

#HEAT
RIGHT

How can Europe FILL THE CLEAN HEAT GAP?



**CLEAN HEAT
EUROPE**

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EXECUTIVE SUMMARY

A just transition to clean heating and cooling from renewable resources is a no-regret option that will boost Europe's competitiveness and energy security, while benefitting society and contributing significantly to the goal of a climate-neutral Europe. Yet, EU and national policies are currently lacking the ambition to fully unlock this potential.

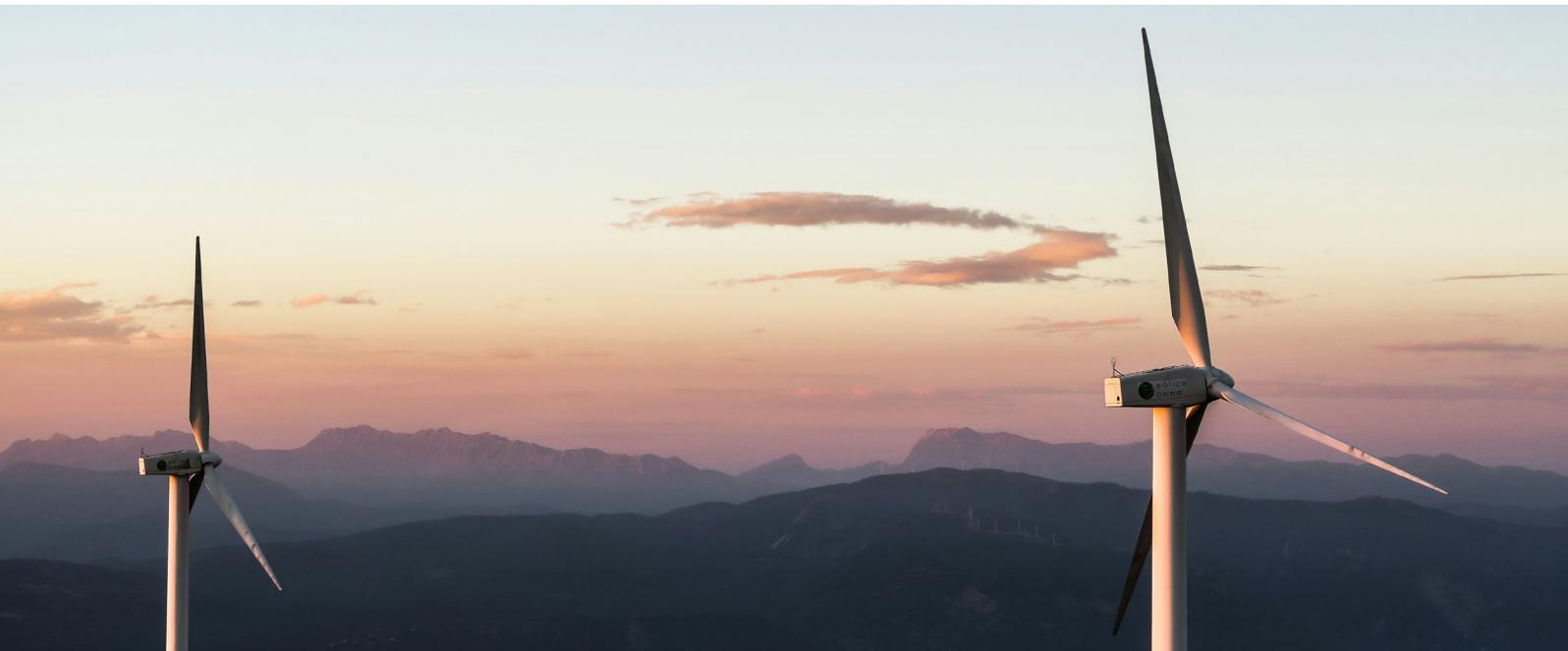
Across the EU, as many as 75% of households are still tied to fossil fuel heating systems, mainly gas boilers¹. Heating homes with fossil fuels binds Europe to volatile gas imports, impacting energy sovereignty and endangering energy security², while also being a major contributor to greenhouse gas emissions³.

Today, the clean heat⁴ industry, including solar, heat pumps and renewables- and sustainable waste heat-based district heating, is expanding

and investing. It is poised to strengthen Europe's leadership and competitiveness in the clean energy sector but it needs EU and national policy certainty to grow.

This report reveals that the policy frameworks in place across 12 EU countries are not yet strong or consistent enough to support a wide-scale clean heating and cooling roll-out.

Now is the time to develop a stable EU and national policy framework to unlock the benefits of the clean heat transition for European industry and citizens, and reach national, EU and international climate goals.



¹ <https://ecostandard.org/wp-content/uploads/2020/12/Five-Years-Left-How-ecodesign-and-energy-labelling-Coolproducts-report.pdf>

² Heating accounts for around 40% of the total final energy demand in Europe: <https://op.europa.eu/en/publication-detail/-/publication/208e7048-b406-11e9-9d01-01aa75ed71a1/language-en>

³ 35% of energy-related emissions are attributed to buildings: <https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emissions-from-energy?activeAccordion=546a7c35-9188-4d23-94ee-005d97c26f2b>

⁴ Clean heat can be broadly defined as efficient, zero-emissions heating systems powered by renewable energy. More information: <https://www.cleanheateurope.eu/>



The next European Commission and national governments must seize this opportunity to fill the “clean heat gap” by **making clean heating and cooling a priority**, strengthening European industry, reducing EU greenhouse gas emissions and freeing European households from their dependency on fossil fuels at volatile prices.

This report focuses on the current state of play for technologies in the sector, the current policy background that is supporting the sector and **identifies what can be done under a new European Commission mandate and at national level to fully grasp the clean heat opportunity to reach climate goals and make clean heating affordable and accessible for households across Europe.**

STRONGER CLEAN HEAT POLICIES NEEDED

The report is based on a study⁵ by research firm Trinomics which examined clean heat readiness in 12 EU countries. These are Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Italy, Lithuania, Poland, Spain, and Sweden⁶.

