

Energy Year 2024 District Heating

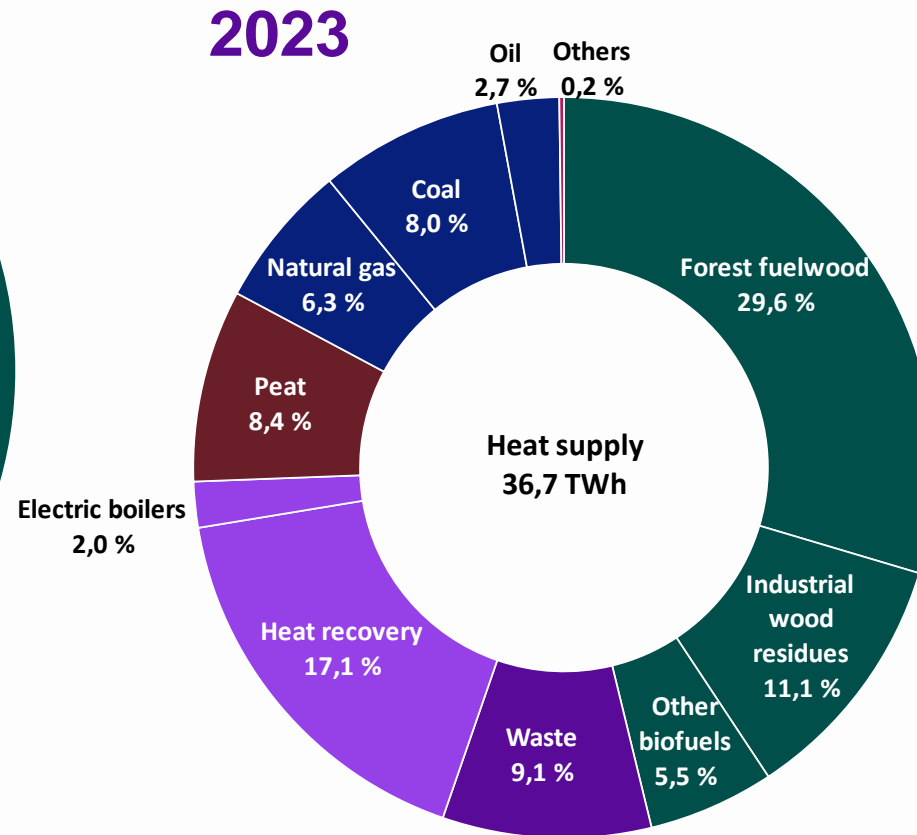
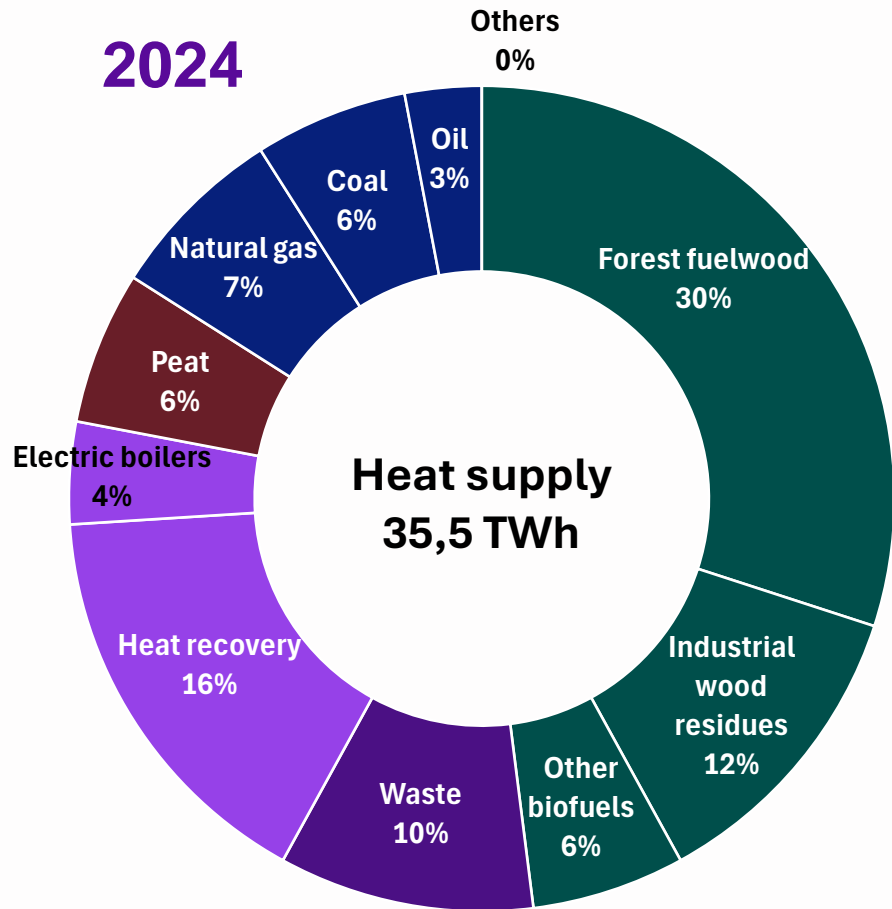
28.01.2025

Finnish Energy

District heating preliminary data
2024

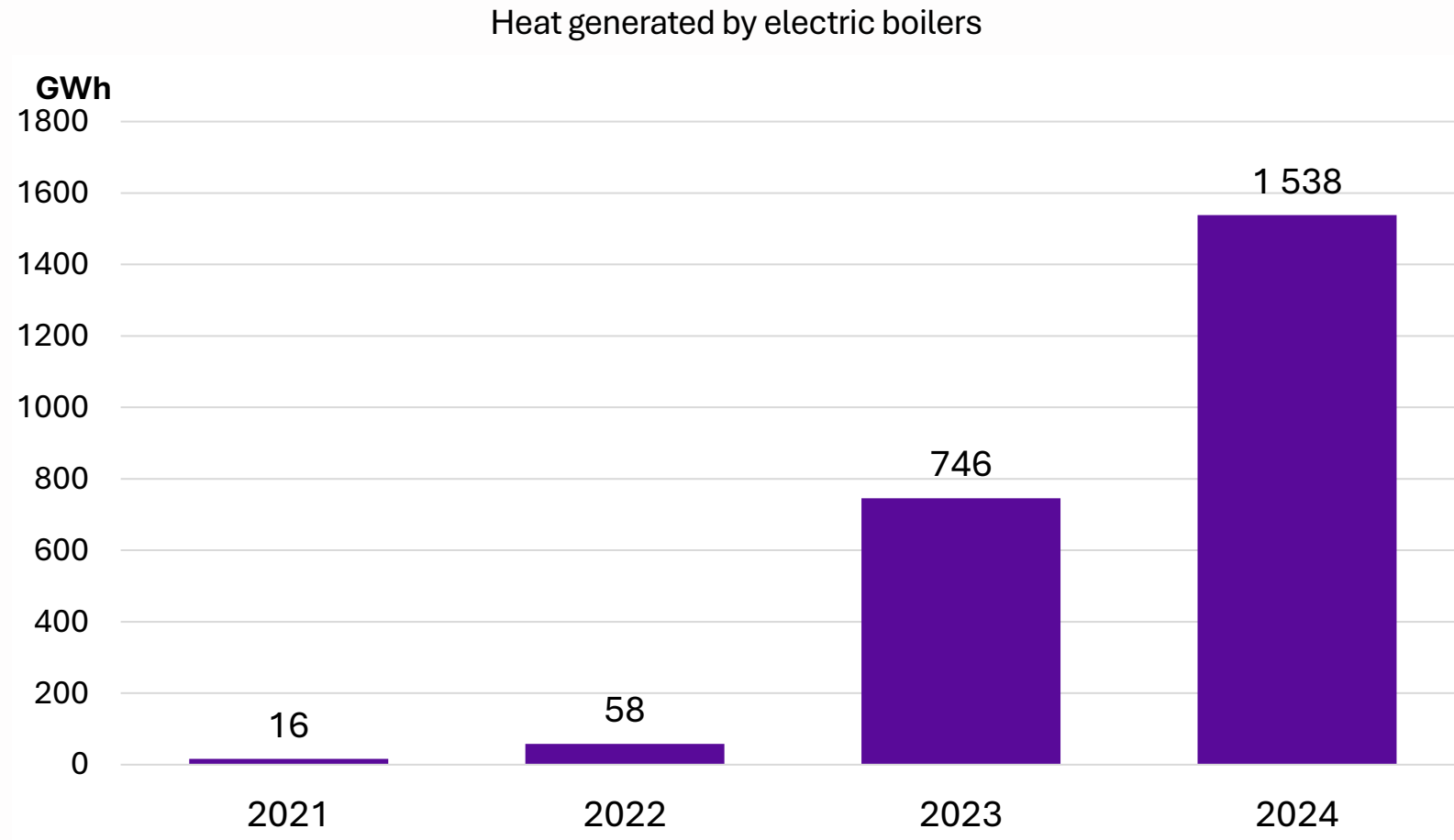
Share of climate neutral energy continued to grow

Share of renewables, heat recovery and electric boilers increased from 70 percent to 73 percent



