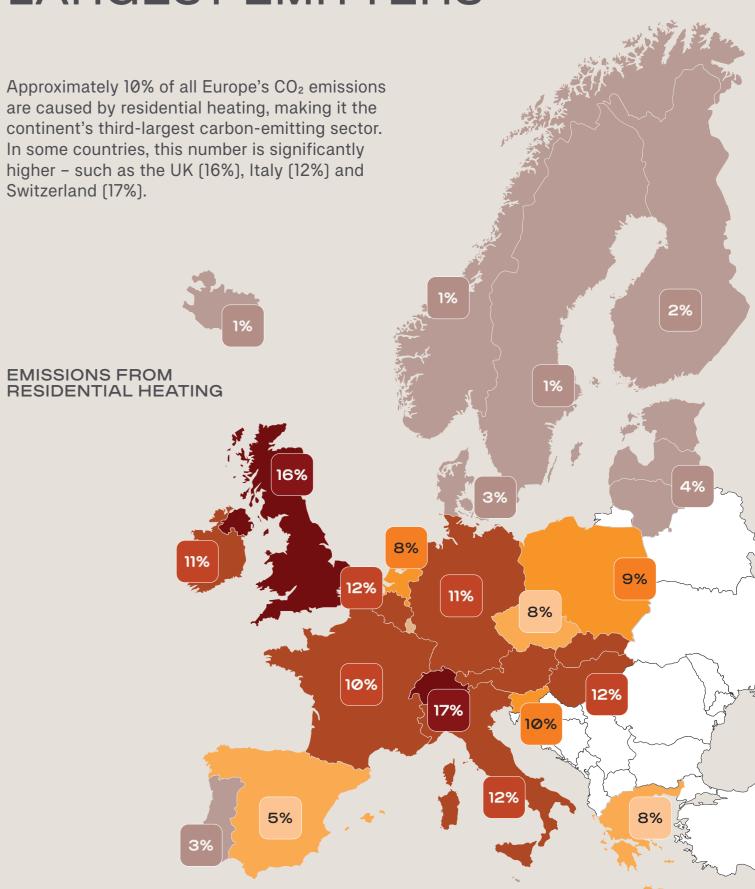




RESIDENTIAL HEATING, ONE 03 OF EUROPE'S LARGEST EMITTERS 05 AIRA 06 **OUR SOLUTIONS** 07 BENEFITS OF A HEAT PUMP 08 **HOW A HEAT PUMP WORKS** 10 EUROPE, IT'S TIME TO MAKE THE SWITCH 13 **LEARNING FROM SWEDEN** 16 **UNITED KINGDOM** 21 **GERMANY** 26 **ITALY** 30 THE TIME TO ACT IS NOW

RESIDENTIAL HEATING, ONE OF EUROPE'S LARGEST EMITTERS



Heat pumps are a proven technology that can effectively replace traditional heating systems. Powered by thermal energy and electricity, they are not only more sustainable but also cost-effective.

About 130 million¹ fossil-fuel-burning boilers are currently heating homes across Europe and, with a new boiler installed every eight seconds,² Europe risks ongoing reliance on foreign gas imports for heating, jeopardising its climate goals outlined in the Paris Agreement.

Heat pumps are a proven technology that can effectively replace traditional heating systems. Powered by thermal energy and electricity, they are not only more sustainable but also cost-effective. This has been demonstrated in Scandinavia, where, over the last 30 years, clean-energy alternatives like heat pumps have become the norm. With renewable energy claiming more and more of the electricity mix in Europe, there's an opportunity to completely decarbonise heating through electrification.

However, unlike Scandinavia, the majority of Europe have not seen the widespread adoption of heat pumps. There are various reasons for this, including high upfront costs, artificially low gas prices, low awareness and a lack of urgency to decarbonise one of Europe's highest emitting sectors.

Policymakers across Europe have a responsibility to promote and foster a more sustainable and affordable home heating industry. Continuing to support heat pump technology with consistent policies and forward-thinking measures, like making clean heating solutions more economically attractive, is crucial. By doing so, policymakers can create a strong market for heat pumps, which will yield a host of consumer benefits across Europe, including decarbonisation, job creation, energy independence and lower energy costs.

This playbook sets out Aira's perspectives on policies that can increase heat pump adoption and get Europe off gas for good.



Aira is a Swedish clean energy-tech company that aims to accelerate the electrification of residential heating with intelligent clean energy-tech solutions.

With heat pumps at the heart, Aira is helping facilitate a net zero future by providing consumers across Europe with a one-stop-clean-energy-shop for all their home energy-saving solutions. Aira's vertically integrated model, combined with a low monthly payment plan, makes owning a heat pump more accessible for millions of homes across the continent. Aira's mission is to empower individuals to join the clean energy revolution and take Europe off gas one home at a time.

Aira currently operates in five markets, with commercial operations in Italy, Germany and the UK; a manufacturing facility in Poland and an HQ in Sweden. With over 1200 employees and counting, Aira is set to be Europe's number one direct-to-consumer brand for clean-energy solutions. In the next 10 years, Aira's aim is to serve 20 markets and 5 million customers with heat pumps and grow their ecosystem of products.





MARKET LEADER BY 2034

Countries served

20+

Homes switched

5M+

Cars off streets (equiv)



OUR SOLUTIONS

WHOLE-HOME EFFICIENCY **SOLUTIONS**

Aira's clean energy-tech solutions are built to be futureproof and the Aira Heat Pump launched in 2024 to join Aira's already extensive home efficiency offering. That portfolio is set to expand further to provide homes with a whole-home clean energy-tech ecosystem, complete with dynamic electricity tariffs, solar power systems, battery storage, an energy hub and EV chargers.