Trinomics evaluated national policies and timelines for phasing out fossil fuels in heating, incentives supporting clean heat, and training and support systems in place

for the clean heat transition at national level. Overall, **the report found that policies under the European Green Deal⁷**, including measures to advance the phase-out of fossil fuel heating, and to increase energy efficiency and the share of renewable heating in buildings, **have begun to decarbonise the heating sector.** However, it outlined the need for a more robust policy framework and greater policy consistency to accelerate the much-needed transition.

⁵ Clean heat readiness in Europe: A survey of Member States

⁶ Based on a survey sent to national industry association experts, the Trinomics study analysed clean heat readiness based on three areas: (1) the status of mainstreaming clean heat nationally, (2) ensuring the affordability of clean heat, and (3) addressing barriers to clean heat deployment in Croatia,

Czechia, Denmark, Finland, France, Germany, Hungary, Italy, Lithuania, Poland, Spain, and Sweden. These countries were chosen to provide a cross-section of Europe's diverse clean heating challenges and opportunities.

⁷ Principally the Energy Efficiency Directive, the Renewable Energy Directive and the Energy Performance of Buildings Directive.

MAIN FINDINGS

● ON TRACK TO A CLEAN HEAT ROLL-OUT
 ● INADEQUATE CLEAN HEAT PROGRESS
 ● NO PROGRESS ON CLEAN HEAT
 - NO ANSWER

POLICY SUPPORT	CRO	CZE	DEN	ESP	FIN	FRA	GER	HUN	ITA	LTH	POL	SWE
6 Member States plan to phase out fossil fuel heating	●	●	●	●	●	●	●	●	●	●	●	●
7 countries plan to develop local or regional heating and cooling transition plans	●	●	●	●	●	●	●	●	●	●	●	●

FINANCIAL SUPPORT	CRO	CZE	DEN	ESP	FIN	FRA	GER	HUN	ITA	LTH	POL	SWE
All countries provide financial support for clean heat technologies	●	●	●	●	●	●	●	●	●	●	●	●
6 countries provide targeted support for vulnerable households	●	●	●	●	●	●	●	-	●	●	●	●
4 countries have stopped subsidies for fossil fuel heating	●	●	●	●	●	●	● ⁸	●	●	●	●	●
In 5 countries the price ratio between fossil fuels and electricity favour a switch to clean heating	●	●	●	●	●	●	●	●	●	●	●	●

TECHNICAL SUPPORT	CRO	CZE	DEN	ESP	FIN	FRA	GER	HUN	ITA	LTH	POL	SWE
9 National governments are providing targeted technical support and assistance to consumers	●	●	●	●	●	●	●	●	●	●	●	●
In 4 countries, households have enough access to information	●	●	●	●	●	●	●	●	●	●	●	●
Most countries have specialised training programmes	●	●	●	●	●	●	●	●	●	●	●	●
4 countries have measures to ease administrative burdens	●	●	●	●	●	●	●	●	●	●	●	●

Fig. 1 - Clean heat readiness in 12 EU countries

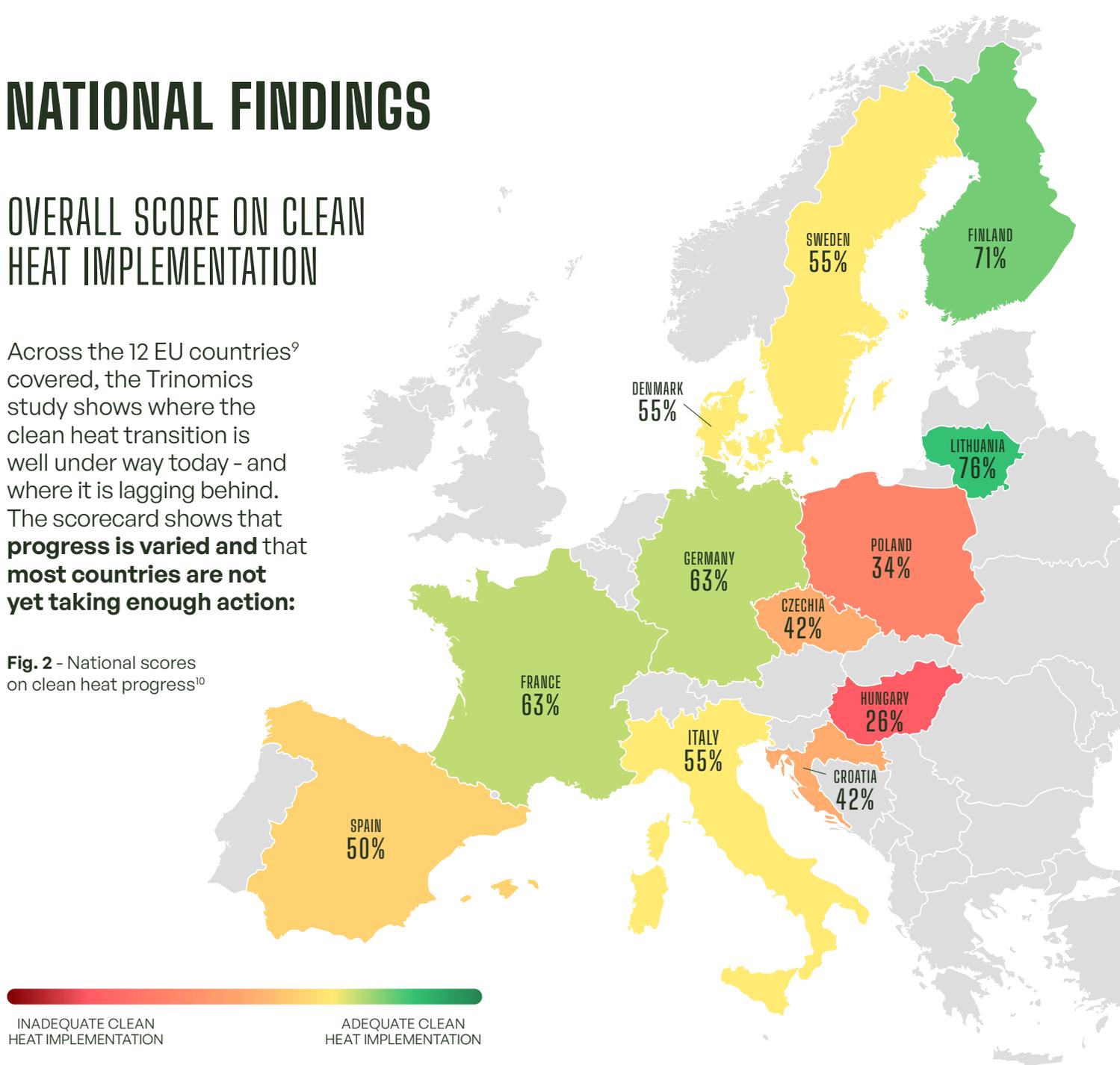
⁸ At the time of writing the report (December 2023–February 2024) Germany still had fossil fuel subsidies in place. Deadlines for the phase out of these subsidies were March 2024.

