The vision of the Finnish district heating on the green transition

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Facts and Figures 2024

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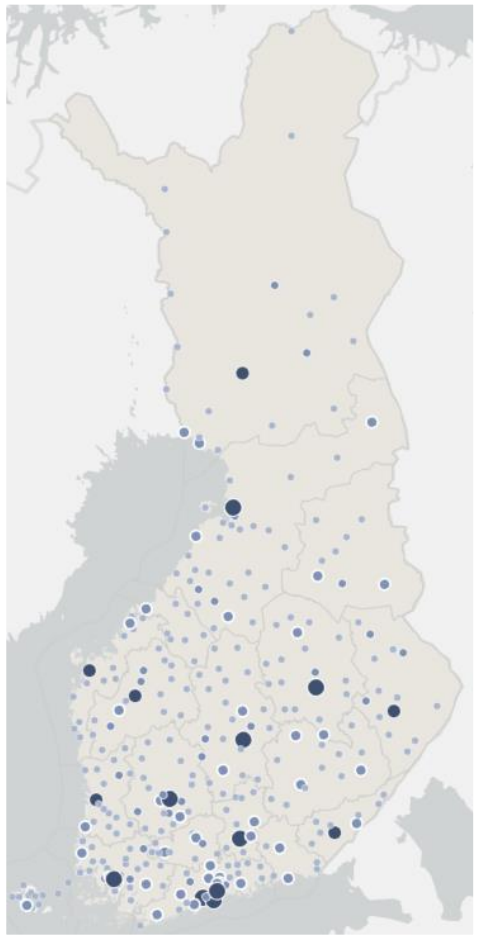
Statistics 2023

