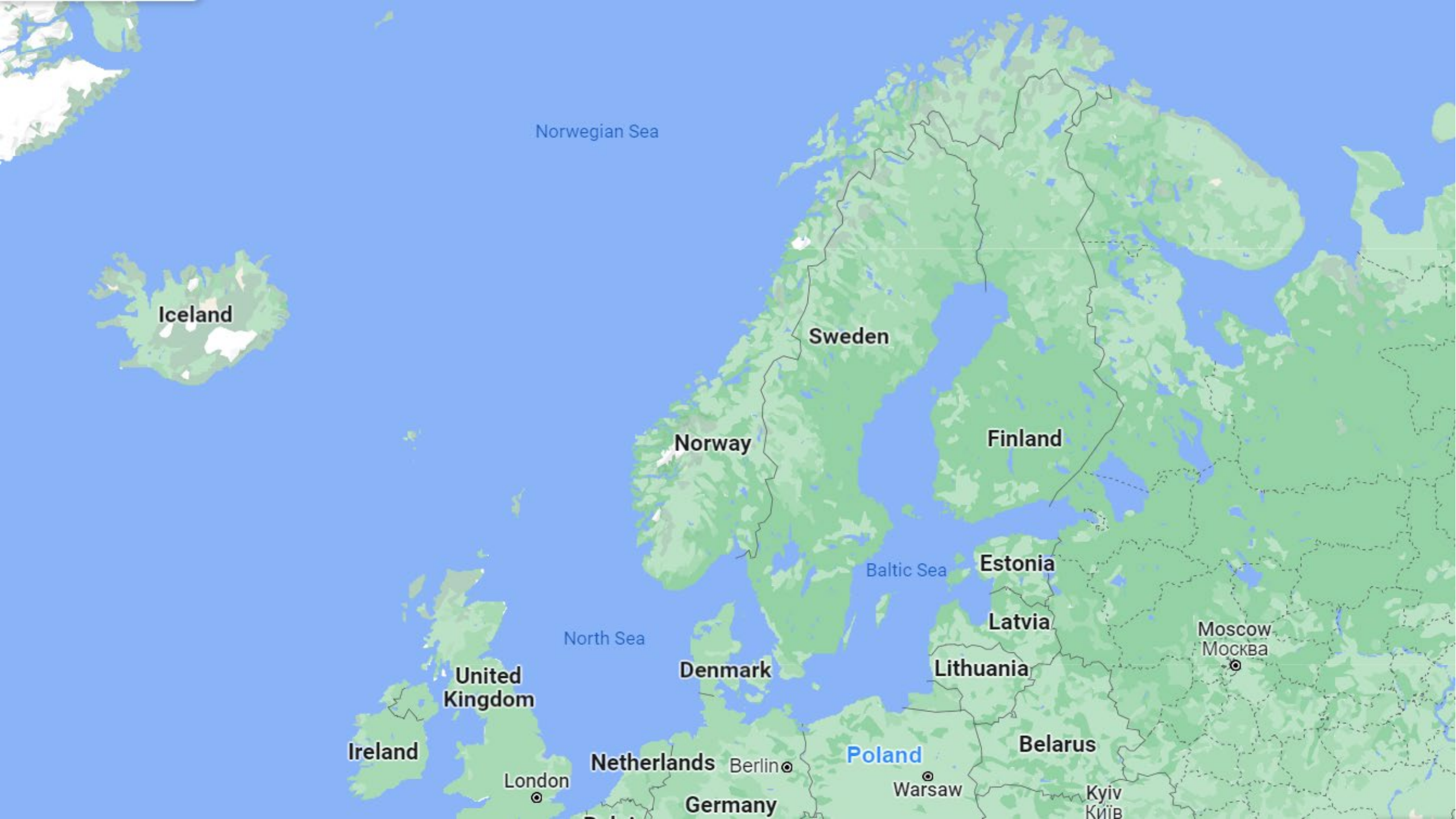
The heat pump market in Norway

Rolf Iver Mytting Hagemoen

Norwegian Heat Pump Association


Norwegian Sea
Iceland
Sweden
Norway
Finland
Baltic Sea
Estonia
Latvia
Lithuania
Moscow
Москва
North Sea
Denmark
United Kingdom
Ireland
Netherlands
Berlin
Poland
Belarus
London
Warsaw
Germany
Kyiv
Київ

Facts about Norway

- Norway is a country of mountain ranges, huge forests, vast empty expanses and only about 3% arable land.
- The population is approximately 5.3 million, around 1.2 million of whom live in and around the capital city, Oslo.
- Form of government: Constitutional monarchy
- Parliament
- EU membership: No

