



The heat pump market in Norway - what is the potential for  
geothermal heat pumps?

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Iceland

Norwegian Sea

Sweden

Norway

Finland

Baltic Sea

Estonia

Latvia

Moscow

Москва

North Sea

Denmark

Lithuania

Belarus

Ireland

United Kingdom

London

Netherlands

Berlin

Poland

Warsaw

Germany

Kyiv

Київ



Heat pumps in all kind of  
buildings all over Norway









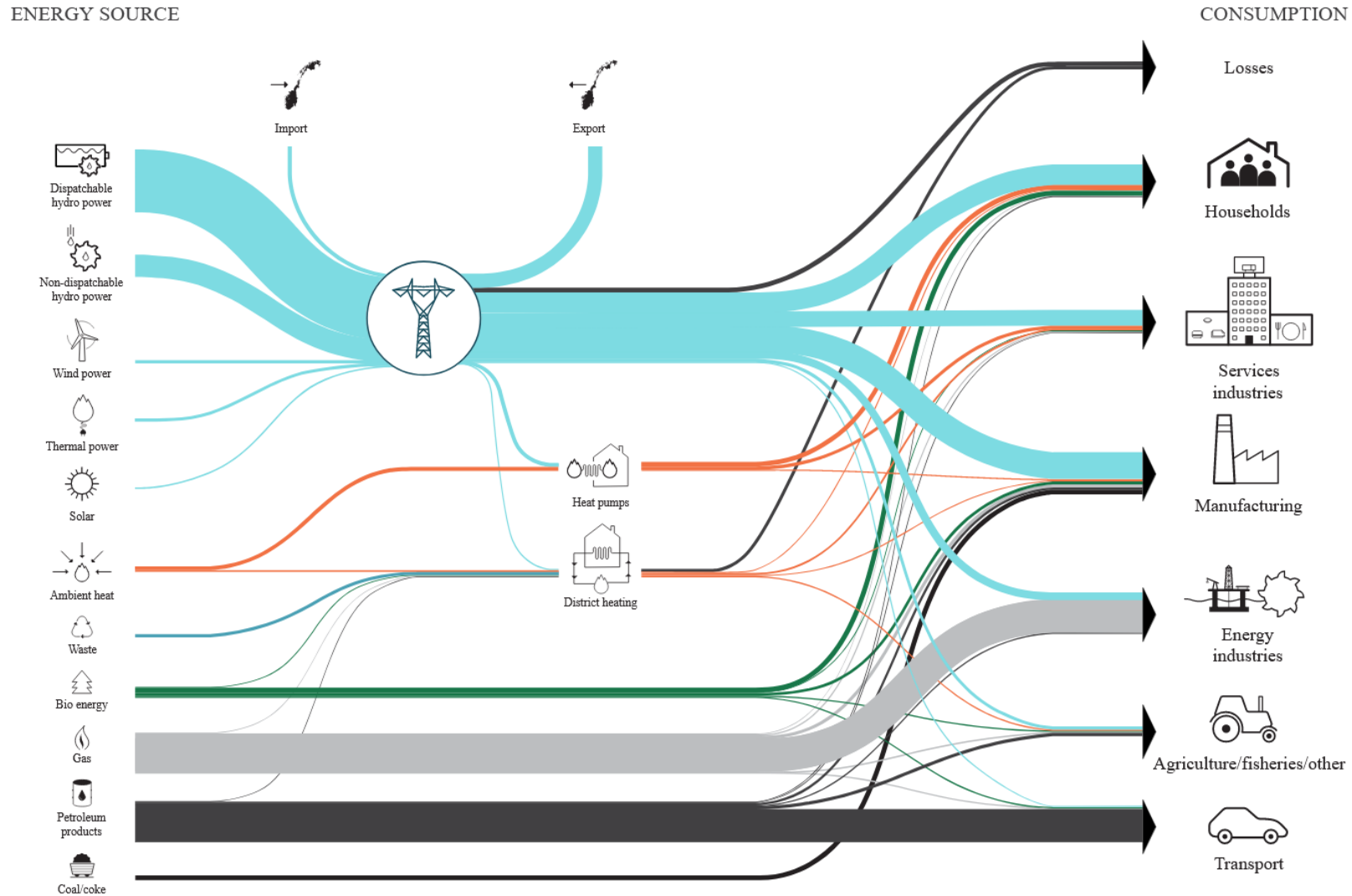
# Some success factors for heat pumps in Norway

## **Success factors for heat pumps:**

- Electrification of society - strong electricity grid
- Price of electricity vs gas - heat pumps are the most profitable heating solution
- Taxes on electricity vs CO<sub>2</sub> - bans of fossil fuels for heating in Norway
- High quality heat pumps for cold climate
- Large network of skilled installers throughout the countries
- Training and specialisation of installers, planners, plumbers and entrepreneurs

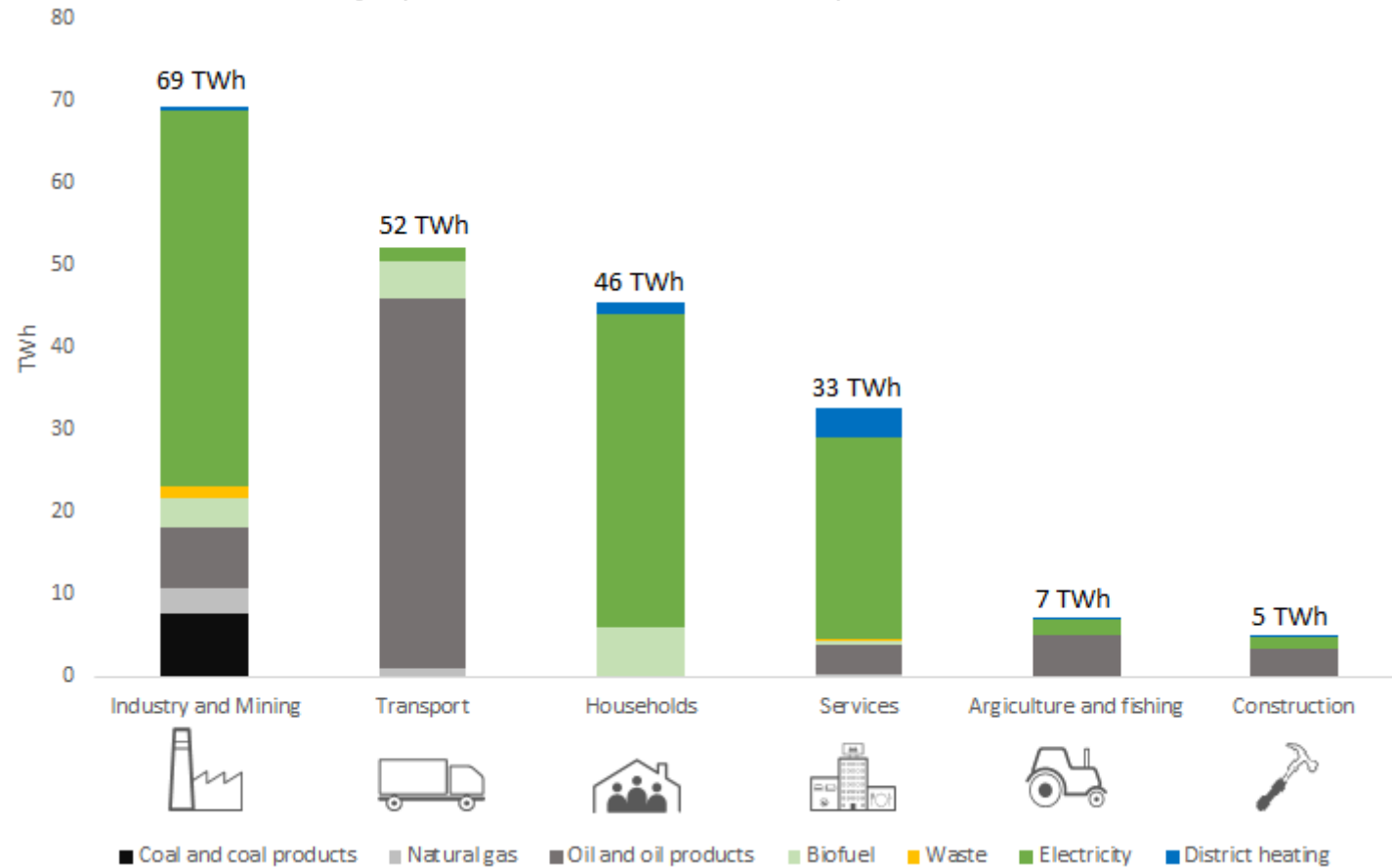


# The Norwegian Energy system





# Final energy consumption in Norway



Total in 2020: 211 TWh. Source: Statistics Norway



# Electricity production and consumption

Electricity production in 2021: 157.1 TWh

Electricity consumption 2021: 139.7 TWh

Net export of electricity: 17.3 TWh

1739 hydropower plants - 88 % of Norwegian production capacity

64 wind farms - 10 % of Norwegian production capacity

**The total renewable share in Norway is 50.4 per cent**



Electric heating is common in Norway



Electric heating is common in Norway







74 percent of Norwegian homes have a fireplace

# Heat pumps in new and old buildings

- Hospitals
- Nursing homes
- Schools
- Hotels
- Offices
- Single family houses
- Apartment blocks
- Cultural buildings
- Churches
- Kindergartens
- Industry
- District heating

# Heat pumps for cold climate

- High quality models adapted to cold and Nordic climates dominate the market
- Many models tested for -25 or -30° Celsius
- Air source heat pumps deliver lower COP and heat at low temperatures
- Buildings with air source heat pumps normally need additional heat from other sources as electric heating or bio energy
  
- Geothermal heat pumps are most efficient but cost more
- Air-to-air heat pumps have the shortest pay back time
  