District heating networks in Finland



~33 TWh
energy sold annually

~3,0 million people
lives in houses with district heating

~16 500 km
district heating networks

~10,1 cent/kWh
The average price including taxes

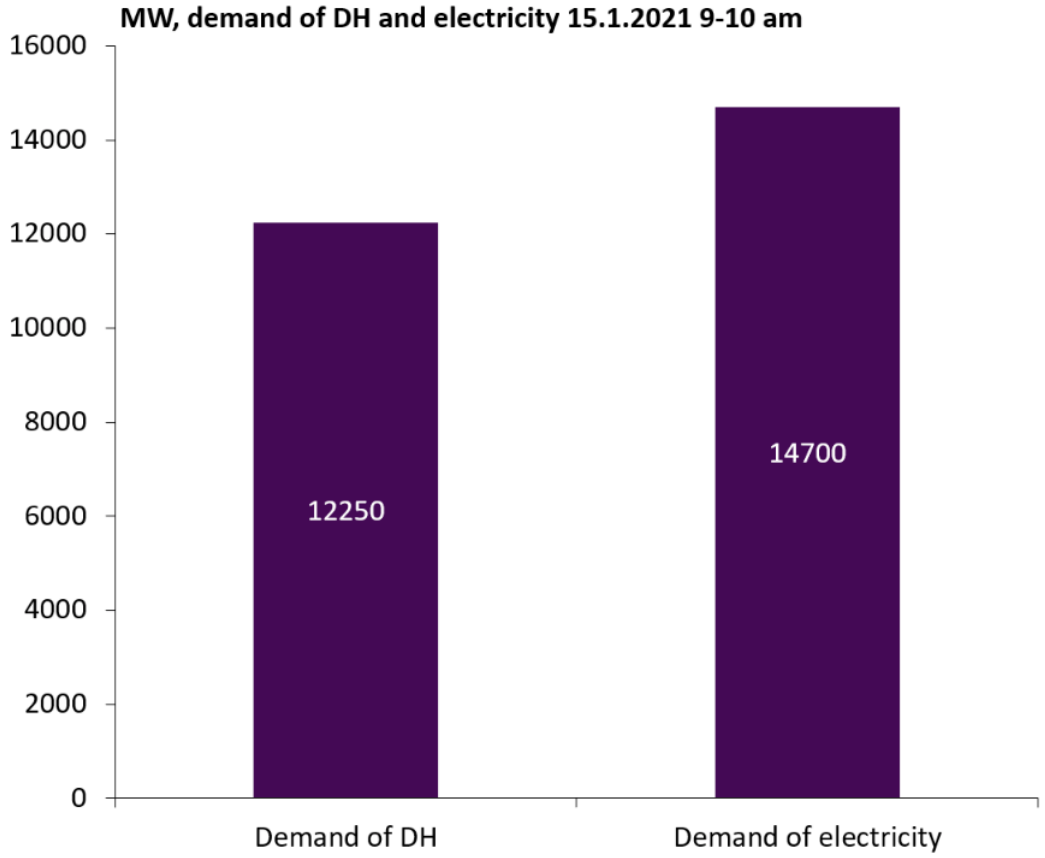
~ 45 %
market share*

~3 mrd. EUR
the value of heat sold including taxes

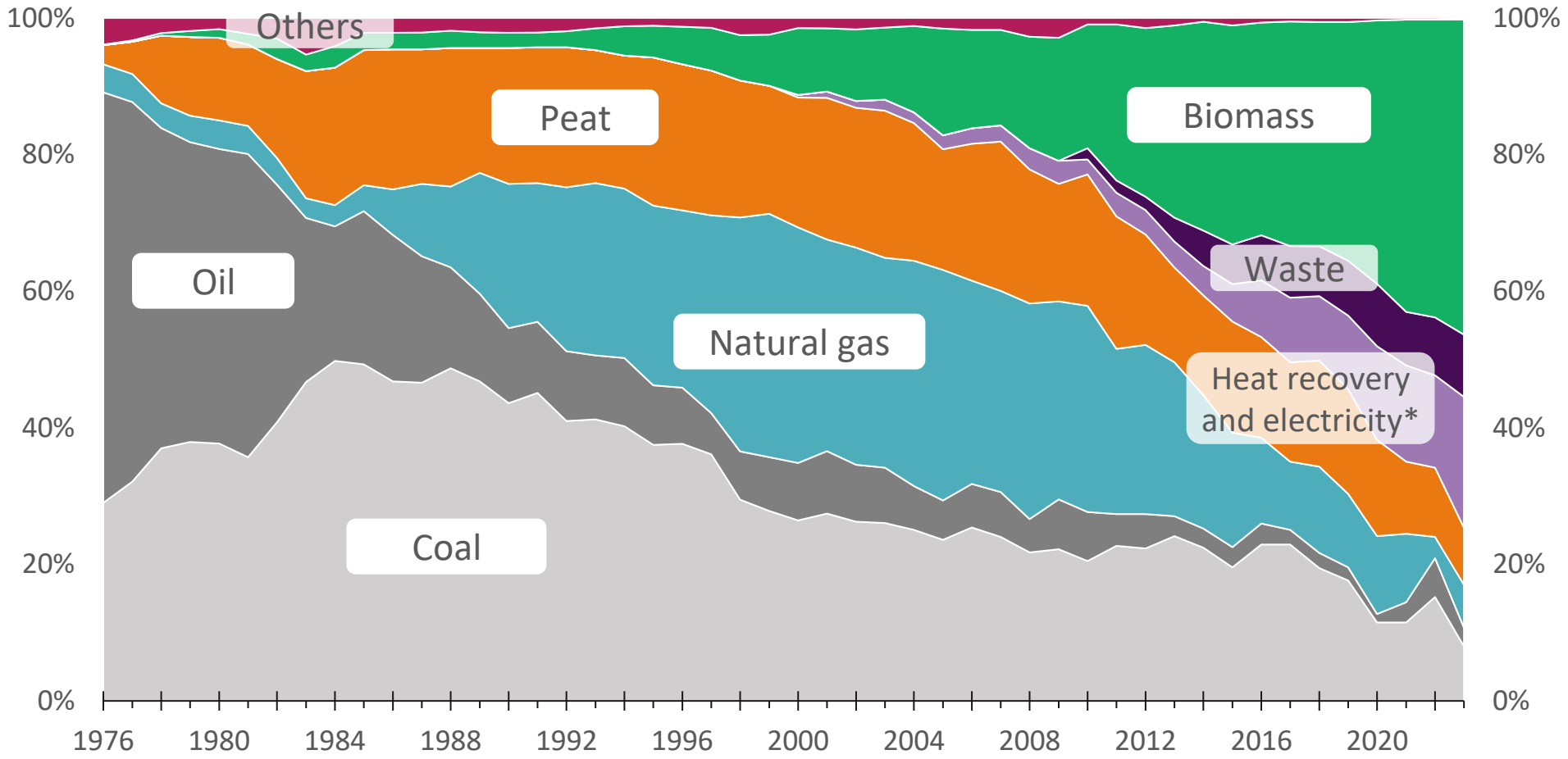
*market share of heating in residential and apartment buildings

Electricity vs heat demand in winter in 2021

- Demand of district heating (DH) at the time of the peak consumption is about the same magnitude as the demand for electricity. On annual basis the demand of electricity is higher than DH (ca. 85 TWh vs. 35 TWh)
- Combined Heat and Power (CHP) plants produce a significant amount of electricity (2 500 MW) while producing heat.
- District heating reduces electricity demand peaks, in addition to electricity production

