



## Heat pumps in industry

Heat pumps are a key technology for modernising and decarbonising industry, turning waste heat into process heat with efficiencies three to five times higher than gas boilers. They are well-suited for low- and medium-temperature processes (up to 200°C), that are common in food, textiles, paper, chemicals, and other sectors. According to the IEA, heat pumps could supply 10% of industrial heating needs by 2030 and 20% by 2050, cutting natural gas demand by over 80 bcm.

Barriers to heat pump integration include its higher upfront costs, the complexity of integrating them into existing processes, the lack of skilled installers and operators, limited awareness, supply chain constraints, the absence of harmonised standards, and the price disparity between electricity and gas in certain regions.

### Selected lessons

- The absence of robust heat pump standards and weak dissemination of best practices hinder large-scale industrial deployment.
- High upfront costs, low gas prices in some areas, and limited awareness are obstacles to adopting industrial heat pumps despite their long-term benefits.
- Electricity price disparities compared to fossil fuels can discourage investment in heat pump technologies.
- Integration challenges, like process adaptation, space constraints, and lack of standardised norms, complicate replacement of boilers with heat pumps.
- Policy tools like grants or levy reductions can unintentionally disadvantage sectors that are harder to electrify, potentially slowing industrial decarbonisation.
- Clear long-term action plans, better data, and improved capacity-building are essential to scaling up clean heating technologies in industry.
- Stronger information campaigns and awareness-raising efforts are needed to build confidence in heat pump performance and benefits.
- The workforce lacks sufficient engineering and installation skills needed for large-scale industrial heat pump deployment.
- Continued R&D is needed to extend the temperature range, improve key components, and increase efficiency of industrial heat pumps.

Examples of relevant policies adopted by Hub Members include the following:



**Canada** implemented the [Low Carbon Economy Fund](#) that invests in capital projects and the [Net Zero Accelerator Initiative](#) (CAD 8 billion) supporting decarbonisation of the country's largest industrial emitters. The government also provides refundable tax credits and direct payments towards investments in retrofit projects and offers several tax incentives for businesses that install clean technologies.



**Japan** provides subsidies for investment in energy-efficient industrial equipment, including heat pumps. Energy-intensive businesses are required to improve their energy intensity by an average of 1% per year and must report their energy use as mandated in the [Energy Efficiency Act](#). When applying for subsidies, businesses must provide the rating they receive following reporting.



**Korea** began developing a 300°C High-Temperature Heat Pump System under the 2021 [Framework Act on Low Carbon Green Growth](#). The government has also partnered with the German Aerospace Center for research and development projects on paper drying processes.



The **United Kingdom** put in place the [Industrial Energy Transformation Fund](#) (GBP 500 million) covering 20–80% of upfront costs for the installation of heat pumps. The government also launched the [Heat Pump Investment Accelerator Competition](#) (GBP 30 million) in 2023 to support the manufacture of heat pumps.



The **United States** has provided incentives for clean heating technologies such as heat pumps via the [Inflation Reduction Act](#). Heat pumps are also pivotal in the decarbonisation strategy outlined by the [Industrial Efficiency and Decarbonisation Office](#). Local utilities promote heat pump benefits and deter the use of gas, such as in New York's [Local Law 154](#) prohibiting the installation of new gas-powered equipment in new buildings after 2026.



**China** put in place policies and regulations including the [Renewable Energy Law](#) and the [Action Plan for Carbon Dioxide Peaking before 2030](#). China operates over 40 city-level geothermal heat pump projects and 60 clean heating projects replacing coal systems. Green finance measures and provincial grants have also been put in place to stimulate investment.

## Resources

- [Heat Pumping Technologies TCP](#) (HPT TCP) – International collaboration programme advancing heat pumping technologies.
- [IEA Industry](#) – Overview of industrial energy use, key efficiency measures, and electrification opportunities.

*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 following Policy Exchange Workshops: 14 December 2022 (Australia, Canada, China, Japan, United States) and 14 May 2024 (China, Korea, United Kingdom, United States).*

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