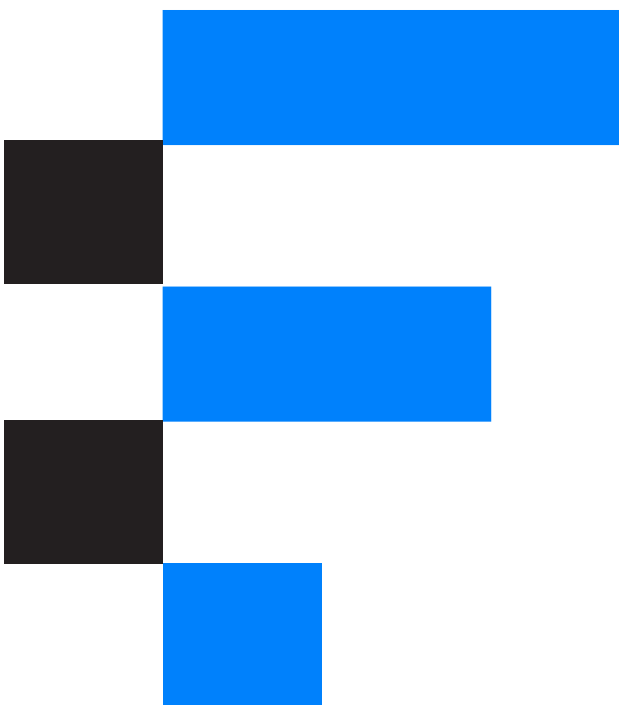


Opening a new chapter for heat pumps

How EU actions can boost clean heat and ensure energy security



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Suggested citation: Anczewska M., Niewiata-Rej, M. and Śniegocki A. (2025),
Opening a new chapter for heat pumps, Reform Institute, Warsaw.

Graphic design

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Publication date

January 2025

Image on the cover: StockSeller_ukr/IStock, smartboy10/IStock

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Executive summary

Europe is far off track to meet its own ambitions when it comes to providing citizens with clean and secure heat. This policy brief offers European decision-makers policy recommendations to increase the roll-out of heat pumps and improve their affordability across the EU, ensuring effective contribution to the shared climate, energy security and competitiveness goals.

Key conclusions:

- The EU risks missing the 2030 target of 60 million installed heat pumps by over 25 million units, i.e. nearly by half. This gap is growing as citizens across Europe lose confidence in the direction of the transition to clean heating and the affordability of heat pumps due to a lack of robust national-level policies.
- Improved regulatory framework, citizen-friendly support schemes, and well-managed electricity pricing policies are needed to improve heat pump affordability and to get deployment on track to meet European policy goals.
- Member States already provide numerous support schemes for heat pump uptake, but many have critical flaws that make them ineffective and often unfair to vulnerable and low-income households.
- Coordinated action is needed by the EU institutions to support Member States in delivering the required heat pump roll-out. The upcoming Electrification Action Plan is an opportunity to address policy gaps and provide a comprehensive framework to support European citizens in the transition away from fossil fuel-based heating.
- A completion of the revision of the Energy Taxation Directive is needed to close the final gaps related to energy pricing. Key European legislation is already in place to support heat pumps as a viable alternative to fossil fuels in residential buildings. Robust and timely implementation on the national level needs to be ensured, and backsliding on previously agreed instruments and targets is to be avoided.
- A strong policy framework for heating transition in buildings should be supported by adequate financing sources, including new revenue streams from the ETS2 and the new European Multiannual Financial Framework 2028-2034.

Heat pumps off track

Heat pumps play a key role in reducing EU emissions from buildings, which account for around 40% of energy consumption and 34% of greenhouse gas emissions in the European Union¹. The benefits of using heat pumps go far beyond climate protection. The most significant aspect of large-scale investment in roll-out in the residential sector is increased energy security due to the cut in dependence on imported gas. Second is European competitiveness, as manufacturing is one of the few clean tech areas where Europe is a global leader² – protecting this position aligns with the ambition of the new European Commission to boost domestic clean tech production.

Unfortunately, heat pump installation in Europe is off track. According to the European Heat Pump Association (EHPA), there are currently 24 million heat pumps installed in Europe³. For the EU to meet its targets, 60 million heat pumps will need to be installed by 2030⁴.