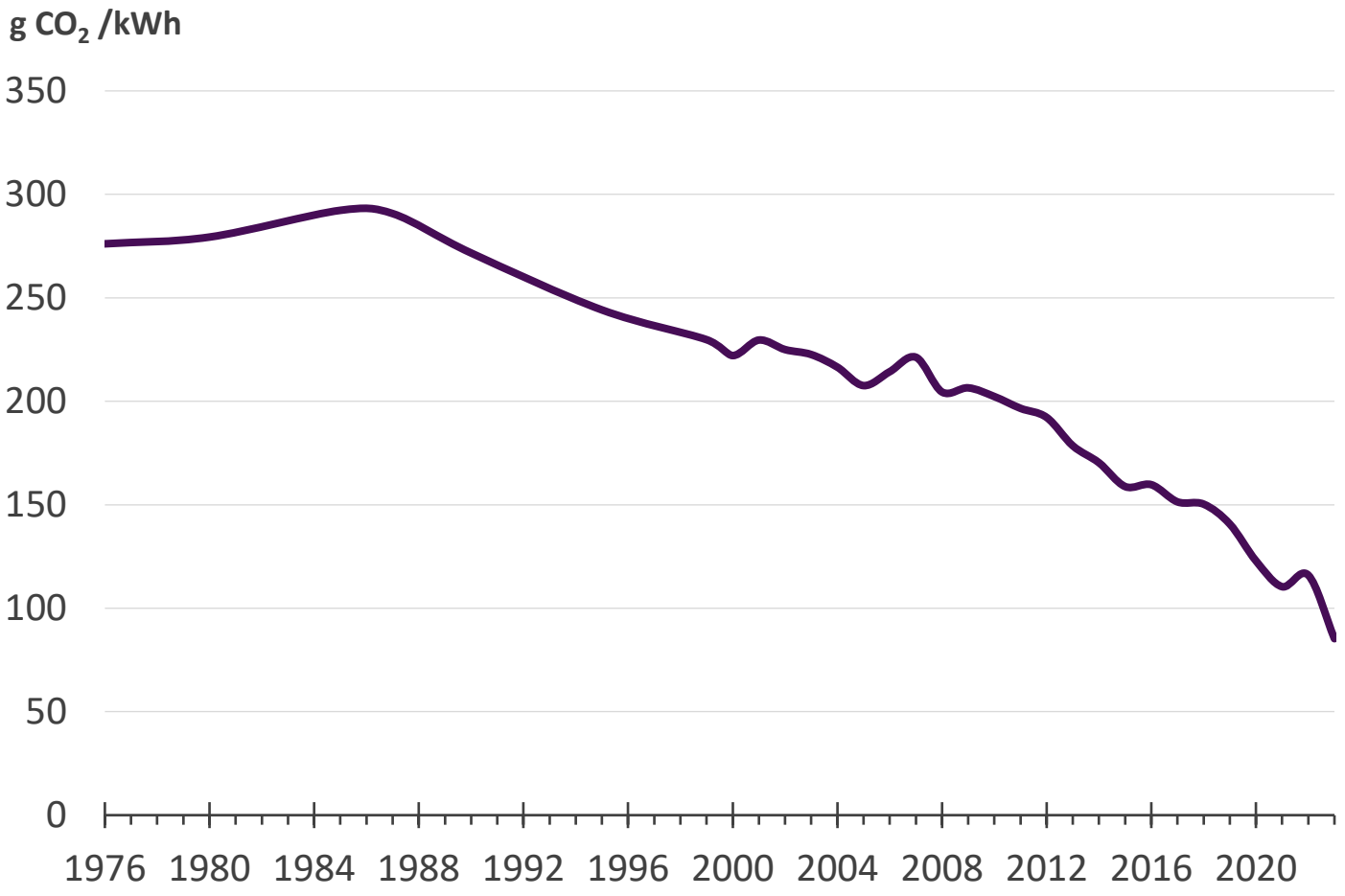


Energy sources for district heat supply 1976-2023



*includes heat pumps and heat recovery and electric boilers

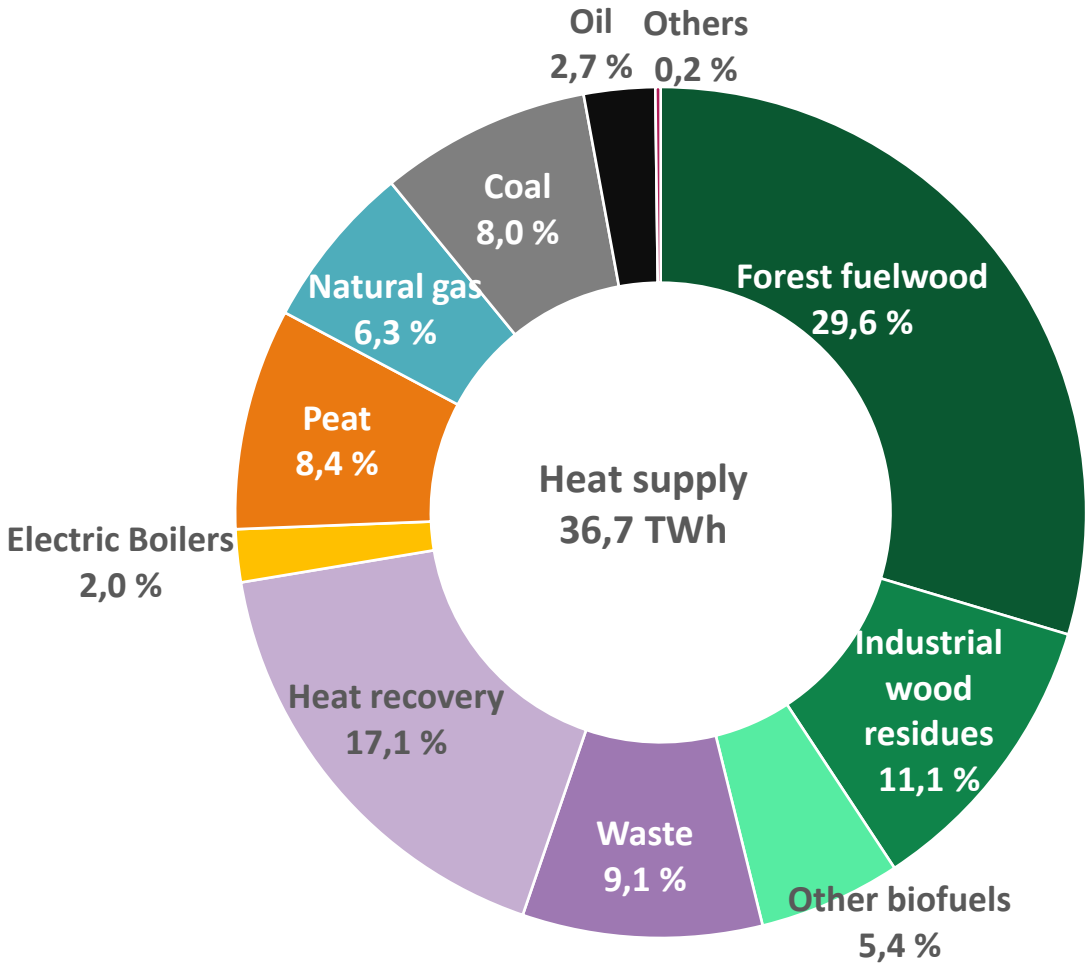
CO_2 -emissions from the district heat supply



