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# European markets overview

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Decarbonising heating systems is the most significant challenge the EU faces in meeting its climate neutrality target for buildings by 2050. Today, buildings account for 36% of EU CO₂ emissions and approximately 40% of final energy consumption.

There is no one-size-fits-all solution to decarbonising heating. Europe has a rich diversity of buildings, energy infrastructure and climate zones, so our engineers develop the heating solution for every need — to drive the use of renewable heat in our homes and offices.

This market report represents the largest available data set on the European heating market and illustrates the broad spectrum of heating technologies available across Europe — as well as their respective CO₂ saving potential. From boilers and hybrids to solar thermal, from heat pumps to fuel cells, from radiators to underfloor heating, our industry boasts a breadth of technologies ready to be deployed. But with an estimated 66 million old and inefficient heating appliances across Europe (out of a total 103 million) being replaced at a rate of just 4% per annum, we must accelerate the rate of modernization if we are to achieve our carbon-neutrality goals by 2050.

Today more than ever, our home is about more than where we live. Since the coronavirus pandemic started, ‘home’ has become the office, the school, the gym, and so much more. Personal well-being, health and comfort at home have become increasingly important as a result of the lockdown restrictions experienced by millions of EU citizens. New heating systems bring not only energy efficiency, but also indoor comfort, good air quality and even the possibility of remote maintenance, which has proved to be incredibly important in adapting to crisis situations such as these.

The heating innovation you will find in this report is world-class, but it is European innovation. Solutions for heating are developed in Europe, by European companies, and are brought into our homes by European Small and Medium-sized Enterprises (SMEs) through a value chain that accounts for an estimated 1.8 million jobs that are local by nature. This is particularly important today, when urgent efforts are being made to stimulate the EU’s economic recovery in the wake of the coronavirus pandemic.

The challenge we take on today is to empower you, the end-user, to make the transition to low-carbon heating. By publishing this report, we hope to contribute to equipping consumers with the right information to make the best-informed decisions on the most appropriate low-carbon heating solution for you; whether you are in a cottage in Sweden, a skyscraper in Frankfurt or a guesthouse in Sicily. Just like we make your heating system work, we will make Europe’s energy transition work.

I hope you enjoy the read.
Climate-neutral buildings: a roadmap to the future of heating

Heating serves an essential human need. It provides comfort and contributes significantly to our health and well-being, be it at home or in the workplace.

It is this awareness that drives EHI member companies, manufacturers of heating technologies, to put people at the centre of our innovation. This enables us to provide future-proof solutions which are affordable, smart and renewables-based, to lead to climate-neutral buildings in 2050.

This is why EHI members support the goal of climate neutrality of buildings in Europe by 2050: we believe that the technological innovation our heating systems need already exists, but as this report will show, these efficient technologies are not yet widespread in European homes. The modernisation of our heating systems will enable a future where buildings are not only carbon-neutral, but have even become active players in the energy system.

But the energy transition will require action from all actors in the energy system: parallel investments in the decarbonisation of all energy sources will further facilitate the cost-efficient carbon neutrality of the building stock.

The EU has an important role to play as enabler of this transformation, by establishing a robust policy framework that shifts every building in Europe to carbon-neutrality. In our view, such a framework should include:

- Modernising old heating installations by accelerating and supporting the replacement of old and inefficient heating equipment installed in existing EU buildings.
- Putting a price on CO₂ emissions from buildings, coupled with support for investments in efficient and renewable-based heating systems.
- Enabling and favouring the roll out of renewable and decarbonised gases such as biomethane, synthetic methane and hydrogen in the heating sector.
- Increasing electrification of heating with efficient technologies, encouraging self-consumption.
- Enabling and promoting the digitalisation of heating systems.
- Promoting electric, hybrid and gas heat pumps.
- Keeping heat distribution systems building- and neighbourhood-sized for maximum efficiency.

Our industry believes that these seven policy areas form a roadmap that will contribute to the climate neutrality of buildings. At the same time, these measures will help make every European home the best possible place to live.
The European heating industry and the European economy
The Association of the European Heating Industry (EHI) represents 90% of the EU market for heat and hot water generation. Directly employing over 125,000 people and investing more than €1 billion annually, our industry is critical in the EU’s transition to a climate-neutral economy by 2050.

EHI brings together 41 market-leading companies and 12 national associations in the European thermal comfort sector; producing efficient and renewables-based heating systems and innovative hybrid and digital solutions.

Heating is a very personal topic, and the heating industry is filled with community-led businesses. A good number of our member organisations are family-owned businesses that have grown into global companies and foundations, but have remained firmly rooted in their local connections. Beyond providing jobs and wealth, they invest in a number of social drivers: training and coaching, sustainable research, sport/music projects, and scholarships for young people.

These companies continue to provide secure employment in their bases across Europe, heavily investing in the skills of their workforce in order to drive the technological innovation that defines our industry. The heating industry is working tirelessly to develop innovative heating technologies to suit European homes of all shapes and sizes. This commitment to innovation will be a game changer in Europe’s journey to climate neutrality before 2050.

The heating industry’s economic footprint expands far beyond our members’ direct employees. Our supply chain is significant, involving European businesses in the form of raw material suppliers, production units, distribution centers, local sales companies, installers, wholesalers and many other construction professionals. With an estimated 1.8 million jobs in its value chain, the heating sector is labour-intensive and local by nature. We estimate imports in this sector from non-EU countries to be lower than 10%.
It is often said that you can measure the health of an economy by the health of its construction sector. Given the importance of buildings in achieving a carbon-neutral economy, encouraging construction in the form of renovating our heating systems would bring a dual economic/environmental benefit to the EU. The economic impact of the coronavirus pandemic was severe, and the heating industry was no exception. As the EU now refocuses its efforts on economic recovery, we believe that an economic stimulus to support EU citizens to replace their old, inefficient heating equipment would have an enormously positive effect across all corners of the EU, while accelerating our transition to carbon-neutrality for buildings by 2050.

A ‘renovation wave’ for old and inefficient heating installations would also bring savings much closer to home, too. New systems bring energy savings, which is especially important for the some 50 million European households that were living in energy poverty even before the coronavirus crisis. The way we view our homes has changed since lockdown restrictions of varying degrees were imposed across Europe. It’s only right, then, that EU policy efforts to stimulate the economy and achieve carbon-neutrality reflect this: by helping to ensure better, more efficiently heated homes.
Heating technologies
Whether you live in a cottage in Sweden, a skyscraper in Frankfurt or a guesthouse in Sicily, there is an energy efficient or renewable energy solution to heat your building and provide hot water for you. This is because the European heating industry develops sustainable heating solutions for every need, from boilers to solar thermal systems, from heat pumps to fuel cells, from radiators to underfloor heating. Each heating technology is perfectly adapted to the specific needs of each building and of its inhabitants, as well as to the availability of peculiar resources – e.g. a rooftop well-exposed to the sun. Each of these technologies is already contributing and will contribute in the future to achieving a carbon-neutral building sector, reducing greenhouse gas emissions and saving energy.