NATIONAL FINDINGS

OVERALL SCORE ON CLEAN HEAT IMPLEMENTATION

Across the 12 EU countries⁹ covered, the Trinomics study shows where the clean heat transition is well under way today - and where it is lagging behind. The scorecard shows that **progress is varied and that most countries are not yet taking enough action:**

Fig. 2 - National scores on clean heat progress¹⁰



Overall, **Lithuania, Finland and France show the strongest approaches to implementing clean heat.** In Finland, the government has agreed a timeline for phasing out fossil fuels and their subsidies, while also providing information and financing for clean heat initiatives. **Germany and Italy are also making progress**, but the operational costs of electric clean heat

remain a barrier. **Hungary, Poland, Croatia and Czechia lag behind** in implementing clean heating with limited plans to phase out fossil fuels and a significant administrative burden on implementing clean heat solutions. Croatia and Hungary also lack information and awareness raising on clean heat, and they offer only a few incentives for installing clean heat solutions.

⁹ Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Italy, Lithuania, Poland, Spain, and Sweden

¹⁰ Source: Clean heat readiness in Europe: A survey of Member States by Trinomics

RECOMMENDATIONS

The next European Commission and national governments should seize the opportunity to accelerate the transition by prioritising clean heating and cooling by:

Fig. 3 - Policy, financial and technical recommendations to accelerate the transition to clean heat

POLICY SUPPORT

DE-INCENTIVISE THE SALE OF NEW FOSSIL FUEL BOILERS as soon as possible, and phase out the use of fossil fuels in buildings by 2040 at the latest

ENCOURAGE THE UPTAKE OF CLEAN HEATING TECHNOLOGIES through clean heating standards, the Heat Pump Action Plan and a revised heating and cooling strategy

SETTING CLEAR HEATING AND COOLING TARGETS in National Energy and Climate Plans (NECPs) and in National Building Renovation Plans (NBRPs)



FINANCIAL SUPPORT

ENSURING A JUST TRANSITION TO CLEAN HEATING through a swift implementation of the Social Climate Fund and targeted financial schemes and adequate subsidies, especially for low income households

LOWERING ELECTRICITY COSTS by moving taxes and levies out of the electricity bill and ensure the implementation of the expanded EU Emissions Trading System (ETS) 2 along with social safeguards to offset its impact



TECHNICAL SUPPORT

SET REQUIREMENTS FOR NEW AND RENOVATED BUILDINGS for low-temperature, hydronic or air based heating distribution systems, and for the upgrade of electrical installations

UNLOCK ECONOMIC SYNERGIES BETWEEN CLEAN HEAT TECHNOLOGIES AND RENEWABLES by ensuring that devices are interoperable and can be controlled remotely.



INTRODUCTION

European households have slowly begun the switch to clean heat, but

75% of homes are still reliant on outdated costly and polluting fossil fuel heating systems like gas boilers



While the European Green Deal may have helped make progress on the transition to clean heat in some EU countries, much more needs to be done to shrink Europe's dependency on imported fossil fuels for heating, and grasp the opportunities to drive demand and European competitiveness in clean heating forward. Switching to clean heat can also make a significant dent in Europe's greenhouse gas emissions, in line with a proposed **new EU target for a 90% reduction in emissions by 2040**

Moreover, the transition to clean heat - powered by renewable energy systems including heat pumps, rooftop solar panels and efficient, renewable and sustainable waste-heat district heating and cooling - is needed to make clean heating available to households across Europe, including low-income groups. **Clean heat can unlock the potential to bring their energy bills down by up to 20% through lower energy demand¹¹**

¹¹ <https://www.ehpa.org/news-and-resources/publications/europes-leap-to-heat-pumps/>

CLEAN HEAT MARKET: THE STATE OF PLAY

In 2022, nearly a quarter of household heating and cooling came from renewable energy, however this includes forest biomass¹². Reliance on fossil fuel heating systems in homes has marginally declined as the share of clean heat

provided by heat pumps, rooftop solar and renewable district heating rises. However, **across the 12 countries studied, there is still a heavy reliance on fossil heating.**