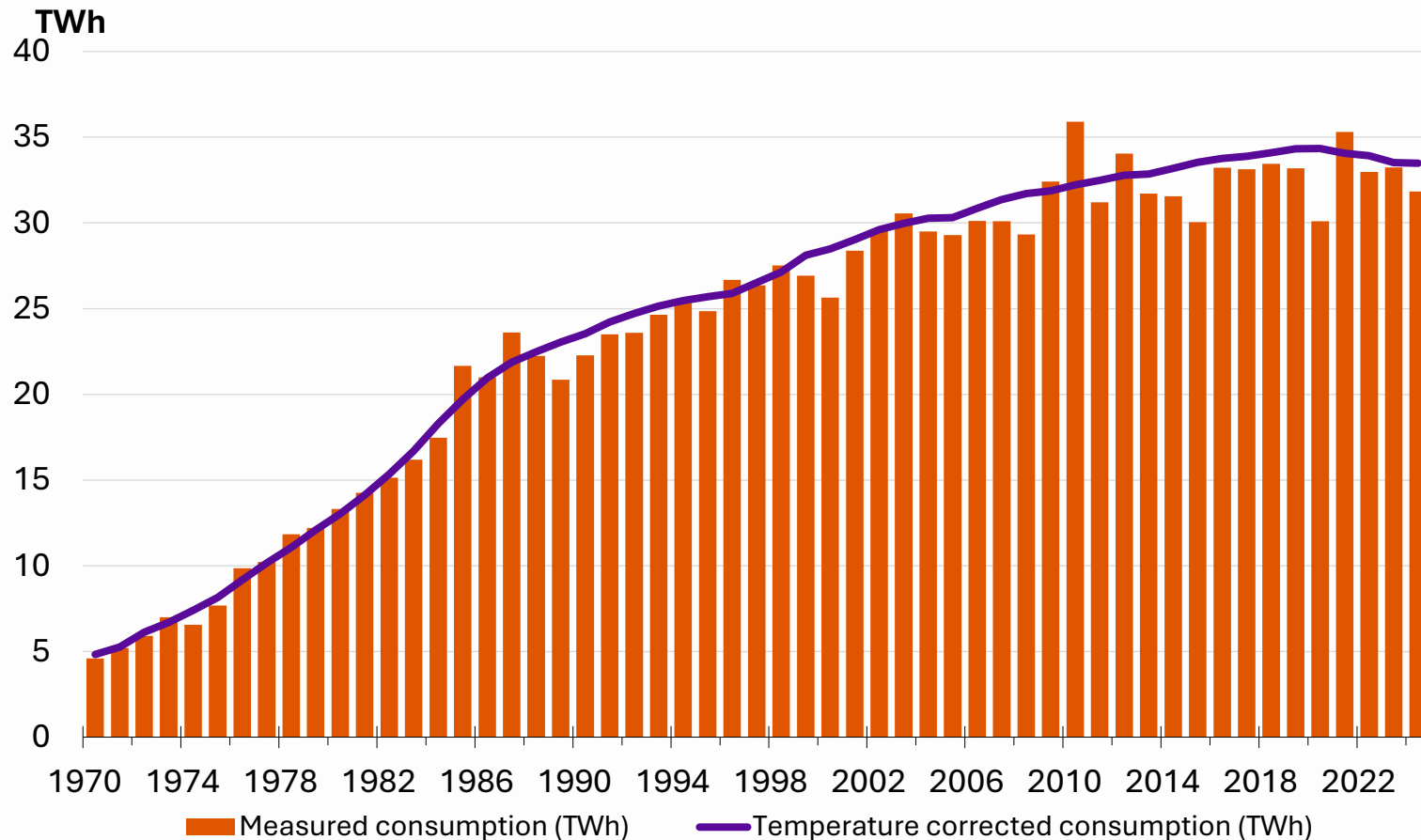
- **Heat recovery** (also renewable heat produced with heat pumps): otherwise unutilised heat energy, e.g. heat recovery from wastewater, flue gases, return water from district cooling.
- **Waste:** municipal waste, recovered fuels, demolition wood, impregnated wood, plastic waste and hazardous waste.
- **Other biofuels:** wood pellets, recovered wood, black liquor tai other biomass
- **Others:** steam, hydrogen.

District heating goes electric



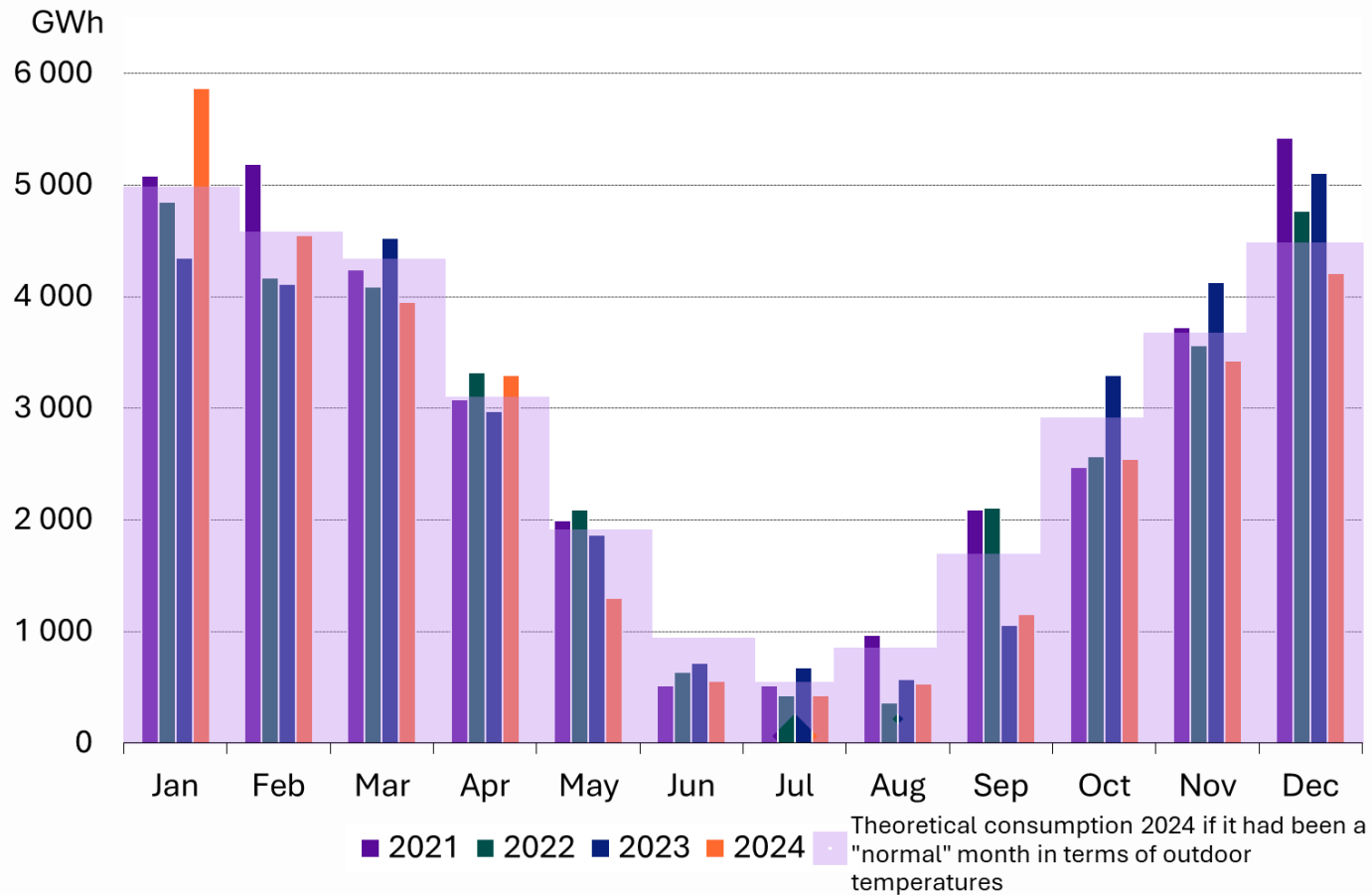
- Electric boilers produced 1540 GWh heat in 2024
- Electric boilers reduce the use of fuels when electricity price is low

Temperature corrected heat consumption stayed in the same level with the previous year



- District heat consumption 31,8 TWh
 - The heating season was 0,9 °C warmer than the normal year
- Temperature corrected district heat consumption 33,5 TWh
 - Temperature correction takes into account annual temperature differences.

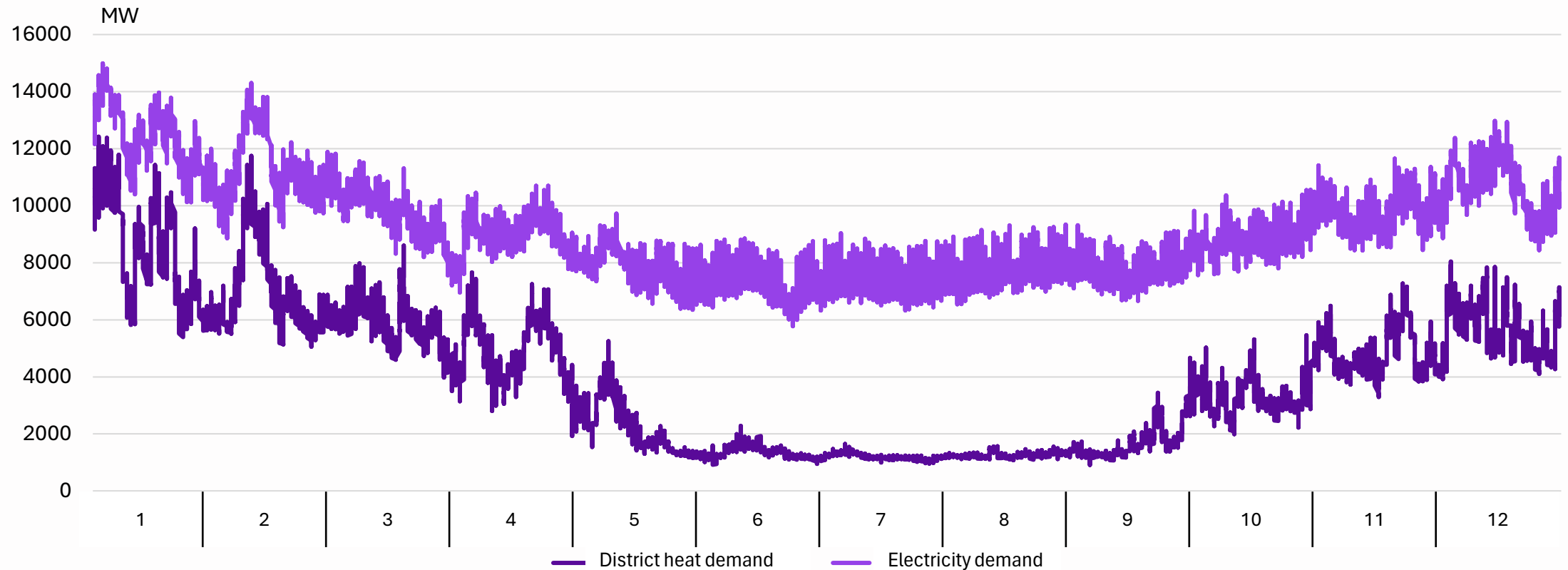
Monthly district heat demand



- Year 2024 was 1 °C warmer than the normal period of 1991-2020
- January and April were colder than normal, and the other months were warmer than normal.
- The cold winter months exemplify the need for a wide palette of fuels to ensure the security of supply of heating.

