

# EU Heat Pump Accelerator



A joint plan for boosting heat pump deployment and meeting the REPowerEU targets



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# Introduction

Following Russia's invasion of Ukraine in February 2022, the EU set new targets for reducing energy imports. Heat pumps were identified as a cornerstone of the move away from imported fossil fuels, and under REPowerEU, a target of doubling annual heat pump installations in five years was set.

There are, however, various bottlenecks that need to be addressed to increase heat pump deployment and production in line with the REPowerEU goals. These include high costs, information gaps, a lack of skilled workers, supply chain bottlenecks and power sector integration.

**The EU Heat Pump Accelerator aims to overcome these barriers and create an improved framework for the accelerated deployment of heat pumps in line with the EU's climate and energy security objectives.**

In particular, it aims to contribute to the scaling up of heat pump sales to reach 60 million installed heat pumps by 2030\* through various actions. These actions include: monitoring annual progress on heat pump deployment; helping increase demand for the installation of heat pumps in line with the overall objective; reducing production costs and installation times for heat pumps; increasing the number of installation companies and skilled installers; kicking off a knowledge platform for professionals; enabling the development of smart heat pumps; and facilitating a flexible energy system.

**The EU Heat Pump Accelerator process brought together key stakeholders and decision makers to make progress towards overcoming barriers for deployment. This report offers an overview of the solutions discussed by this group to the barriers they identified.**

In light of the European Commission's upcoming Heat Pump Action Plan, we believe the barriers and solutions presented here will be useful input, and we remain committed to working together to overcome obstacles and achieve the REPowerEU goals.

\*The European Commission [sees](#) "total additional deployment of 30 million or more heat pumps" by 2030 as compared to 2020, "most of them hydronic (including hybrids)." Extrapolating this number to all heat pumps takes us to around 60 million.

# → Five steps to a fast heat pump roll-out



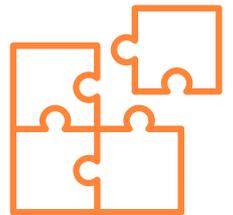
**1** Make clean heating the standard



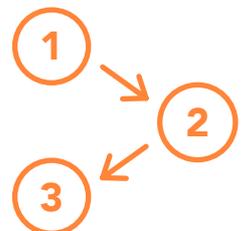
**2** Support European industry leadership



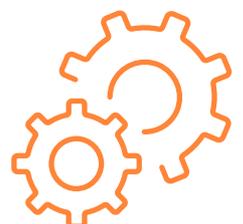
**3** Increase energy system integration with flexible heat pumps



**4** Make it easier for consumers



**5** Develop the required skills and workforce



# The case for heat pumps



Installing **one million heat pumps** removes **1.5 billion cubic metres of gas** - equivalent to around **3 Mt of CO<sub>2</sub>**.

For years, heat pumps were largely dismissed as a niche solution for heating and cooling in Europe. Questions were raised about their ability to heat older homes or buildings in colder climes, and the technology was frequently rejected as being too expensive to become a mainstream option.

A plethora of recent studies debunks these negative presumptions, underlining the ability of heat pumps to heat, and cool, all types of homes and buildings, whatever the temperature, and to significantly bring down energy bills.

While scientific studies highlight the worsening of the climate crisis and the increasingly urgent need to reduce greenhouse gas emissions, the Russian invasion of Ukraine has made clear the pressing need for Europe to wean itself off fossil fuels from untrustworthy regimes.

Scientists, engineers, policy makers and industry experts see heat pumps as a key solution to the climate emergency and the energy crisis.

A fast heat pump roll-out would **make Europe less dependent on foreign energy imports** by reducing gas demand in buildings by 40 per cent by 2030 compared to 2022 and reducing the EU's energy import bill by €60 billion over the same period.

Further, heat pumps, in conjunction with energy renovations, can help **protect consumers** from future energy price shocks and lift people out of energy poverty by cutting average heating bills by 20 per cent by 2030, compared to a business as usual scenario.

