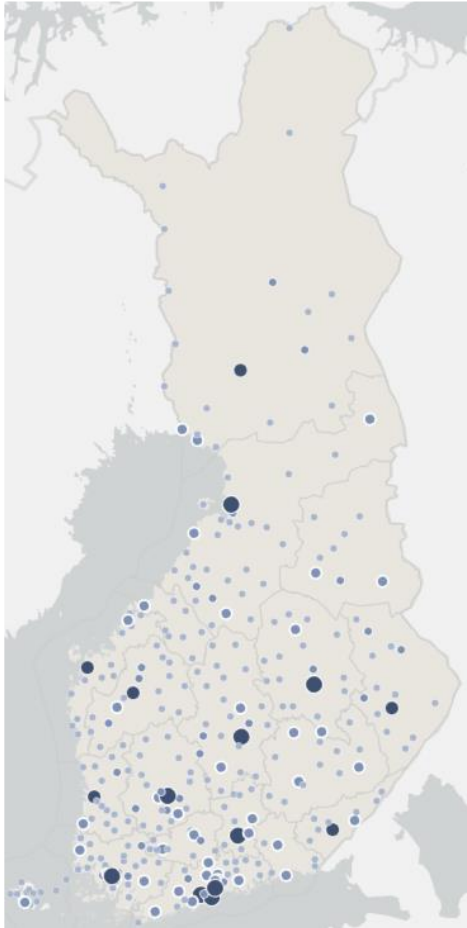


District heating in Finland 2022

Statistics 2022

District heating networks in Finland



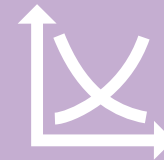
~33 TWh
Annual energy sold



~2,9 million
people
live in district-heated houses



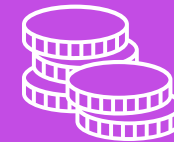
~16 200 km
District heating networks



~9,1
cent/kWh
the average price incl. taxes



~46 %
market share

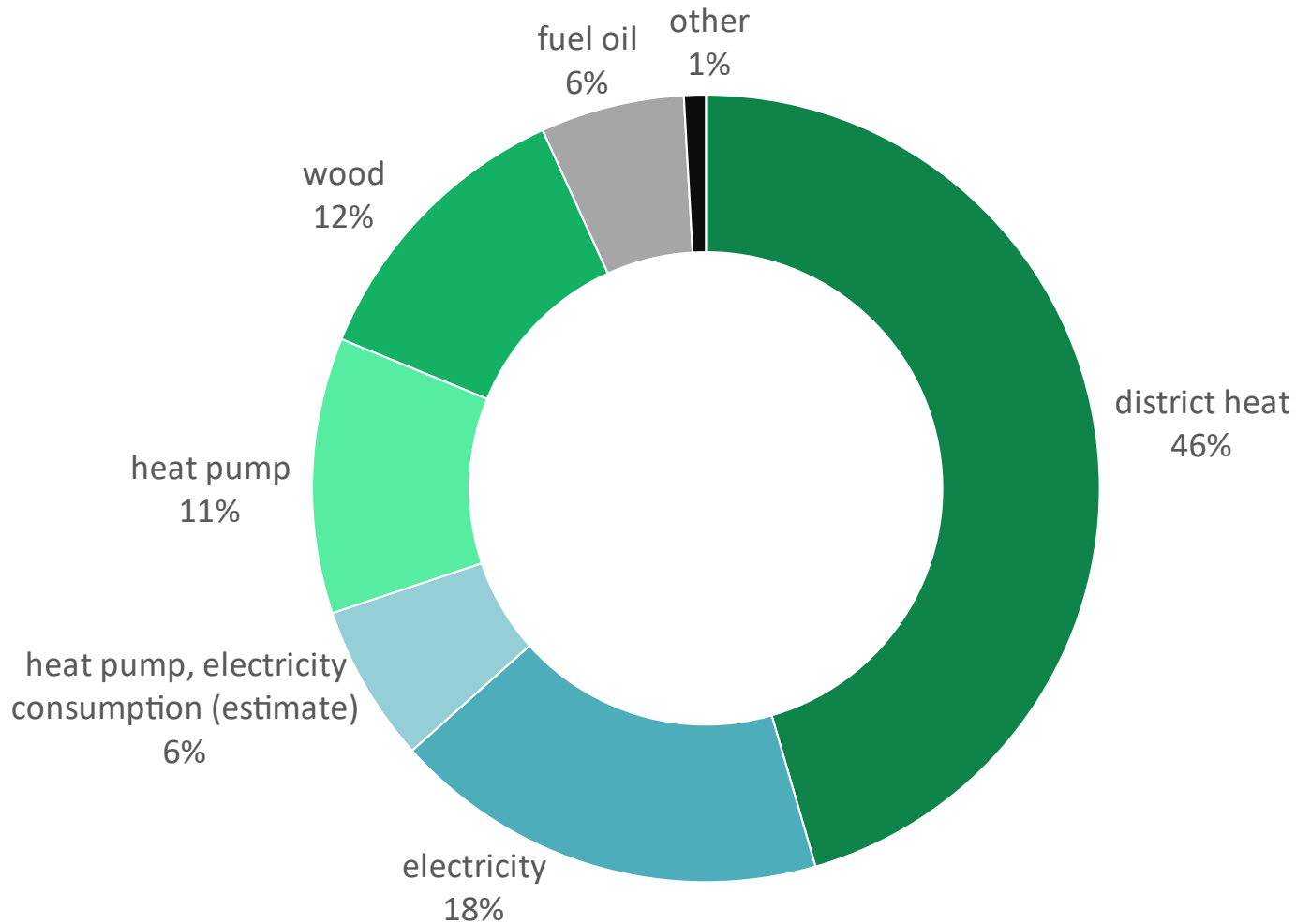


~3 mrd EUR
the value of sold heat,
incl. taxes

Unusual year 2022

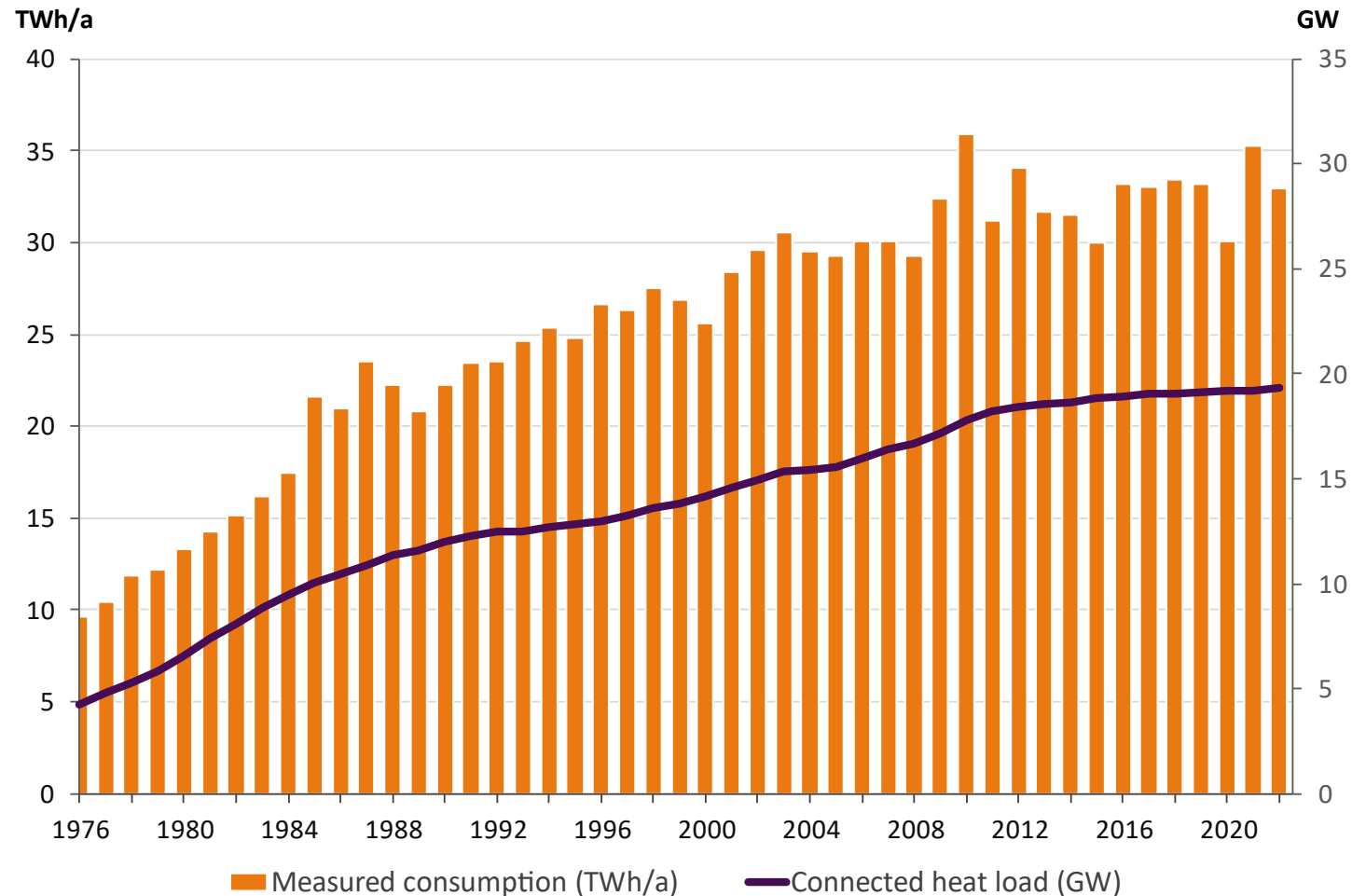
- The year 2022 was unusual in Finnish energy system due to the Russia–Ukraine war and the end of Russian fuel imports.
- In 2022, natural gas was used less in district heat production than in previous years. Natural gas was replaced especially by oil and coal.
 - Previously, natural gas was almost entirely imported from Russia. Its imports from Russia ended in May 2022.
- Imports of electricity, wood and other fuels for energy production from Russia also ended during 2022, which was reflected in the prices of fuels and district heat.
- The year 2022 was warmer than the previous year, which reduced the consumption and production of district heat.