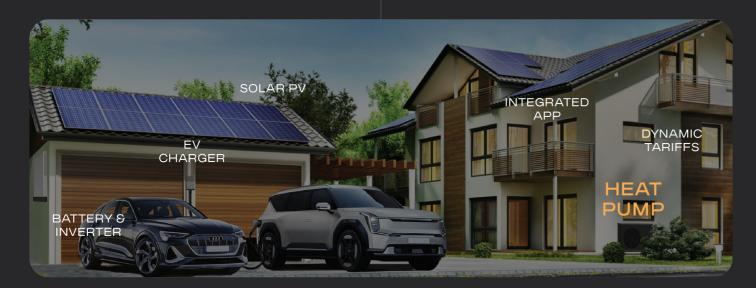
With Aira's complete clean energy tech-ecosystem, consumers will have the opportunity to utilise electricity generated by their home solar power systems, strategically store their surplus solar energy during periods of low demand in a battery and subsequently sell it back to the grid or use it themselves during peak hours. This can help individuals save up to 55% on their energy-related costs.

SMART HEAT PUMP TECHNOLOGY

Heat pumps are an impactful and effective solution for decarbonising residential heating. By replacing 30% of Europe's boilers with heat pumps, 120 megatonnes of CO₂ could be removed from the atmosphere. This is the equivalent of removing 78 million cars from our roads, amounting to 30% of all cars in Europe.3

Being four times more efficient than natural gas boilers,4 heat pumps have long been recognised as a highly efficient alternative to oil and gas boilers. They consume 75% less energy to create the same indoor environment, whilst reducing home CO2 emissions by 75% (rising to 100% when using renewable electricity). This efficiency results in a 40% decrease in heatingrelated costs for the consumer* compared to a traditional gas or oil boiler.

While heat pumps are uncommon in much of Europe, the good news is that over 100 million homes across the continent are currently heat pump ready. This means that much of the infrastructure is already in place for these energy-conscious pieces technology to begin reducing Europe's carbon emissions.



3 Eurostat: Passenger cars in the EU 4 IEA. (2022). "The Future of Heat Pumps." * total cost of ownership over 20 years

BENEFITS OF A HEAT PUMP

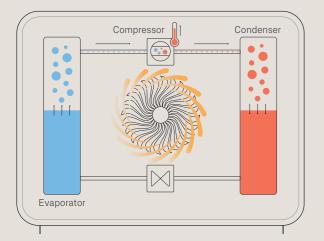
Reduces CO₂ emissions Reduces energy consumption Reduces heating costs Easy to install Provides a cosy indoor temperature Proven technology Long lifespan (over 18 years) Requires no lifestyle changes

100% 40% 4X

less CO₂ than a boiler when using renewable electricity

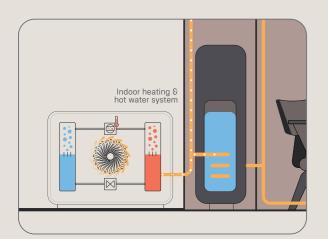
decrease in heating expenses over 20 years more efficient than a boiler

HOW A HEAT PUMP WORKS



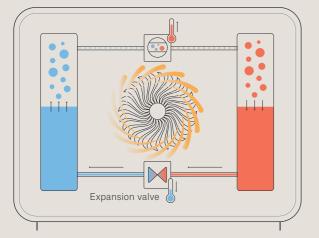
Step 1

The outdoor unit of the heat pump system draws in the surrounding air using a fan. This air passes over an evaporator, where the air's natural heat is absorbed by a refrigerant. The refrigerant, now in a gaseous state, is then compressed by a compressor, raising its temperature.



Step 2

The hot gas from the compressor travels into a condenser, where it transfers its heat to the water in the heating and hot water system. As it releases its heat, the refrigerant condenses back into a liquid.



Step 3

The now-liquid refrigerant passes through an expansion valve, where its pressure is reduced. This causes the refrigerant to cool down before it re-enters the evaporator to repeat the cycle.



EUROPE, IT'S TIME TO MAKE THE SWITCH

The European Green Deal sets out the aim to make Europe climate-neutral by 2050. There are, however, significant differences in how countries are attempting to reach this target. While some have introduced large-scale district heating or smart schemes to make heat pumps more accessible for consumers, others are still replacing fossil fuel boilers with the same old technology.

Switching to a heat pump is one of the most impactful choices an individual can make to reduce their impact on the planet without altering their lifestyle. Not only that, but households also save money on their home energy costs by throwing out their old gas or oil boiler for a heat pump.

EU27 RESIDENTIAL HEATING

324.7

megatonnes of CO2e [2021]

10%

of CO2e total net emissions

40%

of residential buildings still use gas5

20 MILLION

heat pumps installed in Europe (approximately 16% of residential buildings)⁶



If the EU Heat Pump Action Plan is enforced, it could slash Europe's energy import bill by €60 billion by 2030 and slash CO₂ emissions from heating and cooling residential buildings by 46% by the end of the decade.¹⁰

TURN UP THE HEAT PUMP ACTION PLAN

The REPowerEU plan aims to triple the number of new heat pump installations each year, leading to an estimated total of 60 million heat pumps installed in the EU by 2030.7 For this to become a reality, uptake needs to accelerate and the European Commission must put more resources into the EU Heat Pump Action Plan to put Europe on track for energy independence and net zero.

40 MILLION HEAT PUMPS MISSING TO REACH 2030 TARGETS

Even with the current electricity generation mix in Europe, heat pumps have prevented 54 megatonnes of CO₂ from entering Earth's atmosphere. This reduction is roughly the equivalent to the annual greenhouse gas emissions of Greece.⁸

However, the current rate of deployment is too slow. Heat pump sales in the first half of 2023 declined compared to the previous year, partly due to unfavourable electricity-to-gas price ratios and ongoing tax incentives for fossil fuels. These obstacles, compounded by the postponement of the Heat Pump Action Plan until after the EU elections in mid-2024, significantly impede the deployment of heat pumps necessary to achieve the REPowerEU targets.