Heat pumps likewise save considerable amounts of greenhouse gases. The 20 million heat pumps installed in Europe today mean 54 million tonnes

fewer greenhouse gases in the atmosphere, roughly equivalent to the annual emissions of Greece. Increasing energy renovations and accelerating the deployment of heat pumps would **decrease carbon emissions** from EU residential buildings by 46 per cent between 2022 and 2030, and enable Europe to meet its climate commitments. Full decarbonisation of the sector is possible.

Burning fossil fuels and biomass for heating not only emits carbon dioxide, but also other air pollutants that damage people's health. Heat pumps do not emit air pollutants at their point of operation — their increased deployment will **reduce nitrogen dioxide emissions** across the EU by almost 40 per cent by 2030 compared to 2022. In 2020, 49,000 premature deaths were attributed to exposure to NOx emissions in the EU.

Heat pumps are a **cost-competitive option for consumers** as they are on average 30 per cent cheaper to run over their lifetime than a gas boiler in the EU, and upfront costs will continue to decrease as the market becomes more established. New business models like heat as a service make upfront costs less relevant too.

Heat pumps are also **good for the economy**. Increasing their uptake, in line with the REPowerEU plan, will create almost 3 million net additional jobs by 2030, compared to a business as usual scenario.

Current roll-out of heat pumps in households remains too slow to meet the EU's climate goals. To capitalise on the climate and socio-economic benefits of the widespread deployment of heat pumps, EU decision makers must now take the bull by the horns and develop the necessary policy and financing frameworks to speed up the transition.

# The benefits of installing an additional 60 million heat pumps in the EU by 2030

**A 46% fall in CO<sub>2</sub> emissions from buildings** compared to 2022, better for the climate

**A 40% decline in NO<sub>x</sub> emissions** compared to 2022, leading to cleaner air

**2.5% higher GDP**

**Heating bills are over 20% cheaper for households,** thanks to lower energy demand

**€60 billion saved on energy imports** from now until 2030, reducing dependence on volatile fossil fuels

**3 million jobs created** mainly in the services sector

**Gas demand in buildings falls by 40%** compared to 2022



# Barriers hindering a fast heat pump roll-out

There are various bottlenecks that need to be addressed to increase heat pump deployment and production in line with the REPowerEU goals, including high costs, information gaps, a lack of skilled workers, supply chain bottlenecks and power sector integration.

## Upfront and operation costs

Reducing the upfront cost of purchasing and installing heat pumps is critical to boosting their attractiveness to consumers since, in most markets, the upfront cost of a residential heat pump is much higher than that of a fossil fuel boiler. Government support and private sector financing are essential to help consumers bear these costs and tap into the energy savings heat pumps provide. There is a particularly urgent need to shield low-income households from the energy crisis and support their access to cleaner and, ultimately, cheaper to run heating solutions like heat pumps. Industrialising production processes and simplifying solutions can facilitate access to heat pumps by bringing down production and installation costs, but these changes are not happening fast enough.

In certain countries, the operating costs of heat pumps are still higher than those of fossil fuel boilers, despite heat pumps being three-to-five times more energy efficient than boilers. This situation is due to high taxes and levies on electricity, a lack of carbon pricing, and a lack of incentives for consumers to make the most of the flexibility and renewable energy offered by heat pumps.



Credit: Glen Dimplex

## Information gaps

Access to reliable information about heat pumps is crucial for consumers to opt for them over other heating solutions. Heat pumps need to become the accessible, attractive and affordable standard option for consumers. The process of comparing heat pump options, choosing an installer, obtaining approvals and qualifying for relevant subsidies can be very complex and time-consuming. Consumers need to be able to make an informed choice and easily acquire information about whether their house is ready for a heat pump, up-front and operational costs, financing and installation options and have access to user experiences. A qualified installer or another qualified professional, for example from a one-stop shop, can provide this information to consumers. These practices are, however, not yet mainstream across Europe.