2.1 Hybrid heat pumps

The term 'hybrid' refers to an appliance or a system of appliances which combines at least two different energy sources and whose operation is managed by one control. The most common product is the hybrid heat pump, which combines an electric heat pump with a condensing boiler.

How does a hybrid heat pump work? Based on pre-set preferences chosen by users (e.g. minimise CO₂ emissions or running costs), the hybrid’s control will select the most appropriate operation mode for the heater in a given building, climate zone, and current energy prices.

This reliance on two technologies makes hybrid heat pumps very efficient: in well-insulated buildings, the heater will operate mostly as a heat pump during spring and autumn. It will then use the condensing boiler during the coldest days of the year or in old, less insulated buildings.

Moreover, they can be installed without any prior adaptation of the building envelope and they facilitate staged renovation, i.e. to progressively add insulation. To cut CO₂ even further, they can be used with decarbonised and renewable fuels and electricity.

Benefits:
- Ready for green gases and electricity.
- Great energy efficiency and CO₂ emissions reductions.
- Help balance demand on the electricity grid, limiting demand peaks thanks to condensing technology.
- Where dynamic prices are implemented, people may save on the electricity bill, shifting their consumption to times when demand (and prices) are low.
- Suitable for many building contexts: hybrid heat pumps are a very convenient means to renovate existing heating systems.
2.2 Electric heat pumps

Electric heat pumps are extremely efficient because they transfer already existing heat from the environment into a building.

Modern electric heat pumps work very quietly and require virtually no maintenance. They mainly use the energy stored in the ground, groundwater, or air for space heating, domestic hot water, ventilating, and cooling. By reducing energy consumption compared to old and inefficient systems, heat pumps already cut CO₂ emissions. Even further emission cuts can be achieved by using renewable electricity, e.g. from wind or photovoltaic energy sources.

Various electric heat pump technologies adapt to many needs: to heat or cool rooms and to produce domestic hot water.

Moreover, they are suitable for different types of buildings: residential or commercial; with access to a water source (water-water heat pump) or to a large garden (ground source heat pump) and bring great comfort.

They reach their highest efficiency level in combination with:

- well-insulated buildings;
- distribution systems working at low temperature, i.e. underfloor heating and large radiators;
- higher temperature of the heat source (soil, groundwater or air).

<table>
<thead>
<tr>
<th>Year</th>
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<td>245,900</td>
</tr>
<tr>
<td>2013</td>
<td>251,000</td>
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<tr>
<td>2014</td>
<td>262,700</td>
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<tr>
<td>2015</td>
<td>277,900</td>
</tr>
<tr>
<td>2016</td>
<td>288,200</td>
</tr>
<tr>
<td>2017</td>
<td>298,300</td>
</tr>
<tr>
<td>2018</td>
<td>303,200</td>
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Benefits:

- Ready for green electricity.
- They are highly efficient. A heat pump with a coefficient of performance of 4.0 can transfer 4 units of heat to a building, using 1 kWh of electricity input.
- Most of the energy used for heating is renewable.
- They reduce CO₂ emissions; greatest reductions with the use of renewable electricity.

FIGURE 2 Working principle of an electrically driven heat pump

FIGURE 3 Sales of electric heat pumps in selected European markets

1 Figures 2, 6, 12, 14 in this section have been selected from BDH brochure, Efficient systems and renewable energies. Technology and Energy Panel.
2 For figures 3 and 4, considered European markets are Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom, representing over 90% of sales in Europe.
2.3 Condensing boilers

Condensing boilers are highly efficient technologies, capable of providing heat to buildings as well as domestic hot water. They are called ‘condensing’ because they ‘condense’ the water vapour produced in the combustion process into liquid form. The heat of the water vapour is reused to warm up the cold water entering the boiler. This process ensures that most of the energy produced during combustion is recovered to heat the building.

The most common condensing boilers operate with gas, while condensing boilers running on other fuels are especially suited for off-grid buildings. Condensing boilers can easily be teamed with a solar thermal system to reduce fuel consumption by 10-20%. The use of condensing boilers with green gases (such as biomethane, hydrogen and bio-LPG) and fuels would enable further CO₂ emissions reductions, moving us closer to our EU-wide goal to decarbonise the building sector by 2050.

Our market data shows that condensing boilers running on gas remain the first choice in efficient heating technology in Europe. They are particularly suitable for the modernisation of existing appliances as they can rely on an existing, and extensive, gas network. More than 4 million of them were sold in 2018, bringing substantial energy efficiency gains compared to the old and inefficient systems they replace. The highest energy efficiency gains are obtained by installing a condensing boiler and adjusting the system where needed thanks to hydronic balancing and the possible addition of heat emitters.
2.4 **Solar thermal**

Solar thermal technology converts **sunlight into heat**, which is then used to produce hot water, heat or even cool buildings. Most solar thermal systems work in combination with a heater; for example a condensing boiler or a heat pump, which operates when heat demand is too high for the solar system alone. On average, a single-family house can satisfy up to **60% of its heat demand for domestic hot water** with solar energy. A solar heating system is composed of: solar collectors, roof-mounted elements that collect energy from the sun, a hot water tank to store the water heated by the system, a circuit, and a heat exchanger to transfer heat from the collectors to the hot water storage tank.

Solar heat systems can also be used to top up central heating systems: in this case the saving on fuel is somewhere between 10% and 30% depending on the insulation levels of the building. It can be higher in the case of low-energy buildings. Solar thermally driven cooling systems – so-called solar air-conditioning – have a great potential, as the highest need for cooling goes hand in hand with the sun’s presence.

**Benefits:**

- Use of solar heat, which is available and free of charge.
- Saves energy by assisting the central heating system.
- Easy to install and use, low maintenance and low operating costs, long life span.
- Allows to integrate renewables within any heating system, both in existing and new buildings.
- CO₂ emissions reductions.

**FIGURE 5** Solar heat system
2.5 **Biomass boilers**

Biomass boilers are the **latest and most efficient technology to produce heat in the most ancient way**: wood-firing. Each year, 40% of the wood produced sustainably in Europe is used for heating in European buildings, both residential and commercial.

Sustainably-sourced wood is a carbon-neutral renewable resource: when burnt, the same amount of CO$_2$ that was absorbed by the tree during its growth is released. Therefore, central heating biomass boilers can provide high thermal comfort while reducing greenhouse gas emissions. Moreover, the overall sustainability of biomass heating is further increased in areas where wood is locally available, which shortens transport routes and helps the local economy.

Modern heating systems use biomass in the form of pellets, wood chips or split logs. They can also be easily combined with solar thermal systems and reach even higher efficiency levels.