The Reform Institute looked into available data, as per the end of 2024, to identify current trends. There are strong indications that the target will be missed by more than 25 million heat pumps by 2030⁵ (see Graph 1 for details). This means over 40 billion cubic metres of potential gas savings annually (equivalent to the EU imports from Russia in 2023⁶) will not materialise, and it significantly raises the challenge for the EU to reach its overarching 2030 energy and climate targets.

¹ See more information [here](#) and [here](#).

² EHPA notes: "The European Commission has estimated that between 60% and 73% of heat pumps installed in Europe are produced in Europe".

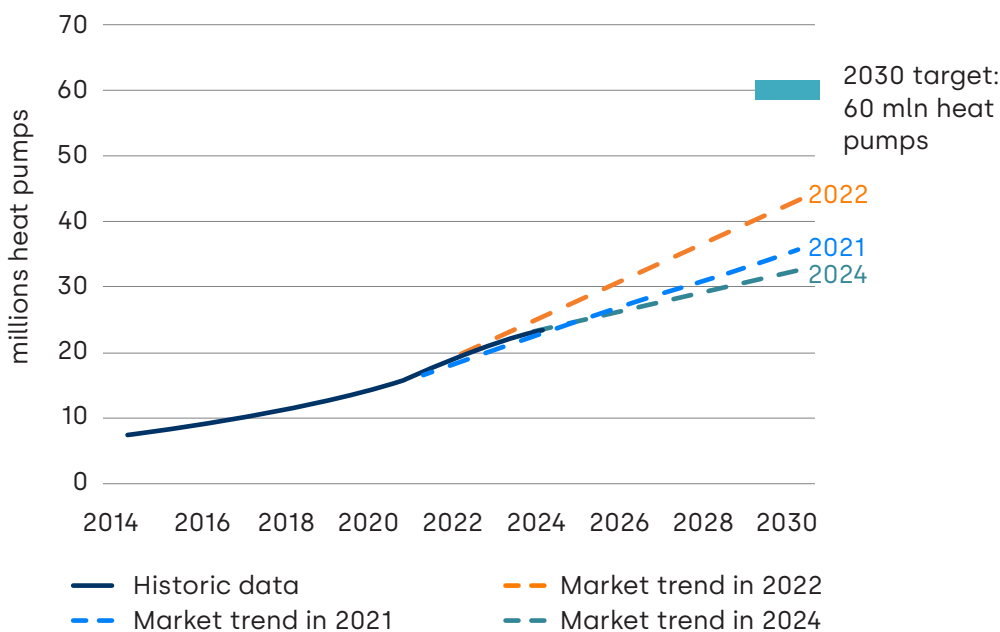
³ See more information [here](#).

⁴ See the European Commission's estimates [here](#) (Figure 44).

⁵ Previous EHPA projections indicate a 15 million gap based on 2023 data (see more details [here](#)).

⁶ According to the European Commission [data](#).

Graph 1. Heat pumps stock in Europe



Graph 1: Source: Reform Institute based on EHPA data

The gap is growing

Over the past two years, the heat pump market has taken a troubling turn. After ten years of growth, with acceleration observed in 2021 and 2022 as a result of the fossil energy crisis, the upward trend has now reversed. Sales have plummeted – dropping by nearly half from their 2022 peak, well beyond the typical market correction that could be expected after gas price stabilisation. The current market trend indicates a deeper issue: **in the absence of an adequate supporting framework, citizens across Europe will continue to lose confidence in the advantage of clean heating solutions.**

Deploying the required 25 million heat pumps would mean avoiding more than 80 million tonnes of CO₂ emissions annually (more than emissions of Greece or Austria), contributing around 4 percentage points to the overall 55% emission reduction target by 2030.