- Specific emissions from district heat production in 2022 were 85 gCO_2/kWh, which
  - Decreased by 26 % from the previous year
  - Decreased by 58 % since 2010
- Fuels used in combined heat and power production were allocated according to the benefit allocation method

Sources :
Statistics Finland (2000…2022)
Finnish Energy (1976…1999, 2023)

Energy sources for district heat supply in 2023 by fuel category



- Carbon neutral*: 70 %
  - Renewables + Heat recovery + electricity usage of electric boilers
- Share of imported fossil fuels in district heat supply 17 %

*Carbon neutral energy sources include those energy sources whose carbon dioxide impact is not reported in heat production. The climate impact of bioenergy is included in the land use sector and emissions from electricity used in district heat production in electricity production.

- Waste category includes municipal waste, recovered fuels, demolition wood, impregnated wood, plastic waste and hazardous waste.
  - Bio share of waste is 54 % and fossil share 46 %.
- Other biofuels: other biofuels and mixed fuels
- Others: steam, hydrogen

Future vision – two trends

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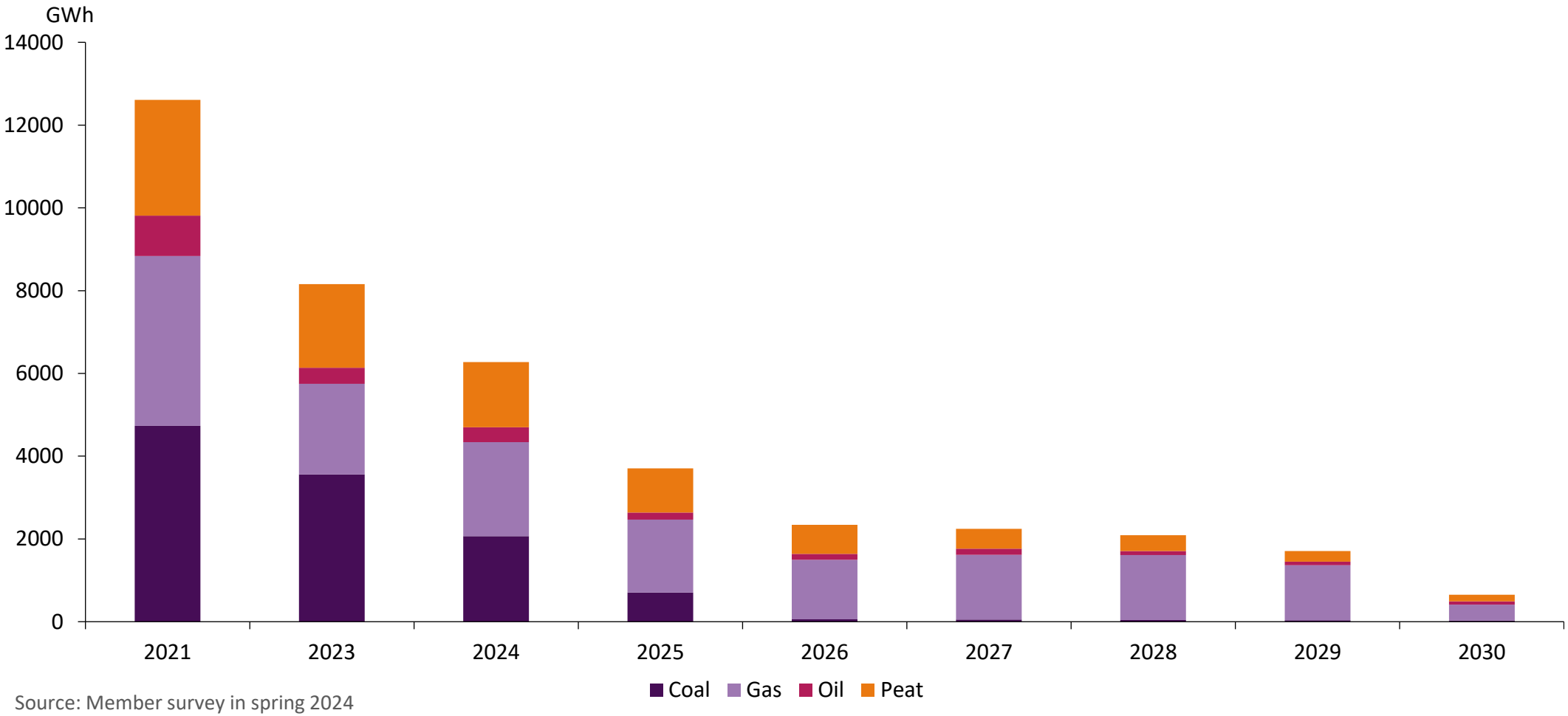
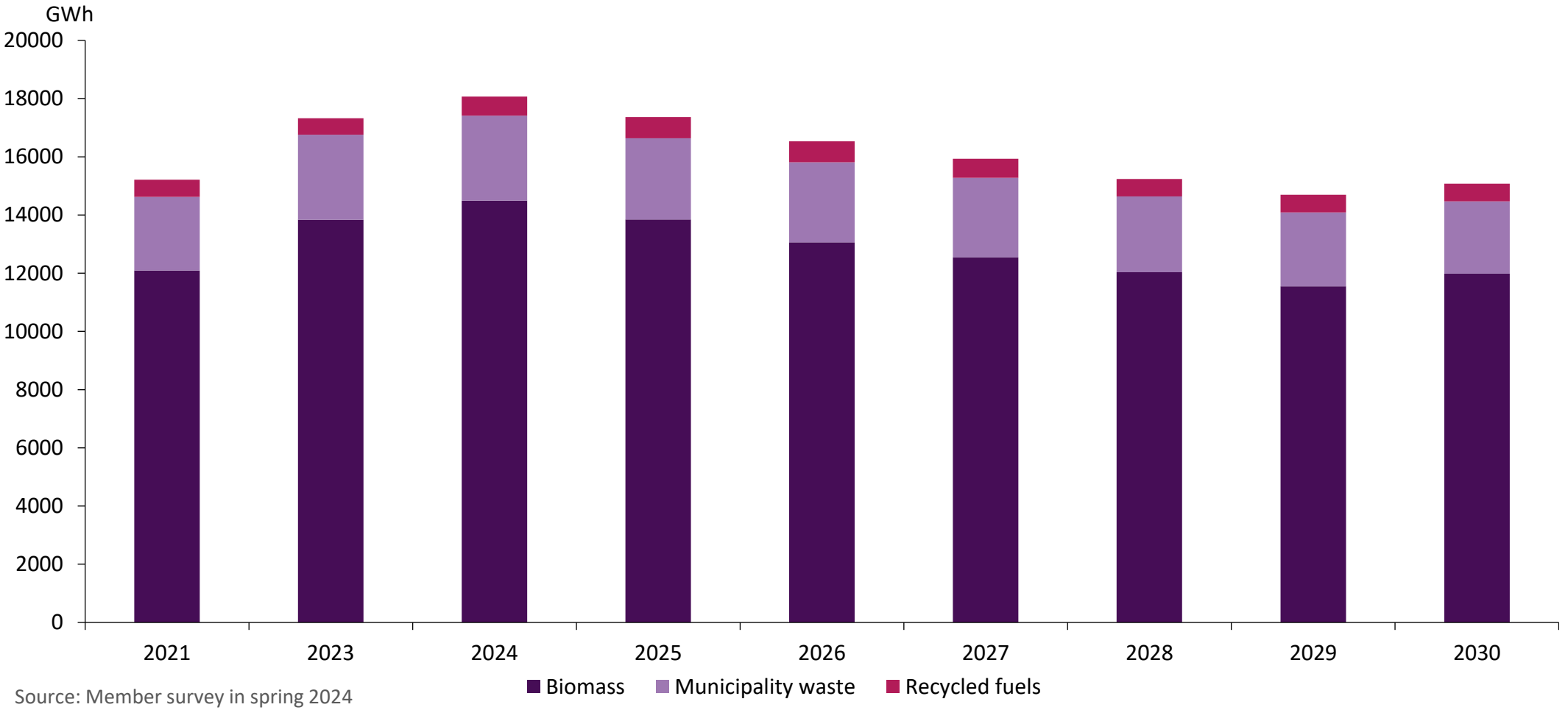
Use of fossil fuels is declining rapidly