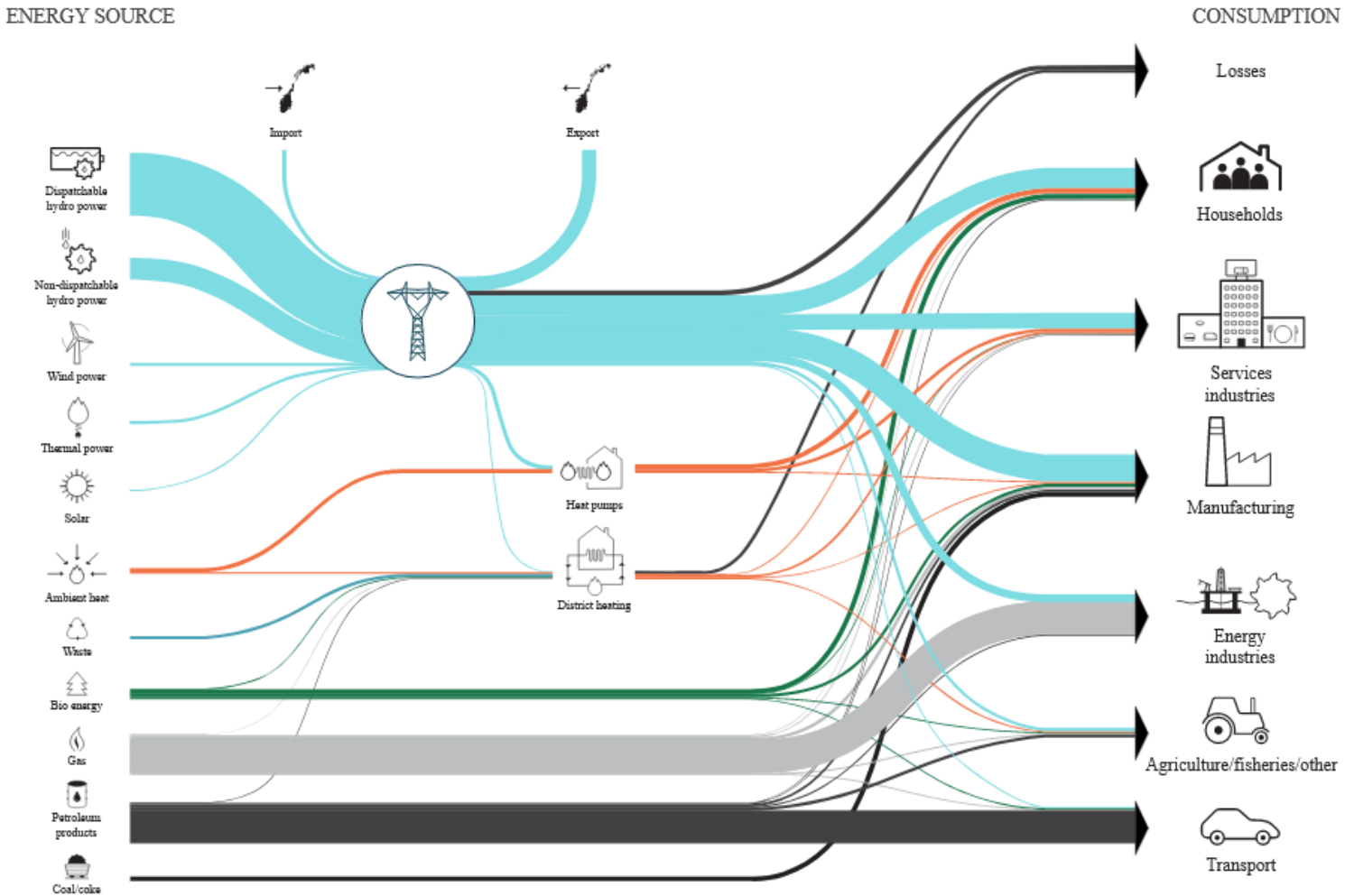

OPB

The Norwegian economy

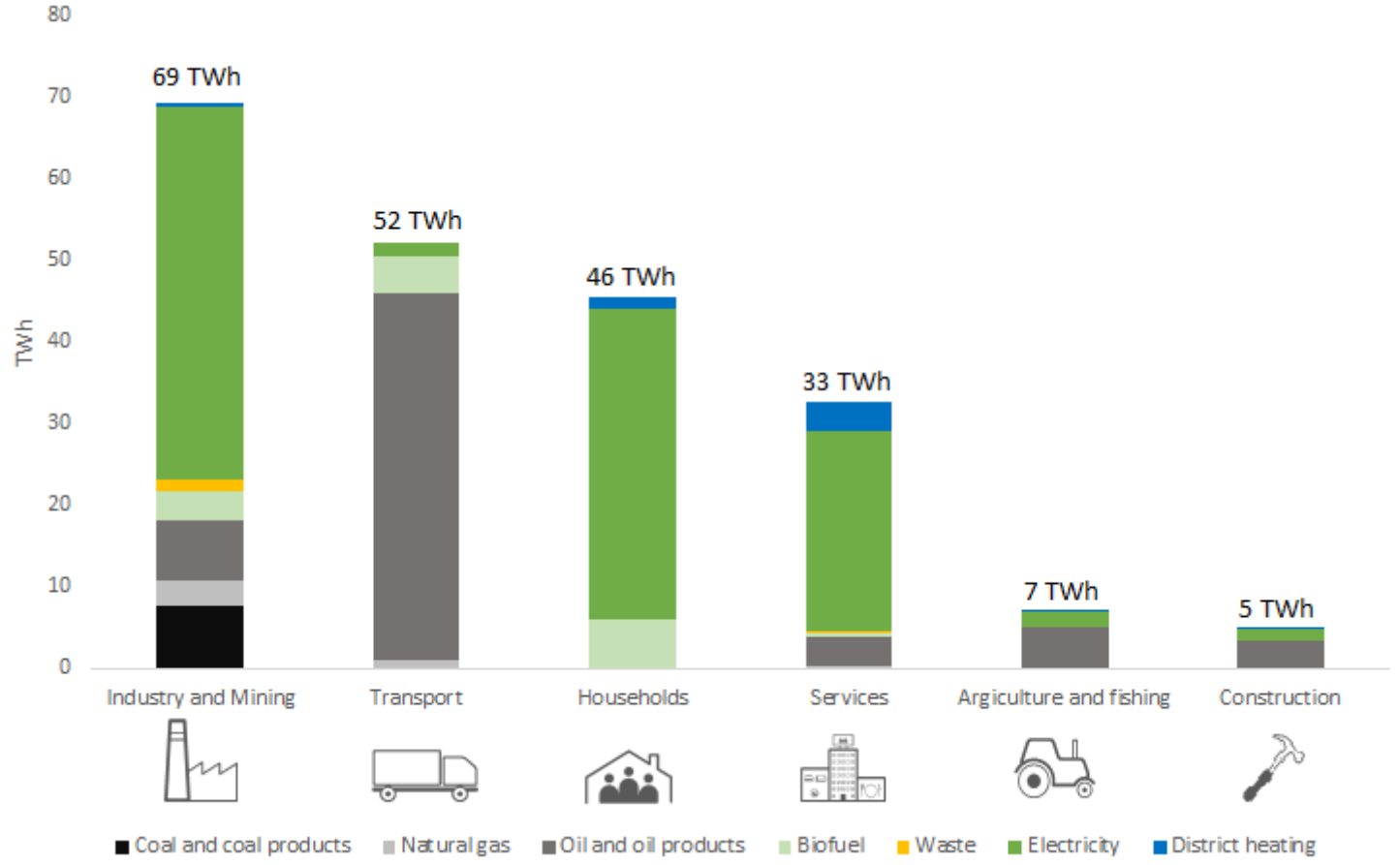
- The biggest source of national income is the extraction and export of offshore oil and gas. Other significant industries include fishing, raw aluminum, shipping and tourism.

- Per capita GDP:
- 73 170,43 Euro
- 76 148,61 US$

THE NORWEGIAN ENERGY SYSTEM



Final energy consumption in Norway



Total in 2020: 211 TWh. Source: Statistics Norway

Electricity production and consumption

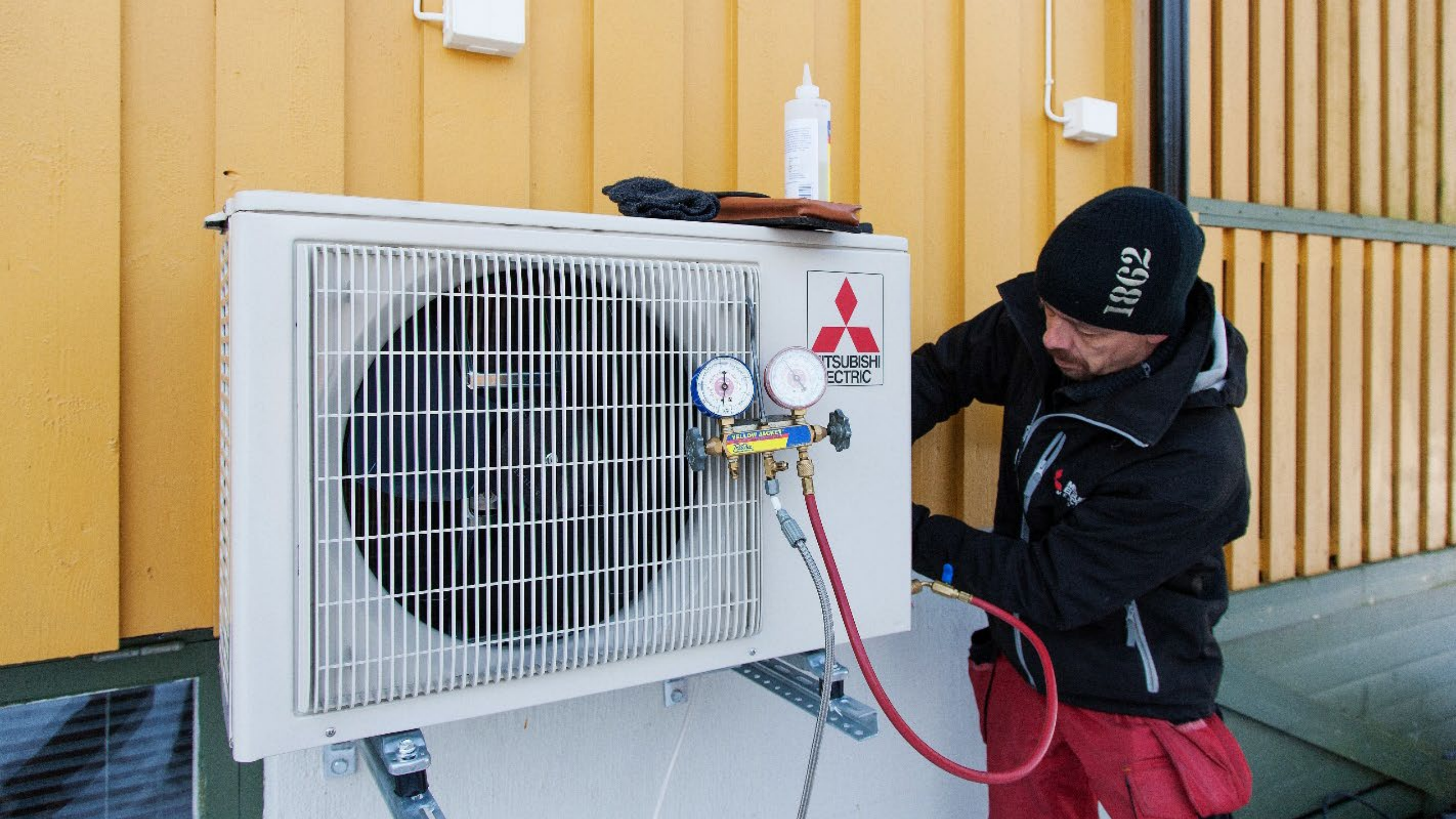
Electricity production in 2021:		157.1 TWh
Electricity consumption 2021:		139.7 TWh
Net export of electricity:		17.3 TWh
1739 hydropower plants	-	88 % of Norwegian production capacity
64 wind farms	-	10 % of Norwegian production capacity

The total renewable share in Norway is 50.4 per cent, compared with 46.7 per cent in 2010