If the EU Heat Pump Action Plan is enforced, it could slash Europe's energy import bill by €60 billion by 2030 and slash CO₂ emissions from heating and cooling residential buildings by 46% by the end of the decade.¹⁰

THE ELECTRIC REVOLUTION

Electricity is illuminating the path towards Europe's energy future. We are, in many ways, already seeing this shift with the uptake of electric cars and the emergence of heat pumps in Scandinavian countries. The electric revolution has already begun, but is the electricity market ready for it?

In 2021, electricity made up 23% of the EU's final energy demand. This share is projected to increase to 30% by 2030 and 50% by 2050.11 This shift will require more energy and, ultimately, more renewables. However, in 2021, only one-third of the average retail price of electricity was attributed to the actual cost of producing electricity, with the remaining two-thirds consisting of taxes.12 This discrepancy in pricing is further compounded by varying taxes and tariffs within the electricity market, leading to significantly volatile electricity costs for consumers.

7 EHPA. (2023). "EU Heat Pump Accelerator."

8 EHPA. (2023). "European Heat Pump Market and Statics Report 2023."

10 ECF & EHPA. [2023]. "Europe's Leap to Heat Pumps: The Socio-Economic and Climate Benefits Unlocked by a Fast Heat Pump Roll-Out."

11 https://www.bruegel.org/policy-brief/europes-under-radar-industrial-policy-intervention electricity-pricing

12 https://www.bruegel.org/policy-brief/europes-under-radar-industrial-policy-intervention-electricity-pricing

If electricity prices are reduced and incentives to buy clean energy-tech are increased, it's clear to see that heat pumps can not only help consumers save money on their energy costs but drastically reduce Europe's CO₂ emissions.

POLLUTERS DON'T PAY THE PRICE

The difference between the cost of electricity and the cost of the natural gas needed to produce that electricity – otherwise known as the spark spread – is negatively impacting the uptake of clean energy-tech across Europe.

To take Europe off gas, we need to stop subsidising gas and ensure that the environmental impact of gas emissions is accurately reflected in the costs of residential heating. In certain countries, like the UK, the price of electricity is 4.3 times higher than that of gas, largely due to environmental taxes and levies targeted solely on electricity. This pricing structure unfairly penalises electricity consumption in favour of gas and undermines the efforts to prioritise cleaner energy sources.

For the switch to low carbon-heating to be more economically advantageous for a consumer, the spark spread should be as low as possible. In the current market, where fossil fuels are made artificially cheaper than electricity, consumers' potential savings from switching to a heat pump are reduced.

The extension of the emissions trading system (ETS 2.0), slated for implementation in 2027, mandates fuel suppliers to purchase and surrender allowances to cover the greenhouse gas emissions from the heating and cooling of buildings. While this marks a positive stride in the right direction, the tangible impact of such a carbon pricing mechanism is yet to be determined.

THE SMART CHOICE

Even with current fossil fuel prices, heat pumps are cost competitive. On average, a heat pump is 30% less expensive to run over its lifetime compared to a fossil fuel boiler. In 2022, European households that switched from a gas boiler to a heat pump experienced average annual savings of \$900 (USD). In These savings could be increased by reducing taxes and levies and redirect various subsidy programs currently supporting fossil fuel heating towards households adopting renewable heating systems.

A heat pump is already four times more efficient than a traditional gas boiler and require significantly less energy to produce the same amount of heat – about 75% less. If electricity prices are reduced and incentives to buy clean energy-tech are increased, it's clear to see that heat pumps can not only help consumers save money on their energy costs but drastically reduce Europe's CO₂ emissions.

Several European countries have implemented subsidies and incentives to encourage the adoption of heat pumps in residential properties, and the results have varied.

13 https://europeanclimate.org/wp-content/uploads/2023/04/heat-pumps-summary-report-ehpa-ecf.pdf

14 IEA. (2022). "The Future of Heat Pumps."

LEARNINGS FROM SWEDEN

Despite being renowned for being in the coldest and darkest corner of Europe, Nordic countries have been using heat pump technology to heat homes for decades. Sweden is one of these Nordic countries where heat pumps are the norm, but it was not always this way.

During the oil crises in the 1970s, the Swedish government took action to ensure the country was more resilient to external market shocks by becoming more energy independent. Sweden achieved this by focusing its efforts on research, implementing a competition-based procurement strategy and placing higher taxes on the fossil fuel industry. Consequently, as of 2022, 92% of new heating systems installed in Sweden were heat pumps. ¹⁵ Ultimately, the country became a global leader in the heat pump sector and CO₂ emissions caused by household heating decreased dramatically.

Aira's mission is, in part, fuelled by Sweden's success. If it worked in Sweden, what if the rest of Europe switched to heat pump technology?

SWEDEN RESIDENTIAL HEATING

0.62

megatonnes of CO₂e (2021).¹⁶

1.1%

of CO2e total net emissions

2 MILLION

heat pumps installed¹⁷ [60%¹⁸ of residential buildings]





invested by Swedish government towards heat pump research & development from 1975 to 2008



invested by Swedish government for subsidies supporting households to transition to heat pumps per year between 2006 to 2010 Since 1990, the use of fossil fuels for heating has decreased by more than 90% and the government has generated considerable revenues that have been reinvested back into the country.

STATE PROCUREMENT COMPETITION

In the late 1980s, the growth of heat pump technology slowed due, in part, to the falling price of oil. To boost interest and deployment, the governmental authority responsible for driving private sector development and regional growth launched a competition¹9.