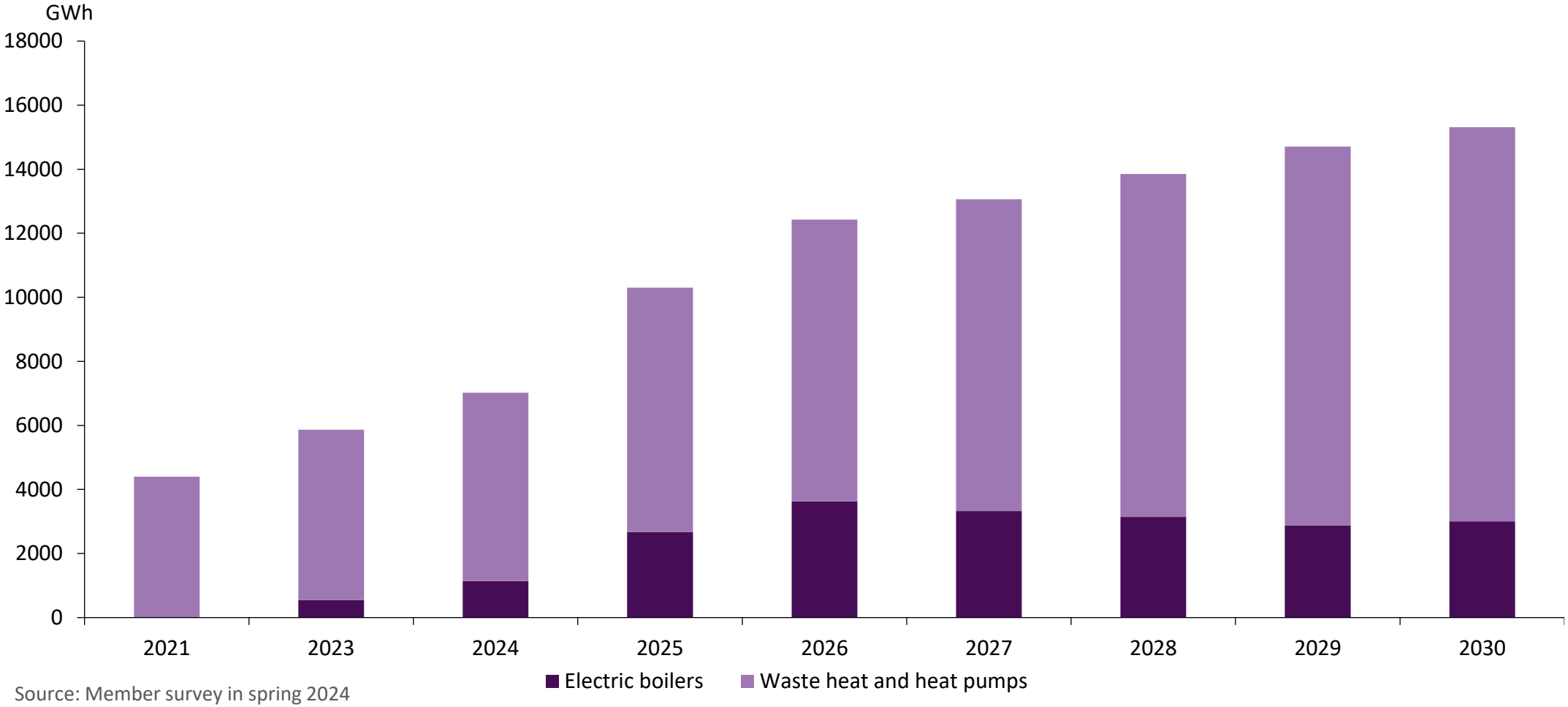
Source: Member survey in spring 2024

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



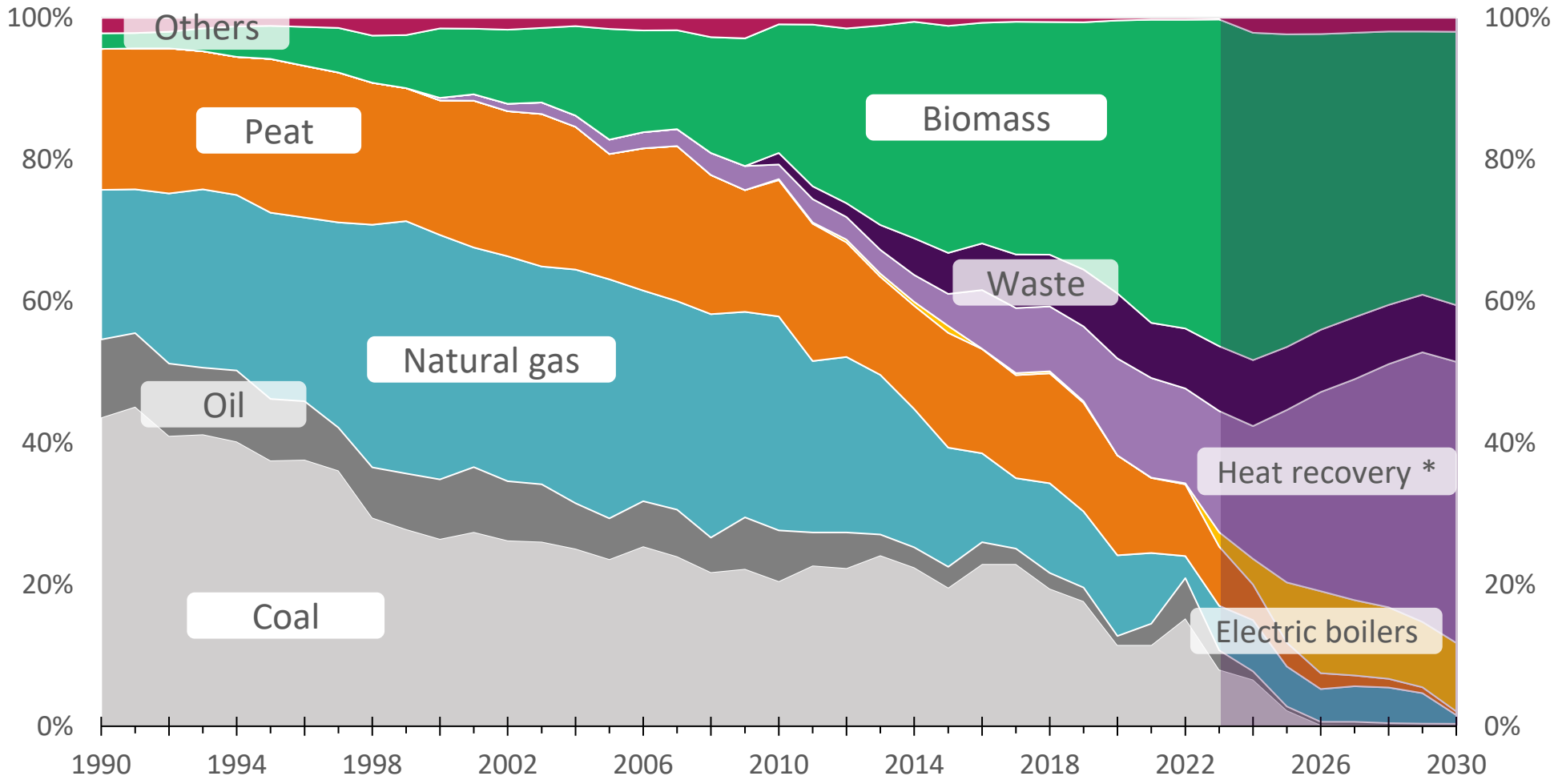
Source: Member survey in spring 2024