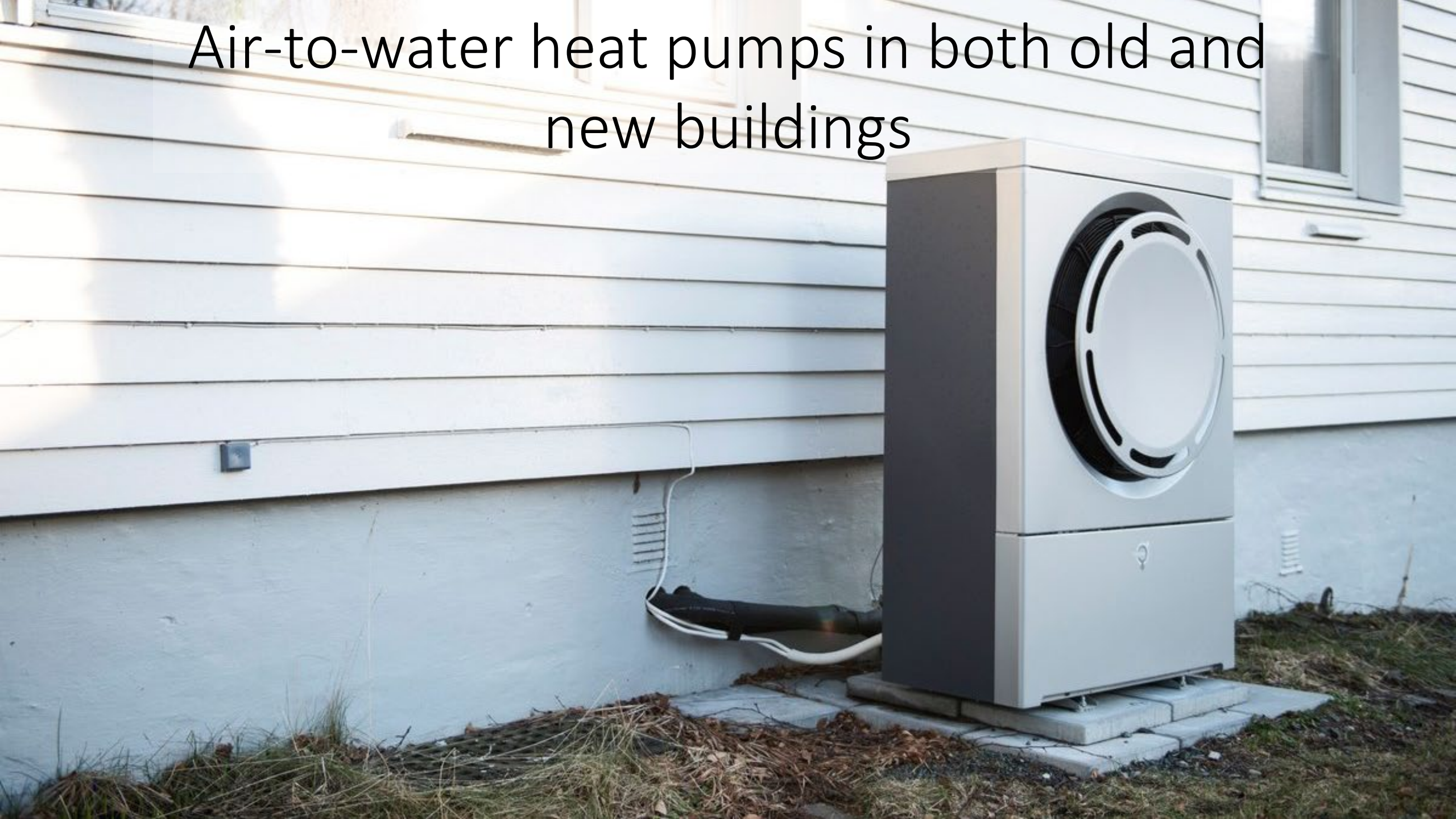
Electric heating is common in Norway

Electric heating is common in Norway

Air-to-air-heat pumps is popular

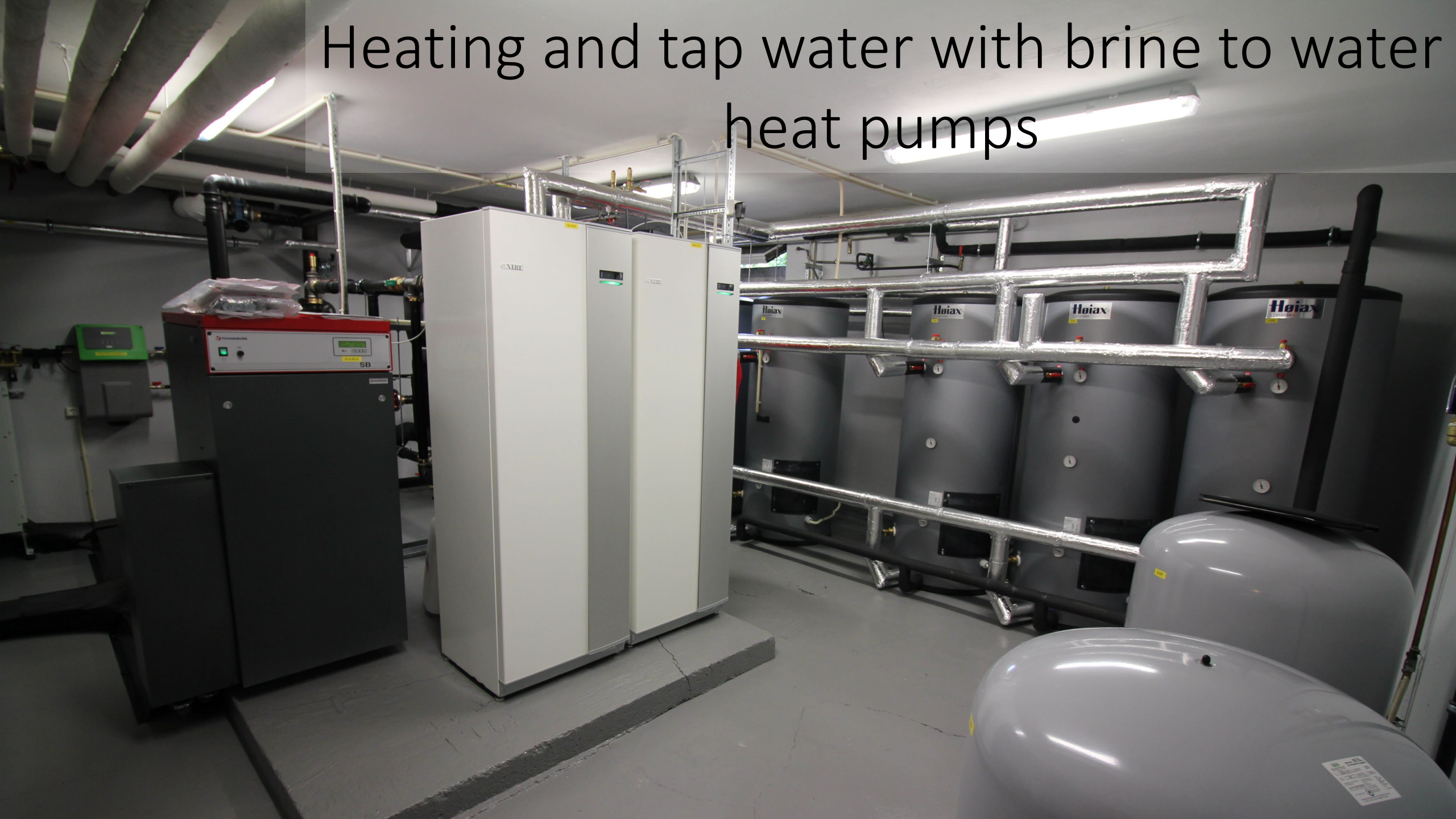

1862
YELLOW JACKET

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

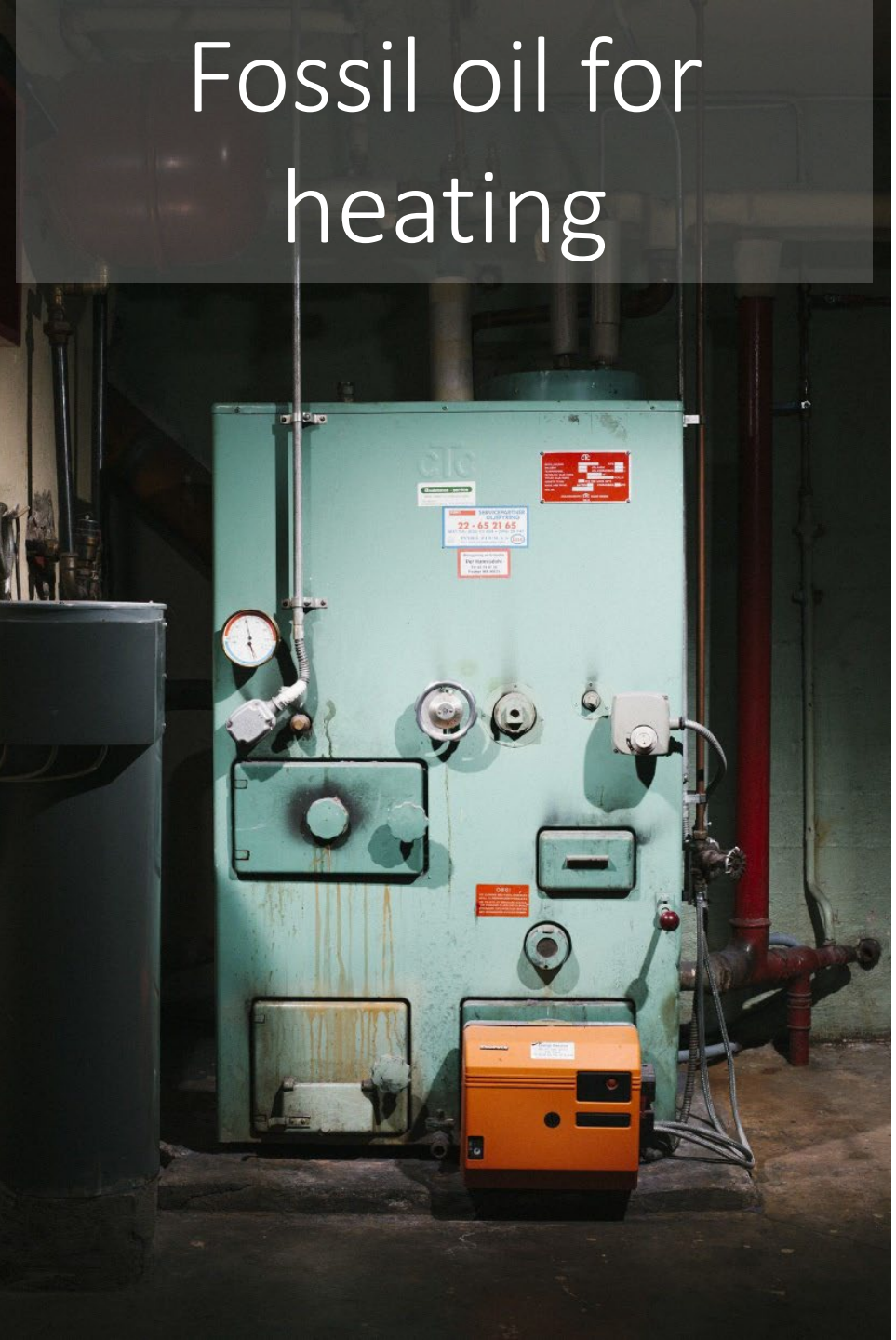


Drilling for boreholes

Heating and tap water with brine to water heat pumps



Fossil oil for heating



Banned in all buildings from 2020

Powerhouse in Trondheim
Plus energy building