Manufacturers competed to create heat pumps that could save energy and costs, incentivising the production of easy-to-install products that were environmentally friendly. The ultimate goal of this competition was to promote more efficient, reliable and affordable heating solutions for homes.²0 From 1975 to 2008, the Swedish government invested a total of €18 million towards research and development initiatives aimed at fostering growth in the heat pump industry.²1

SUBSIDIES FOR PRIVATE HOUSEHOLDS

To further accelerate the uptake of heat pumps in Sweden, a subsidy for private households to install heat pumps was reinstated in 2006. The subsidy was specifically targeted at the transition from an oil or electric resistance heating system to a heat pump or pellet burners in single-family homes. The Swedish government allocated 540 million SEK (~€45 million) per year between 2006 to 2010 to support this initiative. Each subsidy amounted to 10,000 – 14,000 SEK depending on the replacement option. As a result, there was a rapid increase in heat pump sales.²²

ENERGY AND CARBON TAXATION

The Swedish energy taxation system has reshaped the energy pricing landscaping, impacting the relative costs of different heating solutions. In Sweden, the energy tax and CO₂ tax are set strategically to fulfil multiple carbon policy goals. For example, in 1991, the Swedish government implemented a carbon tax targeting all fuels used in heat production and transportation. These taxes not only decreased CO₂ emissions but also incentivised the consideration of other issues like noise, congestion and road wear from traffic. Since 1990, the use of fossil fuels for heating has decreased by more than 90%²³ and the government has generated considerable revenues that have been reinvested back into the country.²⁴

The combination of subsidies and energy taxation has driven considerable change in Sweden's residential heating sector. In addition, individuals in Sweden currently receive a tax rebate equivalent to 30% of labour costs related to residential heating, up to a maximum of €5,000 per year.²⁵

COLLABORATION WITH ACADEMIA

As well as stimulating innovation and product development, the Swedish government has continuously invested in sector-specific programs managed by the Swedish Energy Agency.

Not only that, but since 2004, the Research Institute of Sweden (RISE) has hosted the Heat Pump Centre, serving as the management hub for the International Energy Agency's (IEA) global collaboration program focused on heat pump technologies. The centre plays a vital role in initiating and facilitating international research partnerships and conferences, while also providing authoritative and unbiased information about heat pump technology.

¹⁹ Nutek was closed in 2009, it's areas of responsibilities were absorbed into other

²⁰ Neii et.al 2008

²¹ Swedish Energy Agency, Sverige ledande på värmepumpar

²⁴ https://www.government.se/government-policy/swedens-carbon-tax/swedens-carbon-tax/#:-:text=Swedish%20carbon%20tax%20rates&text=The%20carbon%20tax%20was%20introduced,of%20SEK%2010.87%20per%20EUR).

²⁵ https://www.ehpa.org/wp-content/uploads/2023/03/EHPA_Subsidies-for-residential-heat-pumps-in-Europe_FINAL_March-2023.pdf

Residential heating is one of the UK's largest sources of CO₂ emissions. Despite the proven and clear benefits of low-carbon heating systems such as heat pumps, current energy taxation and pricing are a significant barrier to adoption.

The government's Net Zero Strategy aims to sell 600,000 heat pumps annually by 2028. However, existing legislation, which continues to promote gas and other fossil fuels, is not adequately facilitating the achievement of this goal. Approximately 55,000 heat pumps were sold in the UK in 2022.²⁶

UK RESIDENTIAL HEATING

65 megatonnes of CO₂e [2021].²⁷

16% of CO₂e total net emissions



Implement a green policy on short-term price caps for gas and electricity: A key goal should be for the spark spread to decrease and encourage efficient, low-carbon heating.

POLLUTERS DON'T PAY THE PRICE

In the UK, gas prices are artificially low compared to electricity. Despite the increase in renewables used to produce it, electricity has higher taxes and environmental levies imposed on it compared to gas.

The spark spread – the difference between the price of electricity and the price of fossil gas – is the worst in all of Europe (4.3x) even though renewable electricity generation in the UK has been steadily increasing. In the fourth quarter of 2023, it rose to 44.5%, marking the fourth consecutive quarter where renewables comprised a greater share of electricity production than fossil fuels.²⁹

Recommendation:

- Levies and taxes need to be shifted from electricity to gas bills: This would incentivise cleanenergy systems by enhancing consumer energy cost savings.
- A long-term outlook for consumers: Gas boilers last for 10–15 years, and heat pumps for over 18 years.
 As a result, consumers deserve long-term clarity on taxation and energy pricing of residential heating.
- Implement a green policy on short-term price caps for gas and electricity: A key goal should be for the spark spread to decrease and encourage efficient, low-carbon heating. By committing to this and communicating this to consumers, they can make informed long-term choices for their homes, the climate and their wallets.

IMPROVE THE EPC RATING SYSTEM

The single most impactful energy efficiency measure households can make is switch their fossil-fuel heating system to a clean-energy heat pump. While this change reduces energy consumption for heating by 75%, replacing a gas boiler with a heat pump currently offers only marginal improvement on the EPC rating scale. This is particularly noticeable when compared to other energy efficiency measures like solar panels and insulation, which, despite not reducing energy use to the same extent, show greater improvements.

Recommendation:

• Improve the EPC to reflect energy consumption per square meter: The EPC rating was designed to reflect the energy consumption/efficiency of a property. How the score is calculated should be clarified and more closely tied to the actual energy consumption per square meter. This would result in an easier-to-follow, and more transparent, EPC rating that benefits consumers and green technologies.

Heat pumps are going to be a necessity for almost every home in the future, and a crucial part of the electrification and decarbonisation of residential heating. Planning permissions should not be an obstacle to reaching climate goals. £7.5K

BUS grant makes heat pumps afforable for consumers but more needs to be done to achieve the 600,000 heat pump install target.