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



Source: Member survey in spring 2024

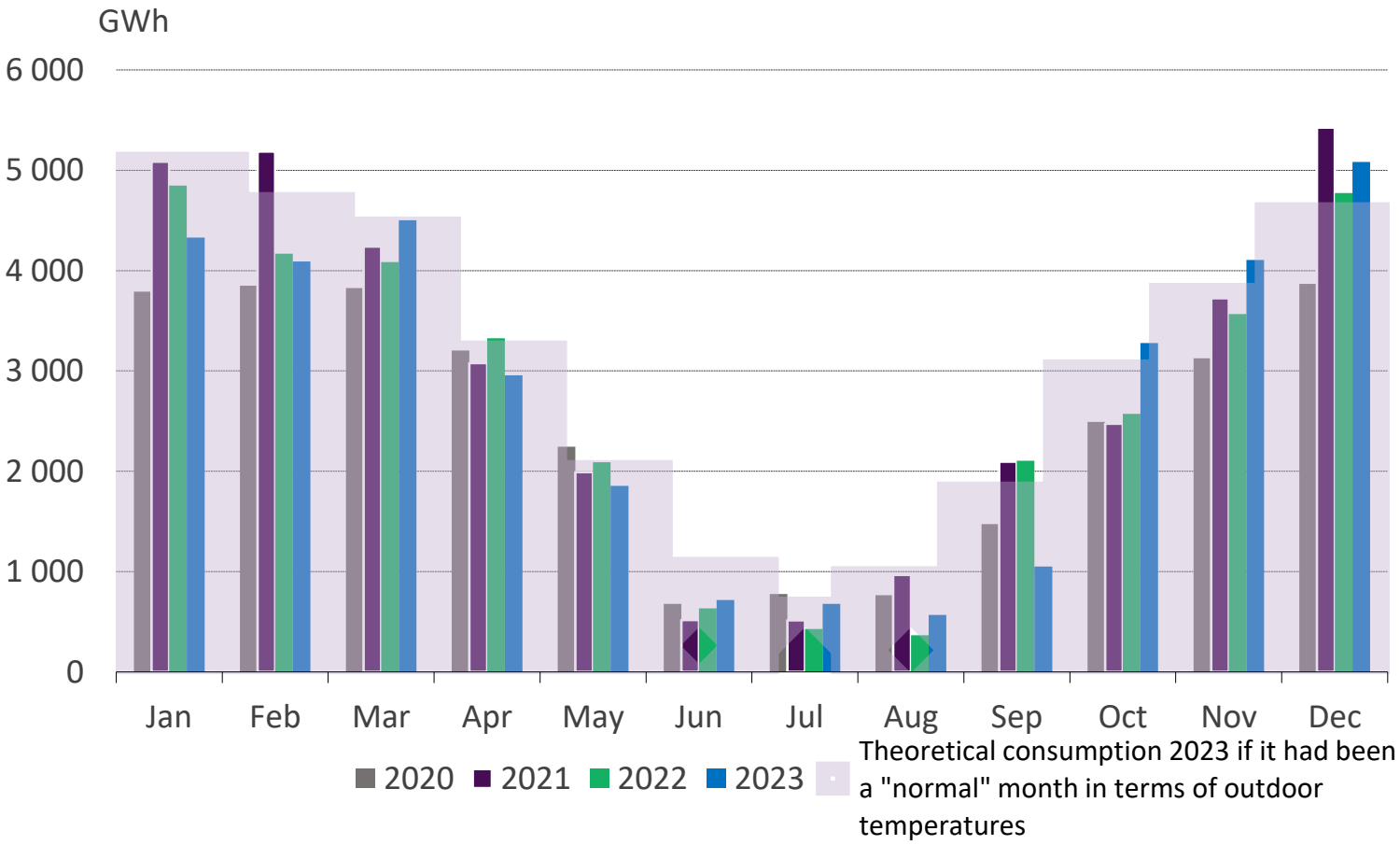
Energy sources for district heat supply 1990-2030