**Benefits:**

- Very efficient use of a renewable fuel.
- Where biomass is locally available, biomass boilers create short transport routes, local jobs and domestic value.
- Great CO$_2$ reductions: sustainably sourced wood can be carbon-neutral.
- Can be easily combined with solar thermal technologies.
2.6 Combined heat and power, fuel cells

Electricity production and heat production go hand in hand. Producing electricity usually generates heat, so appliances that produce heat and power simultaneously, can reach very high levels of efficiency.

The heat they produce keeps a building warm and also provides hot water for washing and cleaning. Their electricity production can be used inside the building or fed into the electric grid. **By using their fuel economically, cogeneration of heat and electricity contributes to reducing energy consumption and CO₂ emissions.** Even greater CO₂ cuts are possible, by using green gases and fuels.

The use of heat from combined heat and power technology is particularly efficient at small scale. So-called micro-CHP and mini-CHP can be used in commercial and public buildings, apartments, individual houses and in some cases even in small collectives of houses. Several CHP technologies are available, they use engines or fuel cells. Fuel cells achieve very high energy efficiency levels and already work with 100% hydrogen.

**Benefits:**

- Ready for green gases.
- CO₂ reductions thanks to low fuel requirements.
- Electricity efficiency: by generating electricity at the point of use, CHP avoids losses typical of central power production and distribution.
- Heat efficiency of small CHP systems: heat generation at point of use avoids heat transport losses.
- Economic savings: reduce electricity purchase and allowing the sale of surplus electricity back to the grid.
2.7 Thermally driven heat pumps

Thermally driven heat pumps use the renewable energy stored in the soil, groundwater or the environment for heating purposes. These heat pumps use fuels such as natural gas or green gases as the source of energy to transfer heat from the environment to the interior of buildings. Because they make the most of already existing heat, these heat pumps are very efficient.

There are three main technologies of thermally driven heat pumps, depending on how environment heat is transferred from the outside to the inside of the building: by compression, adsorption or absorption. Each of these technologies is particularly well-suited for certain applications:

- Thermally driven compression heat pumps are especially suited to commercial buildings (such as hotels, hospitals or schools) and large housings to produce heating, cooling and domestic hot water.
- Absorption heat pumps are well suited not only for new builds, but also for existing buildings. This is because they can very efficiently heat water, up to high temperatures. This characteristic makes them suitable for renovation projects where the original old types of radiators – called high-temperature radiators – have to be kept.
- Adsorption heat pumps are most efficient in new heating systems or in deep renovation where they are coupled with low-temperature radiators or surface heating systems.

**Benefits:**
- Ready for green gases.
- Highly energy efficient: they use existing renewable energy from the environment.
- Absorption technology works very well with existing heating systems.
- Make use of existing energy infrastructure.

![Thermally driven heat pumps in commercial and residential areas](image)
2.8 Water heaters

We all need hot water for our shower and to wash our dishes. This is what water heaters are made for: they are dedicated appliances to provide water at the required temperature.

The production of hot water makes up an important share of the overall residential energy consumption for heating purposes – between 10 and 20%. There are many technologies available, the choice depends on the type of building and on the needs of those who will be using it.

A first differentiation is between on-demand and storage water heaters. On demand water heaters heat water instantly as it flows through them. Most of these water heaters run on gas or electricity. Storage water heaters offer instantaneous delivery of hot water and provide great comfort in case of simultaneous use, for example when two showers are running at the same time.

Storage water heaters directly produce hot water, therefore they combine in the same appliance a hot water storage tank and a heating element (a burner; an electric resistance heater or an air source heat pump). In other cases, hot water is provided by the same appliance that heats the building. This means that a heat pump, a boiler or solar collectors - or combinations of those, are connected to a hot water storage tank, which then releases hot water for domestic use. Other heating appliances, called combination heaters, provide heat for the building and on-demand water production.

Benefits:
- Ready for renewables.
- Variety of technologies to meet hot water demand in all buildings.
- Great comfort for users.
- Combination with solar thermal: energy from the sun may cover 70% of hot water needs.
- Heat pump water heaters: great energy savings.
2.9 Hot water storage

Interestingly, heating systems can even store energy – thanks to hot water storage tanks. Storing hot water is a good means to store energy, as water accumulates a lot of heat per unit of weight.

A hot water storage tank can help reduce energy consumption as it takes less energy to keep water warm (once it has already been heated) than it takes to heat cold water. Hot water cylinders can also help provide demand response services to the grid by allowing consumers to heat water with electricity when prices are lower. Energy is then stored in the tank in the form of hot water, ready to be used for washing or to heat the house when it is needed. Another advantage is that the energy from renewables, such as solar thermal, can be stored when available in abundance and used later.

Benefits:

- Comfort and flexibility: hot water available any time for simultaneous use and at the desired temperature.
- Energy efficiency: modern hot water tanks are well-insulated and ensure that the heat is transferred and stored correctly in the cylinder.
- It allows to store renewable electricity and enables demand-side flexibility: when abundant, it is converted into heat and stored as thermal energy.

**FIGURE 11** Hot water storage tank
2.10 Surface heating and cooling

Many new buildings all over Europe opt for a surface heating and cooling system – hot or cold water is circulated via pipes, which are embedded in floors, walls or ceilings, and thus form an integral part of the building. These systems fulfil two functions at once: in winter they heat the rooms, while in summer they cool them down by running cold water through the pipes. Through their large-area installation, they ensure the distribution of heating or cooling in the room, contributing to a pleasant indoor climate all-year round.

A wide range of solutions is also available for old buildings. Surface heating systems generally work well with low heating temperatures (35/28°C) – perfect to maximise the efficiency of modern heating systems. The lower the heating system temperature, the higher its efficiency. Surface heating and cooling is also great for cosiness and comfort: smart control systems enable residents to create a heating profile for every room, tailoring comfort levels perfectly to the needs of residents. Embedding heating systems in walls, floors and ceilings also frees up a lot of space.

**Benefits:**
- Fully covering thermal comfort needs, all-year round.
- Highly energy efficient and optimal solution when combined with renewable heating.
- Suitable for all efficient modern heating systems in all types of buildings.
- Comfortable and frees up a lot of space.

![An example of floor heating system](image-url)

**FIGURE 12** An example of floor heating system
Today’s radiators are key components of efficient heating systems. Successfully increasing the efficiency of a whole heating system depends on all components being optimally adjusted to each other. Modern heaters tend to run more efficiently, when they run steadily at relatively low temperatures (i.e. 55°C or lower).

Modern radiators can achieve these low temperatures and still properly heat a building thanks to their innovative shapes and large heating surfaces. Modern radiators are also versatile: they can be integrated into any type of heating system, regardless of the heating technology used. This is why low-temperature radiators should ideally form an integral part of the modernisation of a heating system.