- Longer heating seasons than many other European countries



Air-to-air heat pumps  
is popular



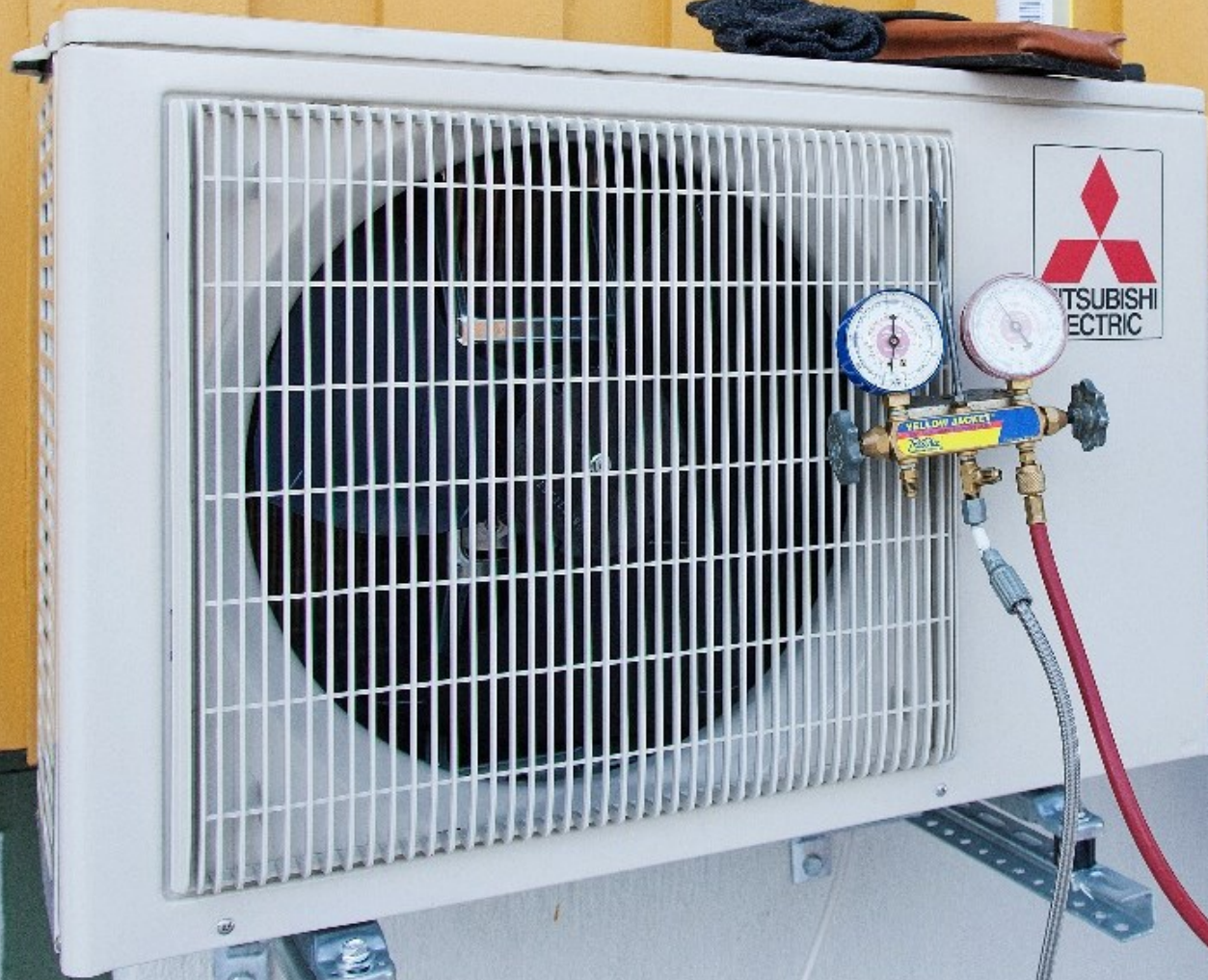














# Heat pumps in mountain cabins





Air-to-water heat pumps in  
both old and new buildings







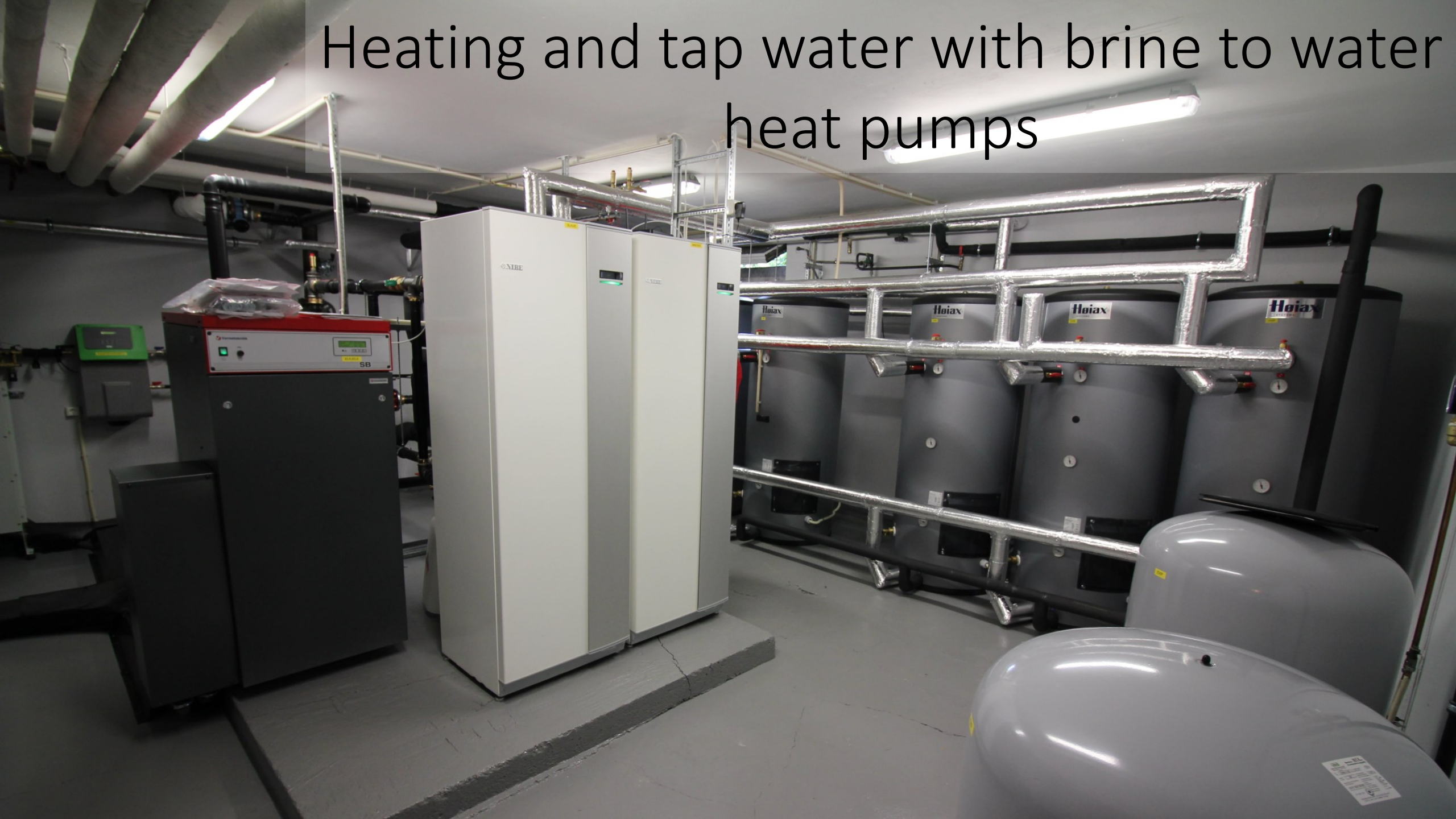
Drilling for boreholes





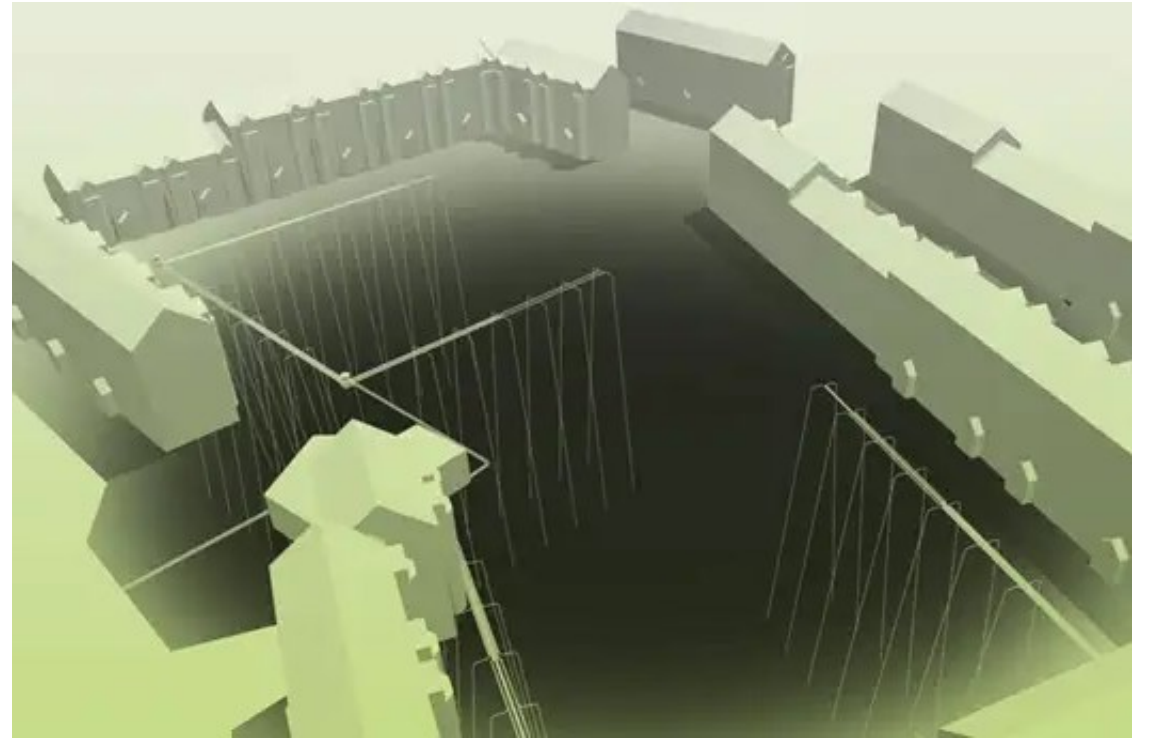


Heating and tap water with brine to water  
heat pumps





# Geothermal heat pumps with energy wells





# Powerhouse in Trondheim Plus energy building





Two buildings share electricity from solar power and heat from a sea water heat pump