Market share of space heating in 2021 (Statistics Finland)

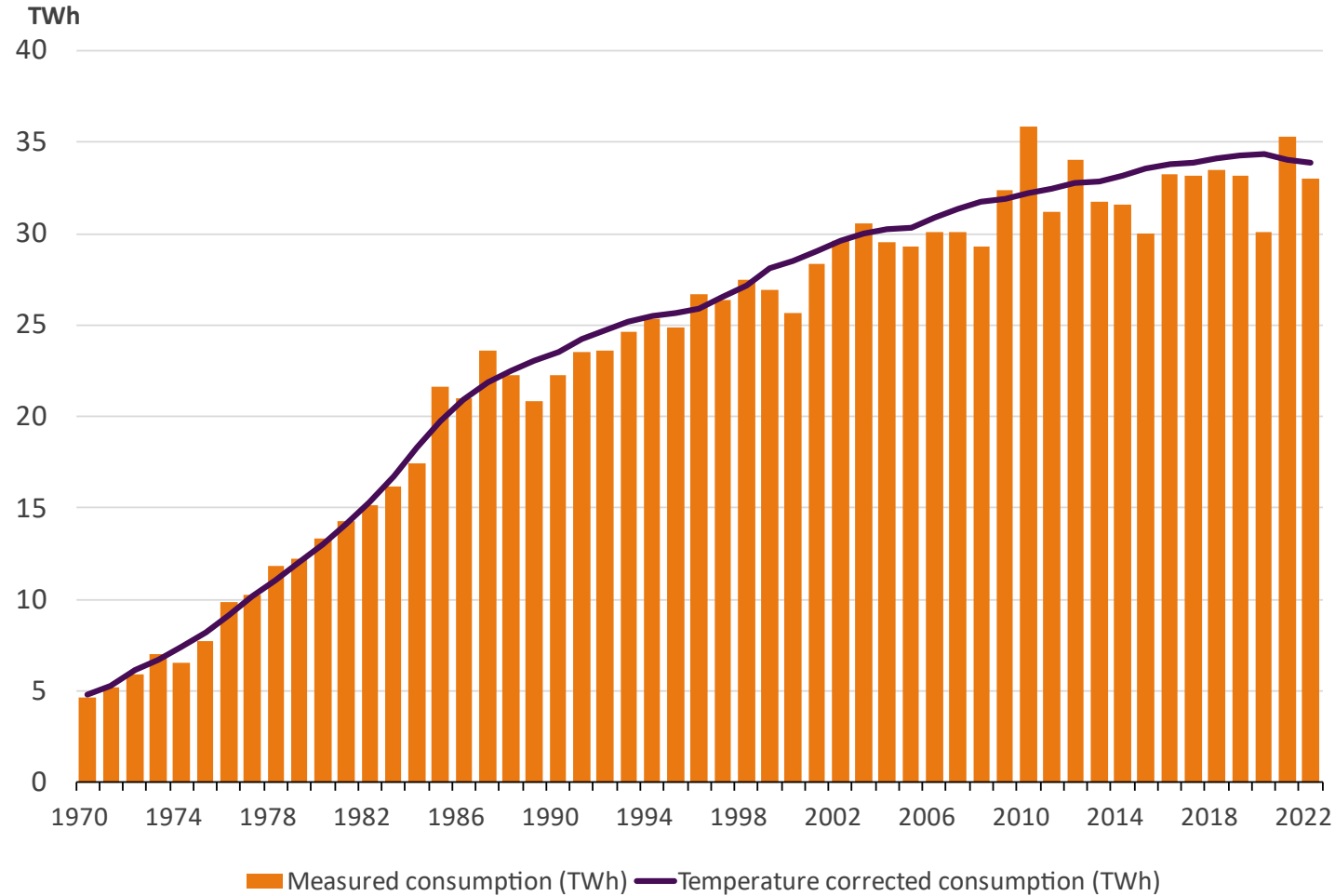


- Includes residential, commercial and public buildings