Modern radiators do not only help to save energy; they also provide comfort. For example, thanks to remotely controlled radiator valves, users can set the temperature of individual rooms from their smartphone. The more aesthetic designs of modern radiators can even make them a design feature.

**Benefits:**

- Energy saving thanks to low-temperature systems.
- Great comfort and possibility to control remotely.
- Easy to install, minimum maintenance.
- Combinable with all modern heating technologies and renewable energies.
2.12 **Smart heating**

Smart heaters are ultimately interactive in nature. They can send and receive information to and from the user, communicate with other appliances in the house and even with the outside world, such as installers and energy utilities.

**Smart heating puts consumers in the driver’s seat.** Thanks to its integrated communication device, a smart heater allows you to adjust the heating of your building to your needs and even to control it remotely. For example, allowing you to switch on your heating towards the end of your commute, so your home is already comfortable from the moment you arrive. Smart heating systems also enable so-called ‘remote appliance monitoring’ that allow your installer or service company to provide timely and pro-active maintenance to end-users, allowing them to enjoy uninterrupted heating comfort in their homes.

*FIGURE 14* Networking of energy-related products with an intelligent Home Energy Management System (HEMS)
Smart heating is good for the environment. Smart controls help to boost the efficiency of a heating system, generating high energy savings. These systems also help to integrate renewable electricity from the grid, for example by setting the smart heater to prioritise electricity consumption when it is more abundant. This is most easily achieved with appliances like hybrid heat pumps, electric heat pumps and hot water storage tanks. With all these appliances, it is possible to anticipate or delay the time when they use electricity. For example, one could use a heat pump to heat a well-insulated house before arriving home, and still enjoy a warm living space for several hours. Another example would be to use a hybrid heat pump in electric mode when electricity is more abundant and economic, switching to the integrated boiler when it gets too expensive. Users could also opt to heat water with the back-up resistance of a well-insulated storage tank (power-to-heat) when electricity is cheap, and to use the hot water whenever it is needed.

Smart heating will be an integral part of the ‘smart homes’ revolution. The many different appliances inside a building (e.g.: heating and cooling systems, ventilation, fridges, electric vehicles), will be able to coordinate their operation, optimising comfort and bringing energy efficiency gains for consumers.
European markets overview

- The colors of all graphs on the installed stock refer to the Ecodesign Energy Labelling Regulation (EU) 2017/1369.
- All data come from EHI market statistics and estimates.
Austria presents a rather diverse heating market, where gas condensing, electric heat pumps and biomass boilers represent most new installations.

From 2015 to 2018, the Austrian market for energy efficient and renewable heating technologies has shown a moderate growth, with over 65,000 of these heaters sold in 2018. These new appliances are badly needed to replace the some 1,088,000 old and inefficient heaters installed in Austria’s buildings as of 2017. New installations are simply not happening fast enough. At the current rate of replacement, it would take decades to switch Austria’s buildings to efficient heating technology.

From condensing boilers to heat pumps and biomass boilers, a wide range of efficient and renewable heaters were sold in Austria in 2018. Gas condensing remains the main technology, despite a slight decrease in sales after 2016 peak. Each new condensing boiler brings an efficiency increase up to 20% and CO₂ emissions reductions up to 35%.

Unlike many other EU countries, Austrian sales of biomass boilers (15% of the market) and heat pumps (31%) are quite high. The market for heat pumps, in particular, has been increasing almost every year since 2011. This technology is often used in new buildings and has been helped by incentives on the regional and local level. The market for solar thermal, on the other hand, has been declining since its peak in 2009, and now stands at just a third of the size recorded a decade ago.
Another important element on the Austrian heating landscape is the presence of district heating, which provided 14% of the country’s heating needs in 2014. District heating is a broad category, which includes large and relatively old systems, like Vienna’s. Vienna’s district heating network conveys heat from waste incineration, oil and gas to about a third of the capital’s households; but district heating also means small and very efficient systems based on renewables (e.g.: biomass), which can contribute to decarbonisation.
3.2 Belgium

In Belgium, gas boilers have been the most common heating for several years due to an extensive gas network and the availability of relatively inexpensive gas from the North Sea and the neighbouring Netherlands. A large stock of old oil boilers is gradually being replaced by new, efficient appliances, including heat pumps.

Every year, over 200,000 new heating appliances are installed in Belgium. Already in 2015 there were more gas condensing, efficient heaters than inefficient, non-condensing gas appliances. The positive trend towards efficiency continued in 2017: there were over 1.7 million gas condensing appliances installed in Belgian buildings in 2017, almost 44% of the overall stock. The replacement is not, however, proceeding as fast as it should. In late 2011, a policy to promote condensing technology stopped, leading to a significant decrease in the replacement of old heaters and a contraction in the condensing gas boilers market of 12% in 2012.

About 2 million inefficient, old boilers are still heating Belgian buildings in 2017, of which more than 600,000 oil fuelled. At current replacement rate, it will take more than 30 years to replace them all with new, efficient appliances. The replacement would be highly beneficial to Belgium’s carbon-reduction goals: bringing at least 2 million tonnes of CO₂ emissions reductions, not to mention high energy savings for consumers.
CO₂ emissions can be reduced even further when installing renewable-based heaters. In this group of technologies, electric heat pumps are on the up, as new installations have been growing steadily since 2013. With over 9,000 hydronic electric heat pumps sold in 2018, the market increased by almost 10% compared to 2017. Renewable solutions are common in new residential buildings (about 8,000 heat pumps installed in these buildings in 2018), while efficient condensing technology makes up most of the rest of the market.
3.3 Denmark

While most heating is district-based, Denmark presents a **diverse market for individual heaters**, with gas condensing, heat pumps and biomass boilers covering most of new installations.

A variety of efficient and renewable-based heating technologies were installed in Denmark in 2018. **Heat pumps** (7,700 sold in 2018) and **biomass boilers** (5,900) are the most common technologies to replace the still sizable stock of old and inefficient non-condensing oil boilers – about 200,000 appliances in 2017, mostly in rural areas. From 2012, the substitution of old oil boilers systems with renewable-based ones has benefitted from a government-funded scheme. Every heat pump replacing an old oil boiler brings about 50% CO$_2$ emissions.

In urban areas served by gas networks, the **old stock to be replaced** is made of about 73,000 non-condensing gas boilers (2017). These inefficient heaters are being replaced at a pace of around 15,000 boilers / year – which represents half of the Danish market for efficient and renewable-based heaters. Substitution with condensing gas heaters systems will bring energy savings of around 20% and consistent CO$_2$ emissions reductions.
District heating plays an important role in Denmark, covering about two thirds of residential buildings in the country. District heating covers 60% of all new buildings; the rest is covered by gas condensing boilers and heat pumps. However, the combustion of fossil fuels and non-organic waste made up about 40% of the fuel mix for district heating – almost a quarter of it being coal. Incineration of municipal waste is also widespread, while some of it is accounted for as biofuel.3

A transition to smaller, low-temperature and renewable-based district heating systems represents a unique opportunity for further efficiency gains and emission reductions.