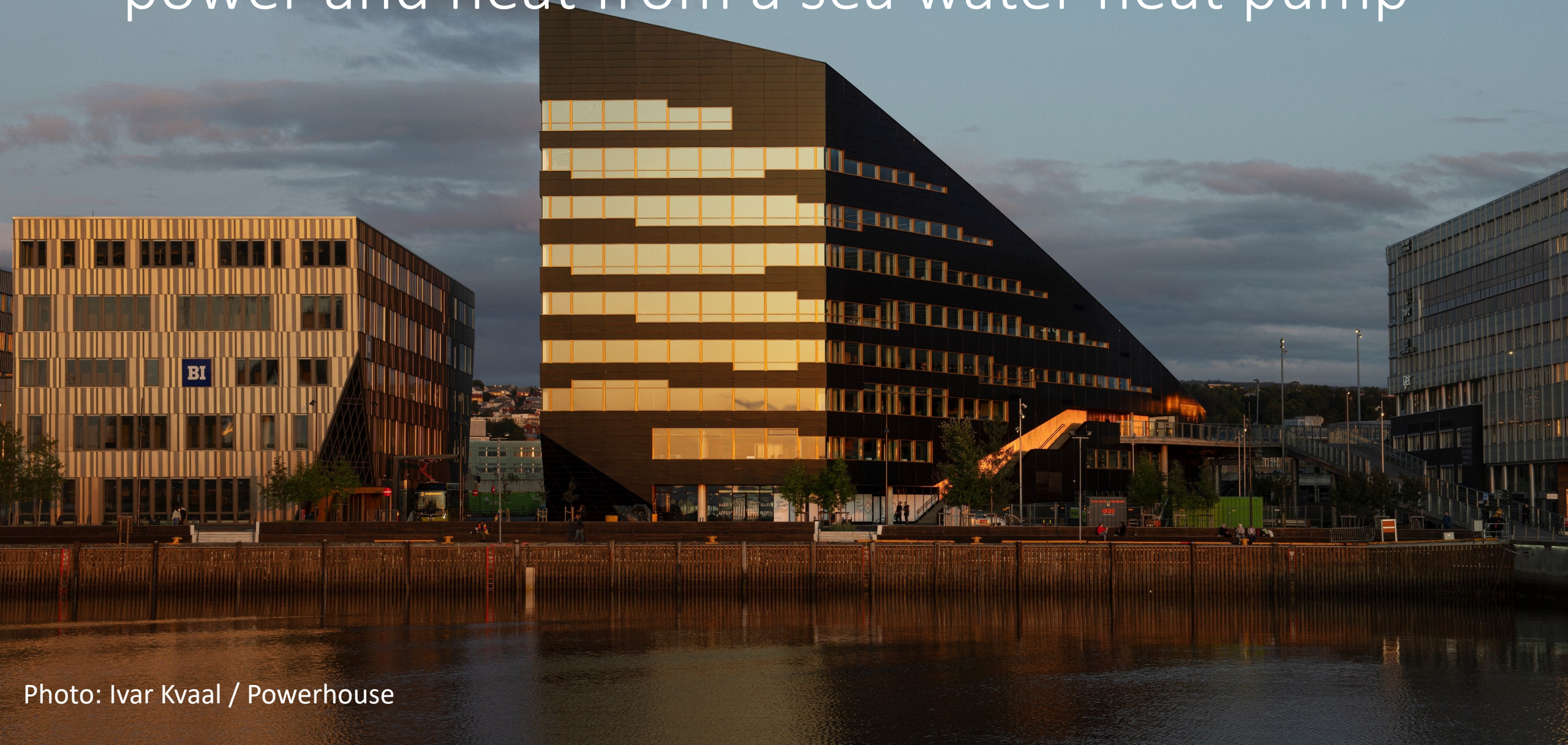


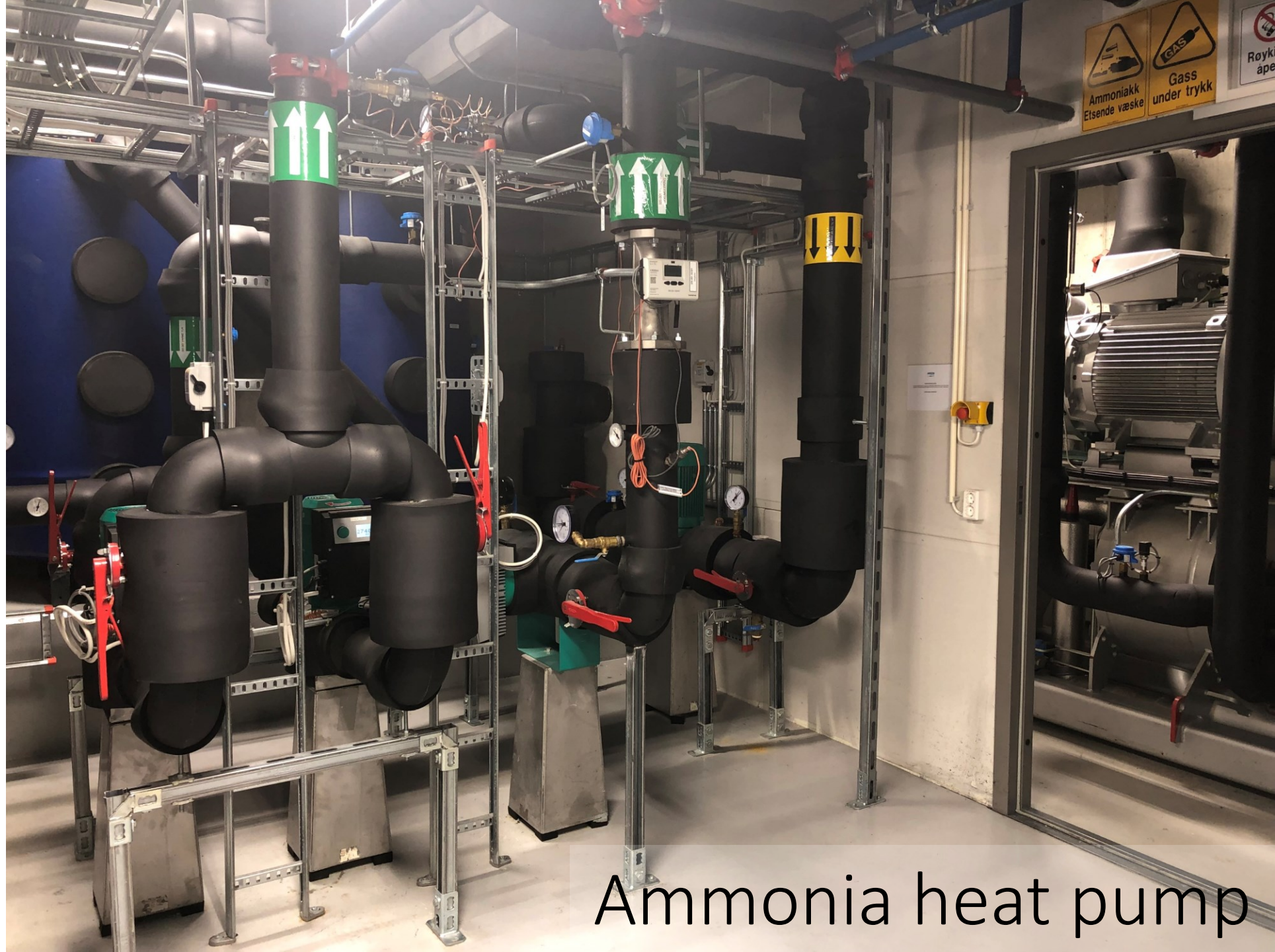
Photo: Ivar Kvaal / Powerhouse



The building is designed for energy production







Ammonia heat pump









District heating



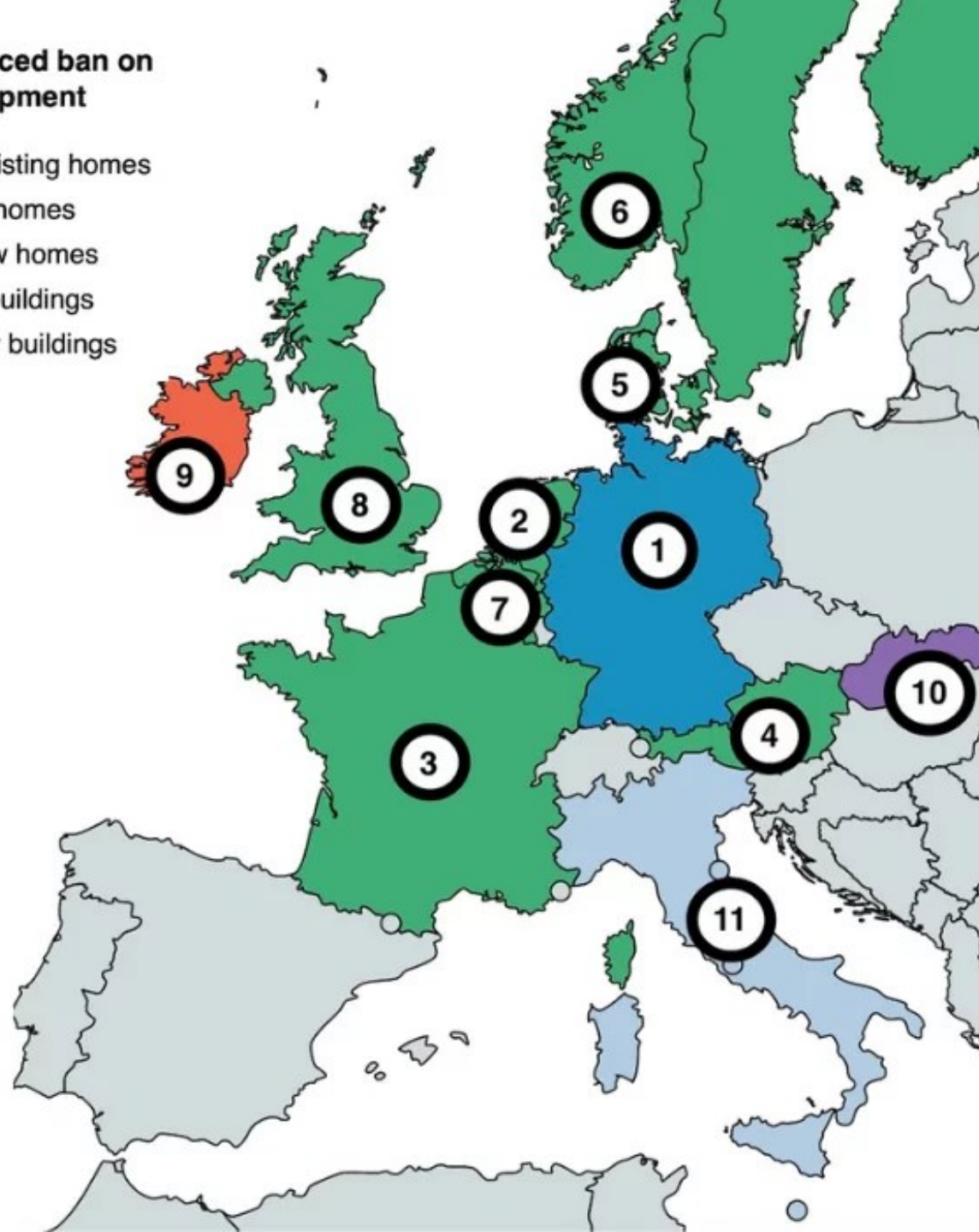
# Use of fossil energy in Norway

- Fossil oil heating is prohibited for most buildings since 2020
- Fossil energy is prohibited in new buildings since 2015
- Gas heating is only available in a few places
- Fossil energy is still used in industry, but this will be phased out
- CO<sub>2</sub>-tax: 70 Euro per ton of CO<sub>2</sub> (NOK 705)