Source for 2024-2030: Member survey in spring 2024

*includes heat pumps and heat recovery

Estimated monthly district heat demand



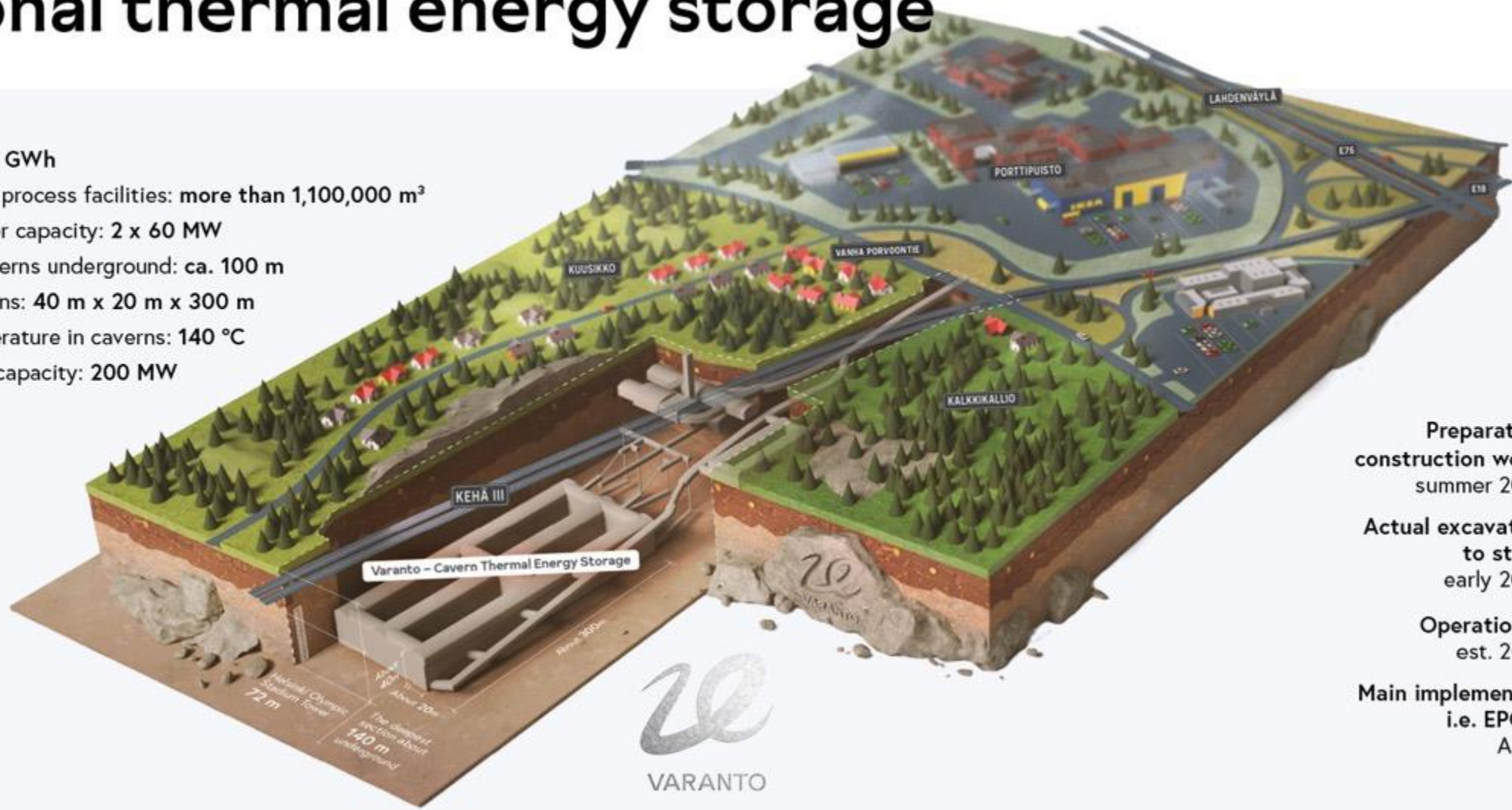
Year 2023 was 0,3 warmer than the normal period of 1991-2020. However, monthly temperatures differed from the average year.

- The January, February and summer months were warmer than normal, but March and the rest of the year were colder than normal.

The cold winter months exemplify the need for a wide palette of fuels to ensure the security of supply of heating.

Varanto – Seasonal thermal energy storage

- Capacity: **90 GWh**
- Volume, incl. process facilities: **more than 1,100,000 m³**
- Electric boiler capacity: **2 x 60 MW**
- Depth of caverns underground: **ca. 100 m**
- Size of caverns: **40 m x 20 m x 300 m**
- Water temperature in caverns: **140 °C**
- Discharging capacity: **200 MW**



Preparatory construction work:
summer 2024

Actual excavation to start:
early 2025

Operational:
est. 2028

Main implementor, i.e. EPCM:
AFRY


IKEA