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Executive Summary



European heat pump sales grew by +33.8% in 2021. With 2.17 million units sold across Europe, yet a new sales record has been achieved. Assuming a life expectancy of approx. 20 years, the current European heat pump stock amounts to 16.96 million units (see Table 1.0-1), of which 15.33 million are for space heating. With approximately 120 million residential buildings in Europe, the heat pump market share in the building stock is almost 14%.

	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	734 283	3.77 million
2010	800 388	4.57 million
2011	808 591	5.37 million
2012	750 436	6.11 million
2013	769 860	6.87 million
2014	791 538	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	13.28 million
2020	1.62 million	14.86 million
2021	2.17 million	16.96 million

Table 1.0-1: Development of heat pump sales and stock, EU-21

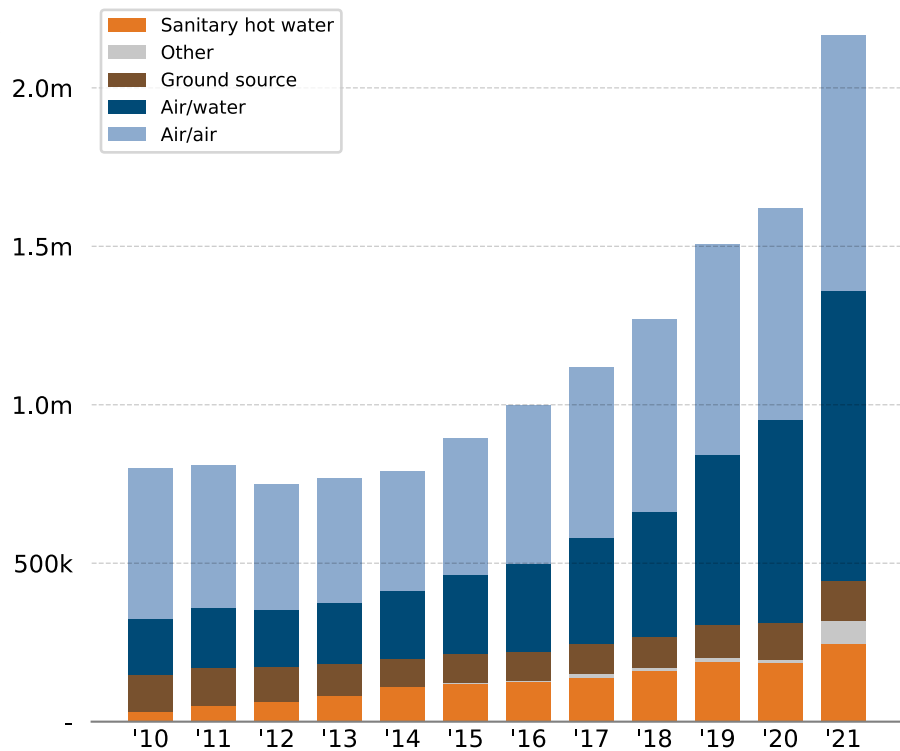
Heat pump market growth is mainly influenced by three trends:

1. From a technology perspective today's heat pumps can cover a wider temperature range. They still operate at -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 the renovation segment.
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 m², 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 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.

Chart 1.0-1: Sales development by type ("Air/air counts heat pumps with a primary heating function")



Most markets experienced substantial growth; declines are notable only in Norway, with +36.1% fewer heat pumps sold in 2021. The strongest relative gains were achieved in Poland (+61.4%), Germany (+26.4%), and the Netherlands (+22.9%).

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 2021 were France (537 111 units sold; +36.3% growth vs. 2021), Italy (379 970; +63.2%), Germany (177 500; +26.4%), Sweden (133 498; +18.7%), and Finland (129 375; +26.5%).

The biggest absolute gains were achieved in Italy (147 136), France (142 982), Poland (37 326), Germany (37 110) and Norway (33 145). 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 42 046 units, with a decrease in Norway (33 145) which is offset by gains in Denmark (8 901), Sweden (21 074) and Finland (27 068). 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 shows.

While Norway's market is maturing it reveals a significant growth perspective for Europe. If all countries had the same market penetration as Norway, the annual sales number of heat pumps in Europe would be more than 7 times bigger than today's... resulting in 9.4 million units sold per year and – if maintained until 2030 - reaching a stock of 106 million units in that year. Consequentially, this would go in parallel with a significant decarbonisation of the heating sector.

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 21% 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 development of flanking measures.