Factors affecting adoption

Understanding the mix of drivers that improve the affordability and uptake of heat pumps across Europe enables effective decision-making that mitigates the challenges and creates the conditions for increasing adoption. A combination of three drivers plays the main role:

1. Well-managed electricity pricing policies,
2. good quality support schemes, and
3. effective regulation.

1. Energy prices

Energy price is the most visible driver of heat pump adoption. In countries where electricity is expensive, consumers are not confident in switching to heat pumps as a heating source. This is especially true for those in danger of energy poverty. In these cases, residential users will stick to gas boilers or choose biomass-based heaters instead. To motivate people to buy heat pumps, a quick return on their investment needs to be ensured, meaning the operating costs of heat pumps need to be lower than those of gas boilers. The operating cost can be expressed as “electricity-to-gas price ratio”⁷.

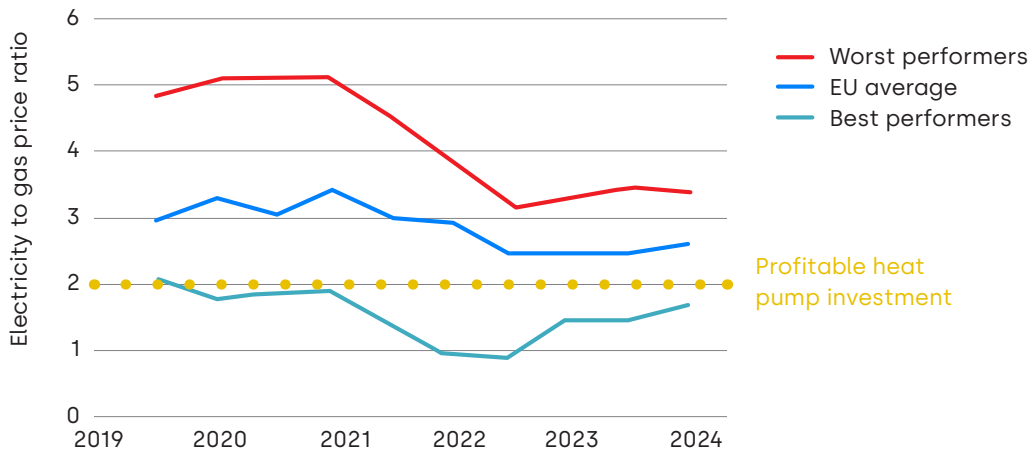
Studies show that heat pump investment becomes economically attractive if the ratio stays below 2, i.e. the cost of electricity should be no more than twice the price of gas.

⁷ Electricity-to-gas price ratio is a comparison of the price of electricity to the price of gas, calculated by dividing the price of electricity by the price of gas.

The turbulent evolution of electricity and gas prices over the past few years (increase started in 2021, followed by unprecedented gas price spikes in 2022, then a decrease in 2023) coupled with the policy response of the EU improved conditions for heat pumps. The EU average ratio went down to 2.5 (from 3.5 in 2021, see the graph below). **Despite the improvement, the ratio is still too high to be entirely favourable for heat pumps.** Moreover, starting in 2024, the ratio trend has started to turn upward again (see end of the blue line on the graph below), which worsens market conditions for end users.

Additionally, looking at national data, it is clear that the spread between best and worst performing European countries is high (red and green lines), with the best performers already providing attractive market conditions for mass heat pump deployment (ratio stays below 2).

Graph 2. Electricity to gas price ratio (households): best and worst performers vs. EU average



Source: Eurostat.

How to read the graph: The "best performers" represent the average performance of the three EU countries with the lowest electricity-to-gas price ratios over the given period, according to Eurostat data (excluding the countries with data gaps). They are Sweden, the Netherlands and Bulgaria. The "worst performers" represent the average performance of the three EU countries with the highest electricity-to-gas price ratios over the given period, according to Eurostat data. They are Belgium, Germany and Latvia.