## Lack of skilled workers

To meet required heat pump roll-out targets, enough skilled workers are needed for every part of the heat pump value chain, from manufacturing to planning, installation and maintenance.

Companies in Europe, including in the heat pump sector, are struggling to recruit skilled electricians, technicians, engineers and construction workers. Various factors can be responsible for the lack of installers:

1. The installer is not familiar with heat pump technology and does not need to obtain such knowledge to have a steady income.
2. The investment — time and financial — to become a certified heat pump installer is too considerable.
3. Customers are not aware of the benefits of heat pumps leading to a lack of demand for their installation.

## Supply chain bottlenecks

Today, at least 60% of heat pump manufacturing happens in Europe. And while leading manufacturers have announced plans to invest billions of euros in expanding heat pump production capacity, supply chain bottlenecks are adding to manufacturing costs and threaten to hold back expansion efforts. Supply chain resilience is also affected by dependency on manufacturers outside Europe for critical components or materials, like compressors.

Until recently there was a lack of regulatory certainty and no clear long-term policy consistency at an EU or a national level, leaving the market without a pipeline of stable demand. Without clear policy signals, manufacturers lack information about where to expand their operations. Bureaucracy and a lack of streamlined processes for new facilities and investments further hamper European heat pump production.

## Power sector and energy system integration

The accelerated deployment of heat pumps, along with the adoption of distributed generation and electrified technologies, also requires investment in the power sector to upgrade customer connections, distribution grids, generating capacity and flexibility. To ensure resource adequacy during peaks in the heating season, the generation capacity of distributed and flexible resources needs to be integrated including through storage and digital technologies.

Heat pumps can provide flexibility to the energy system, reducing power sector investments, but this is not yet happening at a large scale as incentives for consumers are often lacking and heat pump monitoring and control interfaces are not standardised and interoperable. Long-term signals for investments in the electricity grid to enable heat pumps, storage, flexibility, and connected renewable energy sources, like solar PV and storage working in conjunction with heat pumps, are only in their infancy.

The potential of large heat pumps to close the energy cycle and use excess heat in industry and district heating is generally untapped because of a lack of knowledge about the potential of large-scale heat pumps, how to deploy them and fears about their cost, in particular the higher cost of electricity.

# Five point action plan

The barriers hindering a fast heat pump roll-out can be addressed through a number of actions, which fall under five major themes.

## Five steps to a fast heat pump roll-out

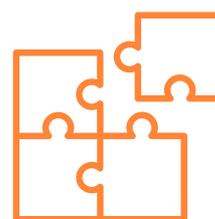
**1** Make clean heating the standard



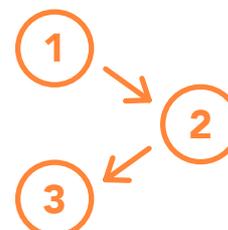
**2** Support European industry leadership



**3** Increase energy system integration with flexible heat pumps



**4** Make it easier for consumers



**5** Develop the required skills and workforce





# 1 Make clean heating the standard

Long-term policy signals and clarity about future demand for heat pumps can ensure that sufficient investments are made in the EU's manufacturing capacity and its workforce. REPowerEU is an important first step in this direction, as is the Net-Zero Industry Act. They need to be consistent, and ambition to be increased. By updating or setting standards, through product policy and/or via clean heat standards, the EU can drive the uptake of heat pumps and provide long-term certainty to investors, manufacturers and workers on the future direction of the heating market.

The EU is the world's largest single market and a global standard setter. We should use these assets to our advantage to drive strategic autonomy, innovation and sustainability. Phasing out the sale of stand-alone fossil fuel boilers through EU product policy at a time when heat pump demand is expected to grow massively globally can strengthen EU competitiveness in heat pump manufacturing and kick-off the process of reducing costs through economies of scale and decarbonise the building sector and industry.