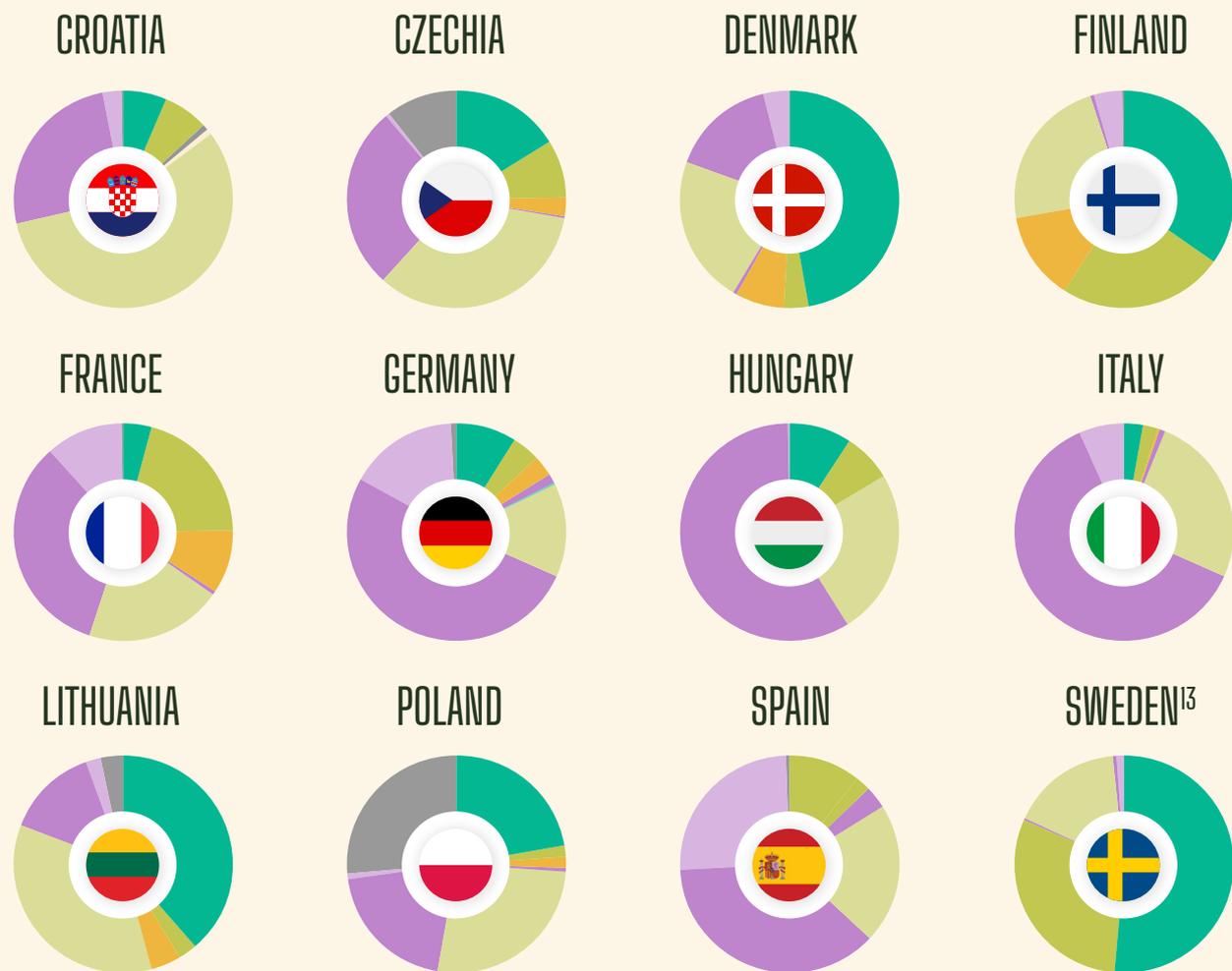


Fig. 4 - Share of heating technologies/fuel use (space + water heating) of households in 12 countries, 2021.

¹² <https://ec.europa.eu/eurostat/en/web/products-eurostat-news/w/ddn-20240227-2>

¹³ Source: Eurostat. With a heat pump stock of around 2.4 million - around 437 for every 1,000 households - Sweden has one of the highest levels of heat

pump penetration in Europe. However, these numbers are unfortunately not yet reflected in Swedish Energy Agency data. The Swedish heat pump association is currently working with the Agency to ensure the numbers are included in future.

DISTRICT HEATING

District heating networks can provide clean heat across residential and industrial areas and are already well established in many cities, in particular in northern and eastern Europe.

There are currently over **17,000** district heating networks in Europe,

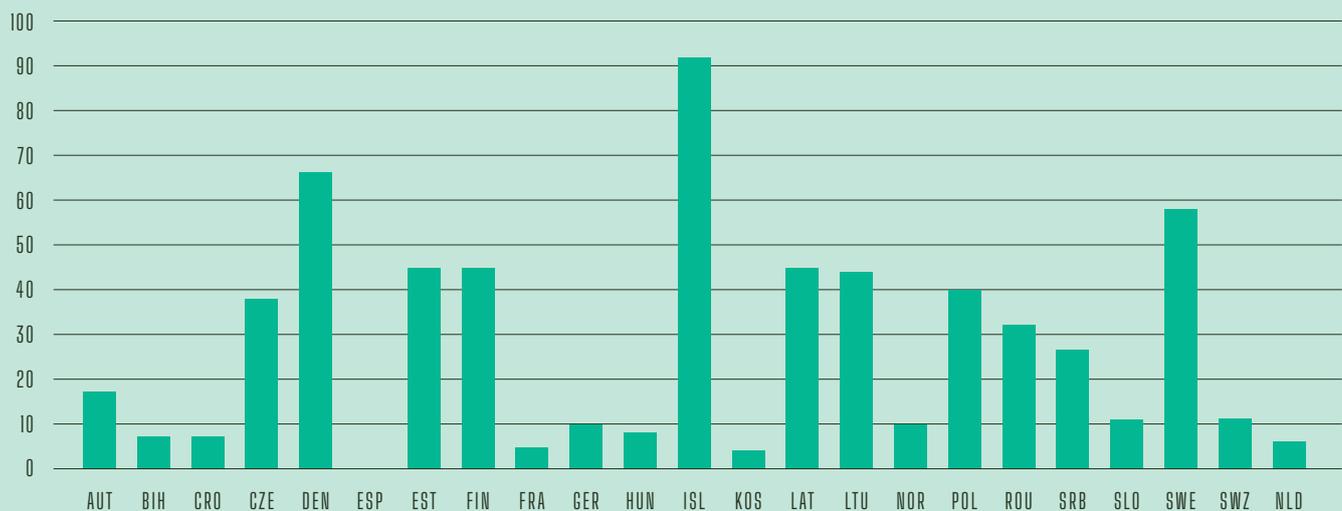
meeting about 13% of the final energy use for heating and hot water in households, services and industry.