District heating supports the Finnish electricity system

Peak consumptions of district heat and electricity are close to each other



- Hourly consumption of district heat and electricity in 2024
- Despite a significant difference in overall demand for electricity and heat, peak consumptions are relatively close to each other

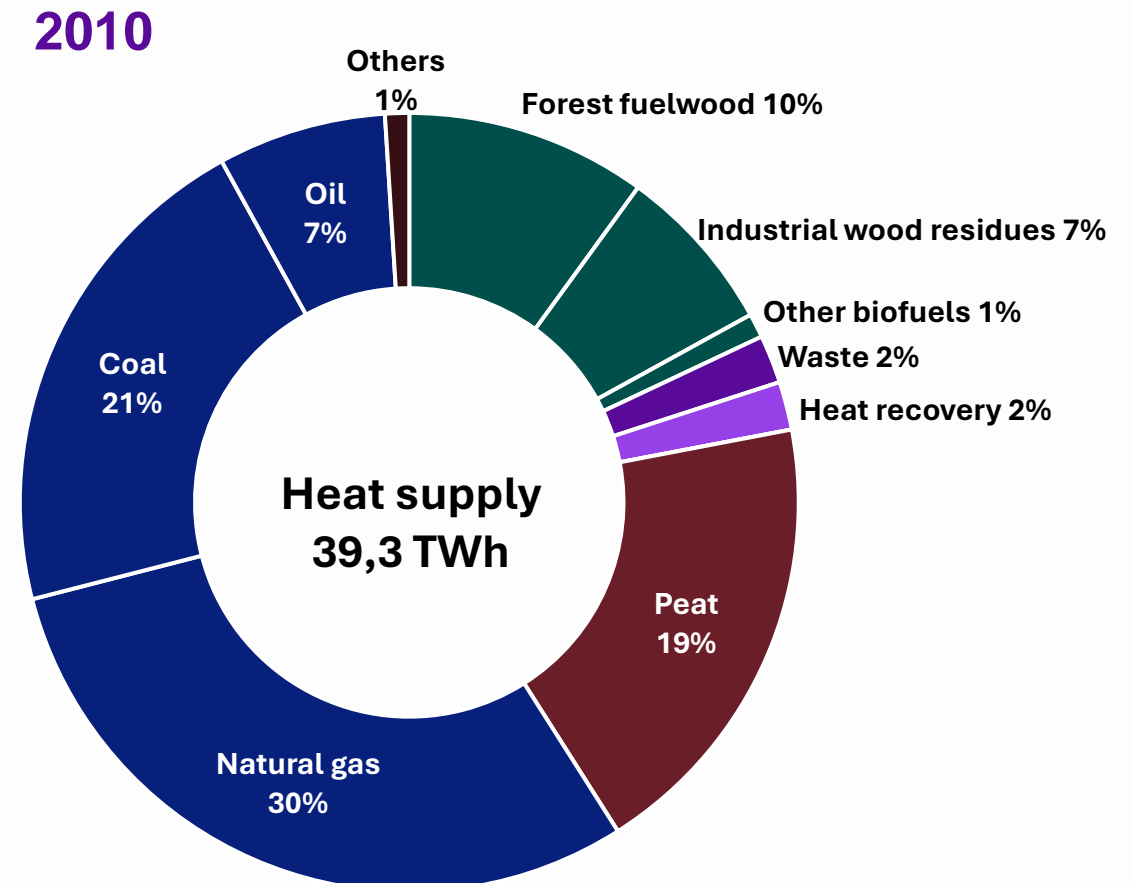
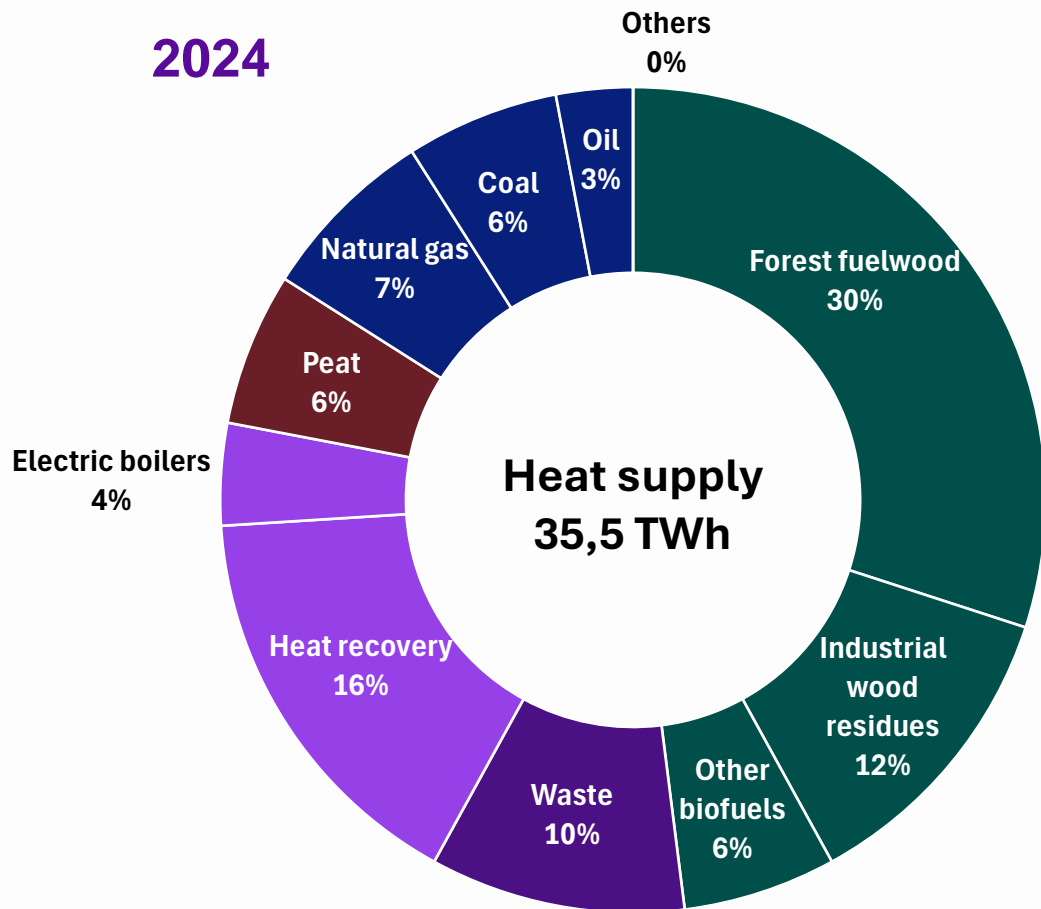
Source: estimation is based on Entso-E and Helen open data 2024*, hourly demand, district heat demand scaled based on Helen's hourly data,

* Preliminary data for 2024.

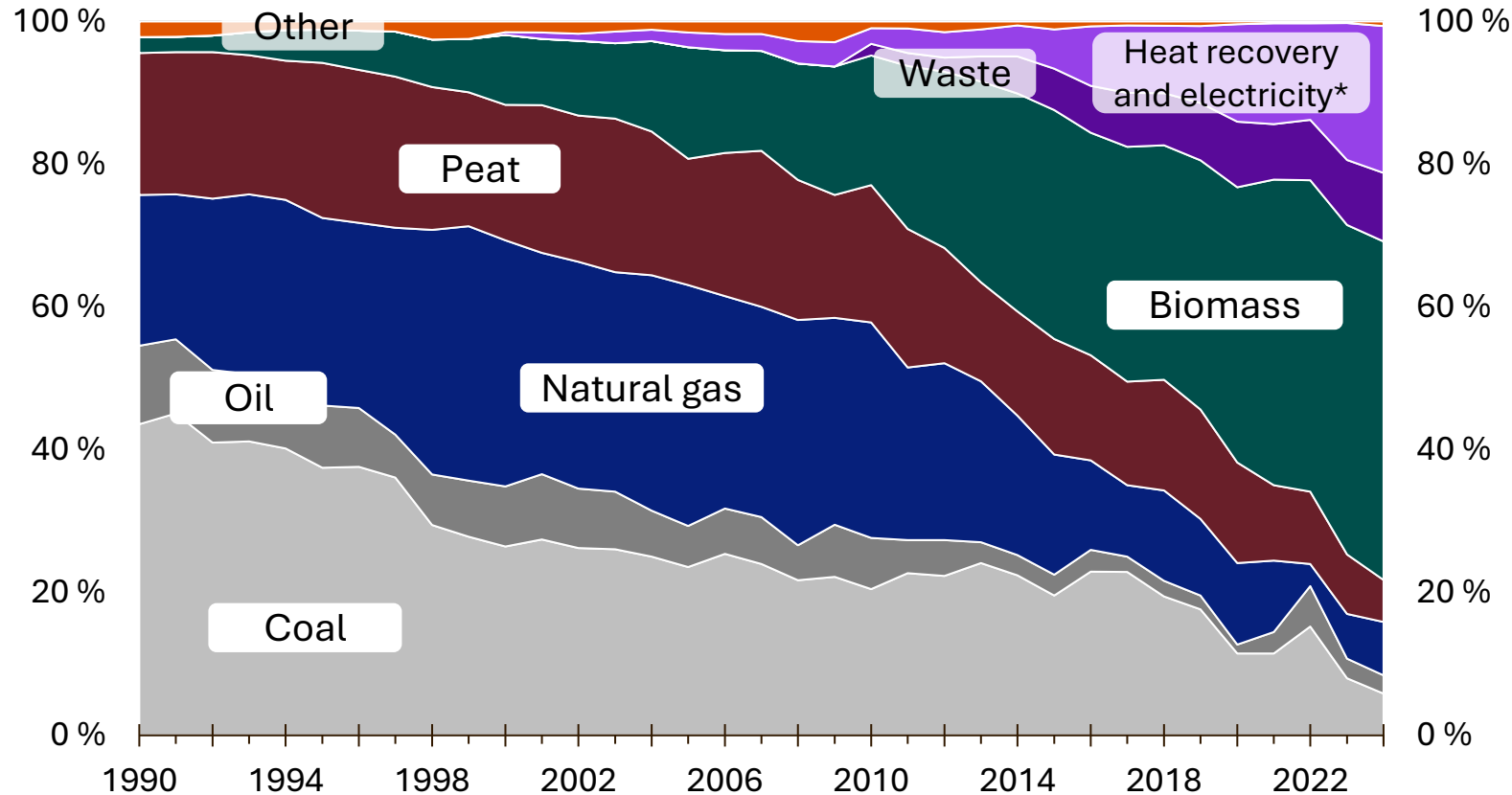
The energy transition in district heat production has advanced well

Share of renewables has more than doubled and share of heat recovery has multiplied compared to year 2010

Share of renewables has increased from 18 to 48 percent and heat recovery from 2 to 16 percent