+5YRS

Aira Policy Playbook | 19

The BUS scheme should be extended by at least 5 years to ensure future funding.

EXCLUDE HEAT PUMPS FROM PLANNING PERMISSIONS

Installing a heat pump often requires planning permissions, and there are various rules and regulations around where you can place the outdoor unit of the system. Heat pumps are going to be a necessity for almost every home in the future, and a crucial part of the electrification and decarbonisation of residential heating. Planning permissions should not be an obstacle to reaching climate goals. Neither should sound restrictions, yet complicated sound calculations often need to be performed when a heat pump is installed. This is unnecessary given that a heat pump makes a similar level of noise to a home refrigerator 42 decibels.³⁰

Recommendation:

- Exclude heat pumps from planning permission requirements: Households may find themselves entangled in complicated and lengthy planning processes, including the sound assessment required by local councils (which can cost around £1,000). The UK government's proposed changes to permitted development rights will help the vast majority of consumers install a heat pump without going through the formal planning process.³¹
- Discard the 1-meter rule: The 1-meter rule is intended to mitigate noise, but it has proven to be overly restrictive. We suggest that the boundary be removed, and focus be re-directed towards restricting certain high sound levels.
- Abandon rules on size and numbers: The current limitations on heat pump sizes and numbers that fall under permitted development (planning permissions not required) pose a barrier for both households aiming to decarbonise and companies seeking to innovate their products.

"CONNECT AND NOTIFY" SHOULD REPLACE "APPLY TO CONNECT"

In many cases, installing a heat pump requires a household to "apply to connect" with the regional DNO (Distribution Network Operator) before it can connect the heat pump to the electricity grid. This is a very different procedure compared to the installation of a 10kW electric shower, electric radiators, or other appliances that use comparable amounts of electricity.

Aira supports the "connect and notify" process to ensure DNOs get all the information they need to plan for capacity. As most houses in the UK will need to install a low-carbon heating system in the near future, we need to erase lengthy and uncertain application processes with regional DNOs to accelerate this change.

Recommendation:

 "Connect and notify" should be the standard procedure: When installing a residential-size heat pump "connect and notify" should become standard and "apply to connect" should only be used if special conditions apply and/or if the heat pump is a certain size (for example, over 15 kW).

INCREASE GOVERNMENT INCENTIVES TO REDUCE EMISSIONS

The Boiler Upgrade Scheme (BUS) provides incentives for individuals wanting to switch their fossil fuel-based heating systems for a heat pump. This includes a £7500 grant for air source heat pumps and £6000 for ground source heat pumps. Aira supports the scheme and its continuation as it makes heat pumps for affordable for consumers in England and Wales. However, based on current trends, it is doubtful that this scheme alone will be sufficient to drive uptake and achieve the target of 600,000 heat pump installations per year by 2028.

The BUS is limited compared to other European markets with a higher heat pump adoption rate. Some European countries have chosen to introduce stronger incentives, both for an initial period and for low-income households, to drive early momentum and accessibility. For instance, Germany offers an extra 20% subsidy to households replacing systems older than 20 years, along with special incentives for low-income households.

Currently, funding for the BUS grant is set to end in 2028. To foster the development of efficient value chains, the industry requires long-term certainty, ideally spanning at least five years. This stability allows businesses to plan investments, streamline operations and drive innovation effectively. Long-term assurances and continuity are vital for establishing robust value chains that can support the widespread adoption of heat pump technology.

Furthermore, today's BUS requires the end-user to own the product to qualify for the grant. In the rest of Europe, this is not the case. Other models such as leasing or monthly subscriptions, where the company who installs and leases the product applies and gets the subsidy in its own name, should be applicable. These alternative ownership models are widely used across various markets to make high-cost products accessible to a broader population.

- Extend the BUS for at least 5 years: The scheme should be extended to ensure funding will still be provided in the future.
- Introduce additional incentives for low-income households: Aira recommends that the UK government offer low-income households (those earning less than £35,000 a year) an additional 50% in funding (£3,750).
- Introduce new business models to reduce emissions: The transfer of title should not be a requirement to qualify for the BUS. We believe that more innovative business models, such as subscriptions or leasing, could broaden the market potential and make low carbon heating accessible to more people.
- Incentivise other energy efficiency measures:

 Many British homes could greatly benefit from simple insulation upgrades. These improvements are most effective when combined with a heat pump installation. By adding insulation, homes can typically be heated more efficiently with a smaller, more cost-effective heat pump. To encourage homeowners to improve their home's energy efficiency, we suggest offering additional incentives for multiple measures. For instance, providing a subsidy of £1000 for loft, cavity wall, external wall or internal wall insulation when completed alongside a heat pump installation.
- Incentivise the installation of solar panels: Heat pumps can use the electricity produced by solar panels. By encouraging customers to install both technologies at the same time, uptake of solar panels and heat pumps would increase, further reducing energy costs and CO₂ emissions. An additional subsidy of £1000 for MCS-accredited solar installations in combination with a heat pump should be considered.

³⁰ https://assets.publishing.service.gov.uk/media/6582f532fc07f3000d8d45bc/Energy_

Although the deadline for halting the sale of new gas boilers remains slated for 2035, these delays raise concerns about the UK's ability to achieve its climate objectives outlined in the Net Zero Strategy

ACCELERATE THE GAS-BOILER PHASE OUT

In 2021, the UK government released a gas boiler ban strategy under the Heat and Buildings Strategy. The plan was divided into two distinct phases. The first phase included plans to phase out gas boilers in new homes in 2025, while the second phase included a plan to phase out gas boilers entirely by 2035.