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

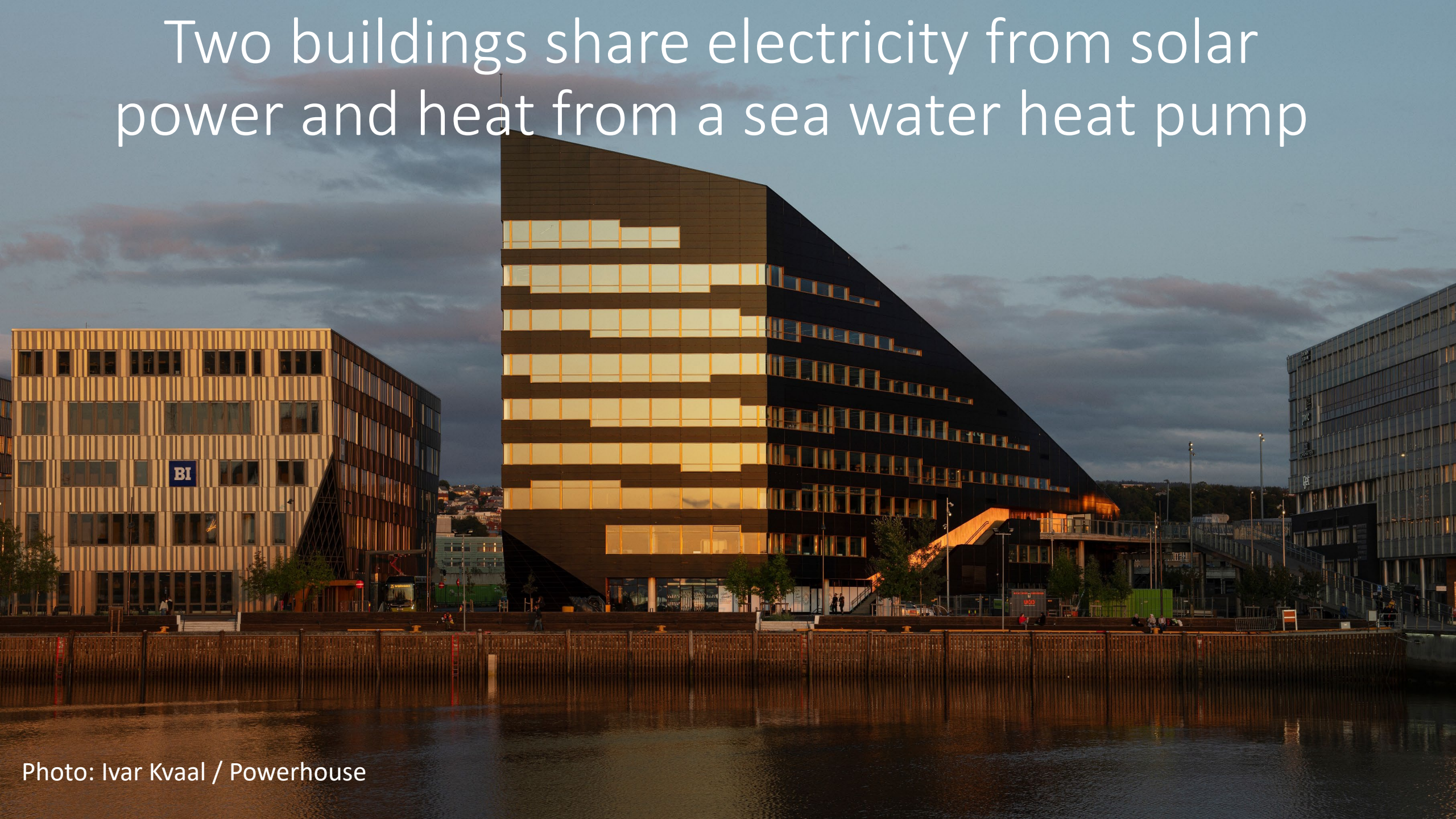
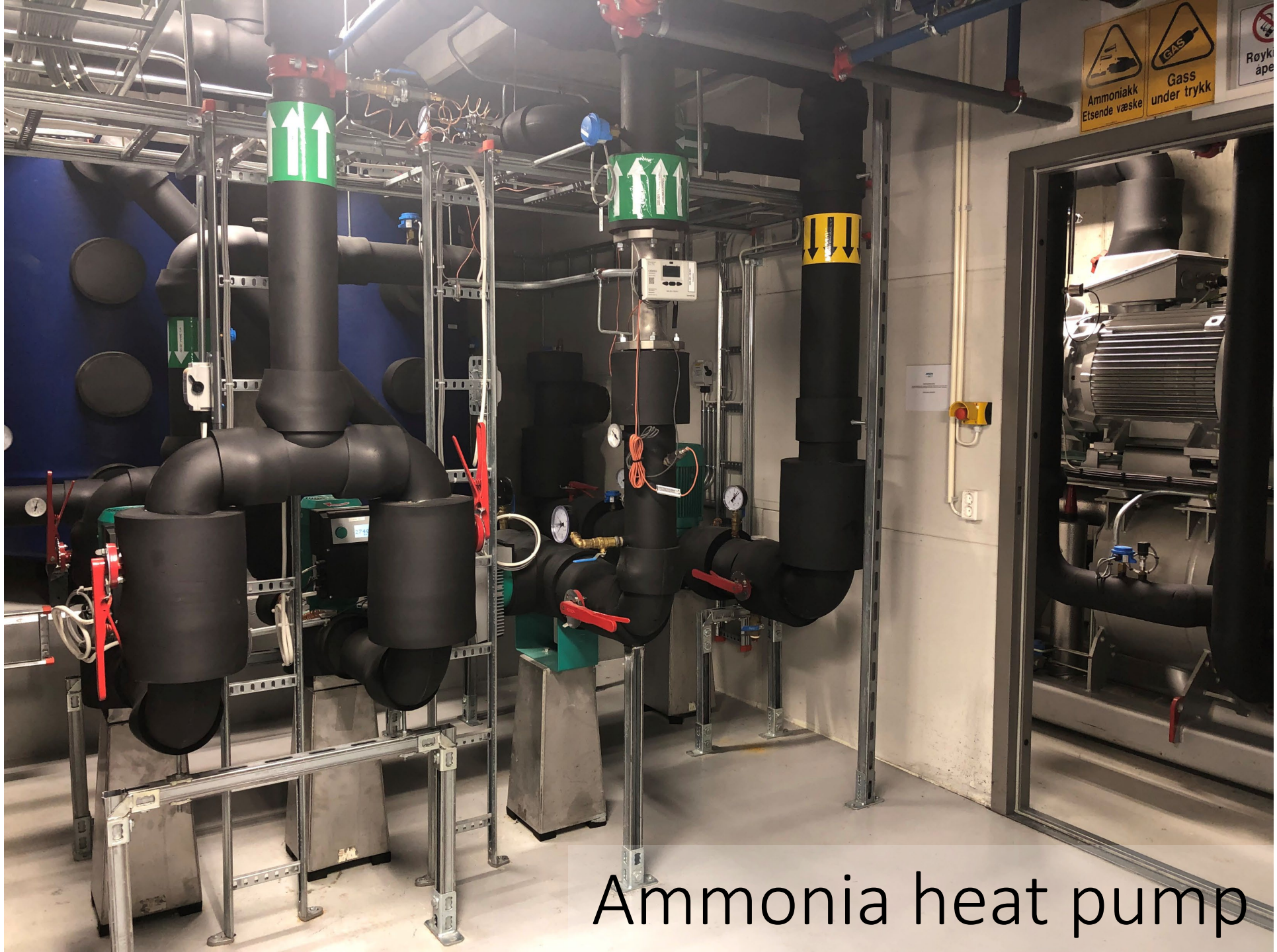


Photo: Ivar Kvaal / Powerhouse

The building is designed for energy production



Ammonia heat pump


SABROE

Norwegian EV market

In 2021: 64.5 percent of all new cars sold were fully electric.

Electric ferries

In 2022 there are 58 car ferries in electric operation in Norway.

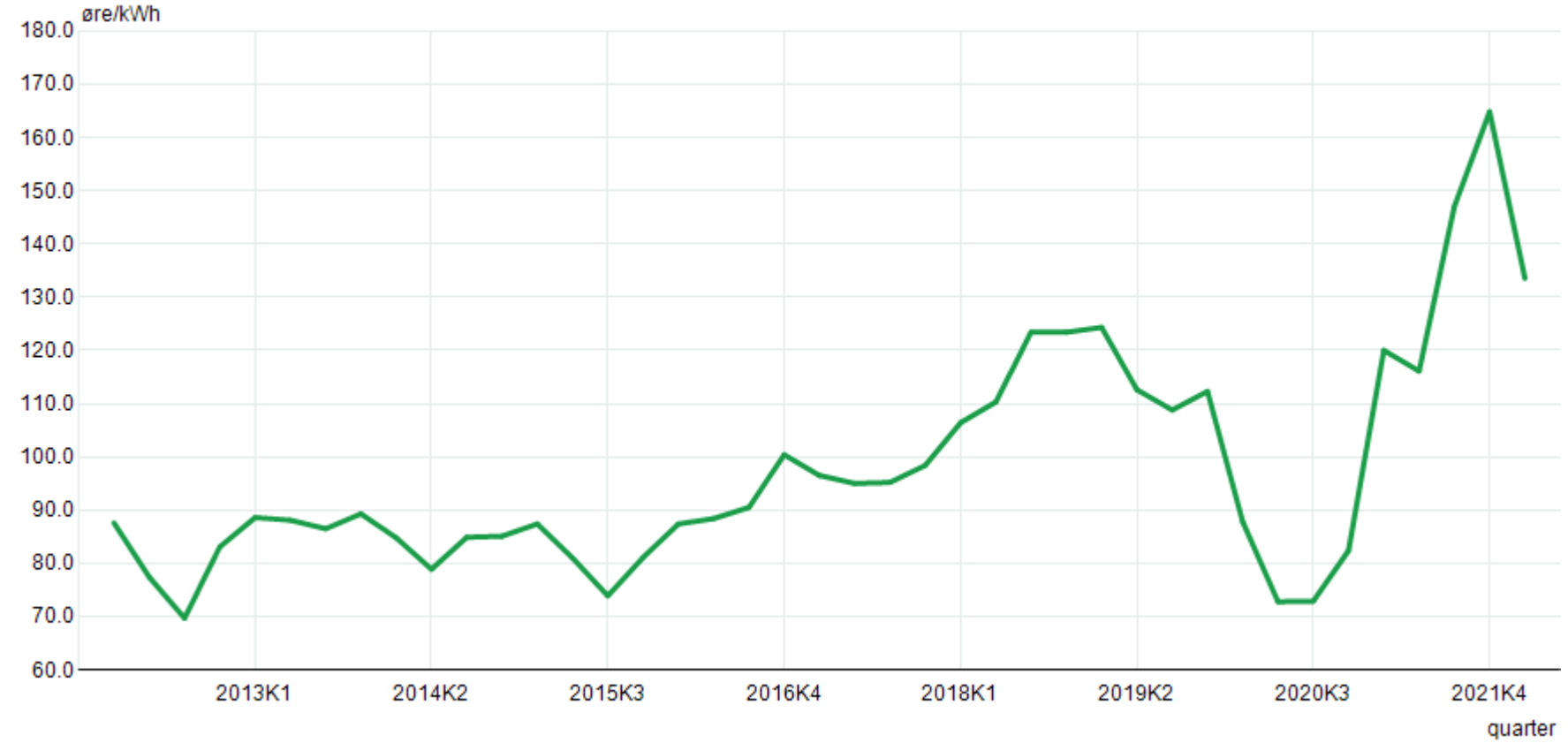
Another 14 ferries will be put into electric operation during the year.

