

European heat pump market

Despite a challenging market environment, European heat pump sales grew by +7.4% in 2020. 1.62 million units were sold across Europe, a number that marks a new record high.

Assuming a life expectancy of approx. 20 years, the current European heat pump stock amounts to 14.86 million units (see **Figure 1**). 13.2 million of these units are heating heat pumps. Putting this into the perspective of between 115 and 120 million residential buildings in Europe, the heat pump market share in the building stock is about 11% 13,2/115.

Heat pump market growth is mainly influenced by three trends:

1. From a technology perspective today's heat pumps can cover a wide temperature range. They can operate at outdoor temperature levels of down to -25°C and increasingly often they provide hot water at 65°C in an efficient manner. That enables their deployment in a much larger share of buildings than a decade ago. Hybrid systems enable heat pumps even in completely unrenovated parts of the renovation segment. Considering the industrial and large thermal capacity segment, heat pumps cannot provide 50 MW and more, if installed in cascades and can provide up to 160°C . 200°C heat pumps are under development.
2. The need to accelerate the energy transition also in the heating and cooling sector moves heat pumps to the centre of attention of policy makers. Legislation passed in the past 8 years is now transposed in all member states and it starts to show impact. Building standards limit maximum heat demand per square meter, mandate the integration of renewable energy and favour smart buildings. This is often substantiated by institutional and financial subsidies that make market development easier.
3. Continuously larger and growing sales numbers result in lower cost. Economies of scale are materialising on the component and the product



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level. The fast decline of the production cost of PV systems also influences the heating market: using self-produced electricity in combination with a heat pump system provides a very low-cost energy source for buildings. Additional benefits like demand response services provided to the grid (which could become a business model and provide an income for their providers) are on the horizon, but have not yet materialised.

These developments contribute to the development of Europe's heat pump markets.

	Sales	Stock
2005	446 037	1.15 million
2006	509 794	1.66 million
2007	589 118	2.24 million
2008	804 457	3.05 million
2009	734 282	3.77 million
2010	800 388	4.57 million
2011	808 591	5.37 million
2012	750 436	6.11 million
2013	769 879	6.87 million
2014	792 621	7.64 million
2015	892 809	8.52 million
2016	999 682	9.49 million
2017	1.12 million	10.58 million
2018	1.27 million	11.81 million
2019	1.51 million	13.29 million
2020	1.62 million	14.86 million

Figure 1. Development of heat pump sales and stock, EU-21.

Most markets experienced substantial growth. The strongest relative gains were achieved in Poland (+43.8%), Germany (+37.2%), and the Netherlands (+30.5%). Declines are notable only in Norway, with -12.6% fewer heat pumps sold in 2020. For Estonia, Ireland and Belgium 2020 market figures are not yet available. Until they are reported, last years' sales numbers are used.

The development of sales especially against the backdrop of the COVID-19 pandemic indicates an on-going strong market expansion for the heat pump industry in Europe.

87% of the European market volume was sold in only ten countries. The five biggest European heat pump markets in 2020 were France (394 129 units sold; -0.7% growth vs. 2020), Italy (232 834; +12.2%), Germany (140 390; +37.2%), Spain (127 856; -0.2%), and Sweden (107 723; +4.4%). The biggest absolute gains were achieved in Germany (38 040), Italy (25 324), Poland (18 504), the Netherlands (13 475) and Denmark (5 117). In relative terms, seven markets showed substantial increases above 10%.

The Nordic countries show the biggest market penetration for heat pumps in the building stock and experience also significant shares of the technology in the renovation sector. In sum. Sweden. Norway.

Denmark and Finland grew by 677 units. The decrease in Norway (-13 233) is offset by gains in Denmark (5 117), Sweden (4 701) and Finland (4 093). However, it should be noted that figures for the Swedish market do not include the growth in air-air heat pumps. Thus, the Swedish market does look better in reality than what data indicates.

While Norway's market is maturing today, its development history reveals a significant growth perspective for Europe. If all countries had the same market penetration as Norway, annual heater sales would be dominated by heat pumps. Consequentially, this would go in parallel with a significant decarbonisation of the heating sector.

In 2020, heat pumps with a thermal capacity of 14.24 GW were installed producing approx. 27.11 TWh of useful energy and integrating 16.92 TWh of renewables in heating and cooling while avoiding 4.31 Mt of CO₂-equivalent emissions.

In order to produce the 2020 sales volume and to maintain the installed stock, a total of 89 784 FTE of employment were necessary. Obviously real employment related to the heat pump market is larger, as not all employees work full-time on heat pumps only.