However, in 2023, the government opted to push back the gas boiler ban in new constructions from 2025 to 2035. Similarly, the prohibition on installing oil, LPG boilers and new coal heating for off-gas-grid homes was postponed until 2035, deviating from the initial plan to phase them out in 2026. Although the deadline for halting the sale of new gas boilers remains slated for 2035, these delays raise concerns about the UK's ability to achieve its climate objectives outlined in the Net Zero Strategy.

- Set clear goals: It is currently unclear what will happen beyond 2035, and how the gas boiler ban will be fully implemented. Therefore, it is imperative for the government to establish transparent and achievable long-term targets beyond 2035, ensuring continued progress towards achieving their Net Zero Strategy objectives.
- No more delays: It is crucial for that no more delays occur and, ideally, the government re-evaluate their postponements. Any further delays risk undermining progress towards meeting their Net Zero Strategy objectives.





German government will cover up to 70% of the costs of new and sustainable heating systems, including heat pumps. However, recent subsidy cuts have led to uncertainty amongst consumers and a reluctancy to change to a more efficient heating system.

SUBSIDIES FOR HEAT PUMP INSTALLATION ARE ESSENTIAL

Currently, the German government will cover up to 70% of the costs of new and sustainable heating systems, including heat pumps. However, recent subsidy changes have led to uncertainty amongst consumers and a reluctancy to change to a more efficient heating system. While this scheme provides consumers with €3,000 less than under the former scheme, stability and maintaining the current government offering is crucial.

The current scheme covers up to 70% of the cost for installing a new sustainable heating system, with a maximum cap of €21,000. The scheme includes various bonuses that are available for eligible households:

Basisfördeung (30%)

This base subsidy is accessible to homeowners with properties older than five years who wish to install a new, eligible heat pump within the framework of the BEG funding guidelines.

Effizienzbonus (5%)

This bonus is granted if the heat pump uses a climatefriendly natural refrigerant or efficient heat sources such as geothermal energy.

Klima-Geschwindigkeitsbonus (20%)

This bonus applies when the heat pump replaces either a gas central heating system or a biomass heating system that is at least 20 years old. It also applies to the replacement of coal, oil, night storage, or gas floor heating systems, regardless of their age. The old heating system must be functional to qualify for the bonus.

Einkommensabhängiger Bonus (30%)

This bonus is granted if the taxable annual income of all relevant (adult) household members does not exceed €40,000.

AN EFFICIENT SUBSIDY PROCESS IS NEEDED

Despite the digitalisation of some of the subsidy application process, customers still encounter administrative difficulties when applying for subsidies for their heat pump installations.

Recommendation:

 Make subsidy schemes more accessible: The current scheme presents challenges for those who are not comfortable using technology, particularly older generations. To apply, individuals must have a KfW account and verify their identity online for payment purposes. For those who find the application process difficult, authorised representatives should be able to provide more support, or apply on their behalf.

BALANCING ENERGY PRODUCTION AND CONSUMPTION

In a renewable energy economy, it's crucial to balance energy production with consumption. Heat pumps can play a key role because they can store energy during windy and sunny periods. This stored energy can then be used during periods when energy production is low, such as at night or during calm weather conditions, ensuring a consistent and reliable energy supply.

To effectively utilise heat pumps as storage systems, intelligent tracking is essential. This involves the use of smart electricity meters and an energy management system. While many heat pumps are already "smart grid-ready", the deployment of smart meters has faced delays. As a result, we advocate for an expedited deployment in accordance with the "Gesetz zum Neustart der Digitalisierung der Energiewende" law, which was enacted at the start of 2023 to kickstart the digitisation of the energy transition.

Recommendation:

Enable smart technologies through legislation:
 Regulations mandating smart meters and future-proof energy technologies play a crucial role in advancing the transition to clean energy.

INCREASED TRANSPARENCY WILL DRIVE THE ENERGY TRANSITION

In the wake of Russia's invasion of Ukraine, energy prices have skyrocketed, particularly for imported gas. Given that many households depend on gas for heating and cooking, subsidies or temporary price freezes have been implemented as a stopgap measure. However, these measures offer only short-term relief and are not sustainable solutions to price escalations in the long run.

Recommendation:

Increase transparency and information on true prices:
 With subsidised gas, consumers are less aware of its
 true cost. It's important that consumers are provided
 with transparent information about real energy costs
 and are made aware of the broader implications of
 relying on subsidised gas prices.

3.8X

Electricity prices are 3.8 times higher than natural gas prices. We need a level playing field.

29.5%

Taxes, levies, and surcharges account for 29.5% of the cost of electricity.

The shortage of skilled workers is a major challenge in the clean-energy industry. To attract more individuals, we need to implement new working models and incentives, beginning with training programs.

POLLUTERS DON'T PAY THE PRICE

The pricing of electricity is a topic of significant debate, and for good reason. The spark spread, which refers to the gap between electricity and natural gas prices, stands at 3.8 times higher for electricity. This means consumers are paying nearly four times more for electricity compared to natural gas. The substantial difference in price is attributed to various factors including resource costs, distribution expenses and taxation. In fact, over half of the electricity price comprises taxes.

Electricity prices vary across different regions in Germany. On average, the composition of electricity prices is approximately as follows: taxes, levies, and surcharges account for 29.5%, grid usage fees for 28%, and procurement, distribution, and margin for 42.5%. With artificially low gas prices of 8 cents per kWh for new customers, many individuals end up paying more in taxes, levies and charges per kWh for electricity compared to gas in its entirety.

Recommendation:

 Levies and taxes need to be shifted from electricity to gas bills: Reducing taxes, levies, and surcharges on electricity prices is imperative to incentivise the transition to sustainable energy technologies like heat pumps.