Explaining market for heat pumps 2022

- Highest electricity prices ever
- 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
- Electric heating is most common in Norway
- Many houses have wood stoves
- High electricity prices increase the demand for heat pumps
- There is district heating in the cities and some smaller towns, yet less than in the other Nordic countries
- CO_2 price on fossil fuel and refrigerants – more natural refrigerants than most other countries

Electricity price, grid rent and taxes for households (100 øre = 1 NOK = 0,1 Euro Cent)

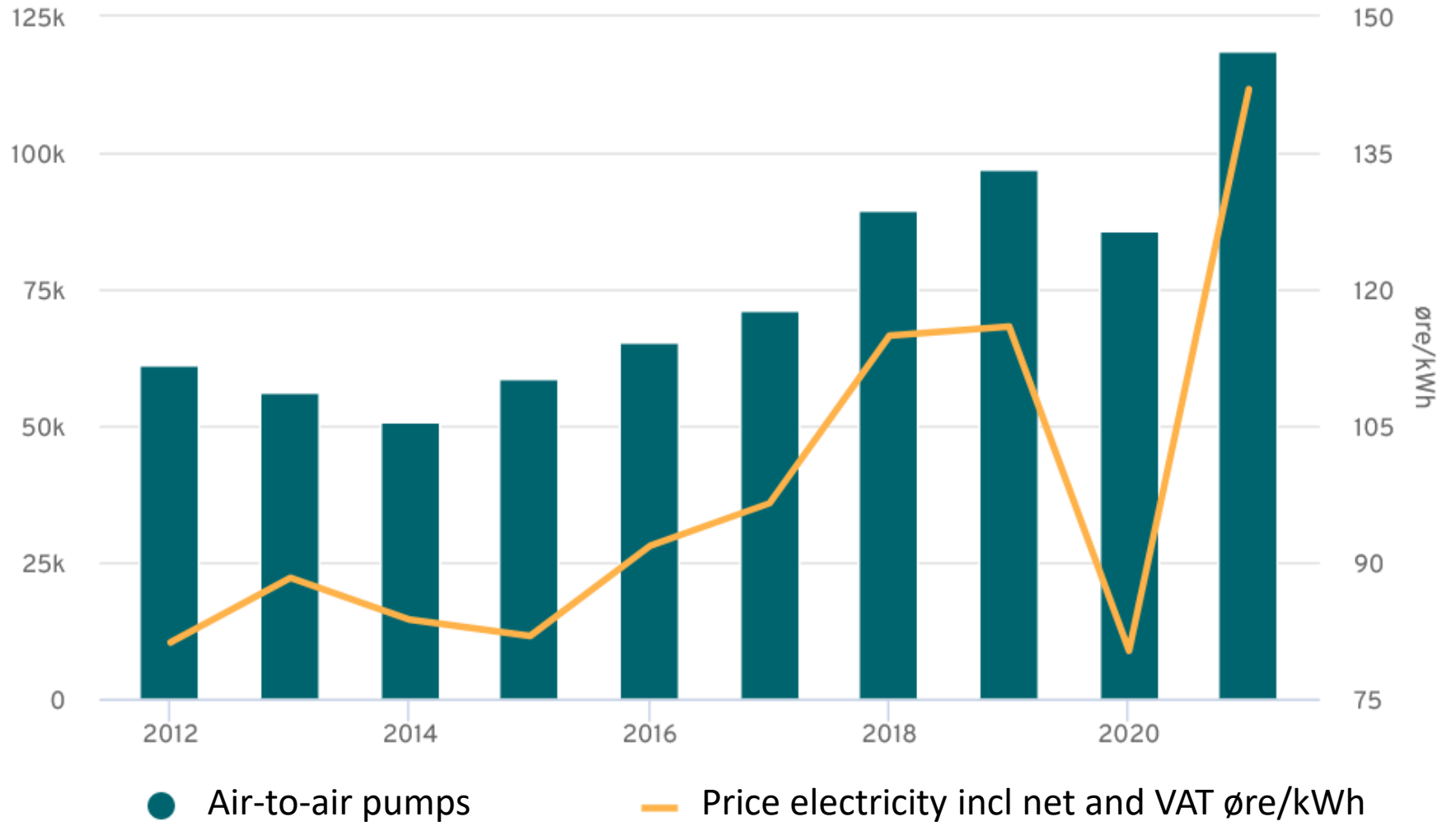
09387: Electricity price, grid rent and taxes for households, by quarter. Total price of electricity and grid rent incl. taxes, electricity support deducted (øre/kWh).



Source: Statistics Norway

ENERGI OG KLIMA

Number of sold air-to-air heat pumps vs price electricity for households



Kilder: SSB/Norsk Varmepumpeforening

Pros and cons for heat pumps

Pros:

Electricity prices low compared to fossil energy

CO_2-taxes on fossil energy

Fossil energy banned in new buildings

Fossil oil banned in most buildings

Energy labelling of buildings, BREEAM, FutureBuild etc promotes heat pumps

Ambitious building owners choose heat pumps

Many competent companies, installers and planners

Subsidies for some heat pumps

Cons:

Direct electric heating is common

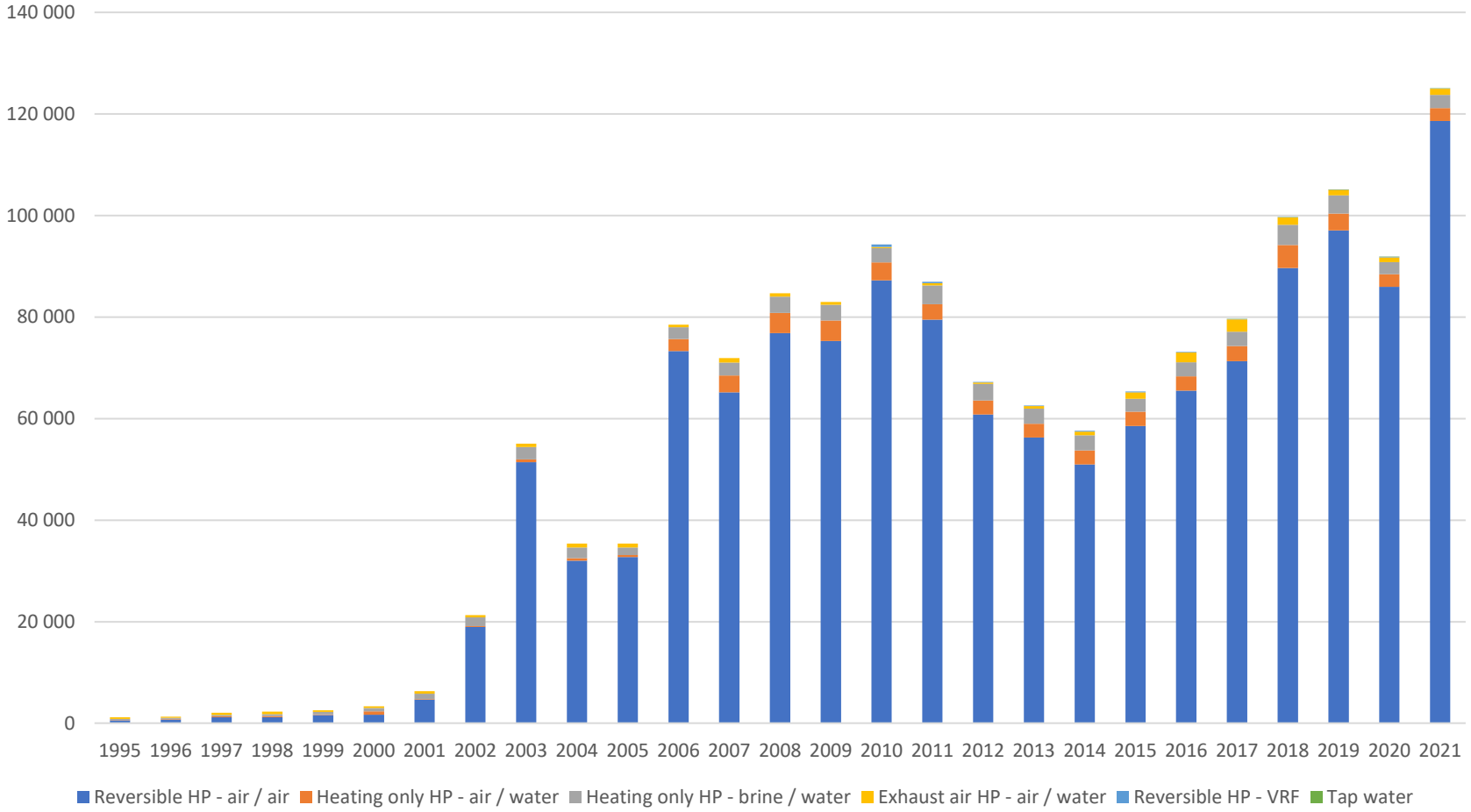
Building regulations does not give initiatives for heat pumps

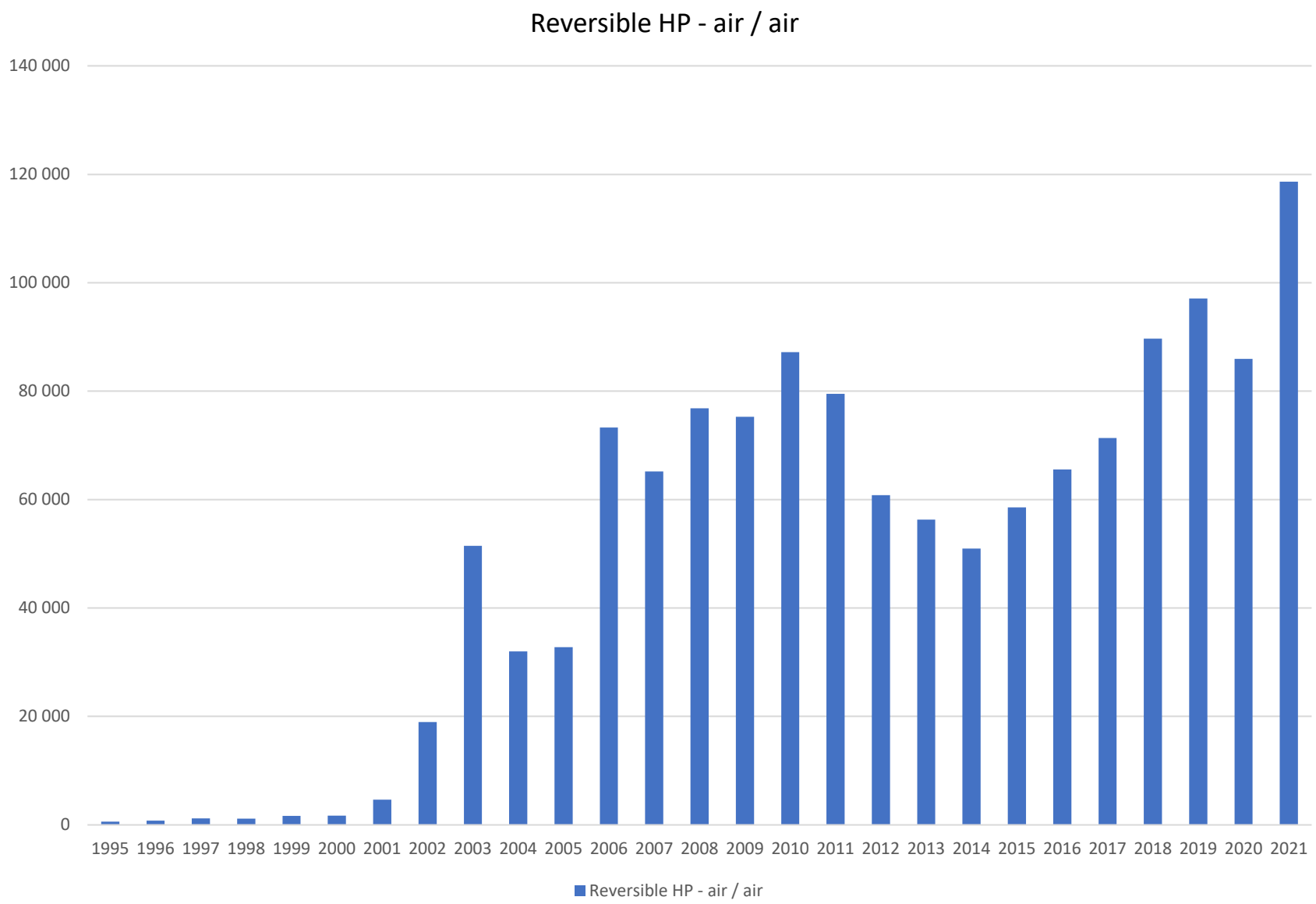
NZEB not implemented in building regulations