In 2021,

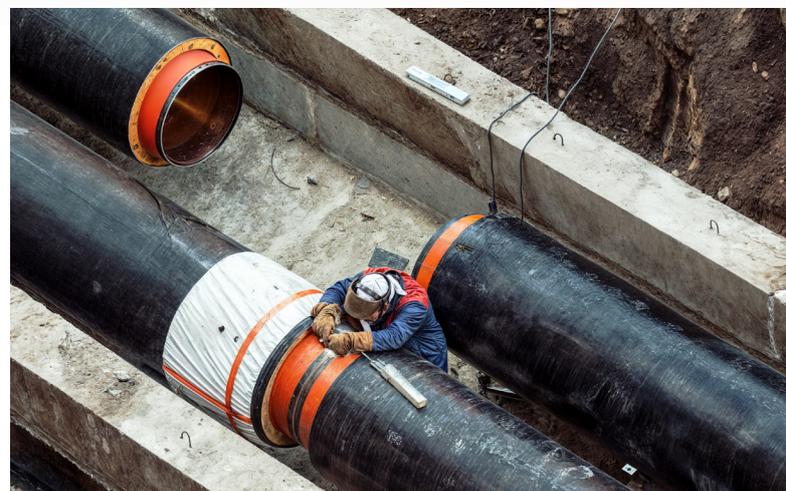
43% of European district heating was supplied by renewable and waste heat sources,

of which 7% was geothermal, solar power, heat pumps and sustainable waste heat; and 36% was biomass and biofuels¹⁴.

Share of district heating in heat demands from residential and service sectors (%)¹⁵



District heating is growing in **Germany**, where **22% of new buildings in 2021 were connected to district heating**. In **France**, there has been a **70% increase** in buildings connected to heat networks in the last decade, while in **Switzerland and Austria**, district heating and cooling has **grown by 50% and 68%**, respectively, over the past decade. The sector is expecting further increases as supporting legislative frameworks are put in place to promote district heating in many Member States, e.g. in the Netherlands.

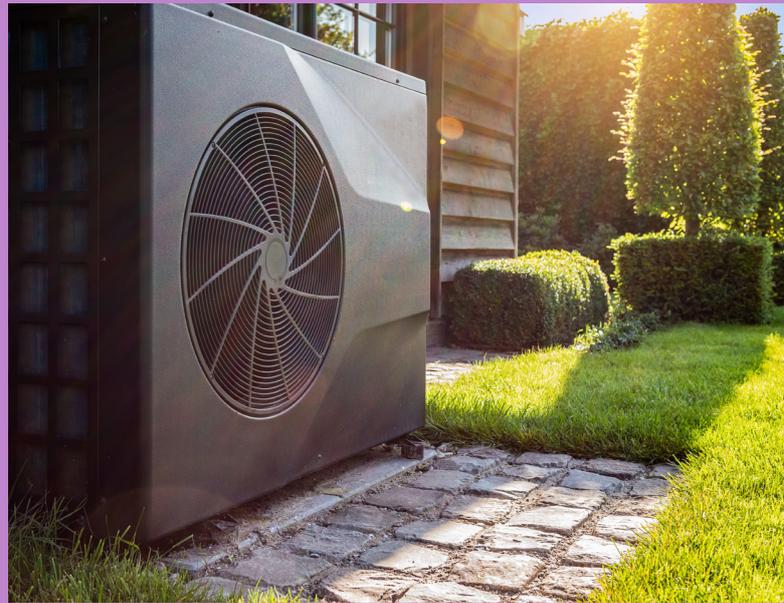


¹⁴ https://api.euroheat.org/uploads/DHC_Market_Outlook_Insights_Trends_2023_81498577a7.pdf

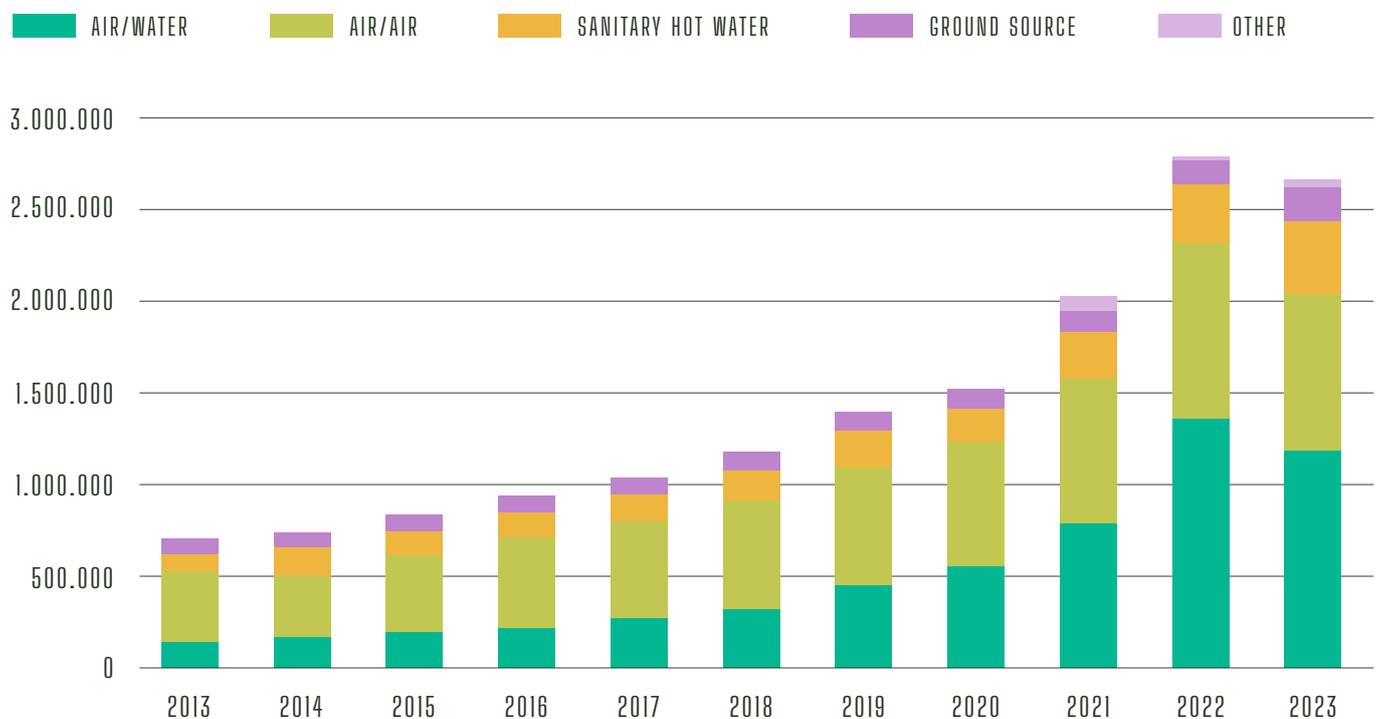
¹⁵ Source: DHC market outlook, insights and trends 2023 https://api.euroheat.org/uploads/DHC_Market_Outlook_Insights_Trends_2023_81498577a7.pdf