3 Energistyle Data, tabeller, statistikker og kort Energistatistik 2018, p. 17
https://ens.dk/sites/ens.dk/files/Analyser/energistatistik_2018.pdf
3.4 France

An abundance of electricity resulting relatively low electricity prices, combined with support schemes, have all contributed to making France the largest EU market for electric heat pumps today.

In 2018, about 100,000 heat pumps were installed in French buildings, marking an increase of over 14% on the previous year. Electric heat pumps are often used in new individual dwellings. When it comes to hybrid heat pumps, France remains one of the largest EU markets, although installations did not grow in 2018.

Gas condensing technologies account for about three quarters of the French heating market, as over 517,000 appliances were sold in 2018. They are mostly installed as replacements for old appliances and in new collective buildings. Pushed by changes in the regulatory framework, biomass boilers also saw a slight increase, although their numbers remain smaller than the pre-crisis peak in 2008. In 2018, about 10,900 biomass boilers were installed in French households. Another previously declining market, solar thermal, started to stabilise in 2018 thanks to installations in collective buildings.

Accelerating the replacement of old appliances with new ones is key to reducing the greenhouse gas emissions of France’s buildings. Modernising the current stock of inefficient heaters (less than 30% of installed boilers are condensing) can cut greenhouse gas emissions by at least 35% per heating system. In this field, condensing technology still makes up the majority of the market as most of the installed non-condensing heaters are replaced with a modern, state-of-the-art condensing boiler. However, at current replacement rates, it will take about two
decades to entirely modernise the installed stock of old and inefficient heaters – hence the need to accelerate the deployment of efficient and renewable heating technologies.

A higher replacement rate will contribute to further raising the contribution of the heating (and cooling) industry to the French economy, which generates a turnover of over 6.6 bn EUR and directly employs 22,000 people.
3.5 Germany

Gas condensing technology holds a leading market position in Germany, followed by electric heat pumps.

In 2018 alone, about 660,000 efficient heating appliances were installed in German buildings. This significantly reduced the country’s installed stock of old and inefficient heaters, which remains the second largest in Europe. In 2017, about 12 million non-condensing boilers were heating German buildings.

And what a difference modernisation makes: the introduction of a new generation of heaters can drastically reduce CO₂ emissions and energy consumption – starting from a minimum level of 20% per heating system renovation. What’s more, it will positively affect the job market: providing new work opportunities to 50,000 heating installers, as well as to the 37,000 employees of the manufacturing industry. An industry generating over 15 billion EUR in worldwide turnover.

While the modernisation rate is higher than in most EU countries, it will still take about 20 years to substitute old heating systems with efficient and renewable ones.

When it comes to efficient heating technologies, gas condensing boilers are the most popular, and in 85% of cases they are used to replace an old heater, bringing substantial energy savings. Electric heat pumps are the second most popular heating technology; in 2018 they represented over 13% of the efficient heaters installed in Germany. Condensing technology and heat pumps are the most chosen technologies in new buildings, representing 44 and 41% of the market respectively, demonstrating the importance of heat pumps in new buildings.
Further, the German solar thermal market is the largest in Europe – although new installations have been declining since 2009. Today, more than one in ten heaters is coupled with solar thermal technology. Moreover, district heating is quite common, being used in about 14% of residential buildings. As several old systems still use coal, modernisation is needed, either via the use of individual, cleaner appliances, or thanks to the creation of small, efficient and renewable-fueled district heating networks.

**Figure 24** Installed stock of heaters in Germany in 2015 and 2017
3.6 **Italy**

The need for both heating and cooling is an important reason why **Italy is the largest EU market for hybrid heat pumps**. Gas condensing technology remains the best-seller, due to an extensive gas network and the affordability of gas.

In 2018, over 775,000 new, energy-efficient and renewable-based heaters were installed in Italian buildings, marking an increase of about 10% from 2017. Among these, 94% were gas-condensing boilers, the most common efficient technology used to replace the stock of old and inefficient non-condensing boilers. This market development generated a **turnover of 3.8 bn EUR** in the period 2014-2018.

Importantly, the **heating sector creates jobs**: Italy is the second-largest EU manufacturing country for heating appliances, meaning heating will contribute in large part to the 115,000 estimated jobs per year that the energy sector is set to create by 2030.

Despite being a large market for energy efficient and renewable based heaters, installations of new appliances are still only making a small dent in the **installed stock of old and inefficient heaters of Italy**. This stands at a daunting **14,6 million systems (2017)** and will take about **20 years** to entirely modernise. As a matter of fact, the modernisation of the stock only really began in full force after the entry into force of the Ecodesign and Energy Label Regulations for heaters. To accelerate the replacement rate, the Italian heating sector is strongly investing in communication and training, and has recently launched a **label for already installed appliances**. Such labels aim to raise awareness as to just how inefficient the appliances installed in their homes are when compared with modern technologies.
Moreover, Italy is the EU’s largest market for hybrid heat pumps, with 7,000 appliances sold in 2018, an increase of almost 10% on the previous year. Their success is due to policy support and their versatility, which makes them highly adaptable to Italy’s strong seasonal weather changes. Solar thermal technology, on the other hand, has been decreasing since 2011, partly because the national legislation for renewables is not based on a principle of technological neutrality. Electric heat pumps have enjoyed high growth rates in the past years and the market reached 33,500 items sold in 2018. Among the reasons for this uptake includes the creation of a special tariff in 2014 to lower Italy’s electricity prices, which were very high.
3.7 **The Netherlands**

The Netherlands has the smallest share of old heaters in the stock of appliances installed in buildings of any EU country. This is because the Netherlands was a very early adopter of the condensing technology.

The condensing boiler became popular in the mid-1990s due to a significant change in the regulatory framework and thanks to the presence of a well-developed gas infrastructure. This led to a dynamic market, counting between 400,000 and 460,000 energy efficient and renewable-based heaters installed every year in the country.

Had non-condensing appliances not been replaced as they were, the Netherlands would have been responsible for an additional 9.3 million tonnes of CO₂ emissions. Those replacements also contributed positively to the Dutch economy, where the heating industry represents over 850 million EUR turnover and 5,000 jobs.