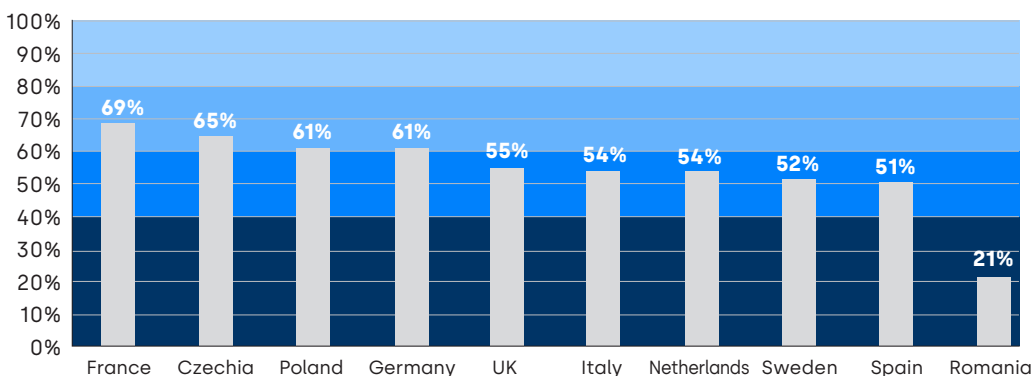
2. Quality of support schemes

Well-crafted support policies are essential for dynamics, i.e. scaling up the market, but often these miss their goal. In October 2024, **we analysed 10 European markets⁸**, revealing policy gaps that could slow the transition to clean heating. We ranked the 10 countries⁹ based on the cumulative score for multiple support measures. The results show that none of the 10 countries had sufficiently robust policies focused on heat pumps.

⁸ The report examines the quality of policies in Germany, France, the UK, Italy, Poland, Spain, the Netherlands, Romania, Czechia and Sweden – countries that together account for 81% of the combined EU and UK household energy demand.

⁹ Ranking results are based on the state of national policies as of October 2024.

Graph 3. Heat pump policies – country scores

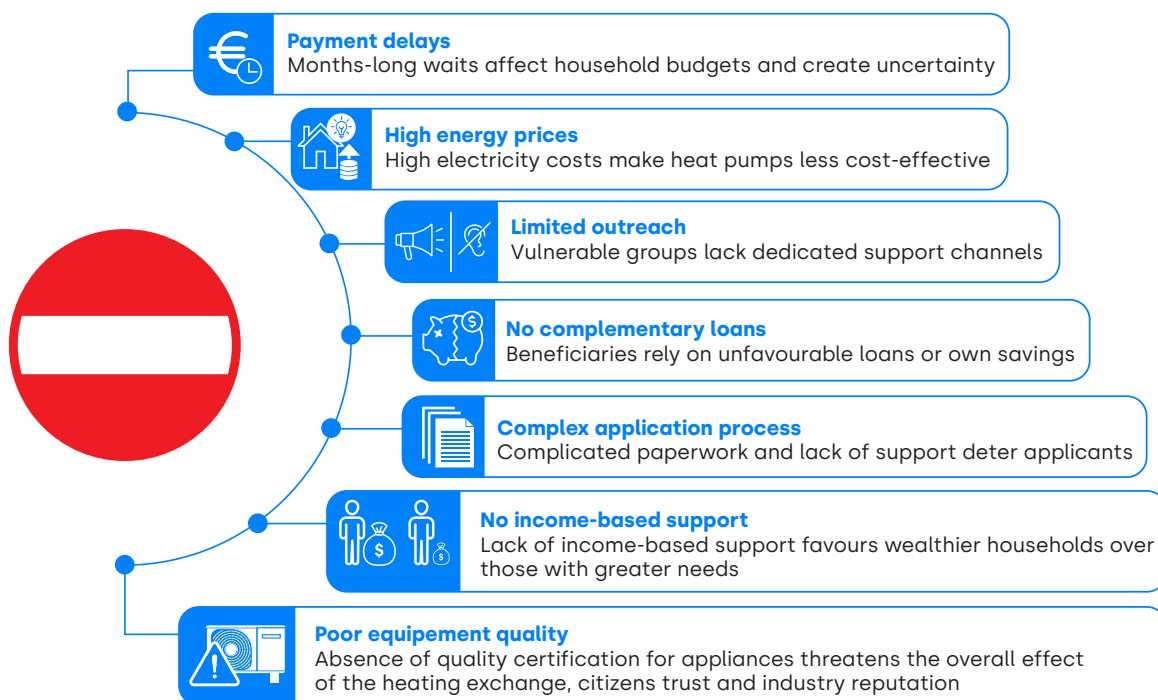


- Robust
- Flawed
- Deeply flawed
- Absent

Source: Reform Institute. According to the report, the policies in the majority of countries (9 out of 10 countries) were categorised as either 'Flawed' or 'Deeply Flawed'. France led with a score of 69% due to a comprehensive and generous support scheme with guidance from an adviser. However, the scheme proved to be too complicated, which discouraged beneficiaries.