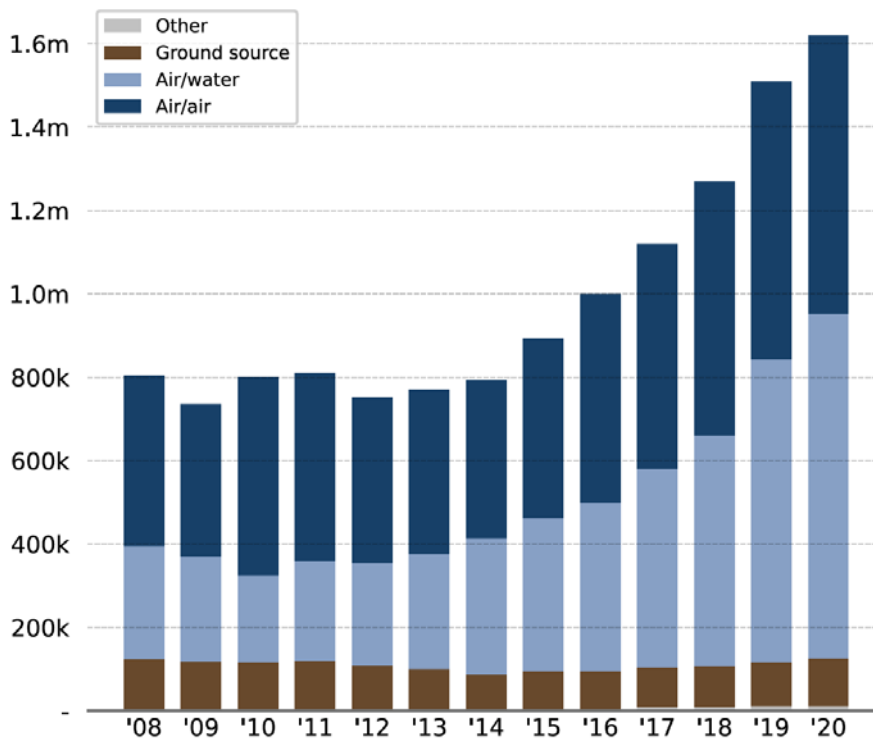


Figure 2. Sales development by type ("H-" indicates primary heating function).

For policymakers, this is good news as it shows a huge untapped potential to reduce Europe’s energy demand for heating, cooling and hot water production. However, achieving it by 2030 would require an annual 15% growth rate and a tremendous effort with regards to framework conditions, efficiency requirements for buildings, upskilling of installer* and planner/architect qualification as well as the introduction of flanking measures.

In aggregated terms, nearly 14.86 million heat pump units were installed since 1996. This amounts to an installed thermal capacity of 128.7 GW. All installed heat pumps produce 252.6 TWh of useful energy, 160.2 TWh of which being renewable. Their use saved 204.8 TWh of final and 93.11 TWh of primary energy.

Figure 3 shows the split of renewable energy production from heat pumps on a country level. France is the country that produces the most renewable energy, followed by Sweden, Germany and Italy.

Emission savings from stock

The heat pump stock in 2020 (heat pumps sold in the past twenty years) contributed 41.07 Mt of greenhouse gas emission savings (see **Figure 4**). The distribution of

emission savings per country is very similar to that of renewable energy production, since both calculations are directly linked to the number of units installed and the related reduction in demand for fossil energy. However even the 14.4% growth achieved in 2020 is not more than a step in the right direction. The current growth rate of heat pump markets across Europe is insufficient to decarbonise heating and cooling by 2050. It needs brave governmental decision makers to address the elephant in the room: a distorted price mechanism that favours the use of fossil fuels and fossil fuel technology.

Instead of making the polluter pay for emissions by adding related cost to the price for fossil energy, most governments still support their use – directly or indirectly – and leave the cost of environmental damage of fossil fuel for society to pay. Latest figures show that 6.5% of the global GDP or \$ 5.4 trn are spent for fossil energy subsidies. A perceived cheap way of heating is actually paid for via other budgets, namely by health and environmental protection services.

The heat pump industry reiterates its call on decision makers in the European Commission and the Member States to address this issue. Heating and cooling industries need to decarbonise over the next 30 years. This