![FIGURE 27: The Netherlands – sales of efficient heaters in 2018](image)

*Gaseous fuel condensing boilers* (94%) vs. *Liquid fuel condensing boilers* (6%)
Gas condensing boilers have been the most common heating technology installed in Dutch buildings in the past years – almost 430,000 in 2018 (Figure 29). Moreover, other efficient and renewable technologies are becoming more and more common. This is because the Dutch government has set to reduce natural gas consumption in the coming years. Hence the use of hybrid heat pumps in renovation is promoted and growing, while electric heat pumps are being installed often in new buildings. District heating has been put forward as another potential avenue, and the potential use of hydrogen and biomethane is being discussed as a way to heat buildings while using (and upgrading where needed) the existing and well-developed Dutch gas network.
3.8 **Poland**

In 2018, over 345,000 energy efficient and renewable-based heaters were installed in Polish buildings. Approximately 75% of them were fitted to replace old and polluting heating systems. However, coal is still widely used for heating. These old and polluting boilers need to be replaced with more efficient and greener alternatives, and quickly.

A significant boost for these heating alternatives came from national policies based on EU Regional Operational Programmes, like the Clean Air Program, intended to lower emissions of air pollutants and improve air quality through the installation of efficient and renewable-based heaters. Coal is still widely used for most energy uses, for example to produce electricity (about 80% from coal) and hot water for district heating (about 75%).

The use of coal for individual heating is also significant, although lower: around half of the over 4 million old boilers in Polish buildings run on coal. These obsolete appliances need to be replaced quickly with more efficient, cleaner technologies, but this is not happening fast enough. At this pace, it will take about 15-20 years to replace them all. The benefits of replacing old heaters in Poland will be huge: over 30 million tonnes of CO₂ and 130 tonnes of particulate matter (PM) emissions reductions per year. It would also mean increasing the contribution of the heating industry – currently 4 bn EUR / year – to the Polish economy.

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Most of the new heaters installed are **gas condensing boilers**, which are particularly suitable (virtually no PM emissions) to fulfil Poland’s Clean Air Programme. The number of electric heat pumps being installed increased by 39 percent in 2018 compared to the previous year, and also do not emit PM locally during operations. These appliances are very common for installation both in old and new buildings. Moreover, in **2018**, the **Polish market for solar thermal systems grew substantially** (about 310,000 sqm sold); the Polish heating market also maintained its characteristically **large share of modern biomass boilers**, which reduce local emissions compared to their coal-based predecessors.

**FIGURE 30** Installed stock of heaters in Poland in 2015 and 2017
3.9 Spain

Easy to install and maintain, and benefitting from a good gas distribution network, condensing boilers are the efficient technology of choice in the Spanish market.

Over 340,000 efficient and renewable-based heaters were sold in 2018. Most of them replacing the stock of around 7 million old and inefficient appliances installed in Spanish buildings until 2017. Only by replacing old gas appliances, which represent the bulk of the installed stock, will Spain achieve over 1,300 GWh of energy savings.

However, at current replacement rates, it will take more than 30 years to attain these results. Therefore, the Spanish heating industry has long decided to speed up the replacement rate and recently launched a label for installed appliances. Thanks to this label, consumers can evaluate the (in)efficiency of their installed heating system and easily plan its replacement with a new, much more efficient and renewable-based one. Decarbonisation cannot be achieved without empowered consumers. Such a people-centred process will contribute to boosting the positive impact of the heating industry in Spain: 2,600 jobs in manufacturing and a turnover of over 450 million EUR, as well as the thousands of small companies active in installation and maintenance across the country.
Gas condensing boilers constitute about 93% of the total market of efficient heaters. Replacing old systems with these new ones will bring energy savings in the area of 20% and even higher CO₂ emissions reductions. When it comes to renewable-based heaters, the installations of biomass boilers remains stable at around 1,500 heaters. Heat pumps are growing, helped by regional incentive programmes and by a growing number of new buildings, where they are most often installed. In 2018, more than 17,000 heat pumps were installed in Spanish buildings. Unlike some other European countries, solar thermal was recovering in 2017-2018, mostly thanks to installation in new buildings.

![FIGURE 32](image_url) Installed stock of heaters in Spain in 2015 and 2017
3.10 **Sweden**

Heat pumps are the leading building-based heating technology in Sweden, followed by biomass boilers.

In 2018, over 47,000 new heaters were installed in Sweden. Among these, **93% were electric heat pumps**. Heat pumps are mostly installed in single family houses, replacing over time a large stock of old non-condensing oil boilers: the most common heating technology in Sweden until the late 1980s. The change from old and inefficient appliances to more efficient ones was a key contributor to increasing energy efficiency and sustainability of the building sector. But this **replacement did not happen on its own**; on the contrary, it was helped by tax credits launched in the 1990s and 2000.\(^5\) Another important factor for the success of heat pumps in Sweden is the low price of electricity. This may change in the future, as there are plans to close several nuclear reactors, which today produce over 40% of Sweden electricity.\(^6\) **Higher electricity prices** may result in increased use of the alternatives, such as biomass, biogases and biofuels.

**FIGURE 33** Sweden – sales of efficient heaters in 2018 (in percentages)

Biomass boilers are the second most common technology in single family houses and non-residential premises: biomass represented **14%** of the total energy consumption for heating and hot water (district heating excluded). Gas boilers are not as used as in most other EU countries (figure 35); an important reason is the relatively **limited development of the gas grid**. On the other hand, the share of consumption of green gas is rather high: almost **24%** of the total gas supply (2017). This is mostly biogas, used in the industrial sector. **Biomethane is mixed in the natural gas grid and the share used in heating is around 60%**.

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\(^5\) [Swedish Energy Agency, Heat Pumps in Sweden - Factors behind the market developments, 2018, slide 8.](#)  
\(^6\) [European Commission, EU energy in figures, 2018, p. 90.](#)
The other main player in the Swedish heating sector is **district heating, which is mainly used in apartments and non-residential buildings**. The market consists of several companies, often operating at a local level in natural monopolies; end users in district heating networks are usually not able to choose their heat supplier. On the other hand, there is competition between district heating and other products and services in the heating market. Because of this, the pricing of district heating is normally set against the prices for alternatives (e.g., heat pumps, biomass boilers).  

![Figure 34: Installed stock of heaters in Sweden in 2015 and 2017](image)

FIGURE 34 Installed stock of heaters in Sweden in 2015 and 2017

Source: SBBA (Swedish Heating Boilers and Burners Association).

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7 Source: SBBA (Swedish Heating Boilers and Burners Association).
3.11 Switzerland

Electric heat pumps and gas condensing boilers are the two most chosen technologies in the Swiss market.

In 2018, more than 47,000 new and efficient heating appliances were installed in Swiss buildings, with the market recovering from the low levels reached in 2016. The introduction of this new generation of heaters is replacing the installed stock of old and inefficient appliances currently installed in about 375,000 Swiss buildings (2017). Ecodesign and energy label rules for heaters have applied in Switzerland since 2018, based on bilateral agreements between Switzerland and the European Union.