## Current or announced ban on fossil heating equipment

- Gas heating - existing homes
- Oil and gas - all homes
- Oil and gas - new homes
- Oil heating - all buildings
- Oil heating - new buildings



- GERMANY**  
Ban on installations of mono-fuel oil/coil boilers from 2026 (new and existing buildings) and regional use obligations for renewable heating. From 2024, a share of 65% RE in heating.
- NETHERLANDS**  
Ban of connection to the gas grid for new buildings from 2018. From 2026, hybrid heat pumps will be mandatory.
- FRANCE**  
Ban of oil boilers and gas boilers in new homes from 2022, from 2023 ban on gas boilers in new buildings and gas boilers banned from 2025 in multifamily buildings.
- AUSTRIA**  
Ban of oil/coal boilers installation from 2020 in new homes and regional restrictions and plans for expanding the ban. Plans on banning new oil and gas heaters from 2023, extending the replacement of existing heaters.
- DENMARK**  
Use obligation for renewable heating and different zones with exemption regulations.
- NORWAY**  
Ban on the use of oil for heating in new and existing homes.
- BELGIUM**  
Regional ban on installation of oil boilers in new homes after renovation from 2022 and additional gas connection ban for new large building projects from 2021 in the Flemish region.
- U.K.**  
Ban on gas and oil boilers in new homes from 2025.
- IRELAND**  
From 2025, gas boilers will be banned from new buildings.
- SLOVAKIA**  
Plans on banning sales and installation of new fuel and oil boilers by 2023.
- ITALY**  
Share of 60% renewable energies in new buildings.



# Explaining market for heat pumps 2022

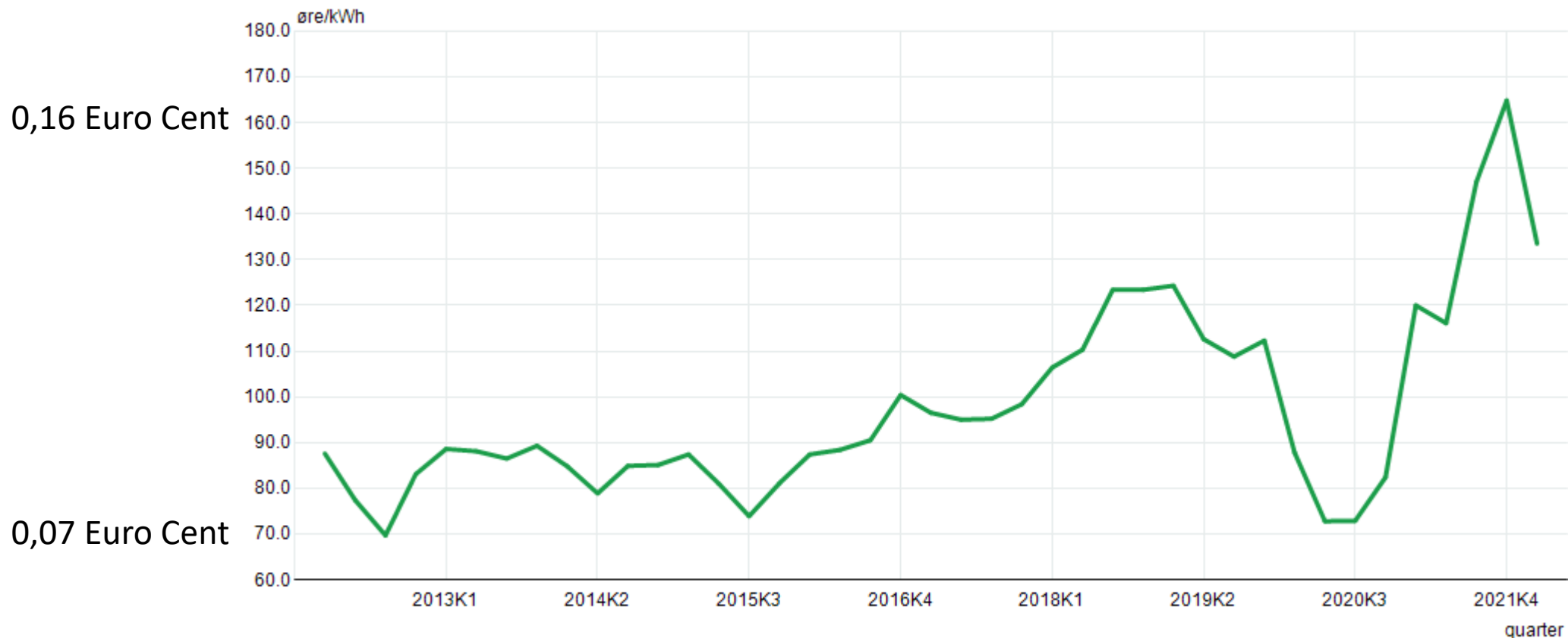
- Highest electricity prices ever
- High electricity prices increase the demand for heat pumps
- Fossil heating is no competitor for heating in buildings



# Electricity price, grid rent and taxes for households

(100 øre = 1 NOK = 0,1 Euro Cent)

09387: Electricity price, grid rent and taxes for households, by quarter. Total price of electricity and grid rent incl. taxes, electricity support deducted (øre/kWh).