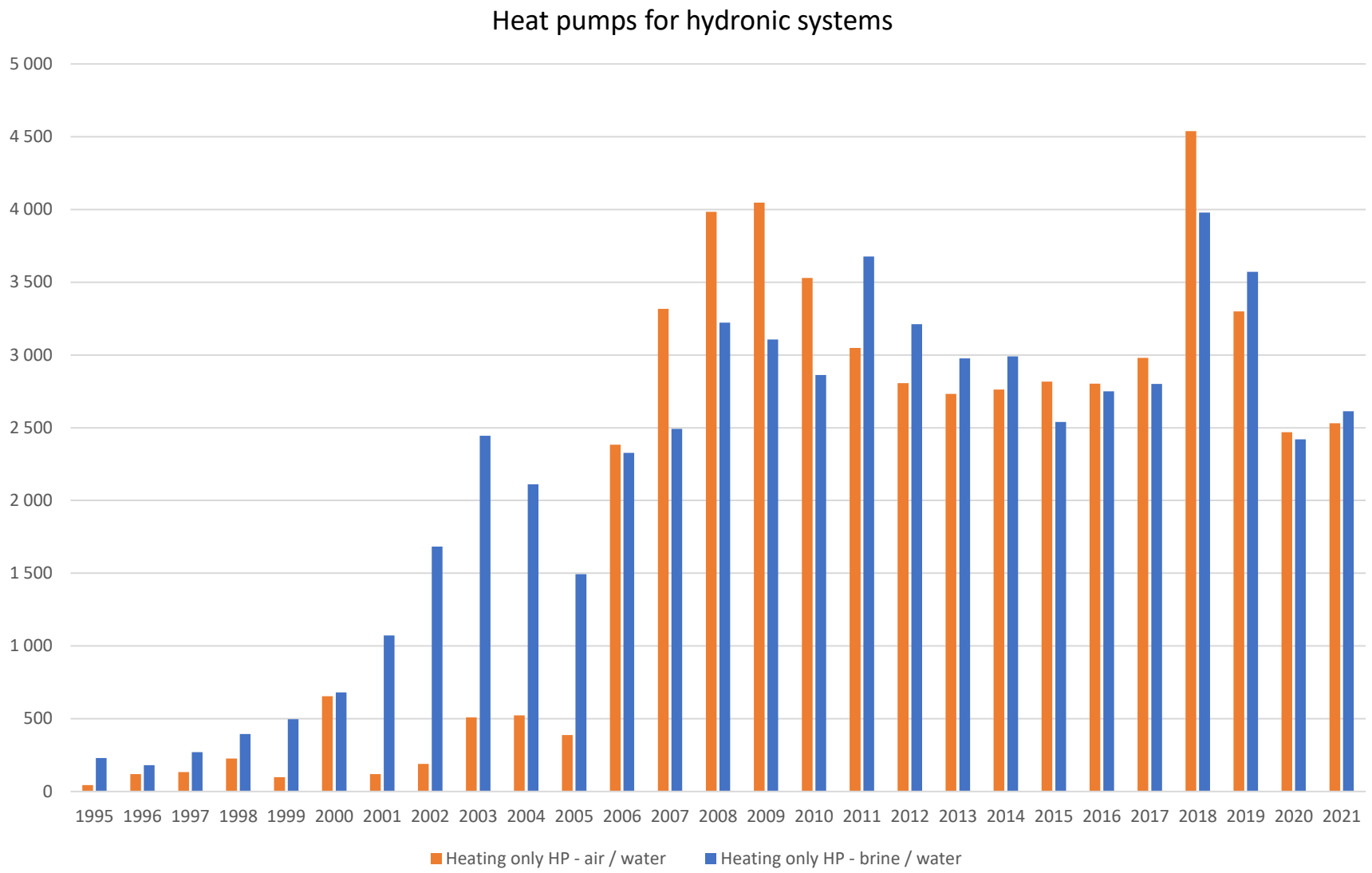
Many incompetent companies, installers and planners

No national strategy for energy efficiency in buildings

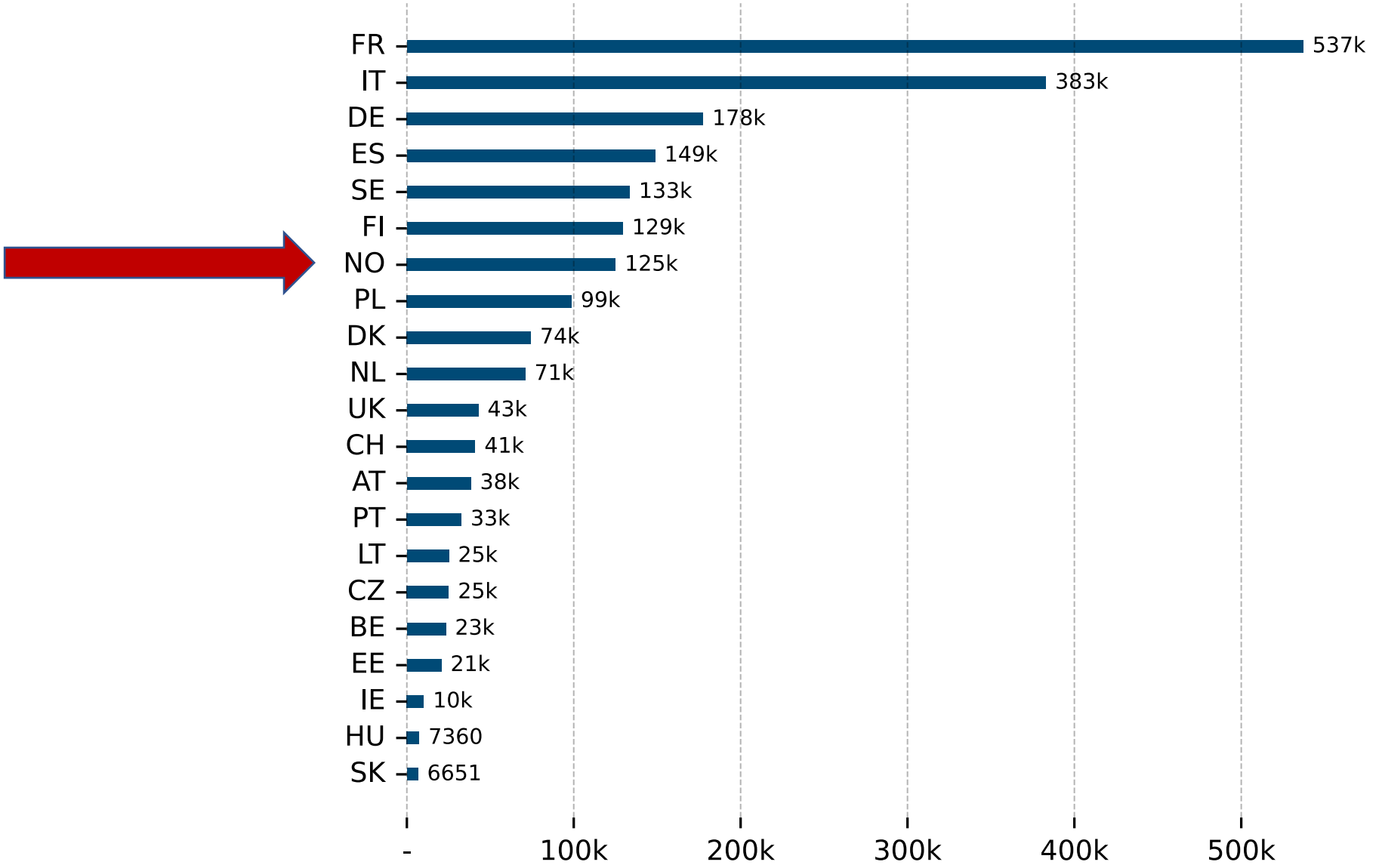
Total market heat pumps 1995 - 2021




Reversible HP - air / air
140 000
120 000
100 000
80 000
60 000
40 000
20 000
0
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021
Reversible HP - air / air