Each country has its own set of shortcomings, but many of the problems identified are common to all the markets analysed. The comparison of policy mixes in the reviewed countries showed no clear divide between north and south, west and east, or lower- and higher-income countries. Having a strong heat pump policy is a choice and is not dependent on the economic situation. For example, despite having similar potential, the market for heat pumps in Poland and Czechia is developing, whereas in Romania it is not. At the same time, common challenges are seen across Europe, as summarised in the infographic below. Please find solutions and good practices responding to these concerns in Annex 2.

Graph 4. "7 deadly sins" of heat pump support schemes



Source: Reform Institute.

3. Effective regulation

Regulations, both national and European, play an important role in the uptake of heat pumps. Stable, coherent and long-term regulatory frameworks are key to ensuring the decarbonisation of all sectors, with the buildings sector being one of the most challenging and costly in terms of emissions reduction. Changing heat sources and improving energy efficiency in residential buildings is an individual decision for owners – without clarity and predictability in the regulatory environment, it will simply not happen. With the EU's Fit for 55 package now in the implementation phase, Member States are creating national instruments that will guide the financial and investment decisions of millions of people for years to come. These instruments need to be coherent and consistent, e.g. the National Building Renovation Plans being prepared now by Member States need to take into account all other strategies that support heat exchange and mitigate social costs, as well as their targets and KPIs. Targets need to be set and executed to provide citizens with a trusted landscape.

Ways to improve affordability for citizens

The EU and Member States can still implement alternative measures to enhance the affordability of heat pumps.

What can Member States do?

- **Shift taxes and levies away from electricity bills**
- **Introduce dedicated heat pumps tariffs**
These allow heat pump users to benefit from cheaper energy at specific hours of the day or times of the year, while at the same time helping to stabilise the power system by shifting the peak in electricity demand.
- **Implement the Fit for 55 package in a timely manner**
Member States are now transposing revised elements of the package into national legislation – timely and robust implementation of the European legislation agreed in 2023/2024 will determine the pace of heat decarbonisation.

What can the EU institutions do?

- **Adjust EU rules to shift taxes and levies away from electricity bills**
- **Provide guidance to Member States on improving support schemes**
The newly launched Heat Pump Accelerator Platform is a positive example of an existing space for stakeholder exchange and data-driven discussion¹⁰. The Accelerator should also include discussion on harmonising and adjusting support schemes for citizens.
- **Reform energy market rules to incentivise heat electrification and decarbonisation**
EU energy market design (EMD) guided by Energy Market Regulation and Energy Market Directive¹¹ should adjust tariff rules to incentivise heat pump uptake (mirroring best national practice) while rewarding heat pumps for providing flexibility to the energy system.

¹⁰ See the Accelerator Platform website [here](#).

¹¹ Both documents were revised in 2024, as part of Fit for 55 package and Green Deal Industrial Plan. See more [here](#).

EU initiatives under new mandate should maintain momentum

As Member States strive to create favourable conditions for heat pumps nationally, the variety of solutions employed does not guarantee the achievement of common European emissions reduction targets. There is still room for improvement at EU level. The current European policy landscape for decarbonisation of the buildings sector – and thus for heat pump adoption – is shaped by two major elements of the Fit for 55 package: the revised Energy Performance of Buildings Directive (EPBD) and the revised Energy Efficiency Directive (EED), both of which set clear targets for emission reduction and measures to phase out fossil fuels from heating. In order for these to bear fruit, more support is needed.

1. New strategies to boost coordination and harmonisation

The long-awaited EU Heat Pump Action Plan has never been published, despite two rounds of calls for evidence in 2023¹². According to the announcements made in 2024, two new flagship strategies will now set the direction:

- the **Electrification Action Plan**, which aims to boost renewables and electrification across sectors and is to be published within the first 100 days, and
- the **Action Plan for Affordable Energy Prices**, which will focus on faster roll-out of competitive clean electricity by removing barriers and bottlenecks, lowering system costs and increasing energy efficiency.