HEAT PUMPS

The total heat pump stock in Europe (21 European countries¹⁶) in 2023 is of **around 22,2 million**, up from around 19,8 million at the end of 2022. Heat pump installations increased by 38,9% to reach 3 million units sold in 2022¹⁷. However, early sales figures for 2023 show that after a decade of sales increases, heat pump sales decreased by 5%. At national level, **France is the biggest heat pump market with a total stock of 4,8 million heat pumps**. Looking at heat pumps per 1000 households however shows that the Scandinavian countries are the most mature markets, with more than 660 heat pumps per 1000 households in Norway, more than 530 per 1000 households in Finland and more than 430 heat pumps per 1000 households in Sweden.



Annual sales of heat pumps in 14 European countries (2013 - 2023)¹⁸



¹⁶ 21 markets covered are: Finland, Norway, Sweden, Estonia, Denmark, Lithuania, Italy, France, Netherlands, Poland, Ireland, Czechia, Austria, Switzerland, Spain, Portugal, Slovakia, Belgium, Germany, Hungary, United Kingdom

¹⁷ EHPA market report 2023 <https://www.ehpa.org/news-and-resources/news/heat-pump-sales-fall-by-5-while-eu-delays-action/>

¹⁸ Source: EHPA Market Statistics, <https://stats.ehpa.org>

SOLAR PHOTOVOLTAICS



Solar PV recorded record growth in 2023 with

55.9 GW installed across the EU, showing a **40%** growth from 2022

On a national level, Germany, Italy and the Netherlands were some of the EU's largest solar PV markets. Solar installers across Europe increasingly also install heat pumps. **In Italy, 85% of solar installers also install heat pumps, in Germany, it's 28% and in Belgium, 41%.**

In addition to photovoltaic, do you also install products in the following sectors? (MULTIPLE ANSWERS)

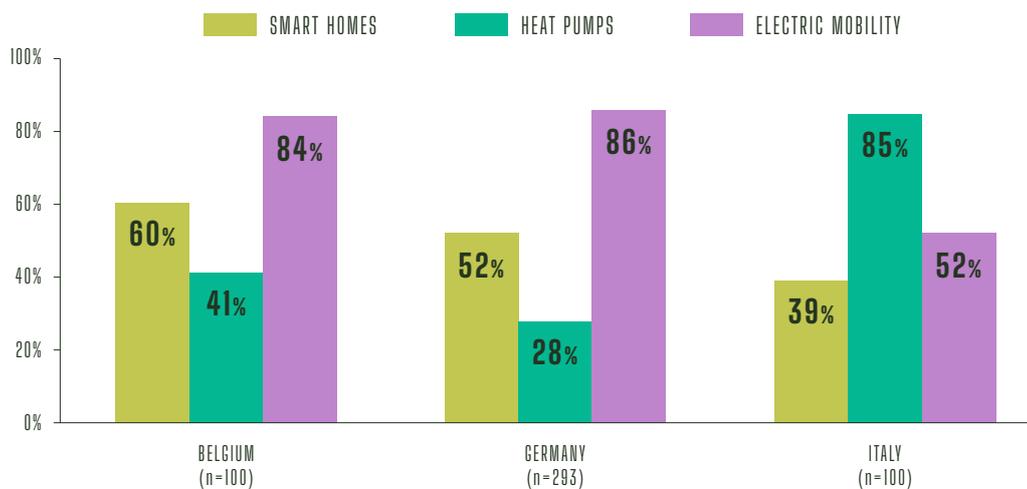


Fig. 7 - Share of solar installers which also install heat pumps, electric transport chargers and smart electricity metres at the same time.¹⁹

During the energy crisis in 2022, homes with both solar PV and heat pumps benefited from substantial savings on their energy bills. In Spain and Italy, savings on household energy bills were as high as 84% and 83% respectively. Even as electricity prices return to pre-crisis levels, **households with PV and heat pump systems will save around €1,800 in Germany, over €1,600 in Spain, and over €1,700 in Italy²⁰.**

¹⁹ Source: Sector Coupling between PV and heat pumps, EUPD PV Installer Monitor 2022/2023: <https://www.solarpowereurope.org/insights/thematic-reports/solar-powers-heat-and-e-vs-2023-case-studies>

²⁰ <https://www.solarpowereurope.org/insights/thematic-reports/solar-powers-heat-2023-2>

SOLAR THERMAL

Solar thermal technologies provide hot water and/or heat for buildings, district heating networks and industry. In 2022, the cumulative capacity in Europe was 40.5 GW and annual sales increased by 12% compared to 2021. The main growth markets are Germany, Greece, Italy, Poland, Spain and France.

THE CLEAN HEAT POLICY CONTEXT

The European Green Deal²¹, launched in 2019, includes the transition to clean energy, focussing on: **a secure and affordable EU energy supply, an interconnected energy market, increased energy efficiency and energy from renewable sources.**

The below table summarises the main European Green Deal policies which include important measures for the uptake of clean heat. These policies are in the process of being transposed into national laws.