Share of renewables and recovered heat is over 70 % in 2024

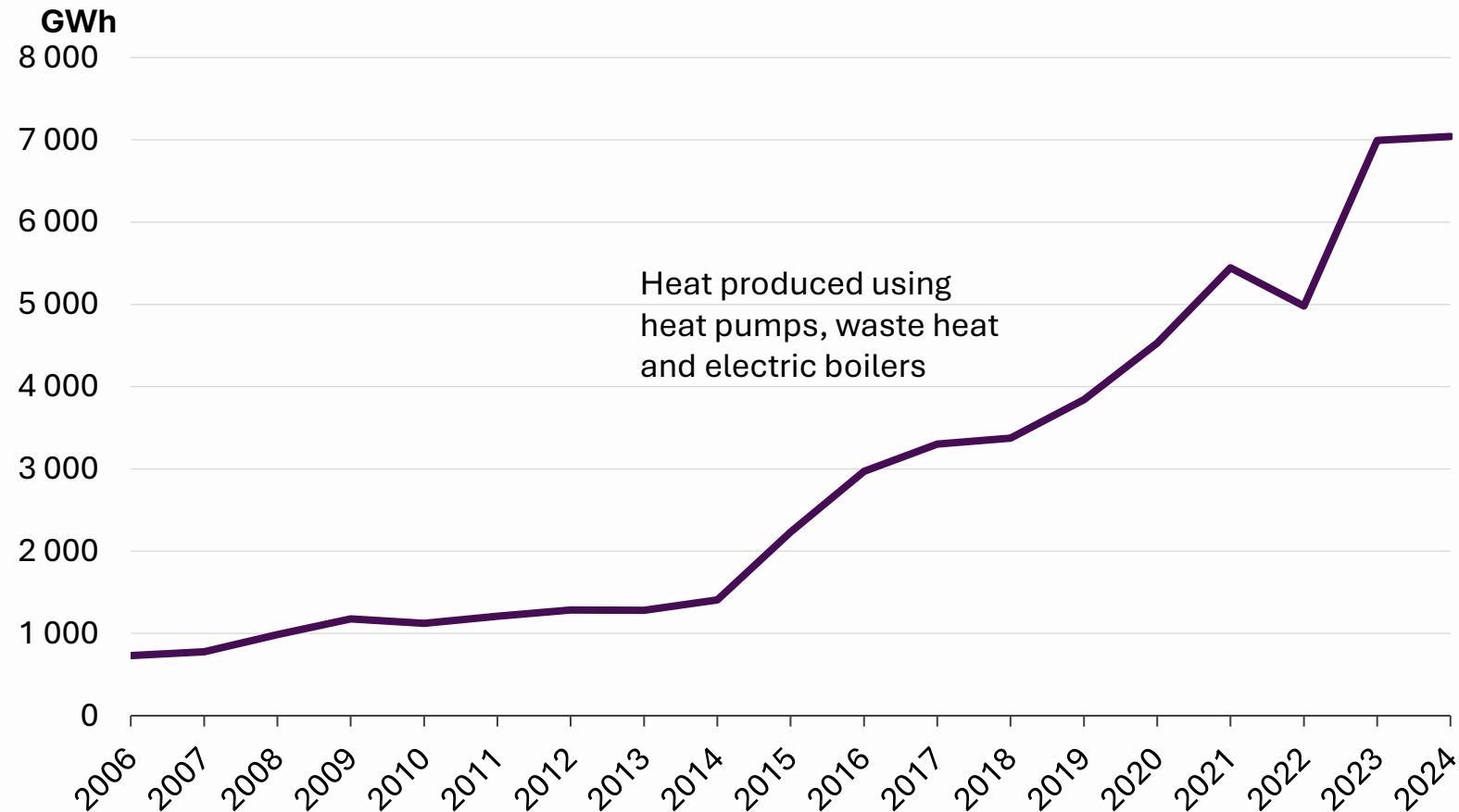


*Includes waste heat, heat pumps and electric boilers

- Fossil fuels have increasingly been replaced by biomass and recovered heat.
- Use of biomass has more than doubled since 2010.
- Amount of heat recovery has nearly fivefold compared to 2010. Fuel consumption is avoided by making use of surplus heat.

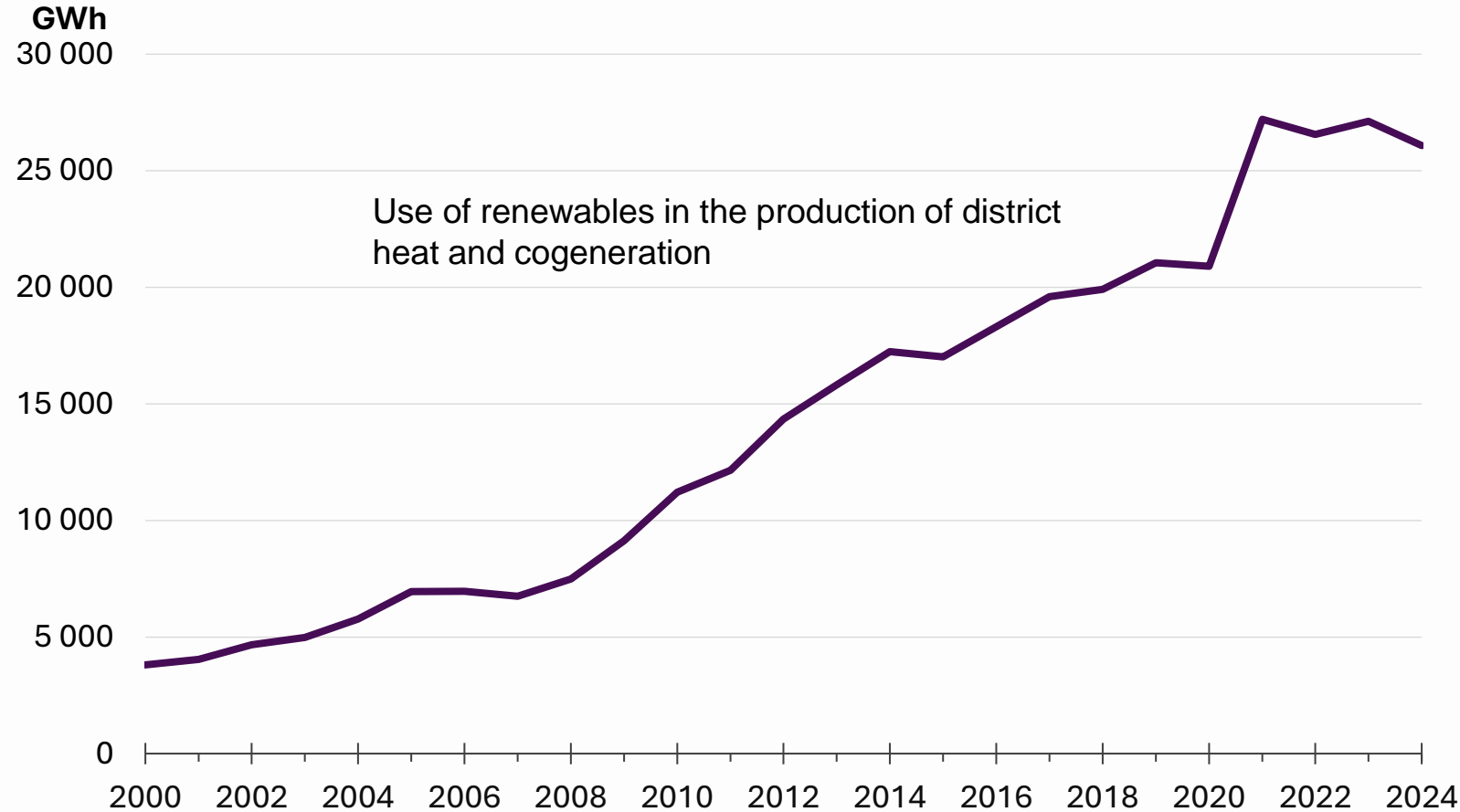
The use of excess heat and electricity remained on the same level with the previous year

In 2024, the heat demand was lower than normal because the year was warmer than normal



- Fuel consumption can be avoided by making use of surplus heat. Heat can be recovered from data centers, industrial processes, flue gases, sewage water etc.
- Electric boilers played a significant role in 2024 and they produced 1540 GWh heat

Use of biomass made a slight downturn

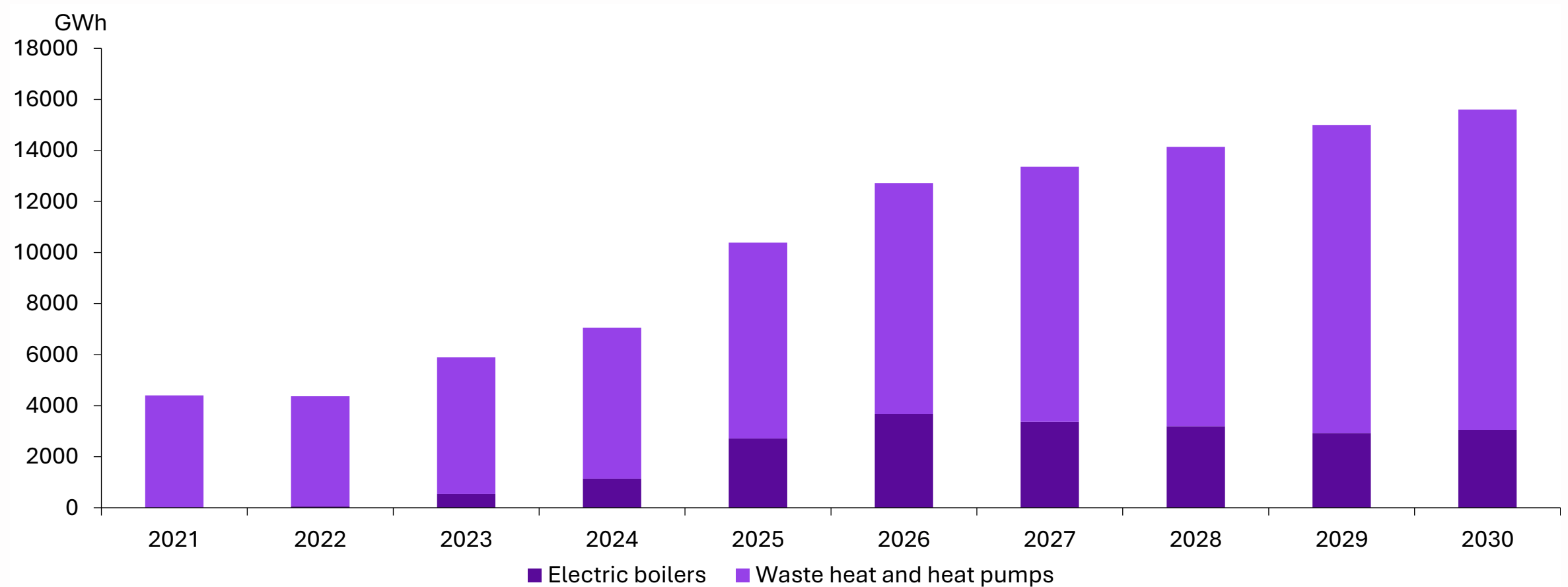


- In municipalities where district heating is provided
 - 85 per cent of networks heat comes from renewable fuels or recovered heat
- Renewable fuels used in producing district heat are e.g. forest fuelwood, industrial wood residue, wood pellets, bio share of municipal waste.