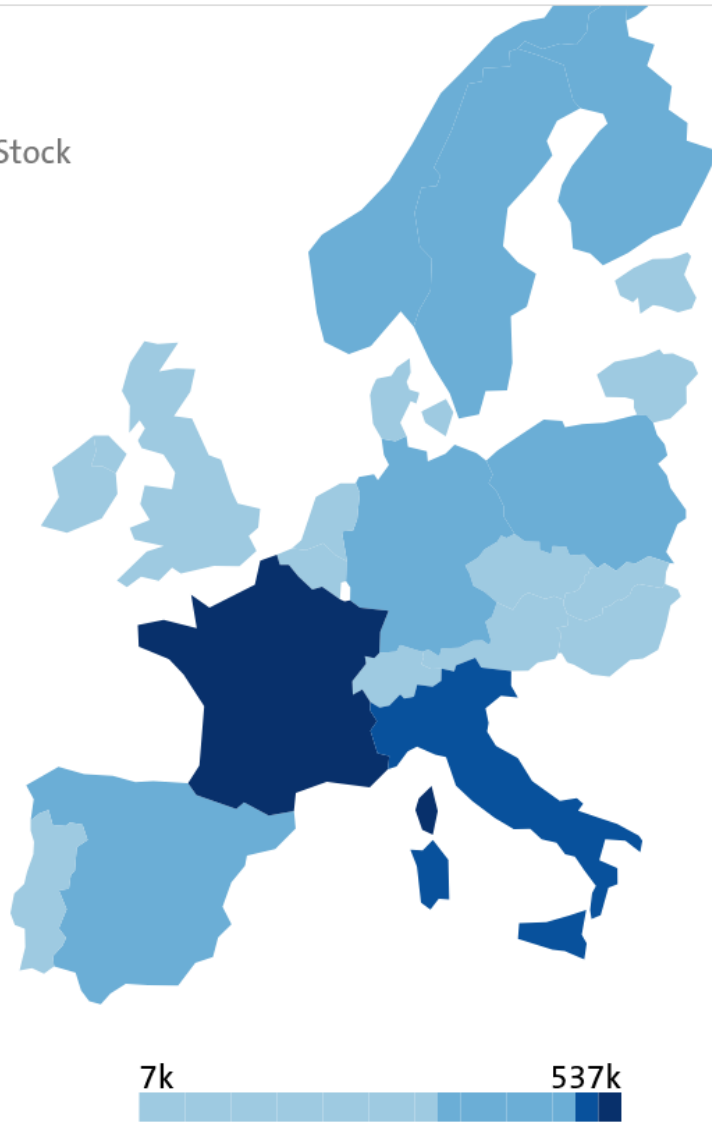


Source: Statistics Norway

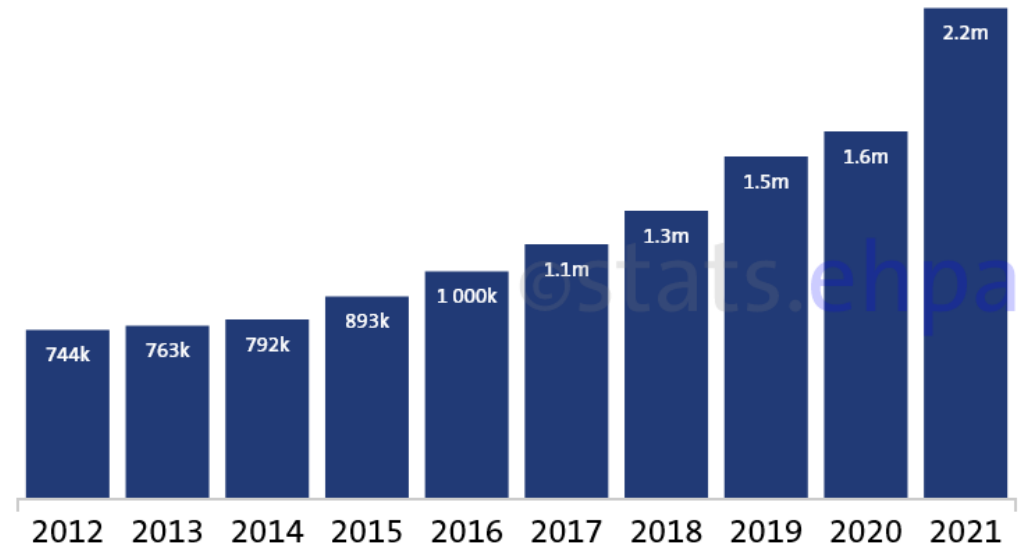


# Heat pumps sold

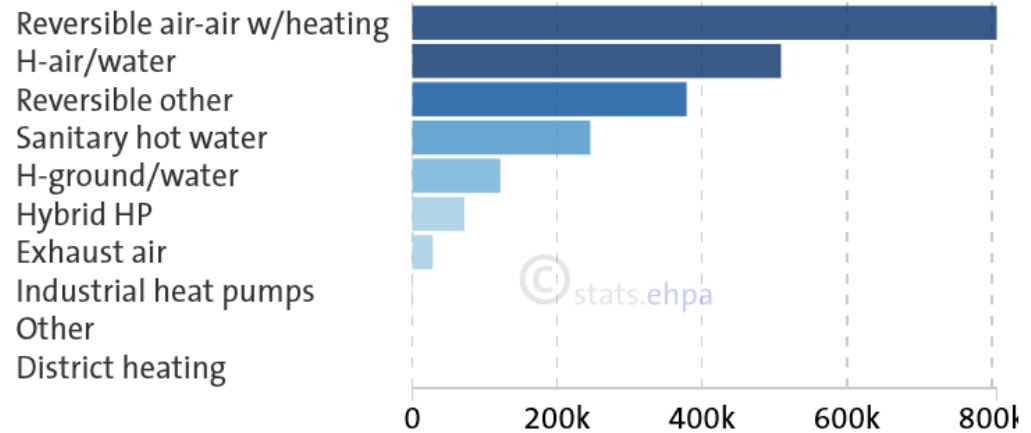
Sales Stock



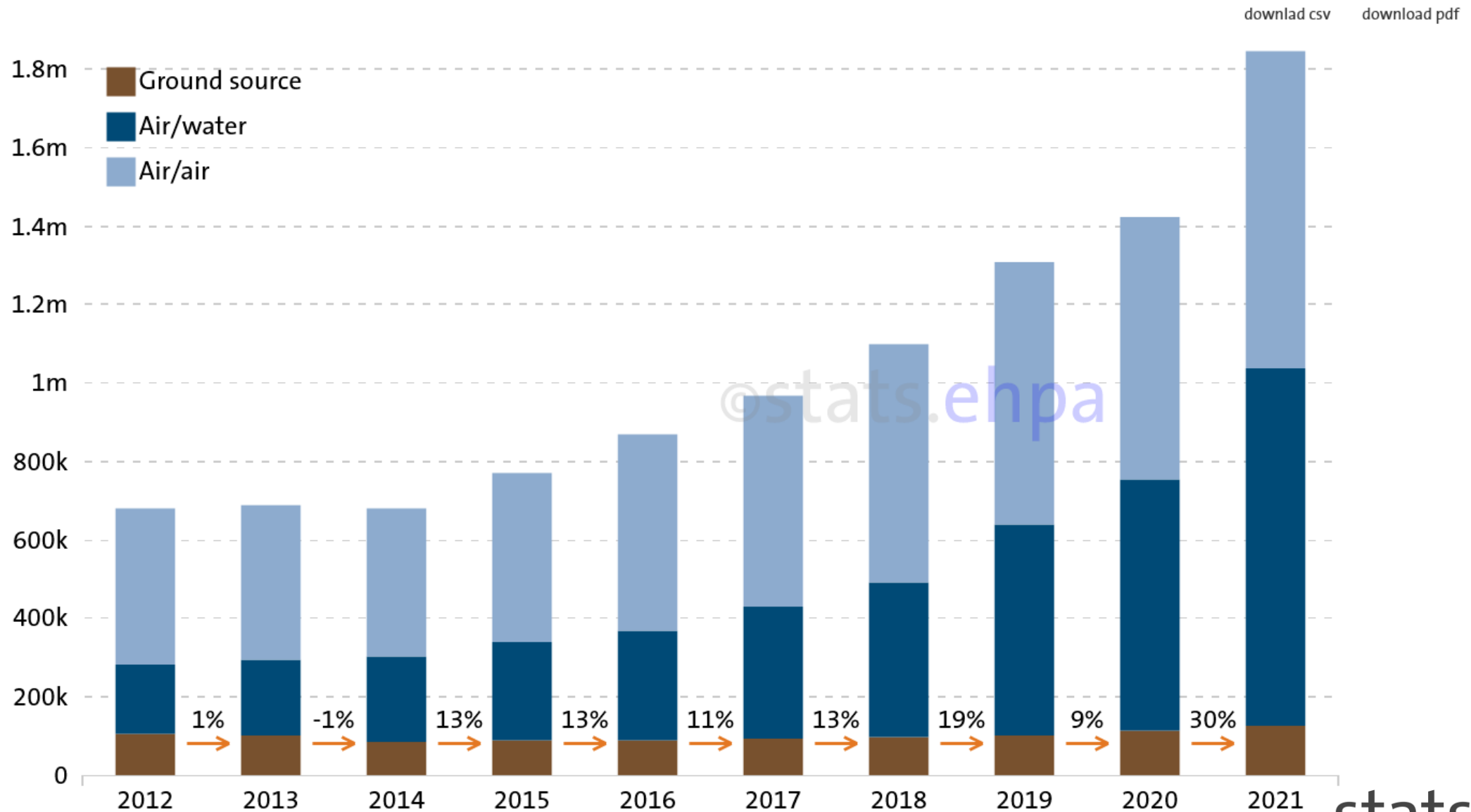
# Sales development



# Type of HP



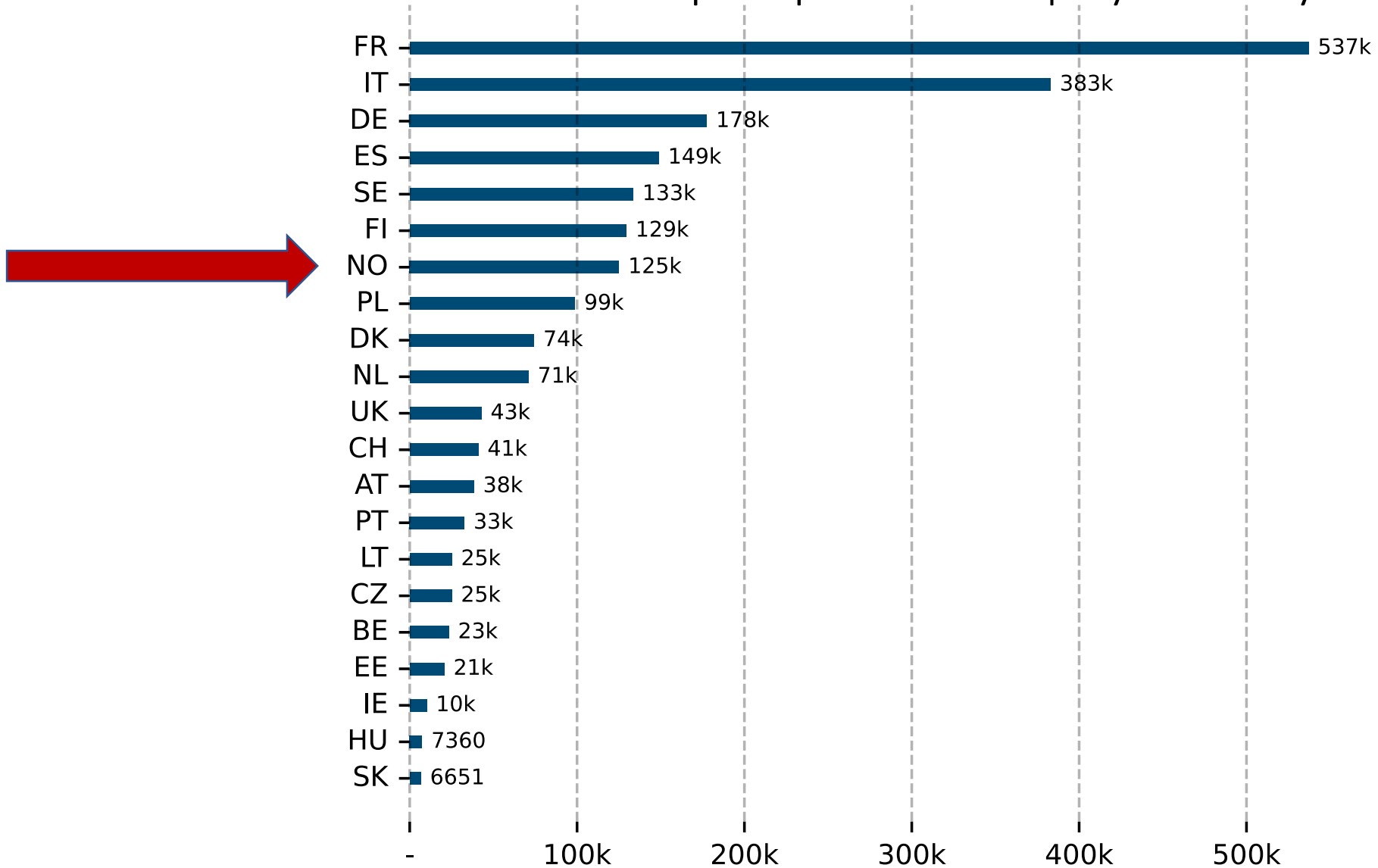
# Sales development, by source



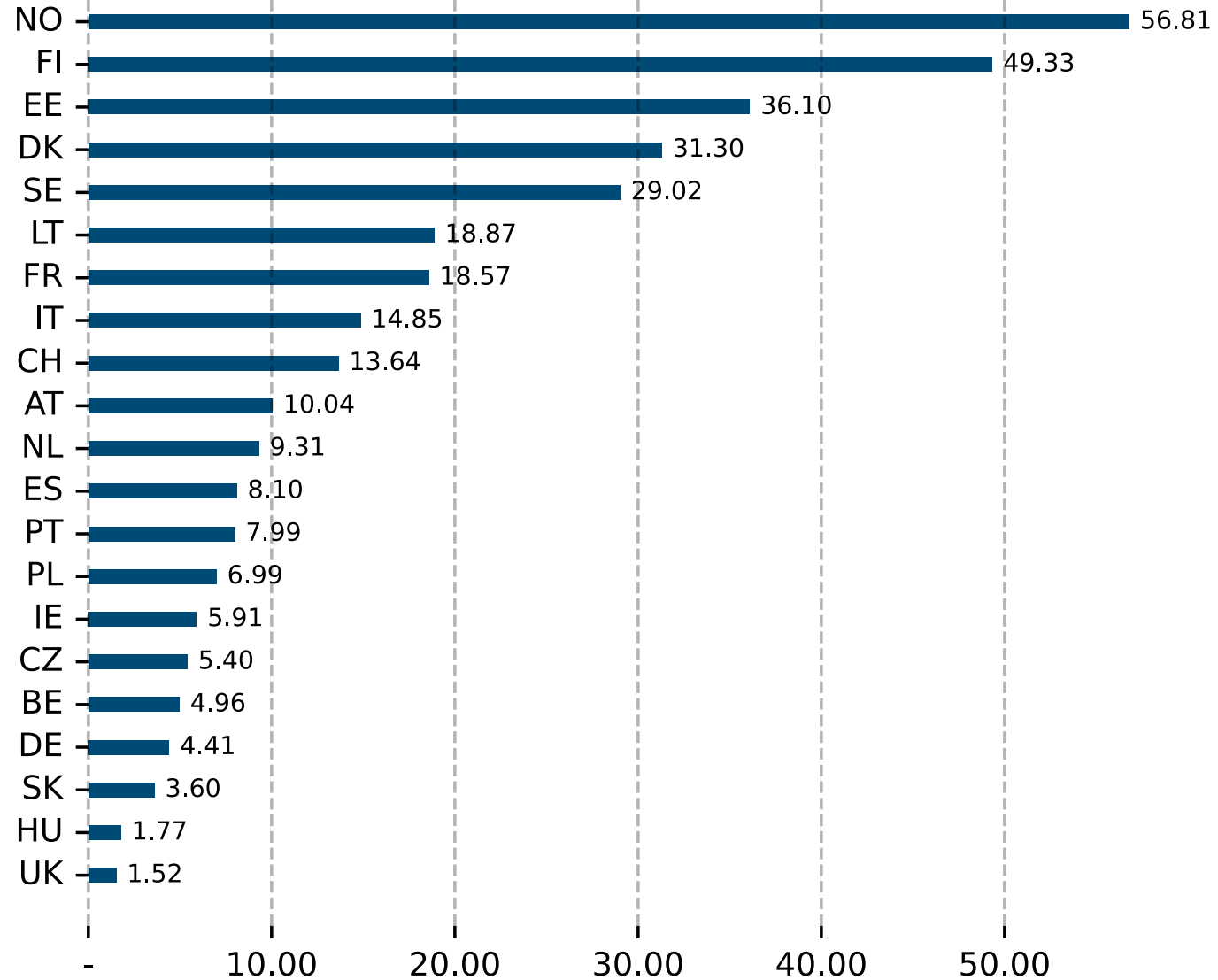
\*For some definitions of heat pumps the energy source is unknown (e.g. district heating). Those are omitted here.



