection to improve system management, along with automated bidding in power markets and standardised equipment interfaces. Municipalities lead Heat Planning based on socio-economic assessments, while high taxes on fossil fuels encourage the shift to renewables.

France set the objective of expanding district heating in the Stratégie Nationale Bas Carbone and the Programmation Pluriannuelle de l'Energie, from 7% of buildings as of November 2025 to 15% by 2030. Public support is provided through the Heat Fund (Fond Chaleur), VAT incentives, feasibility studies, and measures to accelerate renewable deployment. France also requires district heating operators to publish annual performance reports on renewable shares and CO_2 emissions, and is improving building-network connectivity rules. Digital tools like France Chaleur Urbaine, EnRezo, EnergyMapper, and Powerdis help municipalities plan and evaluate DHC expansion.

Germany's Heat Planning Act sets binding targets to increase the share of renewable and waste energy in the district heating mix, namely to 30% by 2030, 80% by 2040, and full decarbonisation by 2045. It also emphasises engagement with consumers, local stakeholders, and authorities to build trust. The Federal Funding for Efficient Heating Networks (BEW) has dedicated EUR 6 billion through 2028 to fund up to 40% of investments in renewable-based district heating and new networks where at least 75% of the heat supply is produced by renewable or waste heat.

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Resources

- IEA report on opportunities to strengthen the role for district heating in the changing energy landscape.
- IEA Report on the status of heat pumps in China, including district heating.
- The IEA Technology Collaboration Programme on District Heating and Cooling carries out research on the design, performance and operation of distribution systems and consumer installations.

These policy insights are derived from Members' exchanges during Policy Exchange Workshops. Hub Members regularly exchange knowledge and practical experience through the Energy Efficiency Hub's Policy Exchange Workshop series. These closed-door sessions provide a platform for experts nominated by Member governments to explore specific energy efficiency topics in greater depth across sectors such as buildings, transport, and industry. Each workshop features national policy presentations, peer-to-peer discussion among officials responsible for design and implementation, and scene-setting contributions from IEA experts.

Findings presented in this Policy Insight are drawn from the discussions that took place during the Policy Exchange Workshop from 26 November 2025 (China, France, Germany, Denmark).

For more information, please contact the Energy Efficiency Hub Secretariat at secretariat@energyefficiencyhub.org.

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