Future scenarios for district heating

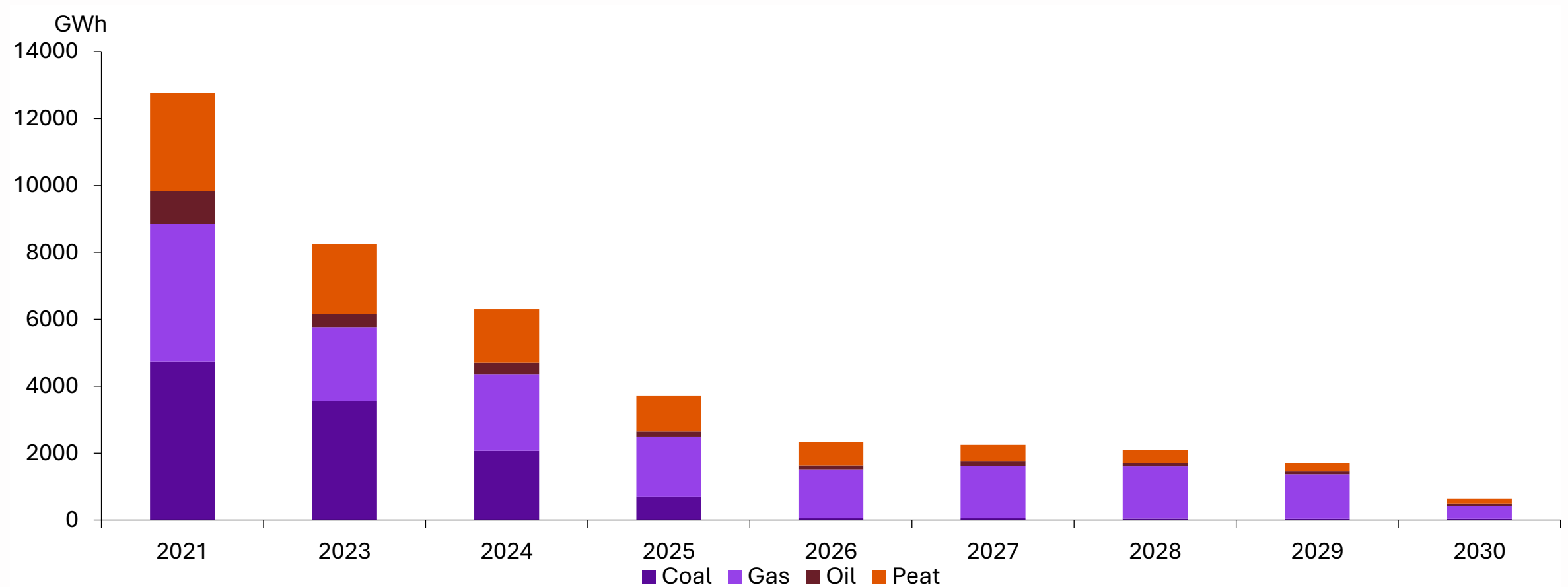
Electrifying district heat production replaces fossil fuels and peat and reduces the need for energy use of biomass

Electrifying district heat production replaces fossil fuels and peat and reduces the need for energy use of biomass



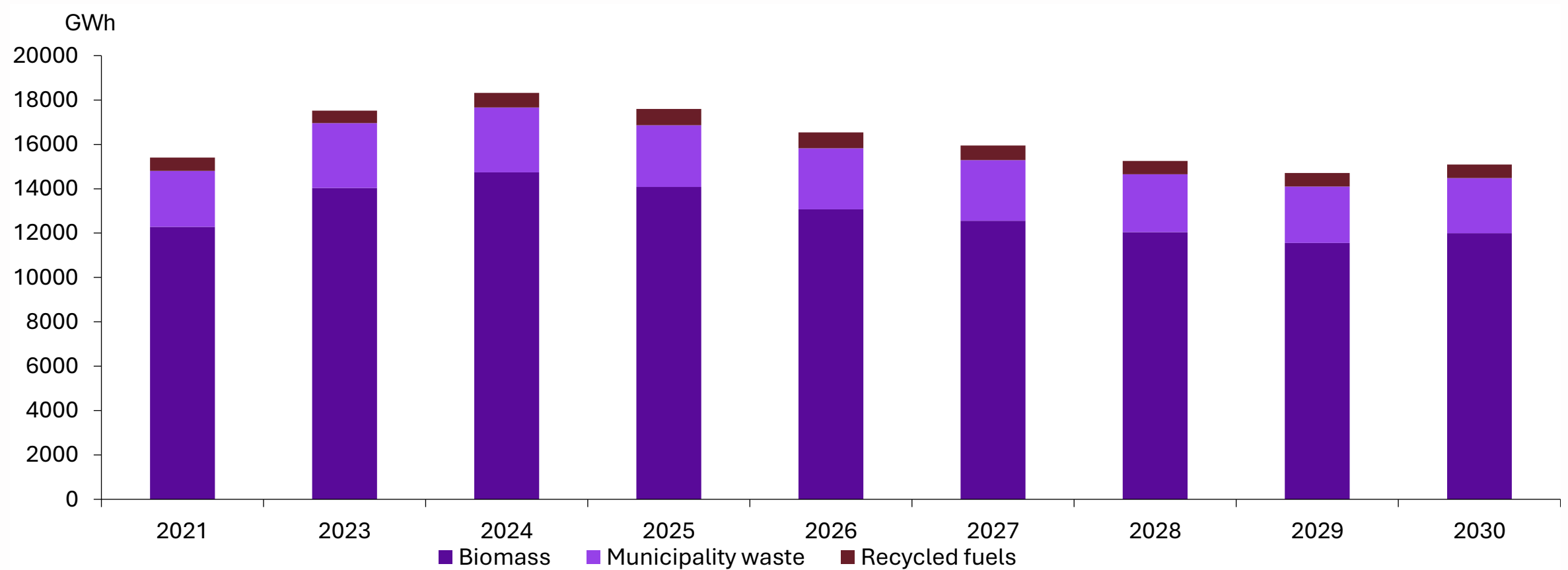
Source: Member survey in spring 2024

Use of fossil fuels and peat is falling rapidly



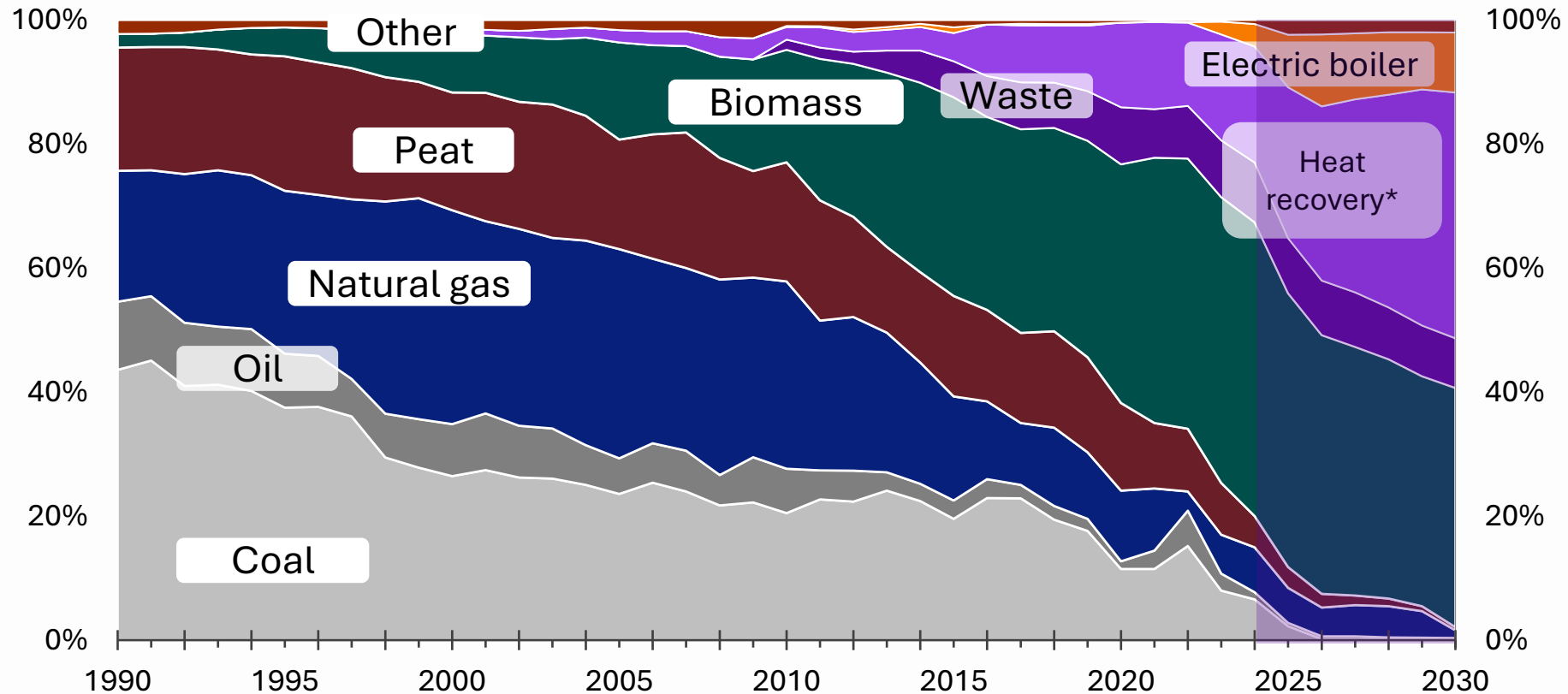
Source: Member survey in spring 2024

The share of biomass and waste in district heating will decrease slightly towards the end of the decade