# Sales of heat pumps in 2021 | by country

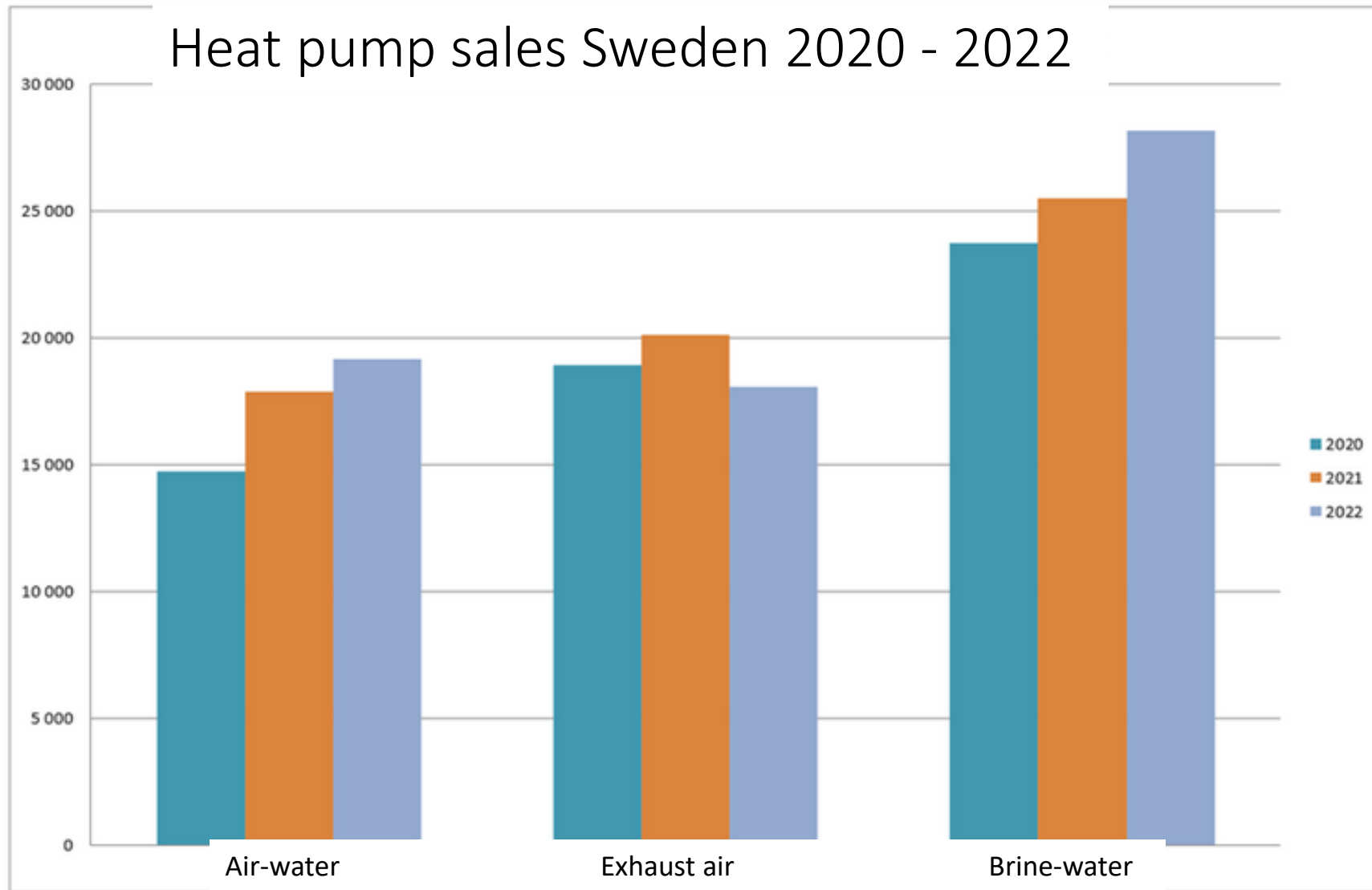


# Heat pump sales 2021 per 1 000 households

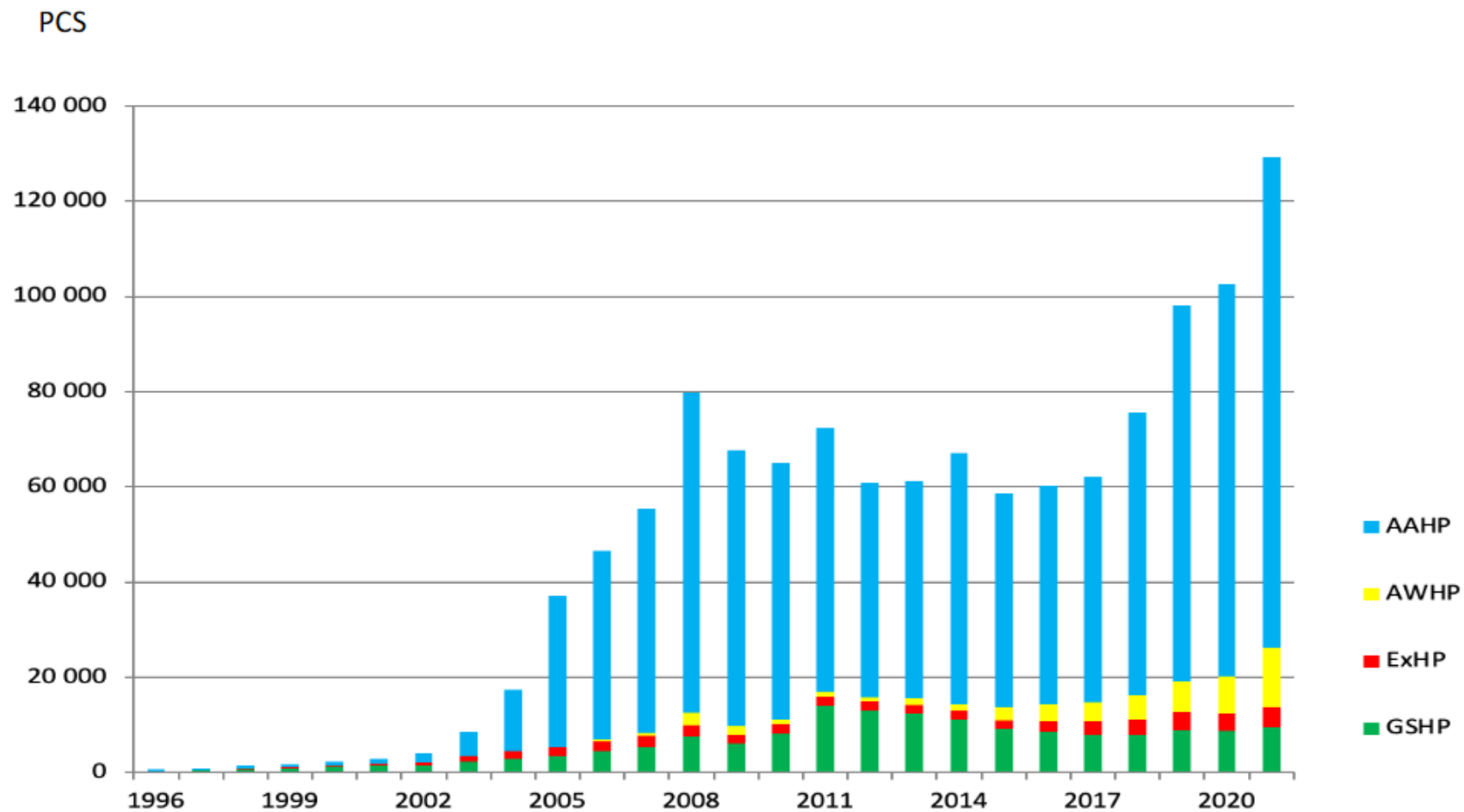




# Heat pump sales Sweden 2020 - 2022



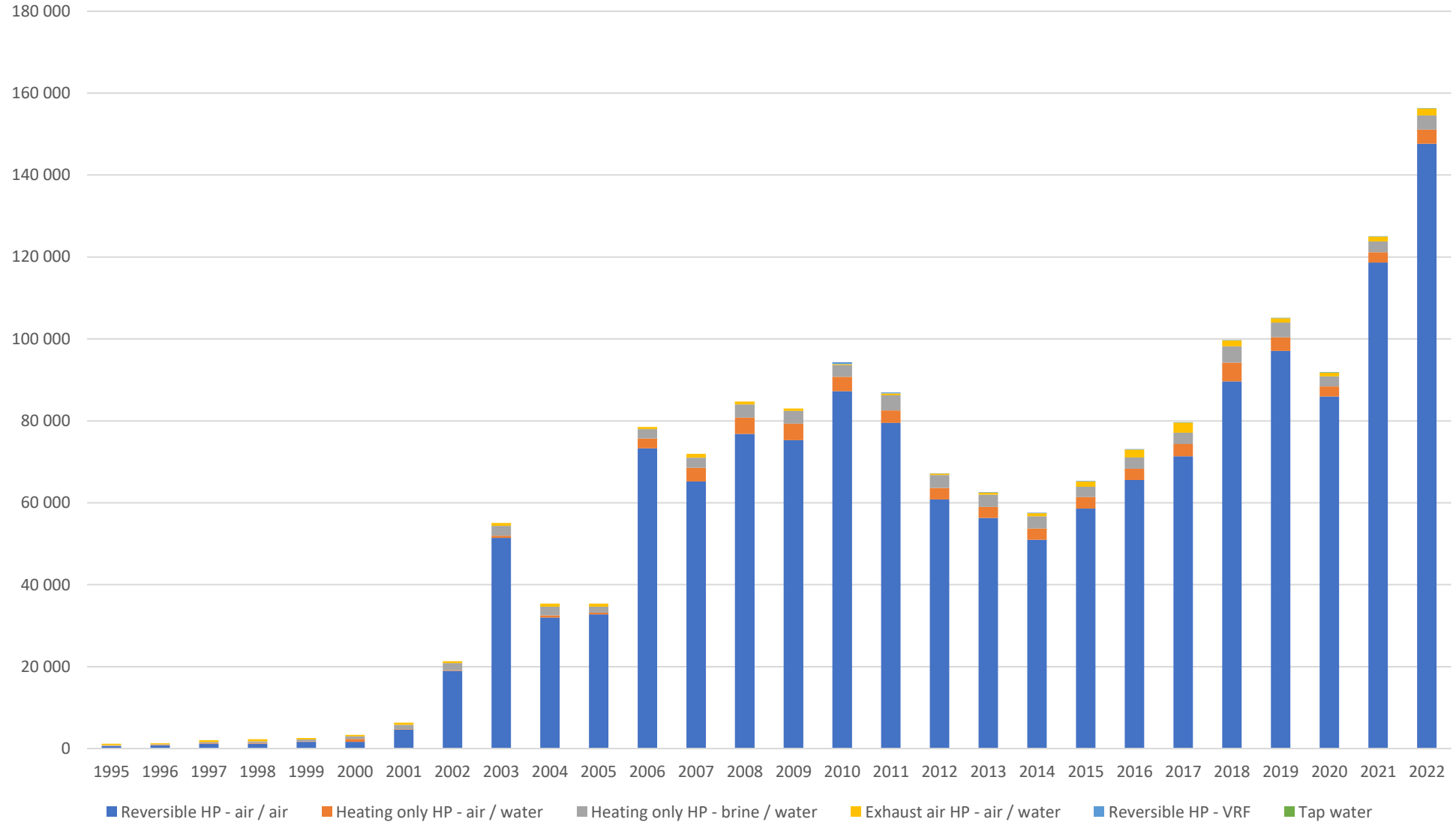
## Annual Heat Pump installations in Finland (pcs)



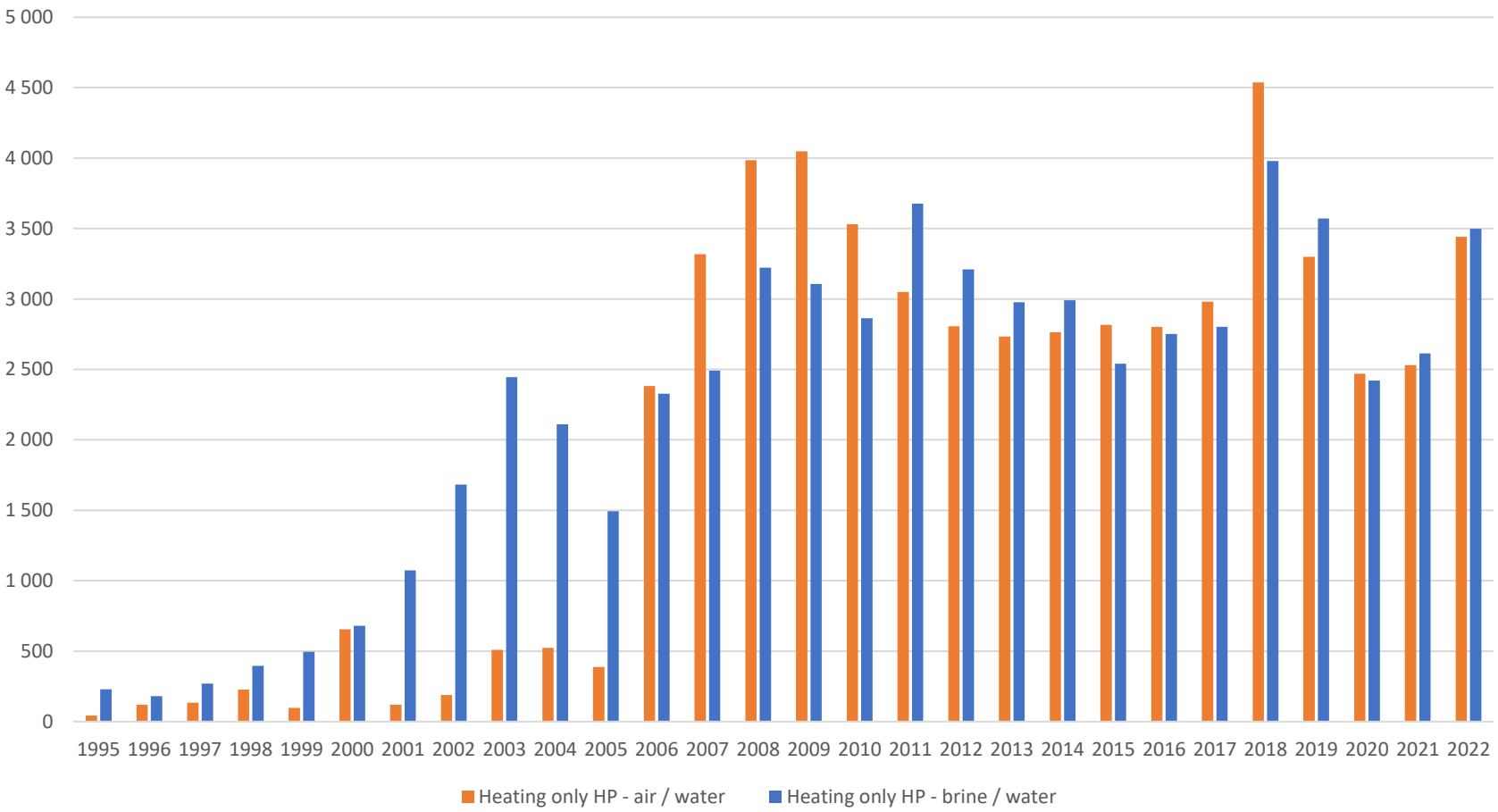
**2022:** The sales of ground-source heat pumps increased by about 20 percent, with 12,000 pumps sold.



# Total market heat pumps 1995 - 2022



# Heat pumps for hydronic systems 1995 - 2022





# Norway vs Nordic countries

## Norway

- Population 5,3 million
- Low electricity prices, years with moderate taxes for electricity, high CO<sub>2</sub>-taxes
- Air-to-air-heat pumps-dominant, little gas grid

## Finland

- Population 5,5 million
- Higher electricity prices than Norway
- More air-to-water and brine-to-water heat pumps than Norway, little gas grid

## Sweden

- Population 10,42 million