## Actions include

- End the sale of stand-alone fossil fuel boilers via **Ecodesign** as soon as possible.
- Downgrade gas boilers to the lowest **energy labels** and do not mislead consumers with a hydrogen-ready label.
- Adapt **building codes** to make sure that new buildings are fossil free.
- Introduce **clean heat standards** that place quantitative targets on market actors (like energy network companies, energy suppliers or heating appliance manufacturers) and provide some flexibility on how to achieve them. These standards can complement other policies (such as using appliance standards to end the sale of fossil fuel boilers) by providing an incentive for removing existing boilers from homes before the end of their lifetimes.
- End the use of fossil-fuel based solutions for **industrial heat applications** that require a maximum heating temperature up to 200 degrees Celsius.
- Adopt a holistic approach at a European level across all policy areas involved in heat pump deployment. **Streamline legislation** to increase the uptake of sustainable heating options by ensuring that legislation on the energy performance of buildings, renewable energy, ecodesign, refrigerants and demand response matches the REPowerEU targets for a large-scale heat pump roll-out.
- Encourage Member States to **streamline and harmonise legislation** at the national level. For example, by ensuring that building codes, Energy Performance Certificates and planning regulations support renewable heating and cooling.
- Accelerate the implementation of **Energy Performance of Buildings** standards (which provide a methodology to calculate the overall energy performance of buildings) in Member States.

- ➔ Encourage Member States to develop comprehensive, rational and consistent **heat planning** linked to their National Energy and Climate Plans (NECPs), Building Renovation Plans and Comprehensive Assessments on heating and cooling. Encourage clean heat zones, local energy grids (neutral loops) or neighbourhoods by removing obstacles to allow local governments to use local planning or construction regulations to oblige newly built, recently refurbished buildings or buildings replacing their heating system to use a local clean heating solution.
  - ➔ Set up a **Concerted Action** on heat pumps to allow Member States to exchange best practices and to support Member States in establishing national heat pump action plans.
  - ➔ Restrict extensions of distribution gas grids and require integrated distribution grid planning that outlines steps and timelines for strategic gas grid decommissioning and the investments required in the electricity grid.
- Such steps would ensure the maintenance, development and decommissioning of infrastructure is aligned with heat planning, NECPs and other relevant plans and goals.
- ➔ High investment costs would be more bearable if **operational costs were significantly lower**. Governments should aim for a ratio of gas to electricity price of two.
  - ➔ **Track progress** on achieving heat pump deployment targets at an EU level and across all Member States, and benchmark performance. This tracking should include the number of heat pumps installed and produced per country, and also the number of installers, the price development of heat pumps and installations, and average installation times.
  - ➔ Review national **Resilience and Recovery Funding** plans to ensure they are in line with green transition objectives and avoid locking-in fossil fuel solutions.



## 2 Support European industry leadership



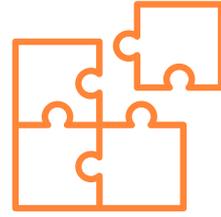
European production capacity can be increased by developing an EU industrial strategy for heat pumps and their components. Maintaining and shifting more heat pump and component manufacturing to Europe through financial support for factories will shorten lead times and

increase security of supply. Heat pump devices that are imported from outside the EU should meet high EU quality standards, including for efficiency and sound emissions as well as repairability.

### Actions include

- Analyse the entire value chain and strengthen the European production of **heat pump components** to develop a competitive and resilient heat pump components value chain.
- Make EU funding available for **repurposing existing facilities** from sunset industries (such as those producing fossil fuel heating systems or white goods) – with suitable sites, facilities, logistics and skills in place that can be built on.
- Establish an **EU Centre of Excellence** for heat pumps to support manufacturers and encourage collaboration to overcome joint problems and lower costs, e.g. around manufacturing efficiencies, non-fluorinated refrigerant development and control systems.
- Continue to make EU R&D funding available throughout this decade to increase **efficiencies in manufacturing**, and to quickly scale heat pump capacities – such as for automation, the modularization of parts, the production of plug-and-play solutions, the optimisation of assembly lines and to generally reduce complexities associated with manufacturing heat pumps. These changes will reduce costs, manufacturing time and installation time.
- **EU R&D funding** should also be prioritised to make residential heat pumps smaller, more silent, smarter, circular, applicable for more temperature levels, and enhance availability of heat pump deployment in district heating systems and industry.
- Set **high EU quality standards** for heat pumps, including around controls and increased recyclability, longevity and efficiency.