Source: Member survey in spring 2024

Energy sources for district heat supply 1990-2030

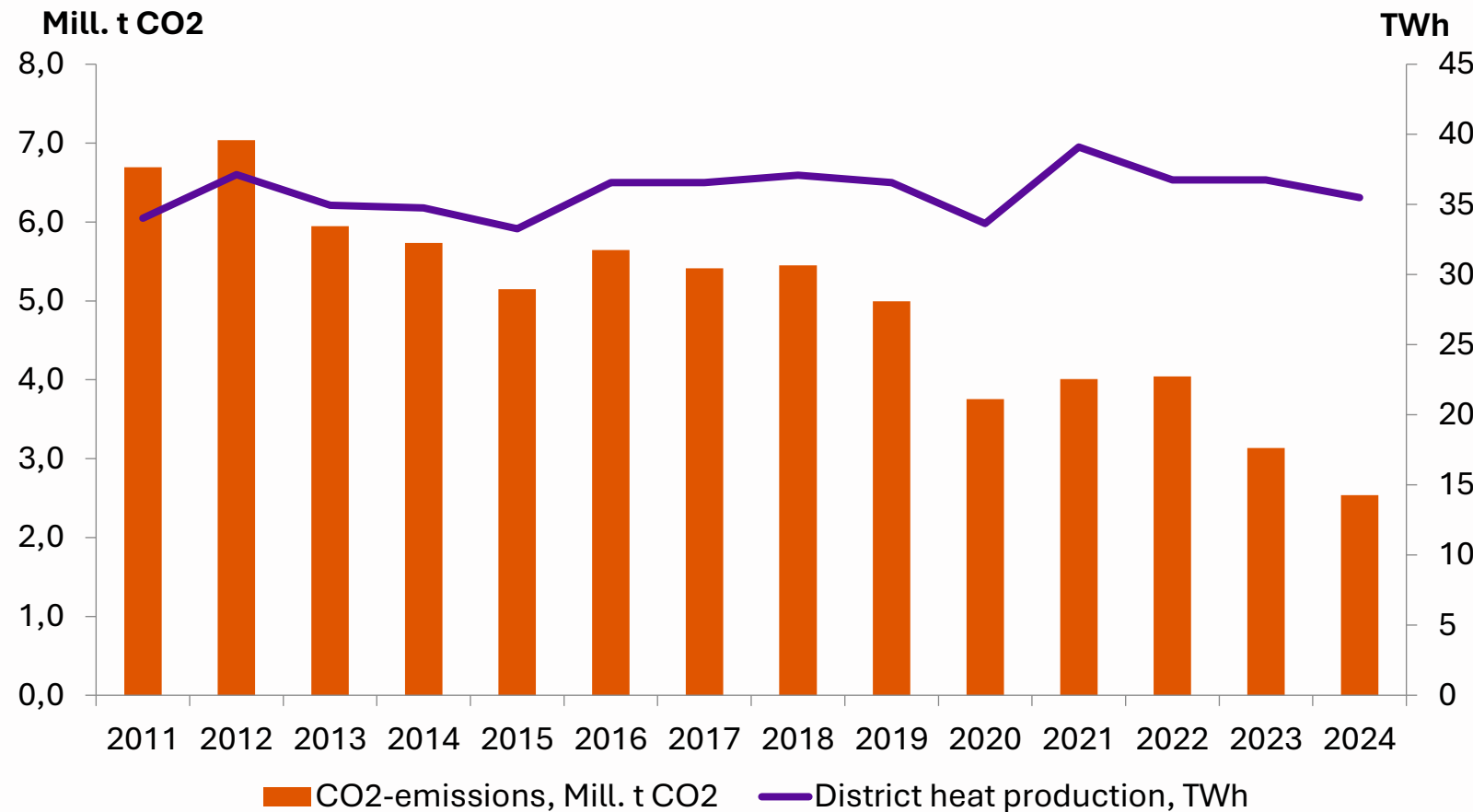


Source for 2024-2030: Member survey in spring 2024

*includes heat pumps and heat recovery

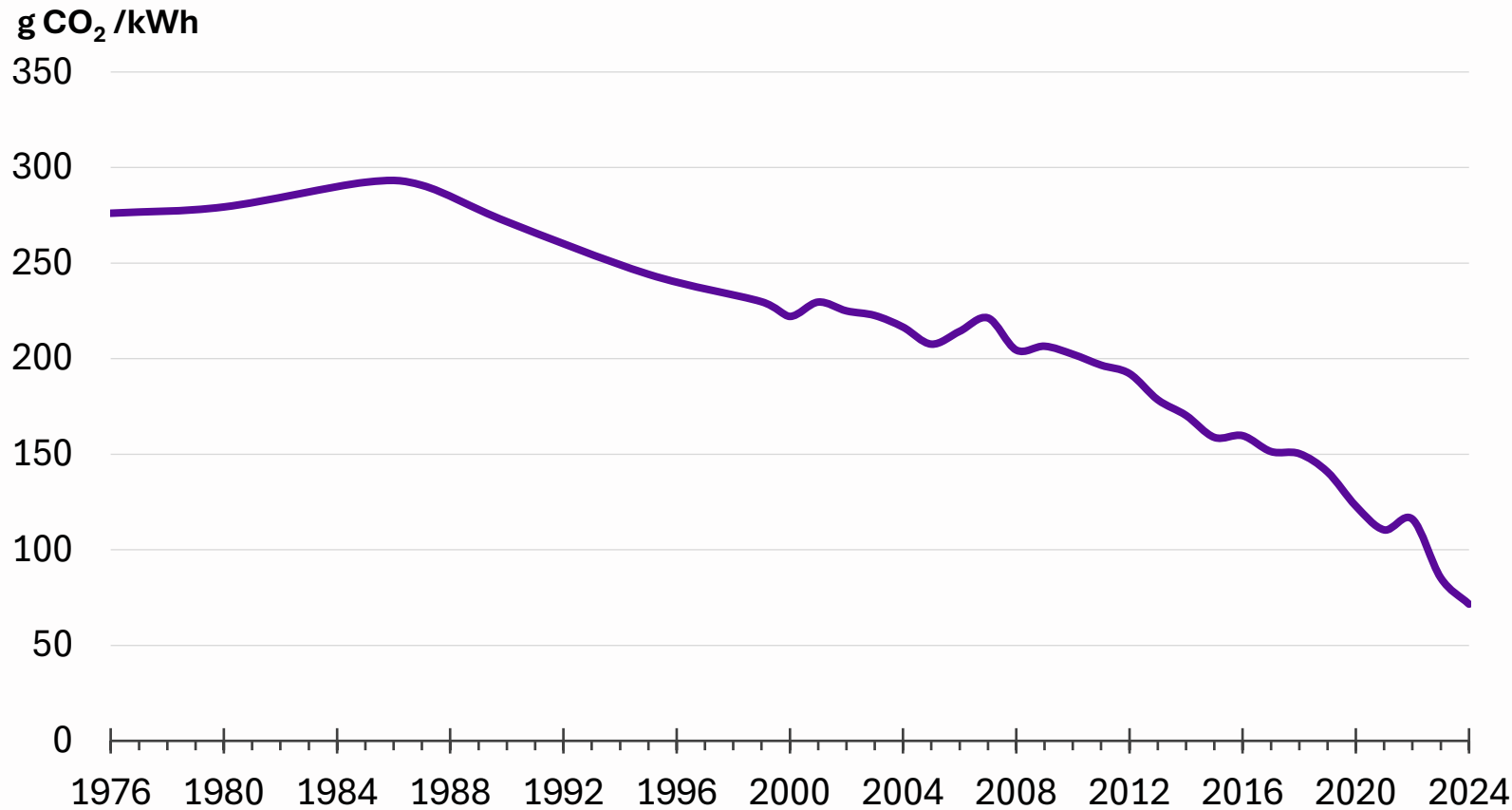
Carbon dioxide emissions from district heating are decreasing

CO2-emissions from district heat production decreased by 19 %



- CO2-emissions from district heat production in 2024 were 2,5 Million tons and decreased by 19 % from the previous year

Specific CO₂-emissions from district heat production have decreased by 65 % since 2010

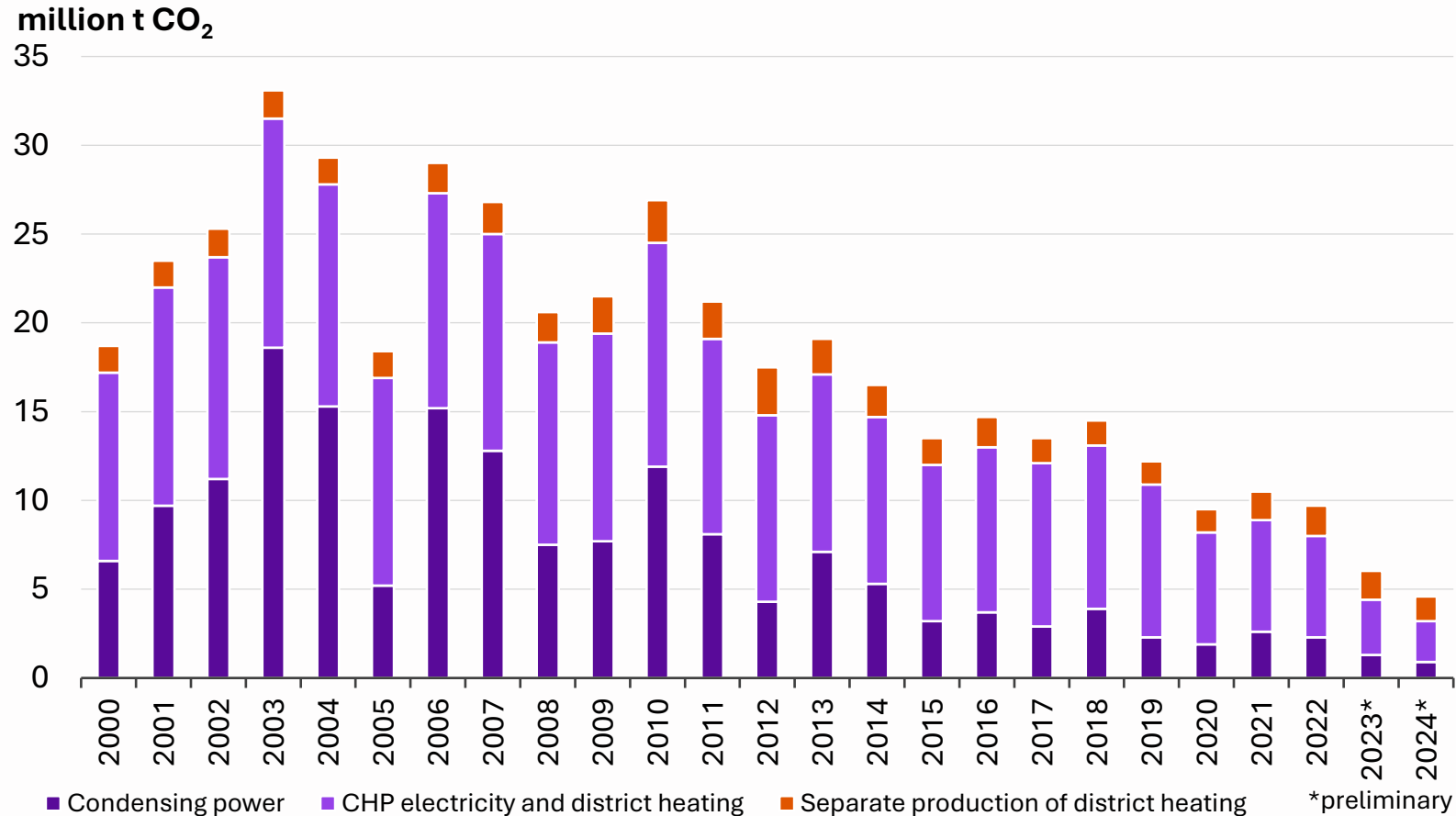


Source: Statistics Finland (2000...2022); Finnish Energy (1976...1999, 2023...2024)