Both strategies offer a chance to provide targeted solutions to problems identified nationally and to boost cooperation. Lastly, the **European Affordable Housing Plan** could have an impact on the heat pump landscape and market evolution, although the link here is less direct. Furthermore, the new European Commission could propose a revision of the **Heating and Cooling Strategy** (dating back to 2016), to adapt the document to the current reality and provide a more systemic perspective on decarbonisation across sectors.

2. Finalisation of the Energy Taxation Directive

EU action is needed on reforming the Energy Taxation Directive to adjust energy taxation rules to the current reality, as proposed under the Fit for 55 package. This outdated regulation, going back to 2003, continues to favour fossil fuel consumption by setting minimum tax rates far too low for fossil energy carriers vs. electricity (as noted by the Commissions' own evaluation¹³), offering a wide list of exemptions to polluting activities. To support heat pump roll-out and affordability, rules need to shift the burden from clean to polluting energy carriers and create sufficient incentives for investment. Despite the attempts of a few consecutive EU Presidencies in 2023 and 2024 to agree on the reform, the discussion is stalled by a small number of Member States. As the sole legislator on taxation matters, the European Council should agree on the reform immediately.

3. ETS2 as a test of EU policy credibility

There are also new challenges ahead: the introduction of the ETS2 system, foreseen for 2027, will impact the heating bills of Europeans. On the one hand, the higher relative cost of fossil fuels will create an incentive to switch to zero-emission technologies, thus triggering emission reductions. On the other hand, the financial burden of the switch for some households may exceed their willingness or ability to contribute to common climate policy, and social and economic challenges are likely to arise, particularly for vulnerable groups who may face a disproportionate increase in costs. Despite these difficulties, the EU should avoid backsliding on this policy, as this could have a detrimental impact on future climate action ambition and the general credibility of EU policymaking. To respond to the concerns of the most impacted Member States, a potential temporary correction of price controls could be considered.

¹² See the information on the initiative [here](#).

¹³ See 'Evaluation of Energy Taxation Directive' [here](#).

Recommendations for the European Commission

1. Complete the regulatory framework and avoid backsliding on agreed provisions

- Assist Member States to break the deadlock on finalising the Energy Taxation Directive reform, making sure it provides incentive for electrification.
- Avoid delaying the introduction of the ETS2 system.
- Revamp the Heating and Cooling Strategy, to ensure system integration and structural support for heat pumps.

2. Support the implementation of existing directives and targets

- Monitor the development of Member States' clean heating and cooling targets under the Renewable Energy Directive (supported by action plans), with the aim of adding voluntary top-ups to contribute to the 45% EU-wide target for increasing the share of renewable energy in heating and cooling, in particular with heat pumps.
- Ensure the timely implementation of the EPBD, EED and EMD and other elements of the Fit for 55 package by Member States using procedures such as European Semester.

3. Ensure adequate financing

- Make electrification, including heating electrification, one of the infrastructure priorities for the next Multiannual Financial Framework (MFF) 2028-2034.
- Ensure financial means are available to support the new strategies (Clean Industrial Deal, Electrification Action Plan), taking into account all available revenues from the ETS system (including ETS2).
- Incentivise European heat pump manufacturing via the Clean Industrial Deal.

Recommendations for Member States

1. Synchronise all provisions relating to buildings decarbonisation to ensure effectiveness

- Use National Building Renovation Plans (NBRPs)¹⁴ as a tool to coordinate all national policies impacting buildings decarbonisation, i.e. National Energy and Climate Plans (NECPs), setting of clean heating and cooling targets (RED), and the comprehensive translation of data to NECPs.
- Implement heat pump tariffs and dynamic electricity pricing to ensure better integration of heat pumps with the energy system, lowering associated bills and total system costs.

¹⁴ The first draft of which is due by 31 December 2025, with the final plan due by 31 December 2026.

2. Leverage Europe-wide frameworks

- Deliver unanimous support to the Energy Taxation Directive reform as Council members.
- Seek cooperation with other Member States in the European forum to address the barriers preventing heat pumps uptake.