STANDARDISE HEAT PUMP INSTALLATIONS

Ensuring ease of installation for heat pumps is essential for both consumers and businesses. However, current regulations categorise heat pumps as buildings, requiring a minimum distance of 2.5 to 3 meters from neighbouring properties. While some federal states have relaxed this regulation, discrepancies persist across Germany, posing challenges for installation.

Recommendation:

 Standardisation and transparency in the approval process: This would eliminate a key barrier for individuals to transition to sustainable energy technologies.

MAKE CLIMATE JOBS ATTRACTIVE

The shortage of skilled workers is a major challenge in the clean-energy industry. To attract more individuals, we need to implement new working models and incentives, beginning with training programs. The training model in the SHK (Sanitär-, Heizungs- und Klimatechnik, HVAC) sector is quite rigid, which discourages individuals who may not have the means to pursue further education. Currently, workers are required to undergo additional training after completing their apprenticeship in order to gain expertise in sustainable energy deployment.

Recommendation:

- Partial qualification: One way to lower the barrier for new talents would be to introduce partial qualifications (Teilqualifikation) that enable specialisation in specific areas, rather than requiring full vocational qualifications for individuals transitioning to new careers.
- Increase sustainable energy and heat pump education as part of SHK training: Revise the training programs to incorporate additional sessions on sustainable energy, particularly focusing on heat pumps. Given Germany's climate objectives, the emphasis should be on educating enough individuals to meet the demand in this sector.

ELIMINATE BUREAUCRATIC PITFALLS

By 2026, comprehensive "municipal heating planning" should be accessible in large cities, and by 2028 in smaller municipalities. It raises the question of whether it's essential for heat pump suppliers and consumers to be aware in advance if a heating network is planned for their area. Despite the absence of heat planning in most federal states, should local authorities accelerate their efforts, even if the law allows more time? We advocate for dialogue among energy suppliers, grid operators and heat pump manufacturers to expedite the transition.

Recommendation:

 The wording of the law on municipal heating planning is not clear: Currently, the requirement to replace heating systems is contingent upon the existence of a municipal heating plan. It's imperative to formulate laws with utmost clarity to avoid pitfalls or loopholes and expedite a clear municipal heating plan.

ACCELERATE THE GAS-BOILER PHASE OUT

In response to the energy crisis triggered by the Russian invasion of Ukraine, the German coalition government expedited the Buildings Energy Act (GEG), which came into effect in January 2024. This legislation mandates that 65% of the energy for all newly installed heating systems must come from renewable sources.

While this demonstrates Germany's commitment to clean energy, the mandate only applies to newly installed systems and includes several exceptions. Existing heating systems can remain operational, broken systems may be repaired and gas heaters that verifiably use renewable gases (such as biomethane, biogenic, liquified petroleum gas or hydrogen) can still be installed in existing buildings. The supply of hydrogen, in particular, is linked to municipal heat planning, which is not required until 2026 for large cities and 2028 for small towns. This leaves many consumers in uncertainty for several more years.

Overall, the reform of the Buildings Energy Act introduces complexity with its deadlines and transitional arrangements. The very gradual phase-out of gas and oil heating systems by 2045, the same year Germany aims to be climate-neutral, necessitates a 50% reduction in CO₂ emissions in the building sector by 2030. This raises concerns about whether Germany can achieve its climate targets set out in the Climate Action Program 2030.

Amidst this uncertainty, heat pumps emerge as a straightforward and effective solution for homeowners. Since they clearly fulfill the 65% renewable energy requirement, it is crucial that consumers are transparently informed about their benefits and encouraged to adopt this sustainable technology.

- Accelerate the phase-out of gas boilers: Efforts should be made to expedite the phase-out of gas boilers with policies that incentivise the installation of clean energy-tech. This will help accelerate the shift to cleaner heating solutions and ensure Germany meets its energy targets.
- Enhance public awareness and communication:
 Policymakers should intensify efforts and launch
 a widespread awareness campaign to inform the
 public about the funding programs and mandates
 set out in the Buildings Energy Act. While federal
 funding has significantly improved, a comprehensive
 communication campaign is necessary to educate
 consumers about the benefits and requirements of
 renewable heating systems.



Italy has committed to achieving carbon neutrality by 2050.³⁵ Despite strides in various sectors, residential heating still contributes nearly 12% to the country's emissions. Additionally, natural gas remains the primary energy source, ³⁶ comprising 60% of the energy used for residential heating.³⁷

While Italy has made progress in reducing its dependence on Russian natural gas imports,³⁸ achieving carbon neutrality requires further actions. This includes enhancing the overall thermal efficiency of buildings and transitioning to electricity and less energy – and carbon-intensive energy systems, such as heat pumps.

Indeed, integrated energy-efficient smart solutions for homes will play a pivotal role in Italy's journey towards achieving net zero emissions. These solutions will facilitate decentralised electricity generation and promote smart consumption practices, ultimately transforming the energy landscape.

Insightful research by Agici shows that Italy could save 100 billion cubic meters of natural gas and generate 95 bn€ in economic benefits by 2030, by simply replacing 60% of inefficient fossil based heating systems with heat pumps. The economic benefit generated would go up to 207 bn€ in case of a 100% renewable electricity grid.

ITALY RESIDENTIAL HEATING

50.4 megatonnes of CO₂e [2021].³⁹

12%

of CO2e total net emissions

19 MILLION

boilers installed (8% of residential buildings have a heat pump)⁴⁰



Integrated energy-efficient smart solutions for homes will facilitate decentralised electricity generation and promote smart consumption practices, ultimately transforming the energy landscape.