- Specific emissions from district heat production in 2024 were 72 gCO₂/kWh(*), which
 - Decreased by 16 % from the previous year
 - Decreased by 65 % since 2010

*) Fuels used in combined heat and power production were allocated according to the benefit allocation method

The CO₂-emissions from Finland's energy production are decreasing

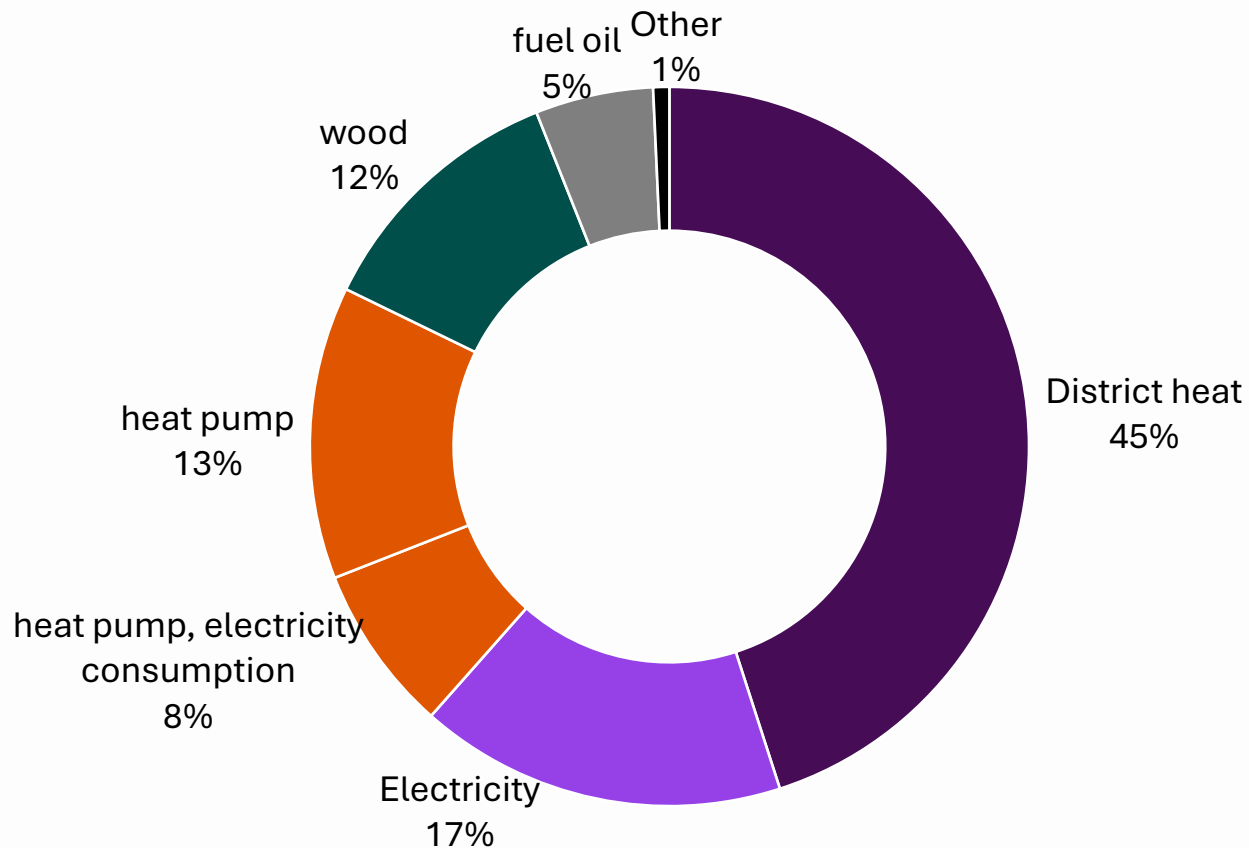


- CO₂-emissions of electricity and district heating production 4,6 million tons in year 2024
- Emissions have declined 86 % compared to 2000s highest emission year 2003

District heat is the most common source of space heating in Finland

Market share of space heating 2022

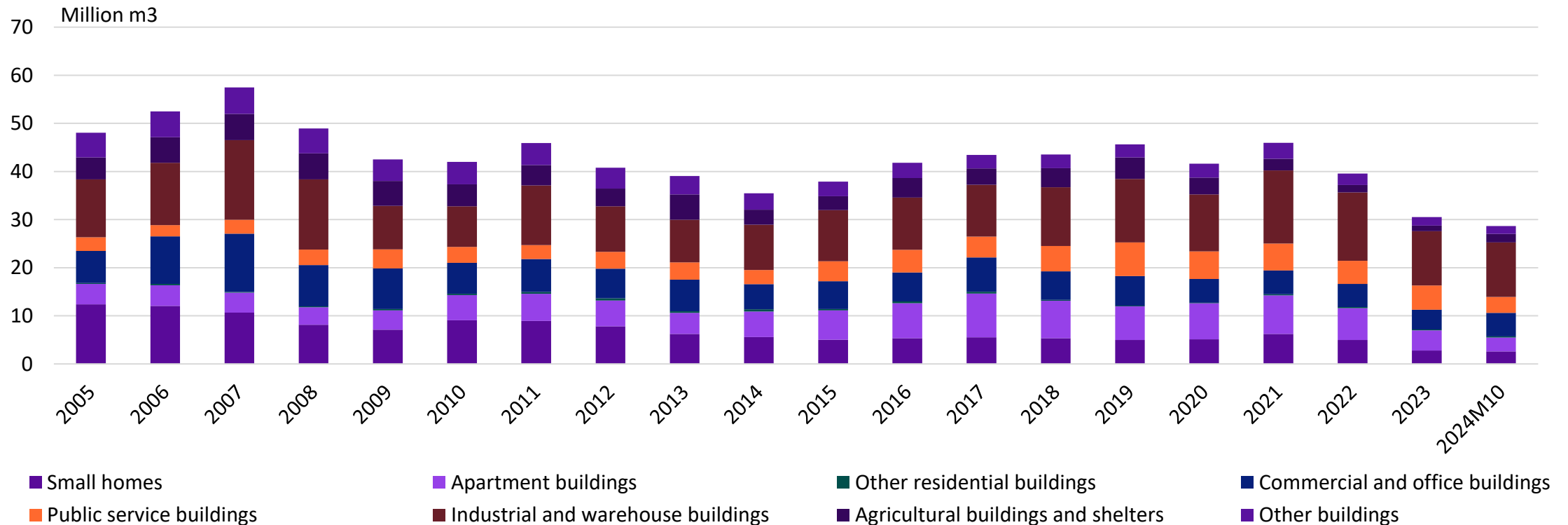
Residential, commercial and public buildings



- **Heat pump:** ambient energy extracted with heat pumps, and electricity consumption of heat pumps
- **Electricity:** includes the electricity consumption of heat distribution equipment and electric sauna stoves
- **Wood:** includes the wood used by sauna stoves

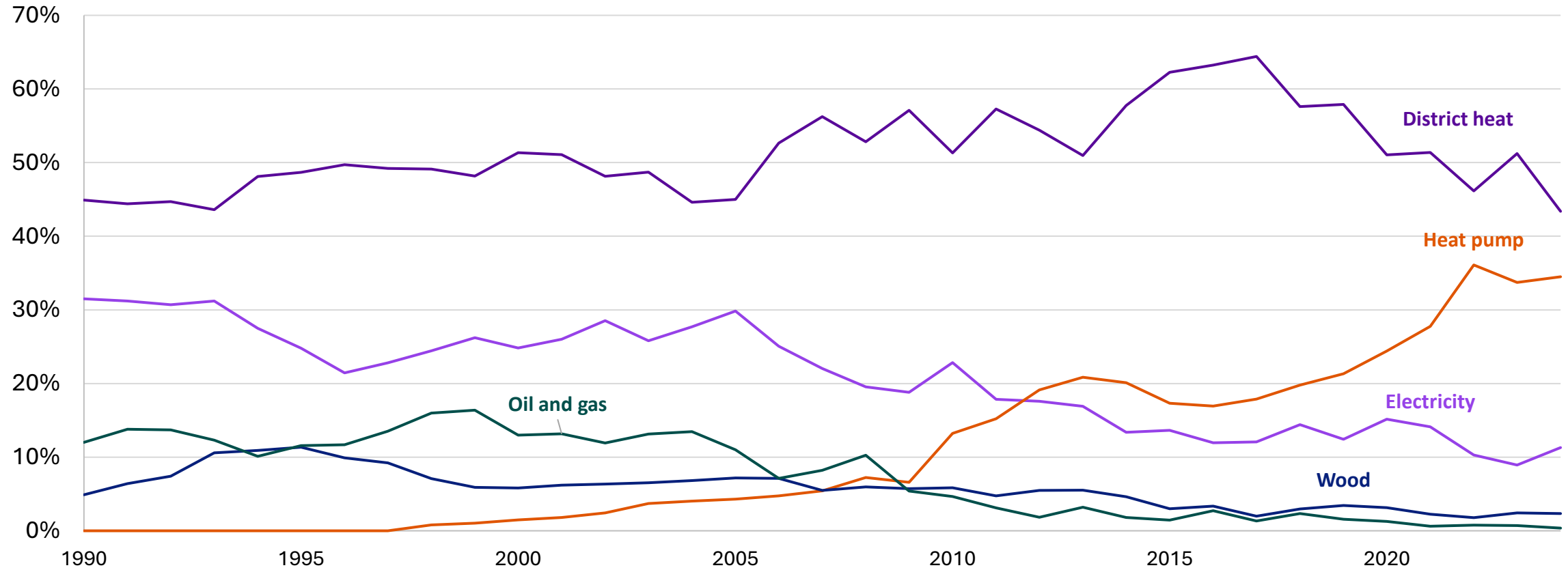
Lähde: Statistics Finland
The electricity consumed by heat pumps has been estimated by Finnish Energy.