- Higher electricity prices and higher taxes for electricity than Norway, high CO<sub>2</sub>-taxes
- More air-to-water and brine to water than Norway, little gas grid

## Denmark

- Population 5,86
- Earlier very high prices and taxes for electricity, large gas infrastructure, thus low heat pump sales
- Now lower taxes for electricity, increased CO<sub>2</sub>-taxes, heat pump market is growing

# Distribution of heat pumps in Norway

- In the period 1987 - 2022, almost 1,67 million heat pumps were sold in Norway
  - Air-to-air: approx. 1,52 million
  - Air-to-water: over 57 000
  - Brine-to-water: almost 64 000
  - Ventilation heat pumps: approx 26,000
- More than 1.3 million heat pumps are in operation – approx. 11 TWh of ambient heat.



# Contribution from heat pumps in Norway

	TWh
Heat production 2021	18,8
Input electricity	8,1
Ambient heat	10,6

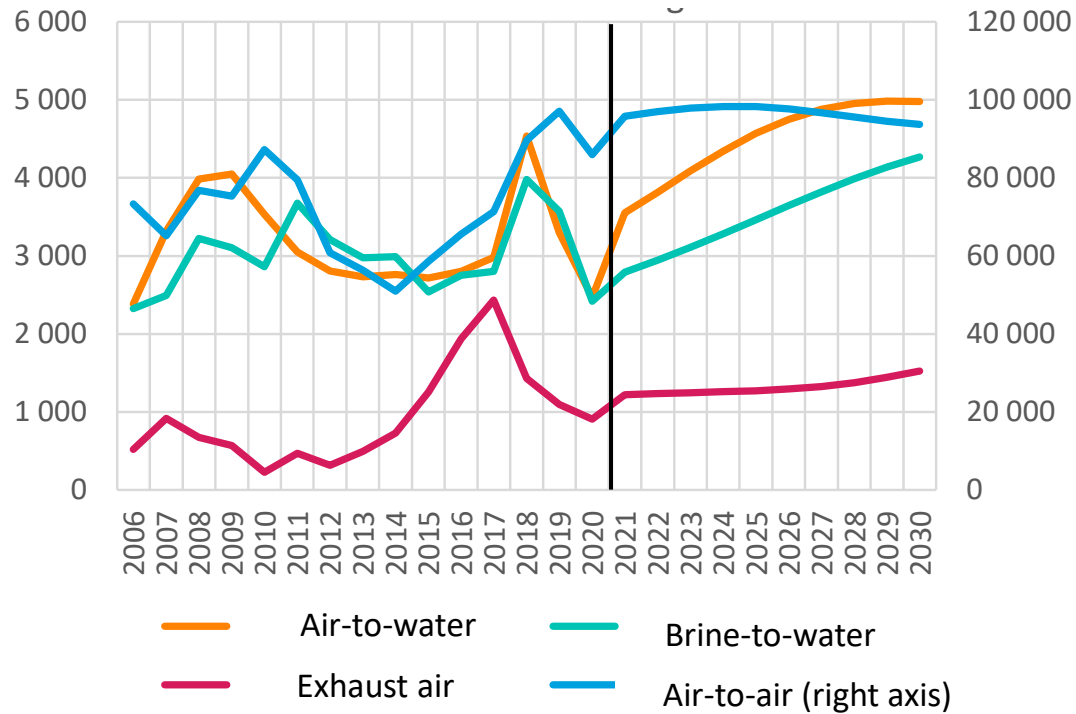


Calculations from NVE based on statistics from the Norwegian Heat Pump Association