ENERGY EFFICIENCY DIRECTIVE



11.7% reduction in energy consumption by 2030



Mandatory renovation of public buildings into zero-emission buildings



A decarbonisation pathway for the district heating & cooling sector



Gradual increase of national energy savings obligations: 1.3% (2024-2025), 1.5% (2026-2027), 1.9% (2028-2030)



Financial support schemes to increase the uptake of energy efficiency improvement measures for district heating and cooling systems



Local heating and cooling plans in municipalities with a population higher than 45,000



Recognition of the role of heat pumps in the assessment of national heating and cooling potentials and for the cost-benefit analysis



Mandatory use of waste heat from data centres and an installation level cost-benefit analysis for other waste heat producers to assess waste heat reuse

²¹ https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/energy-and-green-deal_en

RENEWABLE ENERGY DIRECTIVE



Binding renewable energy target of at least 42.5% by 2030, with a non-binding intention to increase it by another 2.5%



Binding target to increase renewables in heating and cooling by 0.8% per year until 2025, and then a 1.1% increase per year from 2026-2030



Indicative target to increase the share of energy from renewable sources and waste heat in district heating and cooling by 2.2% per year from 2021 to 2030



Faster permitting process for renewables



EU countries should promote (electrified) renewable heating & cooling to reach 49% renewables in buildings by 2030



Role of district heating is a solution to streamline renewable and waste heat sources



Renewable electricity counts towards the renewable energy target in heating and cooling



Waste heat counts towards the renewable energy target in buildings, industry, and heating and cooling

ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE



All new buildings should be zero-emission buildings by 2030, broadening to all buildings by 2050



National governments need to plan a fossil fuel phase out in heating and cooling, with a view to phasing out all fossil fuel boilers by 2040



No national subsidies for standalone fossil fuel boilers after 2025



Minimum energy performance standards for buildings, addressing the worst performing buildings first



Requirement to set up national schemes for renovation passports



Establishment of one-stop shops to help building owners plan renovations



EU countries may encourage the switch to non-fossil fuel heating



Energy Performance Certificates need to include information on heating systems



Measures to deploy solar energy in buildings are encouraged



Building systems data to include the projected lifespan of the heating system



Building inspections to assess the feasibility to reduce on-site use of fossil energy

ETS2

From 2027, a new emissions trading system (ETS2) will cover and address CO2 from fuel combustion in buildings and transport. It will raise costs for fossil fuel heating emissions and provide a market incentive for the transition

to renewable and low-emission solutions. In order to cushion negative distributional effects, revenues from the ETS2 will go to the Social Climate Fund to help vulnerable households in the energy transition.

SOCIAL CLIMATE FUND

From 2026-2032, the SCF will provide Member States with at least €86.7 billion to support the most affected vulnerable groups in the energy transition. This includes energy

renovations and clean heating. The SCF will pool revenues from the EU ETS, ETS2 and national contributions.

ELECTRICITY MARKET DESIGN

The reformed Electricity Market Design should help increase the use of flexibility offered by, for example, heat pumps and district heating. **It focuses on higher grid investments, non-fossil flexibility support options for Member States, and increased assessments of EU flexibility needs.** As part of these measures, Member States will have to report on estimated flexibility needs to enhance security, reliability, and

decarbonisation of the electricity system. Based on this, the Commission may draw up an EU strategy on flexibility, with a particular focus on demand response and energy storage. Member States will also have the possibility to implement support schemes if investments in non-fossil flexibility are insufficient or adapt remuneration capacity mechanisms to promote the use of non-fossil flexibility resources.



THE TRANSITION TO CLEAN HEAT: EU COUNTRIES' PROGRESS

This report is based on a study²² by research firm Trinomics which examined clean heat readiness in 12 EU countries²³. Trinomics evaluated national policies and timelines for phasing out fossil fuels in heating, incentives supporting clean heat, and training and support systems in place for the clean heat transition at national level.

The study by Trinomics finds that six of the 12 analysed countries have timelines for phasing out fossil heating and have put forward or already implemented laws to stop the installation of fossil fuel boilers in new and existing buildings. Almost all the national governments of the countries analysed provide technical assistance, such as renovation guidance, to consumers to switch to clean heat. However, this is hindered by a lack of information on Energy Performance

Certificates in most countries, and six of the 12 countries only provide technical assistance once a consumer commits to switching their energy source. While all countries provide financial support for switching to clean heat solutions, in seven countries among those analysed such support is limited or programmes are still being developed. Out of the countries analysed, only six countries have programmes in place to financially support vulnerable households. However, many countries continue to provide subsidies for fossil fuel heating. In some countries the electricity bill is too high, making clean heat less attractive. Seven of the countries surveyed have local heating and cooling plans in towns with a population over 45,000. Complex administrative processes were recognised as a hindering factor in many countries.

²² Clean heat readiness in Europe: A survey of Member States

²³ The Trinomics study analysed clean heat readiness based on three areas: (1) the status of mainstreaming clean heat nationally, (2) ensuring

the affordability of clean heat, and (3) addressing barriers to clean heat deployment in Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Italy, Lithuania, Poland, Spain, and Sweden.

CONCLUSIONS AND DETAILED RECOMMENDATIONS

Overall, the study found that policies under the European Green Deal²⁴, including measures to advance the phase-out of fossil fuel heating, and to increase energy efficiency and the share of renewable heating in buildings, have begun

to decarbonise the heating sector in the 12 countries analysed. However, it outlined the need for a more robust policy framework and greater policy consistency to accelerate the much-needed transition.

²⁴ Principally the Energy Efficiency Directive, the Renewable Energy Directive and the Energy Performance of Buildings Directive.

The next European Commission and national governments can and should make clean heating the norm across Europe with the following:

POLICY SUPPORT



EU

- Disincentivise the sale of new fossil fuel boilers through Ecodesign rules that phase-out of the sale of stand-alone fossil fuel boilers as soon as possible, and rescale the energy label for heating appliances to give more visibility to the best performing products and solutions.
- Set more ambitious renewable heating and cooling targets and include the REPowerEU targets for heat pumps in legislation.
- Introduce a Clean Heat Market Mechanism that places quantitative targets on market players (such as energy network companies, energy suppliers or heating appliance manufacturers). This can complement other policies by providing an incentive to remove existing boilers from homes before the end of their lifetimes and help scale up clean heating supply chains in line with the EU's energy security and climate goals.
- Regulate the re-use of waste heat by making it mandatory for entities such as service providers (e.g. wastewater treatment plants, metro stations), air-conditioned buildings (e.g. supermarkets, warehouses) and industries to make a plan for reusing waste heat.
- Regulate the use of industrial heat pumps by making it mandatory for industries to plan the utilisation of waste heat heating and cooling in their process design planning.
- Make clean heating and cooling a priority of the next European Commission by publishing the heat pump action plan without further delay, and a revised EU heating and cooling strategy.
- Prioritise clean cooling solutions, and create a level playing field for market players. Efficient cooling solutions in buildings are becoming increasingly necessary as heat waves occur more frequently.