RES from stock

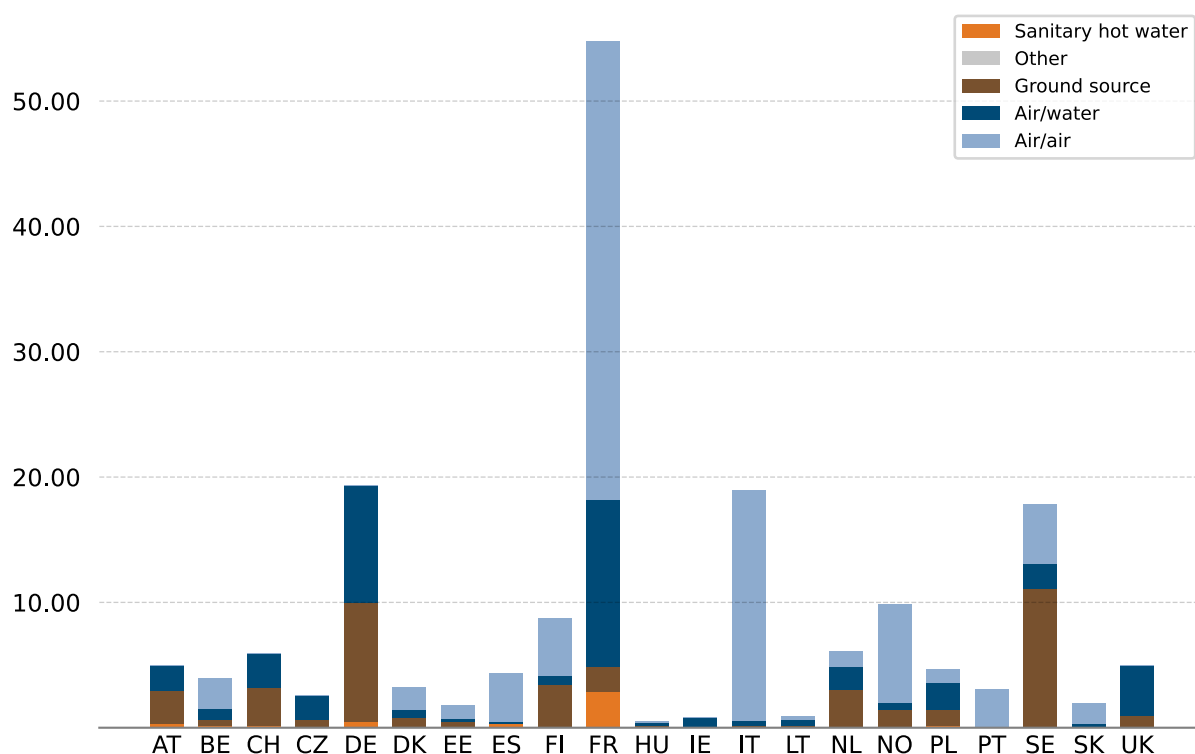
In 2021, heat pumps with a thermal capacity of 18.79 GW were installed producing approx. 31.79 TWh of useful energy and integrating 19.83 TWh of renewables in heating and cooling while avoiding 5.06 Mt of CO₂-equivalent emissions.

In order to produce the 2021 sales volume and to maintain the installed stock, a total of 116 679 man-years 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.

In aggregated terms, nearly 16.96 million million heat pump units were installed since 1996. This amounts to an installed thermal capacity of 147.0 GW. All installed heat pumps produce 283.1 TWh of useful energy, 179.2 TWh of which being renewable. Their use saved 229.1 TWh of final and 103.4 TWh of primary energy.

Charts 1.0-2 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.

Chart 1.0-2: Renewable thermal energy provided per country, by type, 2021 (in TWh); "Air/air" counts heat pumps with a primary heating function

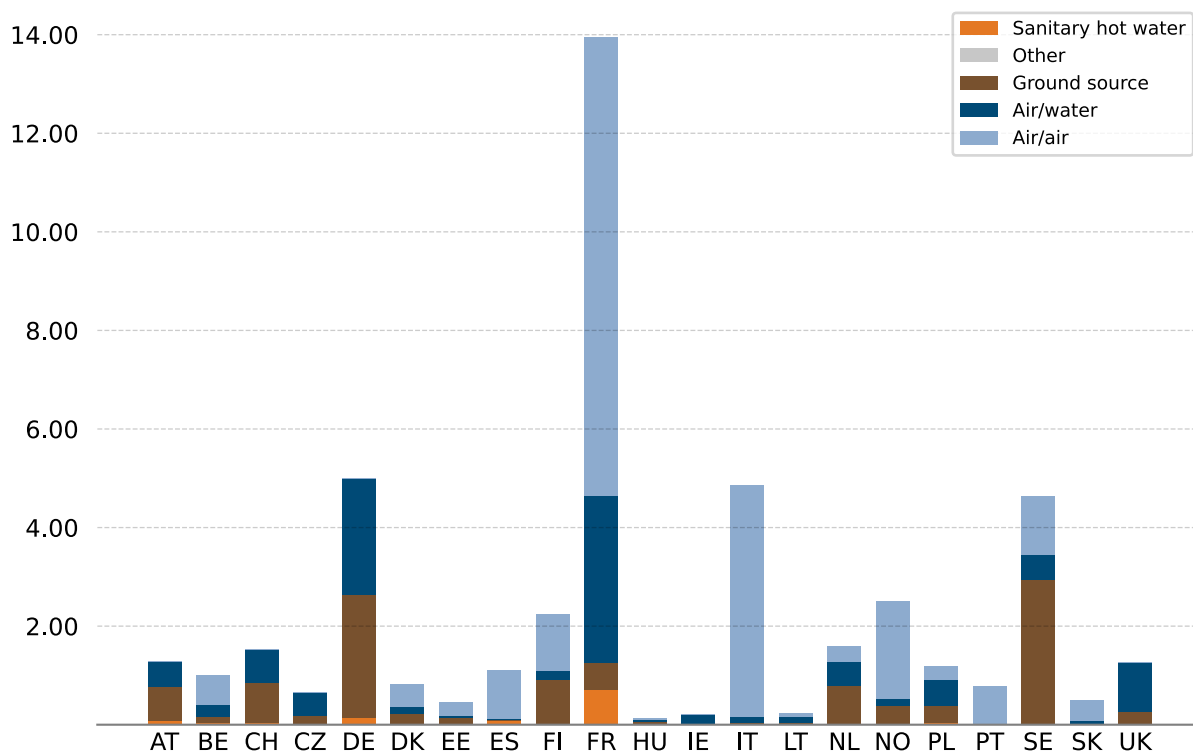


Emission savings from stock

The heat pump stock in 2021 (heat pumps sold in the past twenty years) contributed 45.90 Mt of greenhouse gas emission savings (see Chart 1.0-3). 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 2021 is no 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 (see Figure 1.0-1).

Chart 1.0-3: Greenhouse-gas emission savings based on sales 2021, per country (in Mt)



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 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.

Figure 1.0-1: Relative prices: electric power vs. gas in Europe