### 3 Increase energy system integration with flexible heat pumps



Unlocking and valorising the flexibility potential of heat pumps can reduce costs for the EU's energy system and for consumers, but it requires incentives for reducing and/or moving the electricity demand of heat pumps away from grid load peaks (e.g. through dynamic electricity tariffs or direct flexibility offers). Electricity consumption can also be reduced through building envelope improvements and differentiated temperatures according to the use of different rooms and

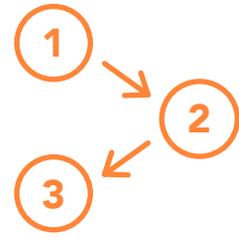
spaces. Grid operators need to be aware of the flexibility potential offered by heat pumps and take this into account in their grid planning.

Large heat pumps play an important role in energy system integration by using excess heat (also called waste heat or surplus heat) from industrial processes and other sources including wastewater, data centres and metro tunnels for district heating systems or heating in industrial processes.

## Actions include

- Ensure that Member States implement the **Electricity Market Design** directive to make sure capacity remuneration mechanisms and dynamic tariffs are in place that can help lower heat pump costs.
- Create **awareness** about the **flexibility potential** of heat pumps and its value for consumers, especially if coupled with other distributed renewable energy sources and behind-the-meter storage.
- Ensure that the flexibility potential of heat pumps is used to shape **grid investment planning**.
- Implement a future-proof **standardised communication protocol** in a harmonised way across the EU to ensure heat pumps can communicate with building energy management systems (BEMS) and to enable the monitoring and control of flexible heat pumps.
- Create awareness about **large-scale heat pumps** applications, their potential, reliability, costs, benefits and the EU (EFSI, Single Market Programme, Horizon2020, Innovation Fund) and national support schemes that can support the switch to large heat pumps.
- Regulate the re-use of **excess heat** by making it mandatory for entities such as data centres, air-conditioned buildings or industries to make a plan for exploiting excess heat.
- Regulate the use of **industrial heat pumps** by making it mandatory for industries to link the required and excess heating and cooling in their process design planning.

## 4 Make it easier for consumers



In most EU markets, heat pumps are now cheaper over their lifetime than gas boilers. The affordability of heat pumps can be improved by reducing taxes and levies on heat pumps, heat pump installation and electricity. Innovative ways

of financing, like heat as a service and pay-as-you-save schemes, are also useful tools to help consumers with the higher upfront costs, while measures that enable a streamlined experience can reduce the hassle for consumers.