The number of building permits applied for for residential construction has fallen strongly



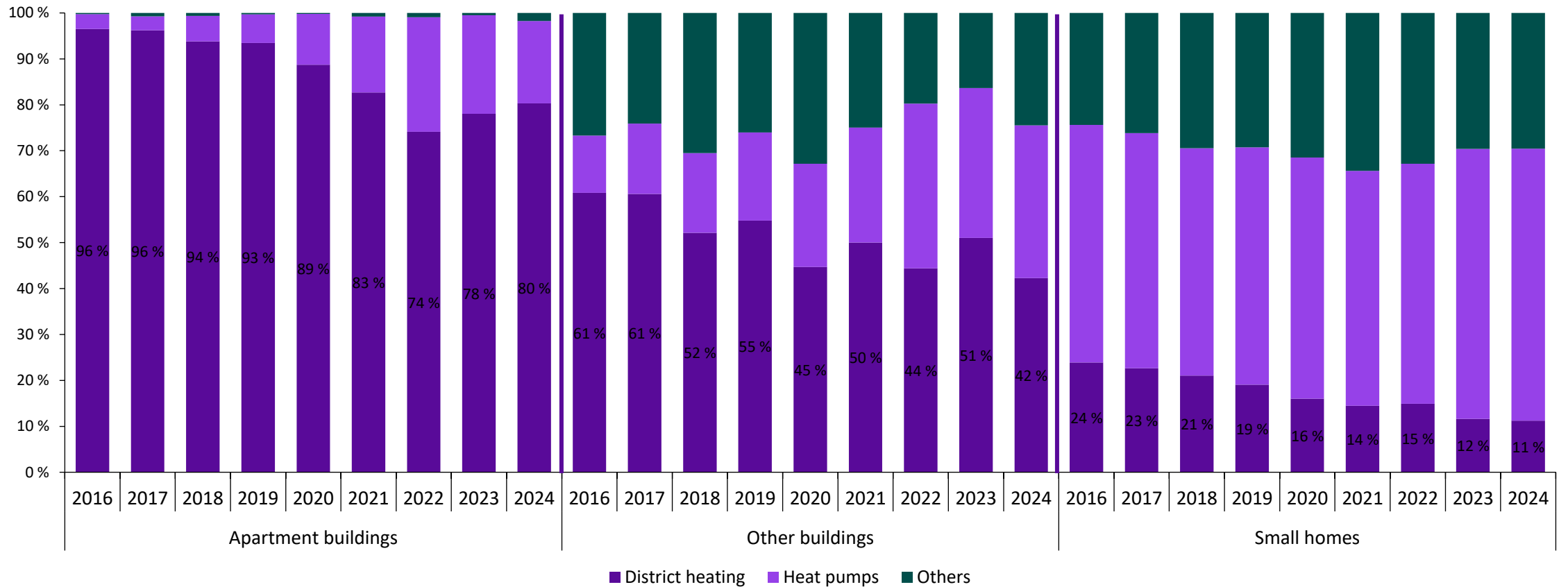
Source: Statistics Finland

District heating is the most popular method of heating in new buildings



Source: Statistics Finland, Granted building permits (heated cubic volume)

Main heating methods in new buildings

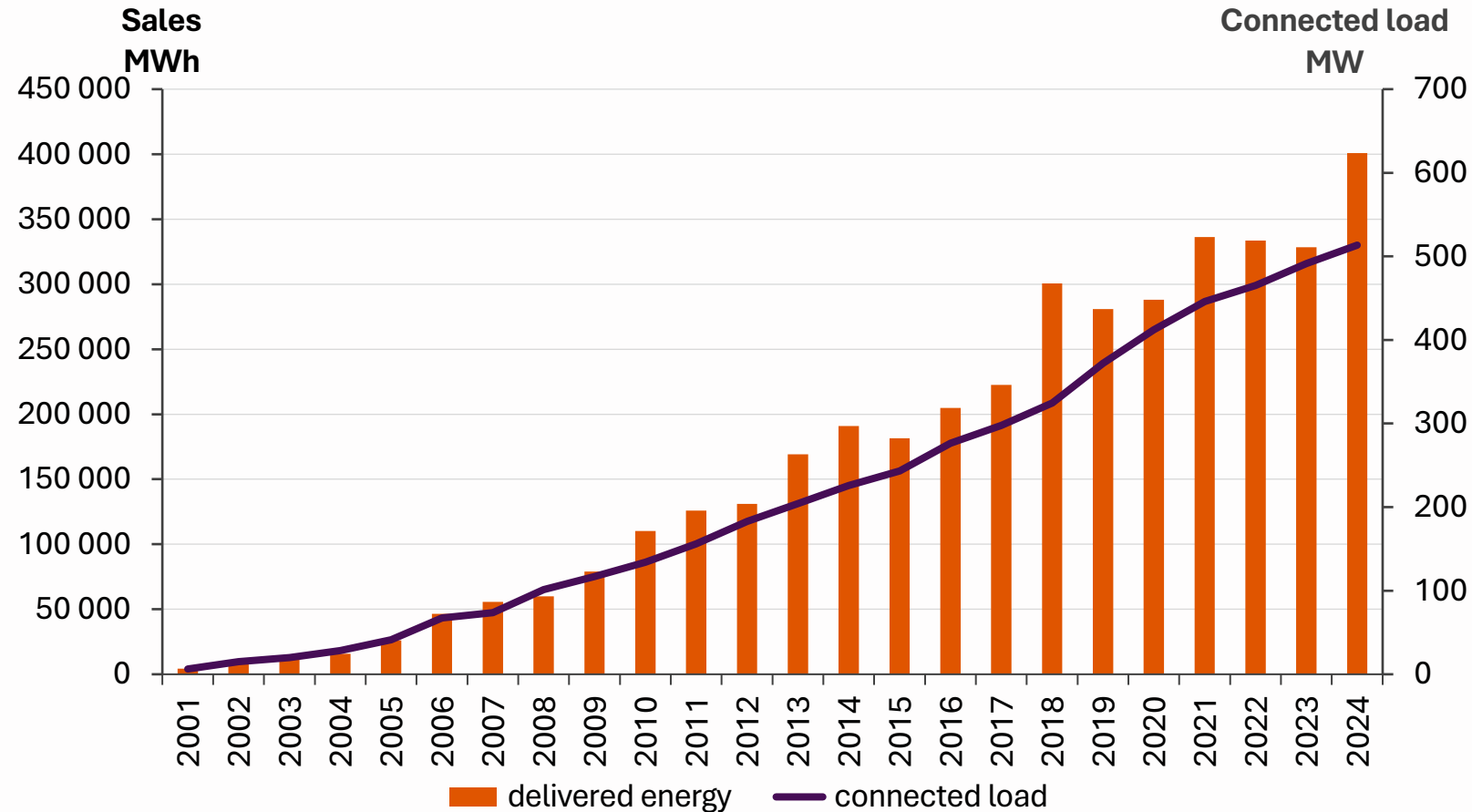


Source: Statistics Finland, Granted building permits (heated cubic volume)

District cooling is cost-effective and environmentally friendly

The use of district cooling increased by 20 % in 2024

The warm year increased the need for cooling

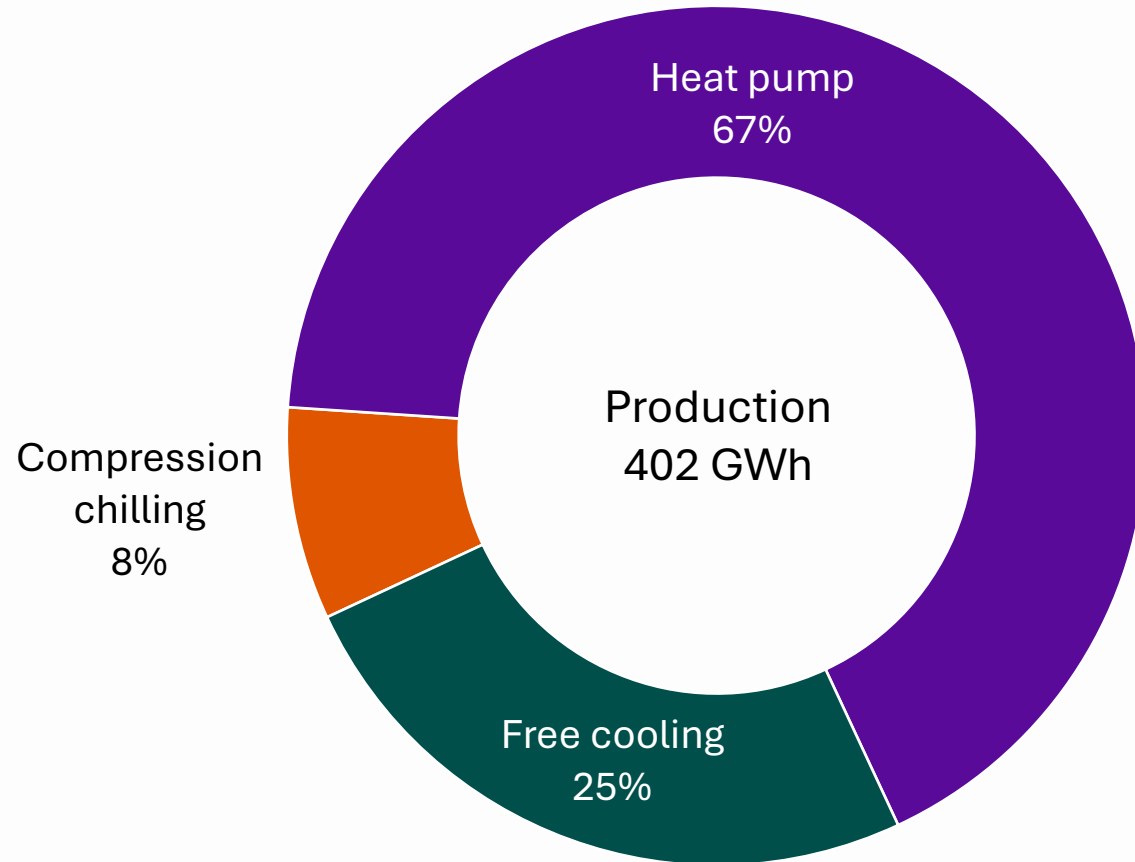


- District cooling sales increased by 20 % from the previous year
- Connected load increased by 3 %

Energy companies which sold district cooling 2024:

- Etelä-Savon Energia Oy
- Fortum Power and Heat Oy
- Helen Oy
- Jyväskylän Energia Oy
- Kuopion Energia Oy
- Lahti Energia Oy
- Lempäälän Lämpö Oy
- Loimua Oy, Hämeenlinna
- Oulun Energia Oy
- Pori Energia Oy
- Tampereen Sähkölaitos Oy
- Turku Energia Oy
- Vierumäen Infra Oy

District cooling is produced efficiently



- Same heat pumps often produce both heat and cooling energy
 - the cooling water is cooled and the district heating water is warmed up in the same process.
- District cooling also utilizes the ambient energy from sea, lakes and rivers as well as outdoor air whenever the temperature is low enough.