Most of the stock of old and inefficient heaters to be replaced is made of non-condensing oil boilers, which are rather common in valleys where the gas grid is not developed. In 2018, electric heat pumps were the most common technology, with about 22,000 new units installed. Thanks to the low CO₂ intensity of the Swiss electricity mix, the carbon footprint of these electric heat pumps during operations is very small. Condensing boilers are also rather common: more than 15,000 gas condensing appliances were sold in 2018, mostly in urban areas connected to the gas grid. Despite the availability of wood, biomass boilers remain a small market in Switzerland, with about 1,700 heaters installed in 2018. Installations of solar thermal are also rather small, and, despite plateauing in 2017-2018, they remain at almost a quarter of their 2013 peak.
FIGURE 36 Installed stock of heaters in Switzerland in 2015 and 2017

<table>
<thead>
<tr>
<th>Type</th>
<th>2015</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid fuel non-condensing</td>
<td>420</td>
<td>360</td>
</tr>
<tr>
<td>Gaseous fuel non-condensing</td>
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<td>14</td>
</tr>
<tr>
<td>Condensing Liquid fuel</td>
<td>56</td>
<td>71</td>
</tr>
<tr>
<td>Condensing Gaseous fuel</td>
<td>247</td>
<td>275</td>
</tr>
<tr>
<td>Heat pumps</td>
<td>223</td>
<td>265</td>
</tr>
<tr>
<td>Biomass boilers</td>
<td>65</td>
<td>68</td>
</tr>
</tbody>
</table>
Turkey

Turkey is a large market for heaters, experiencing in 2018 the transition from non-condensing to condensing technology, pushed by Ecodesign.

In 2018, almost 800,000 energy-efficient and renewable-based heaters were installed in Turkey, with a strong growth from the previous year. Sales of these equipment are on the up, because less efficient, non-condensing appliances are being banned from the market, following the local implementation of Ecodesign requirements (April 2018). Before the introduction of Ecodesign, the total market – including non-efficient appliances – was above 1,000,000 heaters per year. It remains to be seen whether it will reach the same levels again. Although it is not a member of the EU, Turkey has adopted Ecodesign rules for heaters as part of its candidacy to become a member.

Replacements hold about 40% of the market in Turkey. Almost all products installed are gas condensing boilers, which are replacing a stock of almost 8 million older (2017), non-condensing heaters and are installed in new buildings as well. Most of the market for heaters is explained by the growth of the construction sector, which stems from almost 4 years of economic expansion. While the economy slowed down in 2018-19, construction kept growing, based on previous contracts. Considering the 20,000 workers it employs, the impact of the heating industry on the Turkish economy is significant and beneficial.
The market of hydronic heat pumps does not benefit from the same positive dynamics. On the contrary, in 2018, sales of heat pumps decreased compared to the previous year and remain at a very low level below 5,000 units. This is due to the relatively high investment cost of the technology in a price-sensitive market, as well as to the lack of incentives and the low number of installers familiar with the technology.

**FIGURE 38** Installed stock of heaters in Turkey in 2015 and 2017

![Bar chart showing installed stock of heaters in Turkey in 2015 and 2017](image)
3.13 The United Kingdom

The United Kingdom is, together with the Netherlands, the country with the **smallest share of old, non-condensing heaters** installed in buildings. Both countries made **condensing technology mandatory** in the recent past (the UK in 2005) and have a very dynamic market. As a result, in 5 or 6 years from now, all non-condensing heaters in the UK may have already been replaced with more efficient appliances.

And the effects are clear: since 2005, domestic gas consumption has reduced, with a consequent reduction of CO₂ emissions. But even more efficiency gains are coming, as the Boiler Plus scheme in England mandates that all boilers installed in existing buildings are to have **higher efficiency levels** than the first-generation condensing. Moreover, most new boilers are today installed with **smart controls**, allowing for important additional savings, e.g. smart thermostats or controls for weather adjustments.

The heating sector has an important role in the UK economy, employing about 150,000 people (10,000 manufacturers, around 130,000 heating engineers and 2,000 merchants). In 2018, almost all efficient heaters installed in new and existing buildings were gas condensing boilers, with over 1,650,000 appliances put on the market and then delivered to buildings. Approximately 150,000 new homes are built every year in the United Kingdom. **Gas condensing boilers** are the most prominent technology used in these buildings (around 70%), together with electric radiators, heat pumps and heat networks. Installations of electric heat pumps have grown, as they stood at over 20,000 units in 2018. Biomass boilers installations are stable at around 6,000 units per year. **Hybrid heat pumps** are
still a niche market, but they may become one of the most common appliances in the future, according to the latest recommendations to the UK government by the Committee on Climate Change.

Moreover, the UK has been a **frontrunner in innovative projects to use hydrogen for heating** – which burns without producing CO₂. Several pilots are ongoing in the country, investigating various aspects of hydrogen use: from the combustion of **hydrogen for heating** (pure or in blends with natural gas) to its distribution in gas networks, the UK is seeking how this fuel can best contribute to decarbonising buildings.

**FIGURE 40** Installed stock of heaters in the United Kingdom in 2015 and 2017

![Graph showing the installed stock of heaters in the United Kingdom in 2015 and 2017.](image-url)
3.14 **Main trends of Central and Eastern Europe markets**

EHI has been monitoring the evolution of market trends and of the installed stock of heaters in several Central and Eastern European countries: Bulgaria, Czech Republic, Hungary, Poland (see specific country report), Romania and Slovakia. In all these countries, the sales of condensing boilers and electric heat pumps have been growing since 2015. The installed stock of inefficient non-condensing appliances (over 10 million appliances in these countries in 2017) is progressively being substituted with energy efficient and renewable based heaters. In general, markets in these countries tend to be rather dynamic, as individual heating systems gradually substitute stoves and – in certain countries, like Hungary and Romania – district heating.

A peculiarity of several Eastern European countries is the relatively large stock of solid fuel boilers installed in buildings. Most of them are still old coal boilers. Their replacement will bring not only energy savings and CO₂ emissions’ reductions, but it will also improve air quality in the areas where these boilers are installed – mostly near coal mines. These boilers are being replaced with other technologies, which are different depending on local conditions. **Gas condensing technology** is the most common, while sales of biomass boilers are not yet large enough to make up for the lost solid fuel.