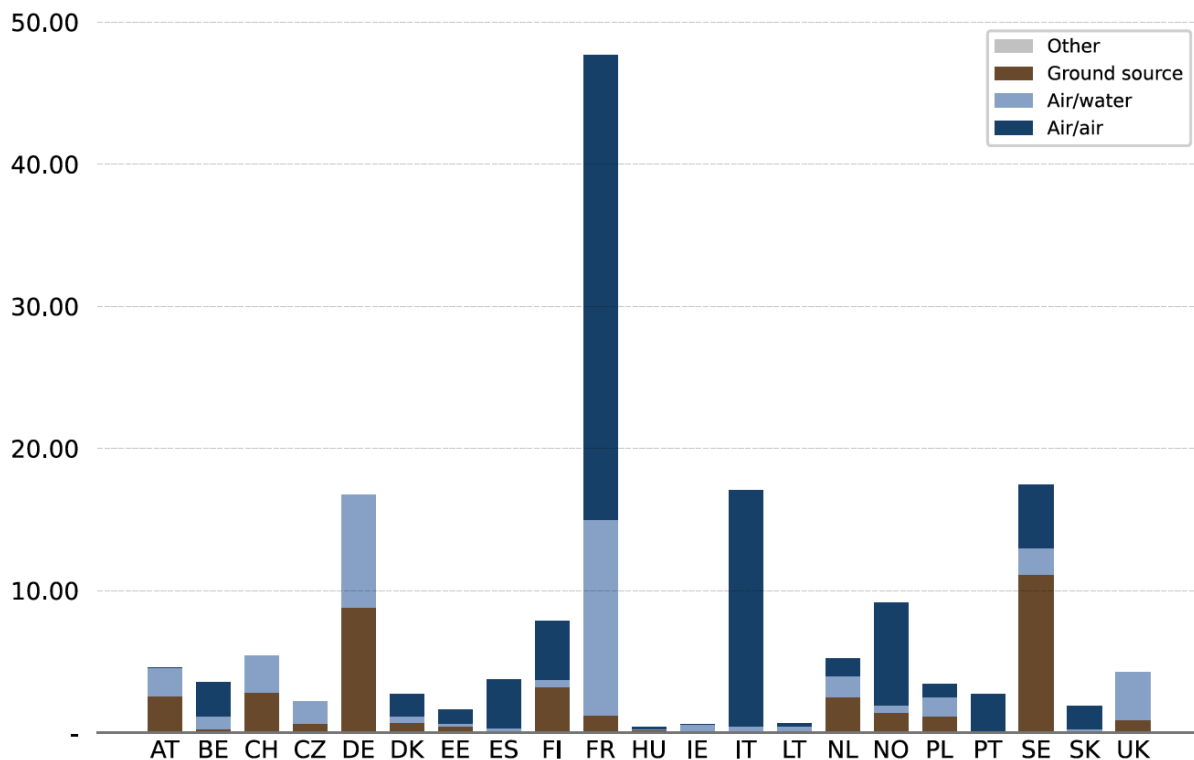


Figure 3. Renewable thermal energy provided per country, by type, 2020 (in TWh); “H-” indicates primary heating function.

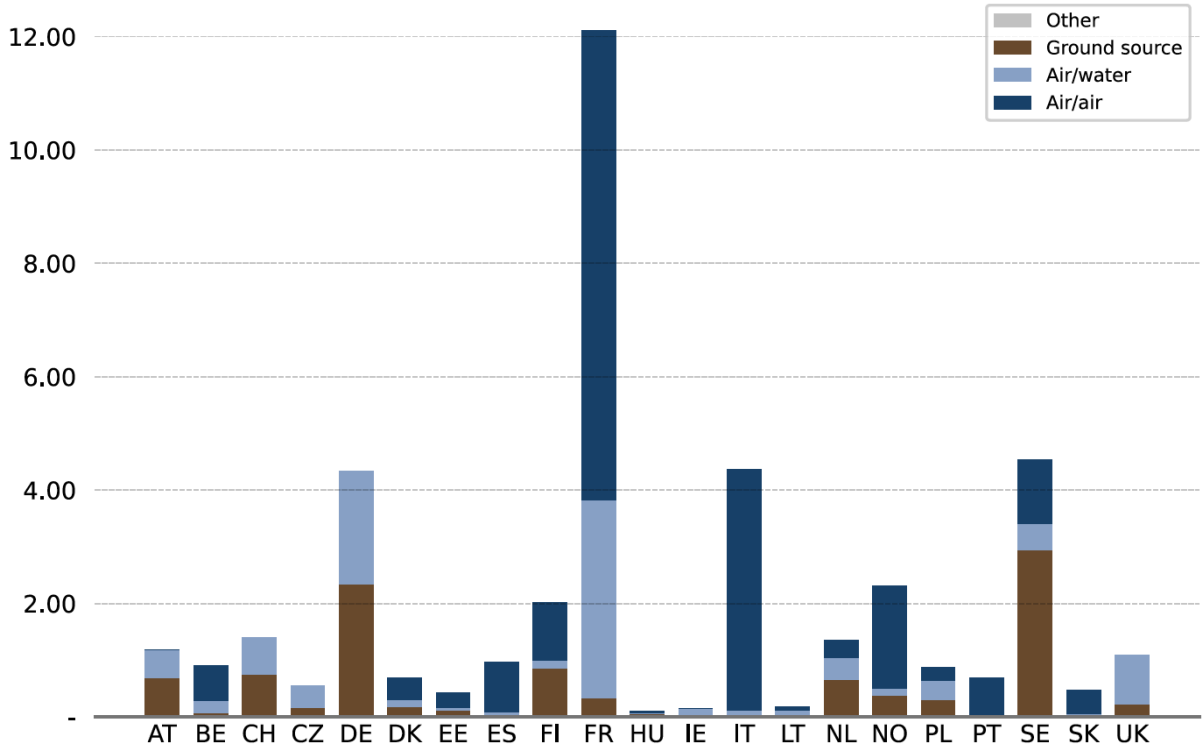


Figure 4. Greenhouse-gas emission savings based on sales 2020, per country (in Mt); "H-" indicates primary heating function.

is a tremendous challenge that needs to be started as soon as possible. The benefits of heat pumps make this technology a prime candidate for a central role in a sustainable European energy system. Clearly, today's

business as usual will not be enough to unearth the technology's potential, instead significant government intervention is necessary to shape the sustainable energy supply in all Member States of the European Union. ■

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