3. Improve national support schemes for heat pumps

- Create long-term support schemes with ensured budgets. Address the failures in existing national support policies to help scale demand.
- Implement existing Ecodesign rules and ensure the timely national adoption of the Ecodesign for Sustainable Products Regulation (ESPR) working plan.

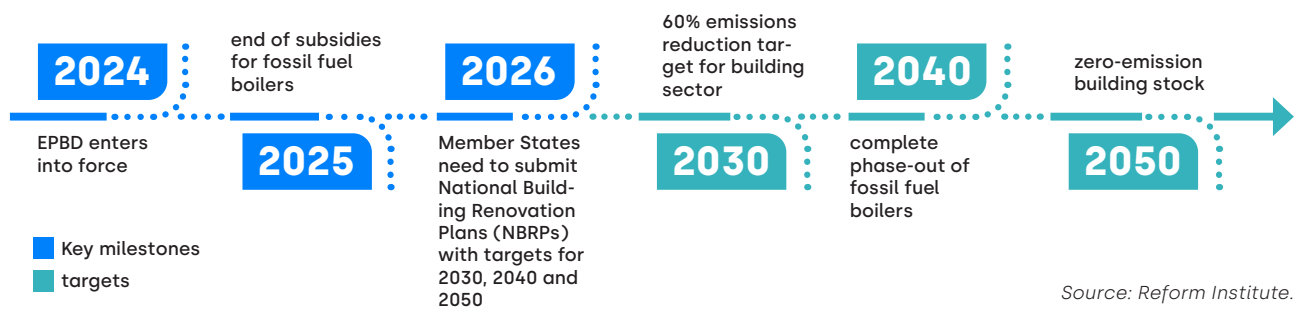
More details and good policy practices can be found in our “European Heat Pump Policies Ranking” [report](#).

Annex 1: EU regulations affecting heat pump adoption

Below we present the key elements of the revised Fit for 55 package and other binding EU regulations that impact heat pumps and the buildings decarbonisation landscape.

- The **Energy Performance of Buildings Directive (EPBD)**, which entered into force in 2024, sets a 60% emissions reduction target for the buildings sector between 2015 and 2030, and aims for a zero-emission building stock by 2050. The Directive also puts an end to subsidies for the installation of stand-alone fossil fuel boilers as of 2025 and requires Member States to draw up a plan to phase them out completely by 2040.
- An important milestone stemming from the EPBD revision is the need for Member States to prepare and submit **National Building Renovation Plans (NBRPs)**. Draft versions are due by December 2025 and final versions by the end of 2026. These plans should include quantifiable indicators and national targets for 2030, 2040 and 2050 for building renovation (as set out in the template attached to the Directive). Such a precise analytical approach to building stock and its energy efficiency improvement should (in principle) have a positive impact on heating sector decarbonisation planning and, as a result, on heat pump demand.

Graph 5. Key milestones and targets stemming from EPBD and other EU regulations



- The **Energy Efficiency Directive (EED)** recast has set an annual renovation target of 3% for public buildings to meet the new zero-emission building (ZEB) standard. This may create additional demand for heat pump installations which are consistent with the ZEB standard.
- The **Renewable Energy Directive (RED)**, revised in 2023, sets an indicative 49% target for renewable heating in buildings by 2030 and requires Member States to increase the share of renewable energy in the heating and cooling sector by at least 1.1 percentage points annually (2026-2030). Those provisions should strongly stimulate the demand for heat pumps in the residential sector.
- The **Net Zero Industry Act** recognises heat pump technology as one of the key technological areas of green manufacturing development in the EU.
- The **Ecodesign for Sustainable Products Regulation (ESPR)**, which is tied to the 2020 Circular Economy Action Plan, aims to advance a circular, sustainable and competitive economy. The first **ESPR working plan**, set for adoption in early 2025, will span at least three years and focus on improving appliance energy