### Actions include

- Encourage Member States to introduce **0% VAT** for the purchase and installation of heat pumps.
- Enable **best practice** sharing between countries around government support, guarantees, the involvement of reputable financial institutions, or innovative business and financing models including heat as a service or tripartite contracts<sup>1</sup>.
- Finalise the **Energy Taxation Directive** to ensure electricity is taxed at a lower level than other fuels.
- In the meantime, encourage Member States to reduce taxes and levies on electricity, increase taxes on fossil fuels and recycle tax revenues to subsidise the deployment of heat pumps.
- Aim for an electricity to gas price **ratio of two** to facilitate heat pump deployment.
- Prioritise EU funding for **local demonstration projects** showcasing heat pumps in different types of buildings and applications across Europe to increase the uptake of renovated smart buildings equipped with heat pumps and other sustainable technologies.
- Support Member States to develop specific streams in **one-stop-shops** at a local level dedicated to heat pumps. These one-stop-shops can provide information about heat pump costs and the benefits of the technology compared to fossil fuel boilers, enable streamlined permitting, facilitate credit, support quality control, ensure the availability of qualified suppliers and installers of heat pumps and support decisions about building envelope improvements and changes to the heat distribution system.
- Require Member States to completely **phase out subsidies to fossil fuel only** systems.
- Facilitate lease or pay-for-use contracts (**heat as a service**) by enabling heat pump manufacturers or installers to provide loans and/or take financial risks to enable them to pre-pay the heat pump for their customers. This approach may require changing financial regulations or providing more guidance on how manufacturers or installers can provide such innovative contracts.
- Encourage Member States to **improve permitting**. Replace permits with notification procedures where possible.
- Provide guidelines to ensure that one-stop shops, Energy Performance Certificates, and renovation passports explicitly integrate heat pumps to **close the information gap**, and provide technical, financial and administrative assistance about heat pumps and associated building envelope and heat distribution system improvements.

<sup>1</sup> A tripartite contract is concluded between a Member State (e.g. an Eco Fund), the beneficiary (e.g. vulnerable consumer) and the contractor (e.g. heat pump installer). The funds are transferred directly to the contractor shortly after the works are completed and all relevant documentation is submitted. The beneficiary does not receive any funds directly. This is currently being done in Slovenia.



## 5 Develop the required skills and workforce

Over 3 million heat pumps were installed across Europe in 2022, employing around 162,000 full-time equivalent workers. Doubling the deployment of heat pumps by 2030 will require more skilled workers including engineers and installers, especially as it is more time consuming to install a heat pump than a gas boiler<sup>2</sup>. Some boiler installers have already reskilled to move into the heat pump segment, but appropriate training will be required for many more given the skills needed, such as the ability to recover and safely handle refrigerants.

Announcing the end of sales of stand-alone fossil fuel boilers and mandating an increasing share of clean heating would, with some lead time, allow installers of fossil fuel boilers to become heat pump installers instead.

The EU is working on a heat pump skills partnership to empower workers with the skills needed for the manufacturing, installation and maintenance of heat pumps, and to establish cooperation between relevant national authorities, vocational education and training institutions and training platforms.

### Actions to include in this partnership

- Quantify the heat pump workforce and the gap between this and the workforce needed to reach heat pump targets at a national and an EU level, and collect data on skills from the EU, national administrations and industry. This could be shown in an EU skills map.
- Encourage countries to introduce **financial incentives** targeted towards installers, to enable more installers to receive training.
- Recommend that **technical schools** for electricians, welders and installers are located close to heat pump manufacturing hubs and that information is shared to ensure new heat pump facilities are in locations with available workers.
- Share a **checklist** for installers to simplify installation and reduce time on site and the number of visits required.
- Carry out EU-wide and national level marketing and awareness raising **campaigns** aimed at: (i) young people in schools about the energy transition, including heat pumps, and future job opportunities, and (ii) existing heating system installers about the energy transition including heat pumps and related job opportunities.
- Help heat pump installers to have a minimum level of skills. Installers should be made aware of the importance of choosing the best size heat pump, and of ensuring the connection to existing installations in the case of renovation, to ensure optimum heat pump performance.
- Recommend that training courses for architects and home designers include heat pumps. This will help the heat pump be well integrated into the building and connected with existing systems.
- Encourage Member States to develop new categories and **skill descriptions** for use in educational schemes for installers to better define the responsibilities and skill requirements and to attract new profiles to the sector (including for heat pump fitters and designers).

<sup>2</sup> Two days for two workers to install a heat pump, compared to a half day for two workers to install a boiler

- Analyse and provide guidance where **red tape** can be **cut** to support the installer profession (for example, by standardising and digitalising parts of the installer process and the needed certifications depending on the heat pump type and application).
- Support the recruitment of, and training for, **staff in local public bodies** to enable them to carry out local heat planning as required in the energy efficiency directive.

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