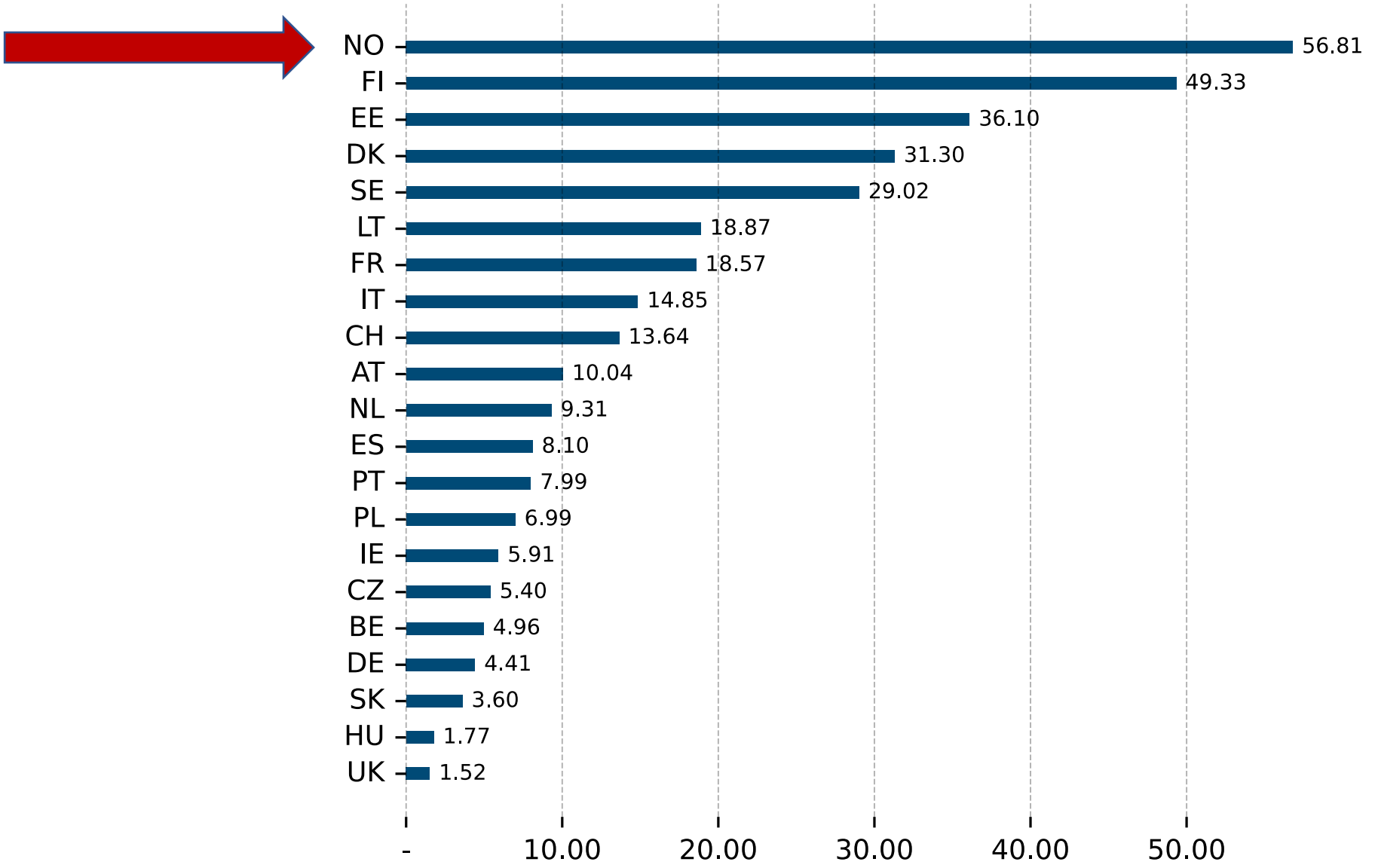

Heat pumps for hydronic systems
5 000
4 500
4 000
3 500
3 000
2 500
2 000
1 500
1 000
500
0
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021
Heating only HP - air / water
Heating only HP - brine / water

Sales of heat pumps in 2021 | by country



stats.ehpa

Heat pump sales 2021 per 1 000 households



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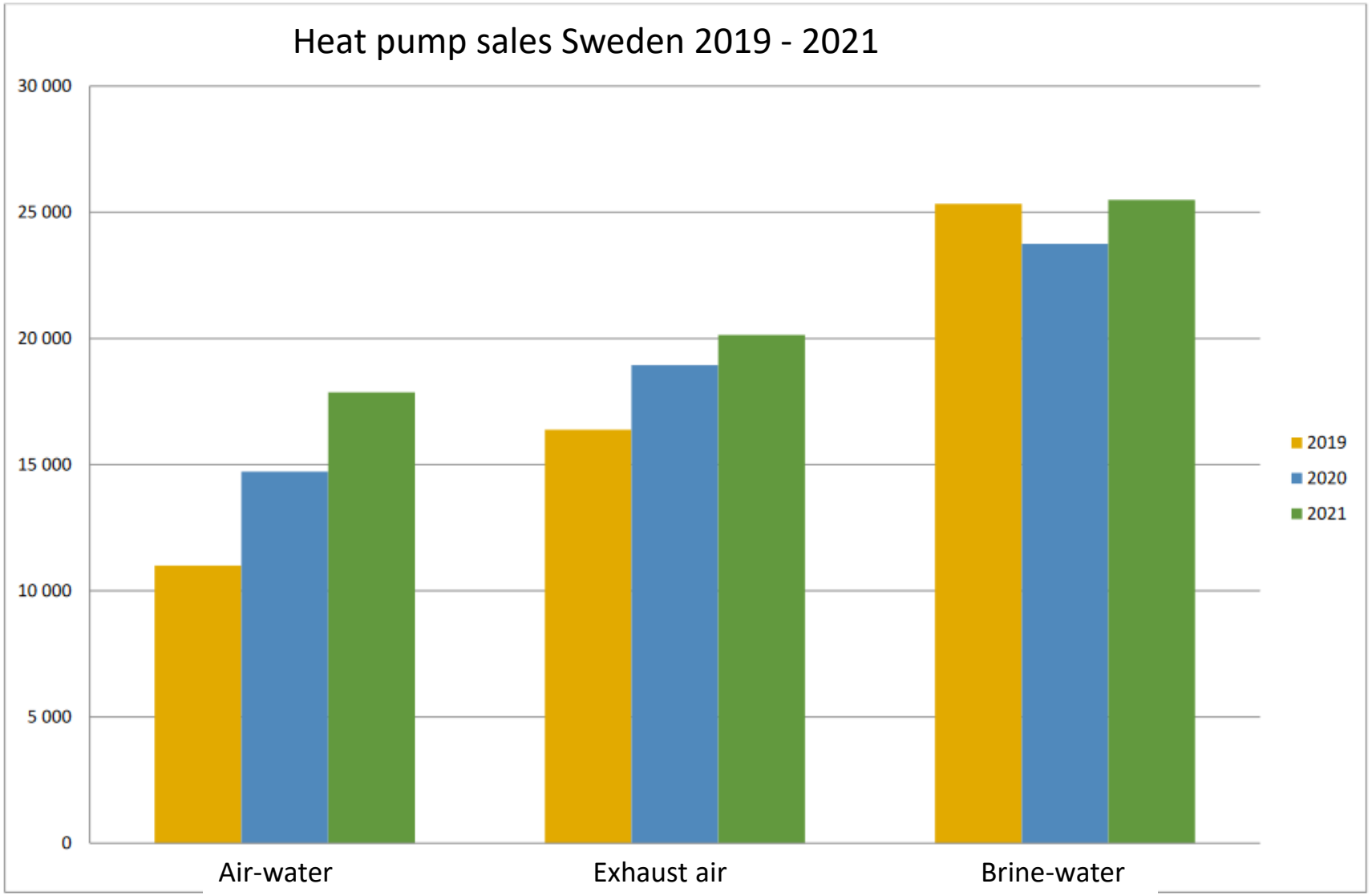
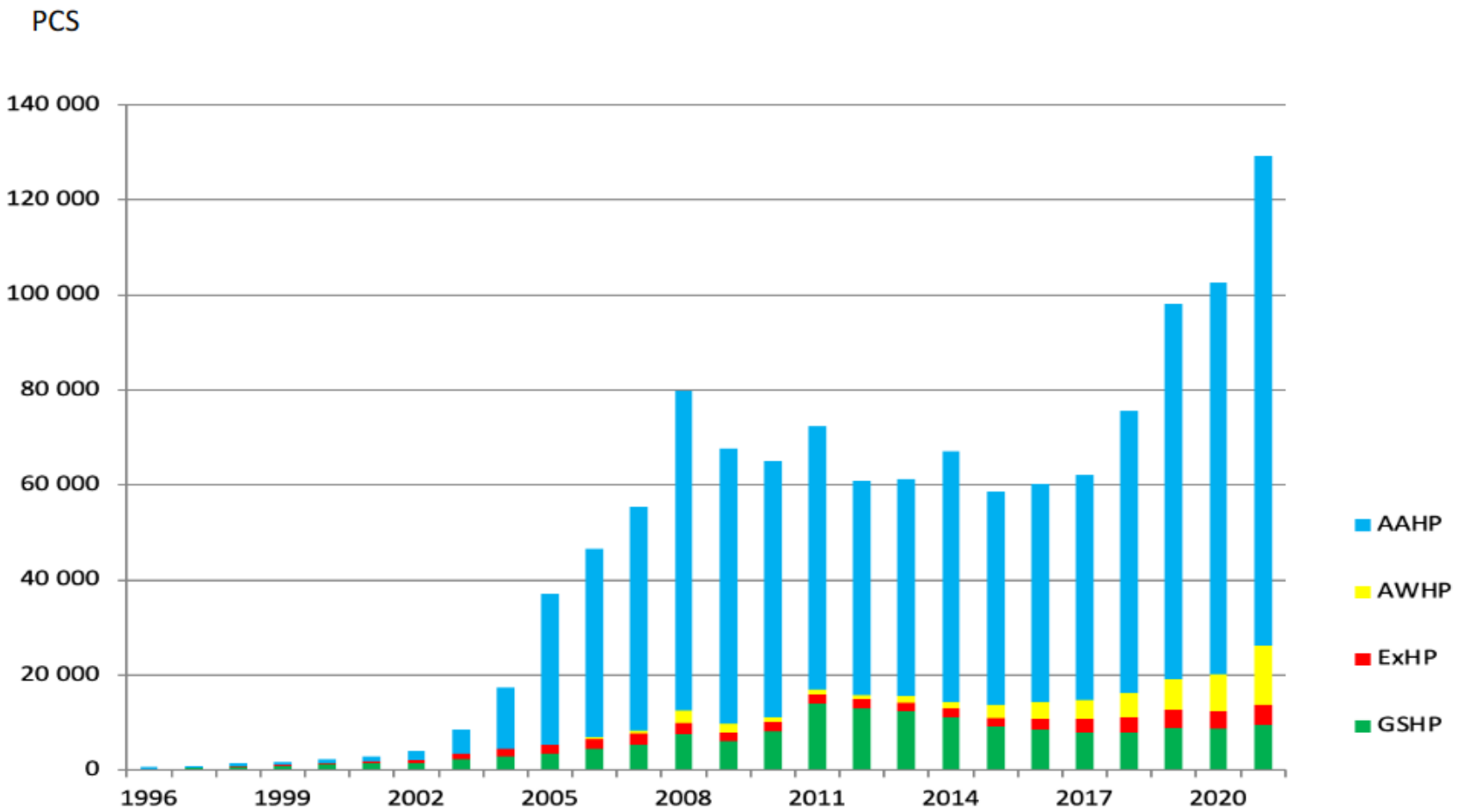