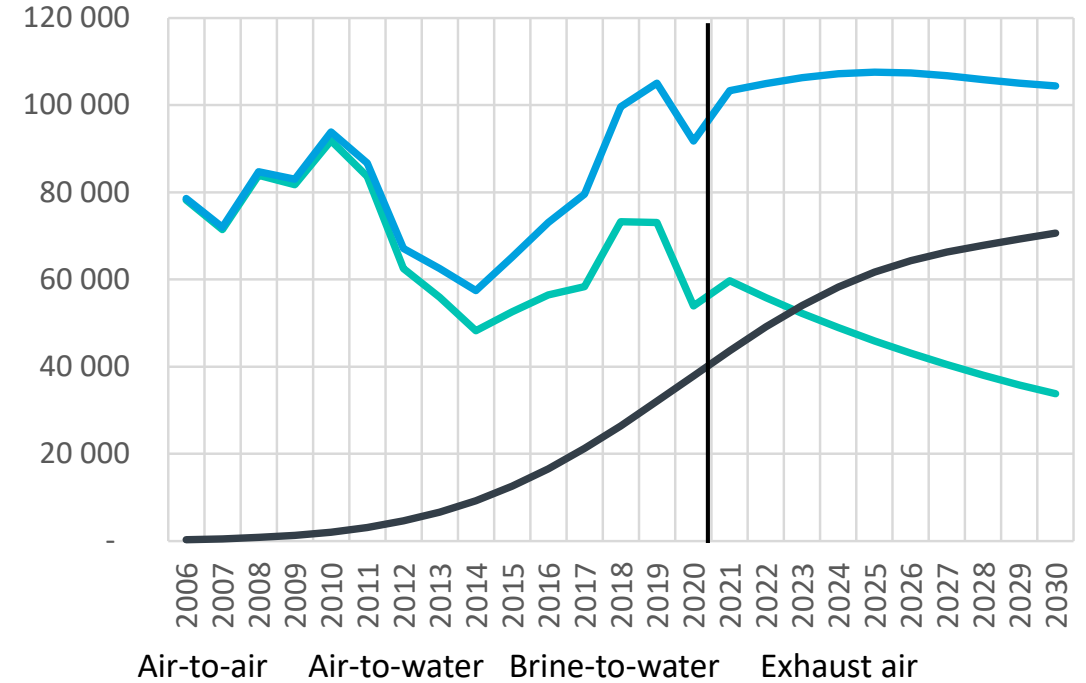
In 2021, 11.8 TWh of wind power was produced, which accounted for 7.5 % of total Norwegian power production.

## Trend projection for heat pump sales

### Number of heat pumps sold by type, trend projection



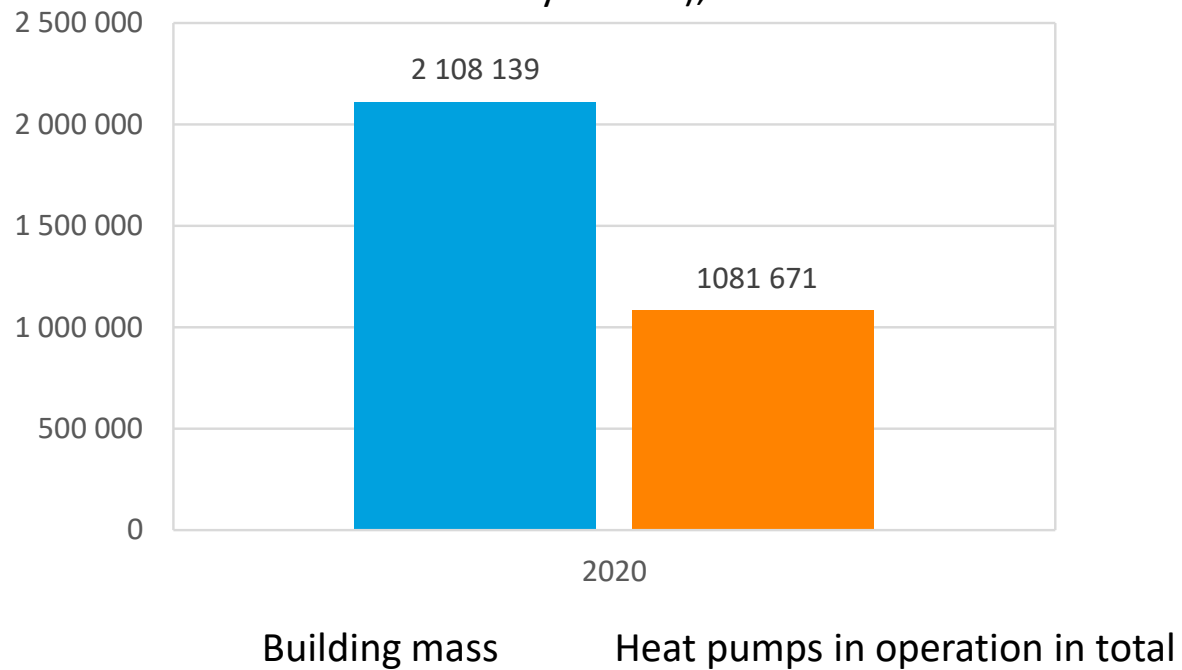
### Number of heat pumps sold per year



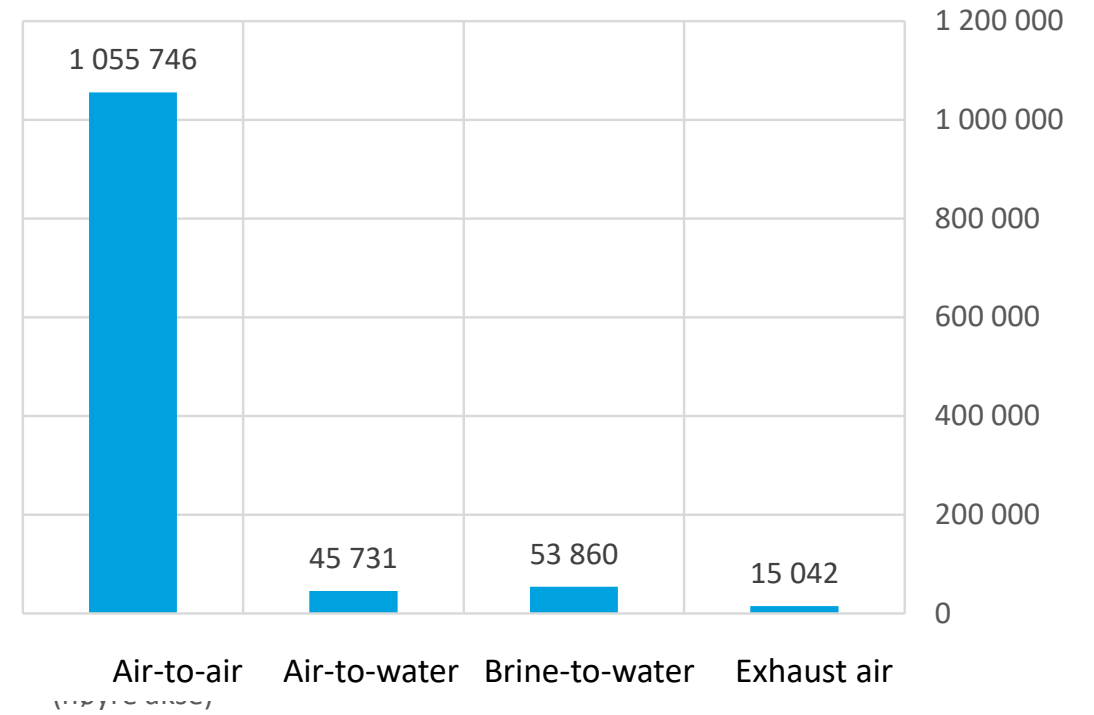


## How many heat pumps are in operation?

### Heat pumps in operation in homes vs. the housing stock (detached houses, terraced houses and holiday homes), 2020



### Number of heat pumps in operation, 2020 - estimate



# Potential for more heat pumps in Norway

## **Sintef Community analyses 2022**

### **Existing building:**

2030 - Potential heat pump 8,1 TWh

2050 - Potential heat pump 9,4 TWh

### **New buildings 2030**

2030 - 3 TWh

2050 – 6,3 TWh

### **Heat pumps in new and existing buildings:**

2030 - 11,1 TWh

2050 – 15,7 TWh

### **Today's contribution 10,6 TWh**





# The installation is at least as important as the heat pump

Use a dealer approved by the Heat Pump Association

Ask for offers from approved dealers

Enter your address..

Find dealer!



# We contribute to high quality in the refrigeration and heat pump industry

NOVAP is one of the country's leading course and competence providers in refrigeration and heat pump technology.

*Our courses and events*

Test of heat pumps, different types, tips for correct use. Get more good advice here!

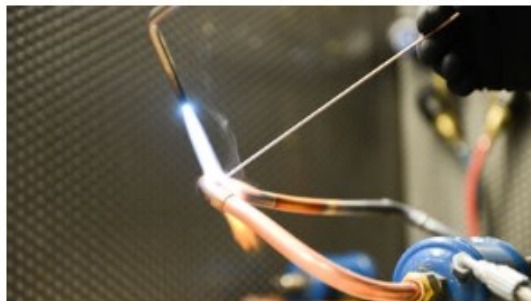




## FSE course for cold and heat pump installers

Regulations on safety at work in and operation of electrical installations set safety requirements for work (or other activity) on or near electrical installations to avoid damage to life, health or material assets.

[Read more about the course](#)



## Hard soldering course

From 1 July 2022, you must document soldering skills to get an f-gas certificate also in category 2. Learn what you need on our hard soldering course.

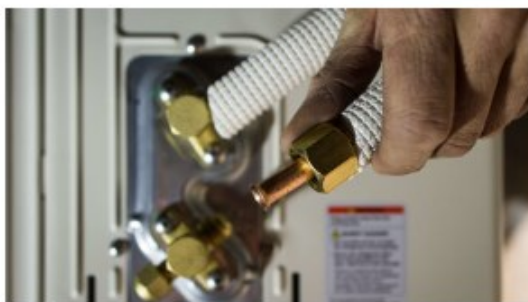
[Read more about the course](#)



## Laws and regulations for the heat pump industry

A strong increase in the sale of heat pumps in Norway and conscious consumers place higher demands on orderly and professional behavior in sales and complaints.

[Read more about the course](#)



## Air-to-air heat pump course

Learn how to install heat pumps safely, efficiently and so that they work optimally. You also learn troubleshooting and service.



## Optimal design of heat pump systems

Learn how to design efficient heat pump systems in new and existing buildings.



## Project manager course - Flammable refrigerants

If you are to design refrigeration systems with flammable refrigerants, you must know how to carry out a risk assessment and calculate the permitted filling quantity according to relevant standards.