efficiency, reparability, recyclability and lifespan to lower the lifecycle carbon footprints of products. The regulation will ensure appliances present on the EU market (including those manufactured outside the EU, which is important as Chinese heat pumps are becoming increasingly popular in Europe), remain functional beyond their warranty, with repair prioritised over replacement. Reducing energy consumption, which is critical for heat pumps and heating sources, is a core Ecodesign objective. An important element of the ESPR will also be the introduction of the EU's Digital Product Passport (DPP). The aim of the DPP is to increase transparency throughout the product value chain by providing comprehensive information on the origin, materials, environmental impact and disposal recommendations of each product. **Energy labelling** review for local space heaters is expected in the new legislative term of the European Commission, including labelling for heat pumps. The main objective of the review is to improve energy efficiency, reduce CO₂ emissions and air pollution, while protecting consumers and easing comparison across different product types. The possible impact of a revised regulation is the introduction of a revised energy label scale which will unify the labelling across different product types (heat sources vs. household appliances). Consideration will also be given to the potential expansion of labelling to cover electric local space heaters and air-to-air heat pumps. Furthermore, the inclusion of details about **low global warming potential (GWP)** refrigerants for heat pumps (e.g. natural refrigerant R-290, which is propane) will be explored, along with various label designs that reflect these considerations.

- The aim of the **F-Gas Regulation** is to reduce emissions of fluorinated greenhouse gases (F-gases), which are used in refrigeration equipment, including heat pumps. F-gases will be phased out completely by 2050. For new heat pumps, the phase-out of F-gases will take place by 2032 for small monoblock heat pumps and air conditioners (<12kW) and by 2035 for split air conditioners and heat pumps, with earlier deadlines for some types of systems. From 12 March 2025, the export of stationary refrigeration, air conditioning and heat pumps containing or relying on fluorinated greenhouse gases with a GWP of 1,000 or more will be prohibited, and from 1 January 2026, the use of fluorinated greenhouse gases with a GWP of 2,500 or more for maintenance or servicing will be prohibited¹⁵. The objective is to make refrigerants more environmentally friendly, which will influence the need for further development of heat pump technology.

¹⁵ The refrigerants currently used in heat pumps have much lower GWPs, e.g. R32 has a GWP ≈ 675, or natural refrigerants such as propane (R290) has a GWP ≈ 3.

Annex 2: Flaws in the support schemes for heat pumps and possible solutions

Long Waiting Times for Payments – beneficiaries often wait months for financial support.

- **Example of a problem:** significant delays observed in Germany and Poland.
- **Example of a solution:** the automatic deduction of the amount of the subsidy from the invoice – applied in Sweden and the UK.

High Electricity Prices – the electricity-to-gas price ratio undermines heat pump cost-effectiveness.

- **Example of a problem:** the UK has one of the highest energy prices in Europe.
- **Example of a solution:** a gradual shift of tax burden from electricity to gas – encouraged a fuel switch in the Netherlands¹⁶; dedicated heat pump tariffs – becoming available in Germany, the UK and Czechia.

Inadequate Outreach and Support to Vulnerable Groups – subsidies rarely link to income levels and progressive rates are uncommon.

- **Example of a problem:** despite the high popularity of heat pumps in Sweden, the Swedish system still struggles to eliminate oil boilers used by the most vulnerable consumers.
- **Example of a solution:** ensuring households with lower incomes receive more support – as in Germany, France and Poland; a range of complementary loan options – as offered in Germany.

Equipment Quality Concerns – quality certificates for heat pumps are rarely required or recognised and lists of approved equipment often overlook European quality certifications.

- **Example of a problem:** issues in Poland have occurred with dishonest installers exploiting pre-financing schemes.
- **Example of a solution:** requirement of a quality certificate and an energy performance certificate for the building both before and after renovation – applied in Spain.

Burdensome Application Processes – complicated procedures deter potential applicants.

- **Example of a problem:** France offers generous support but sees low participation due to red tape.
- **Example of a solution:** paperwork completed by the heat pump installer – applied in the UK, Italy and Sweden; use of online chat to answer applicants' questions – applied in the Netherlands.

¹⁶ The climate agreement has mandated a gradual increase in gas taxes and a decrease in electricity taxes by 2026, encouraging a shift away from natural gas. According to the Eurostat data for the first half of 2024, the electricity-to-gas price ratio in the Netherlands was 1.66.