INCENTIVISE HEAT PUMPS

The existing legislation in Italy poses various challenges for the electrification of residential heating. Despite various measures aimed at incentivising consumers to adopt new heating systems, the current schemes implemented since 2023, following the Superbonus and sconto in fattura initiatives, have had a detrimental effect on the installation of new heat pumps in the market. Currently, there are two incentive schemes available for air to water heat pumps: Ecobonus and Conto Termico 2.0 (soon to be replaced by Conto Termico 3.0), which cannot be combined or added together.

Both schemes also include the installation of hybrid heat pumps (electric and gas), which contradicts Italy's aim of reducing its dependency on gas.

THE ECOBONUS HEAT PUMP SCHEME

The Ecobonus scheme in Italy offers a tax reduction spread across ten years, covering up to 65% of the cost of a heat pump. Although it promises a significant return on investment, customers face a hefty upfront expense of around €19,000. They'll only start recovering this investment gradually over time.

Moreover, the process to apply for Ecobonus funding is lengthy and unclear. This administrative complexity places a heavy burden on businesses, resulting in higher costs for consumers and inefficiencies for the national economy.

CONTO TERMICO 2.0

The Conto Termico 2.0 scheme provides grants of up to €5,000 for residential heat pumps. While it lowers the initial expense for customers, it covers less than 20% of the total investment (around €19,000) and the total funding typically does not exceed €3,500, rendering it less attractive compared to the Ecobonus scheme.

- Introduce a fixed subsidy scheme: Instead of tax reductions, all installations of full electric heat pumps would receive a grant equal to at least 60% of the investment, approximately €19,000. Taking inspiration from the UK's approach, Italy could introduce a "heat pump check" program, providing a fixed subsidy amount for all qualifying installations. Allocating a specific budget, such as €2 billion, would enable the government to manage expenditures effectively, similar to the UK's model.
- Awareness and predictability: Consumer subsidies
 and schemes need to be straightforward and
 enduring. The current system of bonuses is too
 complex for consumers to navigate effectively. Aira
 recommend that a scheme should be introduced that
 is reliable and beneficial for both consumers and the
 environment. Additionally, there's a lack of awareness
 regarding heat pump technology that needs to
 be addressed.

Through integrated smart energy solutions, consumers can intelligently control their heat pump usage, utilise electricity from home solar systems and efficiently store excess energy during off-peak times.

60%

The Italian government implemented a mandate requiring that 60% of energy in new buildings be sourced from renewables as of June 1, 2022

PROMOTE INTEGRATED SMART HOME ENERGY SYSTEMS

An integrated smart home energy system utilises advanced technologies to optimise energy consumption, enhance efficiency and minimise environmental impact. Italy has a competitive edge over many OECD countries with its widespread adoption of digitised metering systems like the Enel smart meters. This infrastructure empowers households to actively participate in the electricity market and helps facilitates the energy transition from gas to electricity.

Through integrated smart energy solutions, consumers can intelligently control their heat pump usage, utilise electricity from home solar systems and efficiently store excess energy during off-peak times. They can then sell this surplus back to the grid during high-demand periods, maximising both economic savings and energy efficiency.

Recommendation:

A subsidy or incentive for smart homes: Homes
that want to install a clean-energy heat pump,
solar panels and/or batteries should benefit from
streamlined permitting processes and a dedicated
grant scheme. Such initiatives would not only promote
the adoption of sustainable energy technologies but
also contribute to the enhancement of Italy's overall
energy system.

POLLUTERS DON'T PAY THE PRICE

Regulations governing residential electricity prices need to be modernised and adapted to serve as effective incentives for consumers to adjust their behaviour and adopt flexible, integrated energy solutions.

Recommendation:

Implement strategies to lower electricity prices: This
is a highly effective strategy that would encourage
virtuous and smart consumption habits, bringing Italy
in line with other EU countries. The two key changes
would be introducing negative prices and allow for
hourly consumer prices.

ACCELERATE THE GAS-BOILER PHASE OUT

The Italian government implemented a mandate requiring that 60% of energy in new buildings be sourced from renewables as of June 1, 2022. Despite this progressive step, there are still challenges and uncertainties surrounding the transition to renewable heating solutions. These include the need for clear and consistent policies to guide the phase-out of gas boilers, establishing a definitive ban date, and the promotion of renewable alternatives.

- Increase taxation for natural gas consumption: By taxing natural gas consumption, citizens will have a clear path toward cleaner and cheaper alternatives. With the money collected from taxation, the government could fund the transition towards cleaner heating systems, including heat pump subsidy schemes, without increasing spend.
- Implement a gas boiler ban: Policymakers should create a comprehensive roadmap for phasing in renewable heating solutions and establish a clear ban date for gas boilers. This will help facilitate alignment with climate targets and encourage adoption of sustainable technologies.
- Enhance public awareness of renewable heating: In addition to regulatory measures, policymakers should prioritise public awareness campaigns and support programs to educate homeowners, builders, and industry stakeholders about the benefits of renewable heating technologies.

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THE TIME TO ACT IS NOW

Countries and policymakers have numerous opportunities to decrease emissions from residential heating.
Accelerating the adoption of smart home energy technologies can be achieved through five key actions:

FIVE KEY ACTIONS

01

Implementing the 'polluters pay' principle to expedite the transition from gas to electrification.

02

Eliminating outdated administrative burdens and barriers that hinder the installation of new clean-energy technologies like heat pumps.

03

A commitment to providing long-term, transparent subsidies or regulations that facilitate sustained investments by consumers.

04

Greater support for households transitioning to greater energy independence through solar panels, battery systems and heat pumps. This will alleviate pressure on the grid and promote the green revolution.

05

Introduce a definitive timeline for phasing out boilers and adhere to it, ensuring that there are clear milestones and accountability measures in place to track progress towards achieving this goal. This will provide clarity and certainty to consumers and manufacturers and help facilitate effective planning and investment in alternative heating technologies.











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