NATIONAL GOVERNMENTS

- Advance the phase out of fossil fuels boilers and end subsidies for fossil heating at the latest by 2025, through a robust implementation of the Energy Performance of Buildings Directive (EPBD). Boost building renovation to reduce energy demand.
- Develop clear clean heating and cooling targets and action plans and include them in the National Energy and Climate Plans (NECPs) and in the National Building Renovation Plans.
- Set requirements for new and renovated buildings to be equipped with hydronic or air based heating distribution systems suitable for low-temperature heat sources and solutions such as district heating and cooling, and heat pumps.
- Set requirements for integrated, district-level energy and heating plans, including the possibility to upgrade and/or expand nearby district heating and cooling infrastructure.
- Include requirements to upgrade electrical installations during renovation works to anticipate future needs (such as increased power connection, adaptation to current safety norms) and optimise the efficiency of installations (optimal sizing of connectors to limit losses). This includes technical and financial support that covers electrical installation safety, readiness and efficiency.
- Create a level playing field among all clean heating solutions by ensuring the Energy Performance Certificates (EPCs) give equal weight to the sustainability of district heating and cooling networks, compared to individual heating solutions.

FINANCIAL SUPPORT



EU

- Finalise an ambitious energy taxation directive to ensure that the most polluting energy products and fuels bear the greatest amount of tax, and clean heating becomes economically more attractive.
- Swiftly implement the Emissions Trading System (ETS) 2 and Social Climate Fund in order to link fossil fuels with their environmental damage, and support households in the energy transition. Set social safeguards to offset the impact of ETS2 on households. Ensure that carbon pricing revenues from ETS1 and ETS2 aid vulnerable groups in the green transition, such as supporting renovations and the switch to clean heating solutions. The design of ETS1 and ETS2 should ensure a level playing field between individual and central clean heating systems.
- Propose an EU Heat Fund, inspired by the Invest EU Programme, to consolidate financing for clean heating projects. This fund should have transparent eligibility criteria and supporting tools for investors and project developers, similar to those in the existing Innovation Fund.
- Insurance schemes to support heat recovery from industry and tertiary activities, and also for geothermal energy projects in case of failed drilling to guarantee short-term risks linked to geothermal first well drilling, as well as the long-term risk of total or partial depletion of the resource during 15 years of operation.

- Streamline financing and ensure appropriate funding in the new multiannual financial

framework (MFF) to support the uptake of clean heating and cooling solutions.



NATIONAL GOVERNMENTS

- Support consumers in the switch to clean heating with targeted financial schemes and adequate subsidies to enable households, especially lower income, to afford the upfront costs. This would reduce energy poverty and mitigate the impact of energy price volatility. It would also prevent vulnerable households from being locked into fossil fuel heating technologies.
- Make clean heating the most attractive choice financially for consumers compared to gas, heating oil and coal. High operating costs in some countries are 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 and district heating. As an immediate measure, policy must aim to reduce the cost of electricity for residential, commercial and industrial applications through carbon pricing, by removing taxes and levies on renewable electricity and by removing subsidies and tax brakes on fossil fuels.
- Ensure incentives and funding for clean heating and cooling solutions or building renovations encourage consumers

to adopt the most cost and climate efficient solutions for each district or city neighbourhood, in line with the results of local heating and cooling plans.

- Offer dedicated support schemes for combining heat pumps with on-site electricity generation. In addition to reducing the payback period of heat pumps, this will integrate renewable energy, alleviate strain on the power grid and minimise the need for additional centralised power generation.
- Make public support schemes compatible with all options to acquire a heat pump. Beyond traditional upfront payments, these include energy-as-a-service, leasing (operating and financing), instalment purchase models, contracting, subscriptions and other seller-operated solutions. Support schemes should be attainable either by the customer or by the seller, who passes the benefit to the customer through reduced monthly amounts. Subsidy schemes that target financing costs should be accessible to non-traditional financing solutions, such as leasing for financing and operation.

TECHNICAL SUPPORT



EU

- Create awareness about the flexibility potential of heat pumps and district heating and cooling networks, and the value of flexibility for consumers, and the electricity grid.

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.

- Ensure that district heating and cooling networks can economically benefit from balancing the electricity grid with electric boilers and large-scale heat pumps.
- Ensure that hot water stored in thermal storages produced by electric boilers and large heat pumps, which provides flexibility and balancing services to the electricity grid, is considered as renewable heat when discharged into the district heating and cooling grid.
- Include the potential of district heating and cooling to provide balancing services to the electricity grid in future network planning exercises, as required by the Renewable Energy Directive II.
- Ensure Transmission System Operators (TSOs) and Distribution System Operators (DSOs) take the flexibility potential of heat pumps, both large heat pumps and aggregated flexibility from smaller heat pumps, into account when planning grid investments.
- Include the district heating and cooling sector, alongside ENTSO-E and ENTSO-G, in EU-level discussions on the Ten-Year Network Development Plan.
- Make district heating and cooling projects eligible for Projects of Common Interest (PCI) status.
- Define harmonised, technical requirements on communication protocols, Application Programme Interfaces (APIs), prequalification and device-certification requirements for future heat pumps and smart energy resources. These criteria must ensure that heat pumps can be flexibly integrated into other smart buildings and smart grids based on grid congestion and wholesale market signals. This can be done in the Implementing Acts on Data Interoperability and the Network Code for Demand-Response.



NATIONAL GOVERNMENTS

- Establish dynamic electricity supply and grid pricing to create a powerful incentive for proactive and adaptable customers who utilise electric boilers and (large-scale) heat pumps. This will ensure that citizens opt for smart heat pumps, which can react to external signals and help relieve the power grid.
- Focus support schemes on heat pumps that allow for smart heat management with home energy management systems based on signals from the power grid. A heat pump that operates within a smart system can adjust heating behaviour dynamically, based on external signals without a user's input.
- Set requirements for all heat pumps to be able to operate within a smart system, or be retroactively equipped to do so. Communication interfaces and cables should be based on European recognised standards.
- Boost the number of clean heating installers by offering training programmes to upskill professionals to ensure the quality of installations and meet consumer demand.
- Support local governments to ensure they have the knowledge, financial resources and capacity needed to effectively prepare and implement their local heating and cooling plans.

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