SVENSKA KYL&VÄRMEPUMP FÖRENINGEN

Annual Heat Pump installations in Finland (pcs)



Norway 2021 vs 2020

- **Lowest electricity prices for 20 years in 2020, highest ever in 2021**

- **Total sales of heat pumps:**
- 2019 105 124
- 2020 91 894
- 2021 125 049

- An increase of 36% compared to 2020

- **Fourth quarter 2021 compared to fourth quarter 2020**
- Air-to-air + 60,70 %
- Air-to-water + 33,70 %
- Brine-to-water + 29,90 %
- Exhaust air 156,2%

- **2021 compared to 2020**
- Air-to-air + 38,00 %
- Air-to-water + 2,5 %
- Brine-to-water + 8,0 %
- Exhaust air 29,9%

Distribution of heat pumps in Norway

- In the period 1987 - 2021, almost 1.5 million heat pumps were sold in Norway
- Air-to-air: approx. 1,36 millioner
- Air-to-water: over 50 000
- Brine-to-water: over 60 000
- Ventilation heat pumps: over 20,000

- More than 1.1 million heat pumps are in operation - more than 10,6 TWh of ambient heat.

Contribution from heat pumps in Norway

	Housesholds	Commercial	Industry	District heating	Sum
Heat production 2021	10,8	6	1,9		18,8
Input electricity	5,2	2,3	0,6		8,1
Ambient heat	5,6	3,7	1,3		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.

Potential for more heat pumps in Norway

Sintef Community analyses 2022

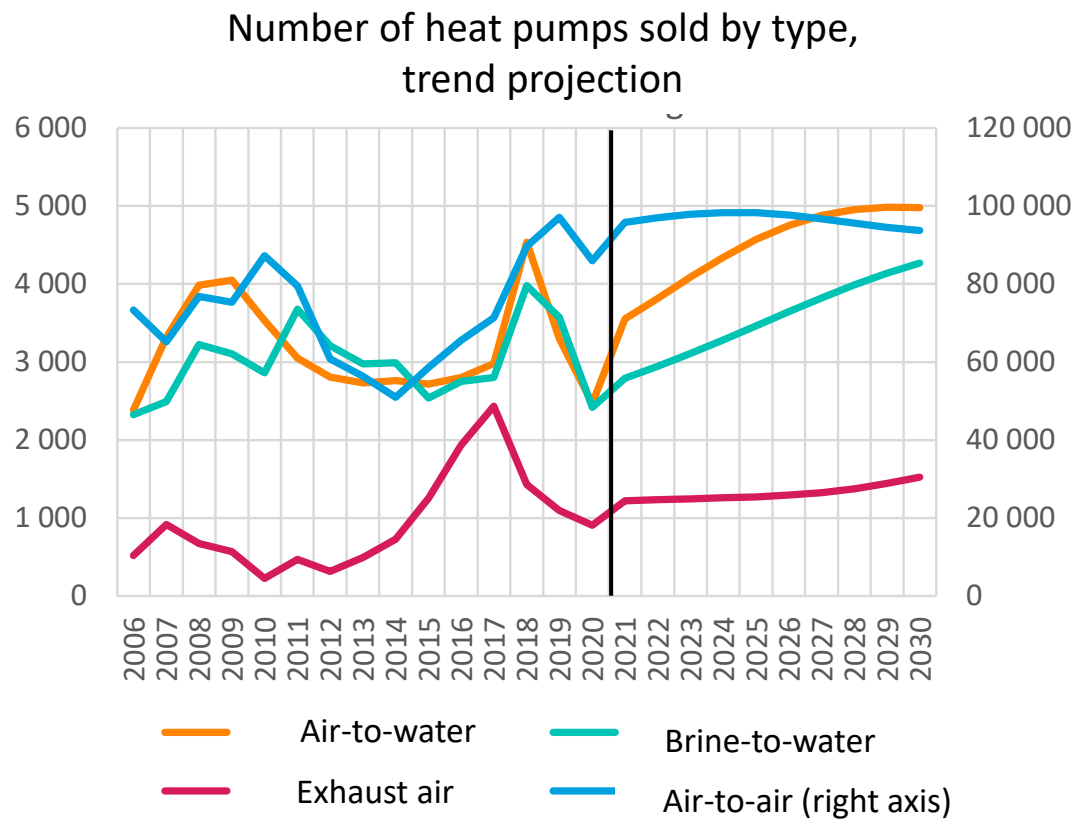
Existing building:
2030 - Potential heat pump 8.1 TWh
2050 - Potential heat pump 9.4 TWh

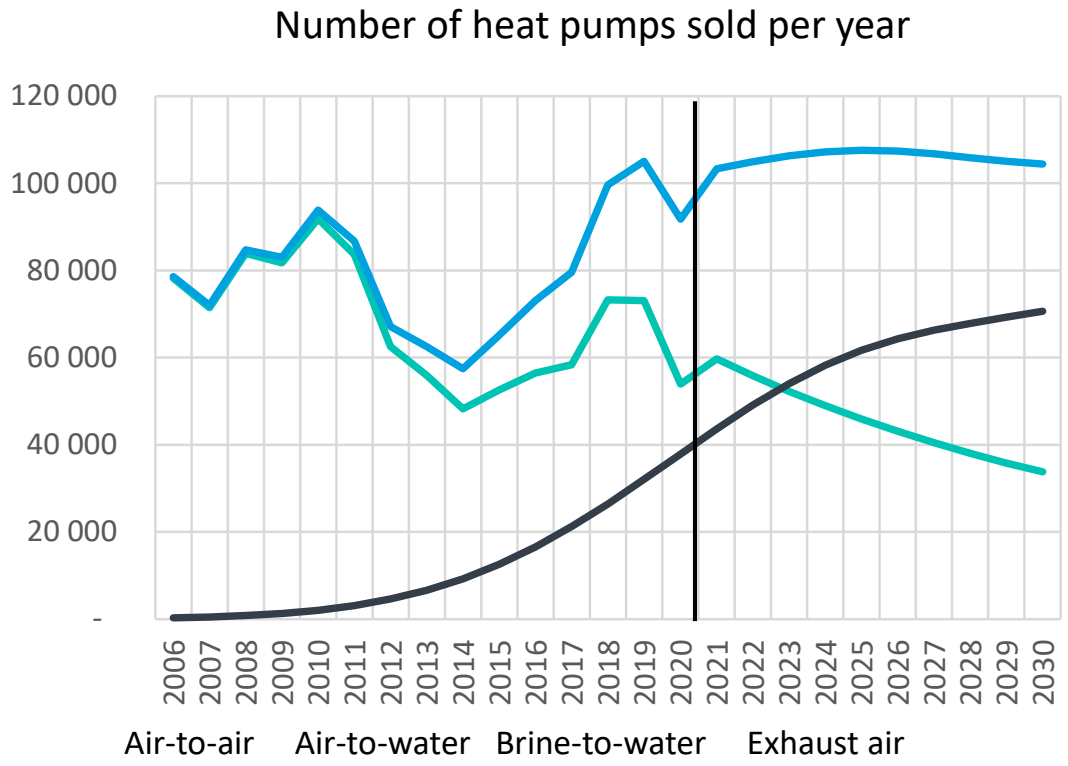
New buildings 2030
2030 - 3 TWh
2050 - 6.3 TWh

Heat pumps in new and existing buildings
2030 - 11, 1 TWh
2050 - 15.7 TWh

Todays contribution 10, 6 TWh

Trend projection for heat pump sales

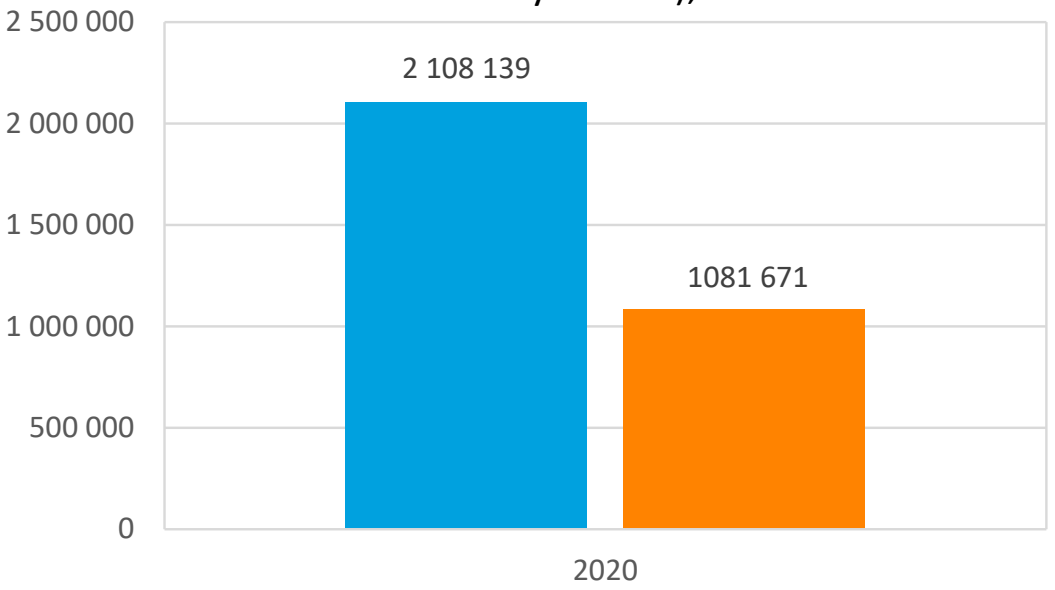




Prognosesenteret

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