Another interesting characteristic common to many of these countries is the higher share of users connected to large district heating networks, compared to the EU average. For example, in Czech Republic and Poland, over 40%⁸ of the population is connected to district heating. In Romania, the share is about 24%.⁹ But these district heating systems are often old and inefficient and coal is still often used as a fuel: in Poland, 75% of district heating was generated from coal in 2016,¹⁰ while in Czech Republic the percentage was above 50%. However, there are some signs that the situation is changing, thanks to the installation of individual efficient heating appliances in buildings previously connected with district heating (e.g.: heat pumps and condensing boilers in Czech Republic and Romania). Moreover, some district heating systems are being renovated and made more efficient, or the source of heating is being changed from coal to natural gas or others. However, **trends are mixed**: for example, in Romania the trend to substitute coal with gas in district heating seems to be diminishing.¹¹

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⁹ Data on district heating in Romania come from the website of the Romanian Cogeneration association, COGEN Romania, [https://cogen.ro/](https://cogen.ro/).
¹¹ COGEN Romania website, [https://cogen.ro/](https://cogen.ro/)
3.15 **Main trends of the burners’ market**

A burner is a crucial component of a boiler, because it generates and accurately controls its heat source, the flame. The sales of burners monitored by EHI refer to **four main national markets**: France, Germany, Italy and the United Kingdom. The definitions of the product destination are slightly different for each country, so the numbers should not be directly aggregated. Therefore, this section focuses on trends, rather than on total sales numbers. The **EHI statistics cover burners sold alone**, i.e. separately from boilers. Burners can be sold integrated in a boiler – in this case their sales are already captured in the EHI statistics on heaters – or separately from it.

**Residential and commercial sector, up to 400 kW**

Sales of burners have been historically declining in this segment, due to the increasing presence of integrated boilers and burners. Many of these burners are sold as spare parts, to be installed in existing appliances. After the **introduction of Ecodesign** in 2015, the market slightly increased in France, Italy and the UK and then stabilised or slightly decreased. In 2018, the warm winter further contributed to the market decrease (e.g. in France). Burners sold as spare parts can increase the efficiency of a boiler and reduce its emissions; even **higher gains**, however, will be obtained by **substituting the whole boiler** with a new, condensing appliance.
Commercial and industrial sector, from 400 kW

These large burners are mostly sold alone. They can then be integrated in big boilers or used on their own for industrial processes like ceramic production or paint drying.

In this segment, the industry is developing innovative solutions, aimed to optimise combustion processes and to automatically adjust them, according to environmental and system variables. These new developments are important to achieve important emissions cuts, for example of NOx. In addition, the range of modulation is an important area of research from manufacturers. This is key to increase the efficiency in operations, as well as to extend the flexibility of burners and make them suitable for a growing range of applications.

The total number of sales is often related to the trends of the production segments for which these burners are used.

FIGURE 44 Sales of commercial and industrial burners >400 Kw

<table>
<thead>
<tr>
<th>Year</th>
<th>France</th>
<th>Germany</th>
<th>Italy</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
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<td>2018</td>
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3.16 Main trends of the market for heat emitters

Most heated buildings in Europe rely on water to distribute heat in the various rooms. Hydronic (water-based) heat emitters, such as radiators, convectors and surface heating and cooling (e.g. underfloor heating), can be found in almost 130 million EU buildings. Not only are they crucial for peoples’ comfort; they also bring energy savings and reduce CO₂ emissions.

Modern heat emitters called ‘low-temperature’ enable the use of efficient and renewable energy for heating purposes. They do so by maximising their heating surface (large radiators, wide heated floor areas) and by reducing their water content. This combination allows for the use of low-temperature water (< 50°C) to heat a room; and the lower a heating system’s temperature, the higher its efficiency. This is why Europeans can achieve significant energy and CO₂ emissions savings in their buildings by modernising their heating and cooling systems and installing low-temperature heaters and heat emitters.

Radiators are the most common type of heat emitters. They are versatile, as they can be used with both low and higher temperature systems – which may be needed if the house is not well insulated.

While their sales slightly declined between 2015 and 2016, the market was relatively stable between 2010 and 2016 onwards. Among the various types of radiators, bathroom radiators have been growing the most because they are installed even in houses that do not have space heating radiators, for their important function as towel dryers.

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\[ Data\ on\ radiators\ include\ the\ following\ countries:\ Austria,\ Belgium,\ Bosnia\ and\ Herzegovina,\ Cyprus,\ Czech\ Republic,\ Denmark,\ France,\ Germany,\ Greece,\ Italy,\ Lithuania,\ Netherlands,\ Poland,\ Romania,\ Slovakia,\ Slovenia,\ Spain,\ UK,\ Ukraine. \]
Radiators with integrated valves, which make it possible to increase further comfort and energy efficiency by adjusting the heat in a specific room, are also becoming more and more common.

**Surface heating and cooling** (e.g. underfloor heating) is a growing technology. It has already become rather common in houses, but it is less installed in apartments and commercial buildings.

With some differences across Europe: underfloor heating is most used in **central Europe**, less so in Eastern European and Mediterranean countries. It brings great comfort and, due to its low temperature, it allows heaters to run very efficiently.

![FIGURE 46](image)

Another advantage of surface heating and cooling systems is the function of **cooling during hot periods**. This is an increasing aspect for the comfort in buildings.

It is expected that the sales of low-temperature heat emitters will grow in the coming years, also as a result of European and national legislation that favours the adoption of energy efficiency measures and renewable energy in buildings.
Heat emitters also make a positive contribution to the EU economy. EU manufacturers have an annual turnover of over **2.5 billion EUR** and employ over **20,000 people** in Europe – and even more in the supply chains and distribution / installation networks. Additionally, companies invest about 100 million EUR annually in research and development to boost the sector’s intellectual and industrial leadership.

Data on radiators include the following countries: Austria, Belgium, Bosnia and Herzegovina, Cyprus, Czech Republic, Denmark, France, Germany, Greece, Italy, Lithuania, Netherlands, Poland, Romania, Slovakia, Slovenia, Spain, UK, Ukraine.
NOTE ON THIS REPORT:

All data are rounded to the nearest hundred (sales), thousand (installed stock) and whole number (percentages). Where actual data is not available, we have used estimates based on market knowledge and existing figures.

The country overviews found in this report were selected based on data availability and market size, with the aim of providing the most complete data set possible, and to illustrate important market trends across Europe.
### Product Definitions Glossary

<table>
<thead>
<tr>
<th><strong>GAS CONDENSING</strong></th>
<th>Gas condensing boilers, up to 400 kW</th>
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<tbody>
<tr>
<td><strong>OIL CONDENSING</strong></td>
<td>Oil condensing boilers, up to 400 kW</td>
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<tr>
<td><strong>GAS LT</strong></td>
<td>Gas non-condensing, low temperature boilers, up to 400 kW</td>
</tr>
<tr>
<td><strong>OIL LT</strong></td>
<td>Gas non-condensing, low temperature boilers, up to 400 kW</td>
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<td><strong>BIOMASS</strong></td>
<td>Biomass boilers, up to 400 kW</td>
</tr>
<tr>
<td><strong>HEAT PUMPS</strong></td>
<td>Hydronic heat pumps for heating purposes, not chillers, up to 400 kW</td>
</tr>
<tr>
<td><strong>SOLAR THERMAL SYSTEMS</strong></td>
<td>Solar thermal collectors, both flat plate and vacuum tubes, with the exclusion of collectors used in thermosiphon systems.</td>
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</tbody>
</table>
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