District heat consumption and connected heat load of the customers

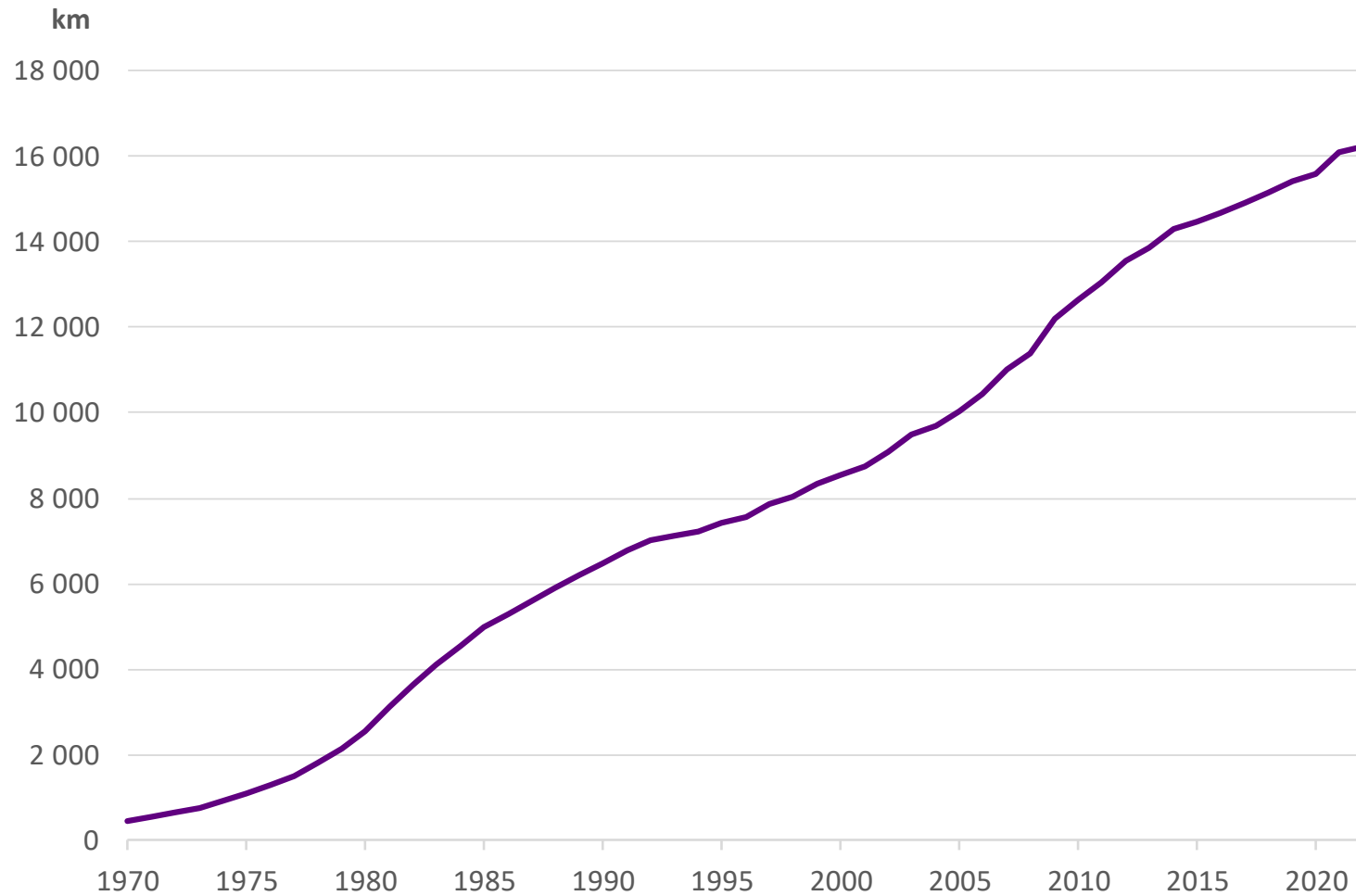


Temperature corrected heat consumption

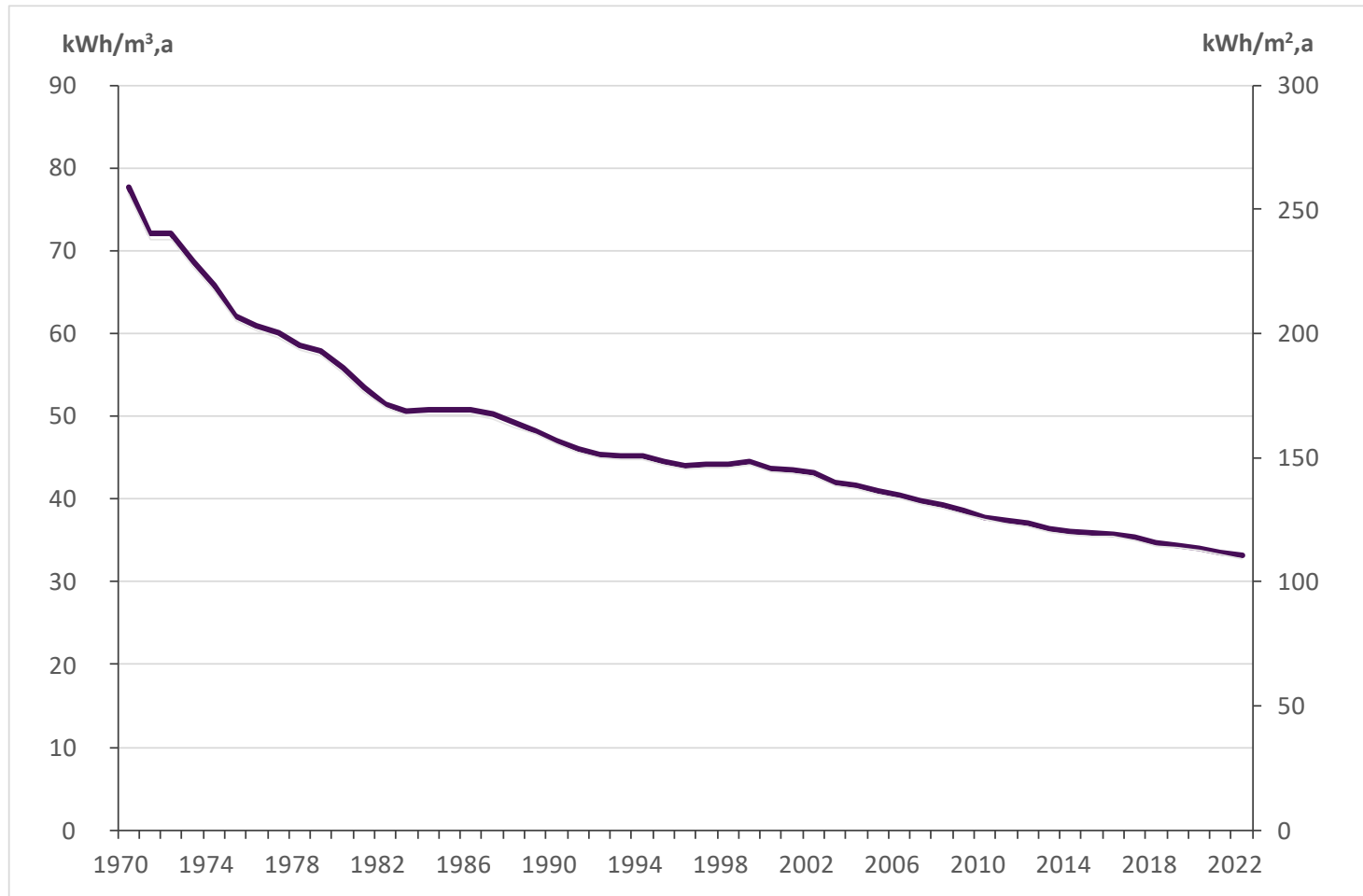


- District heat consumption 33,0 TWh (year 2022)
 - Temperature corrected heat consumption 33,9 TWh
- Temperature corrected heat consumption decreased 0,6 %

Length of networks



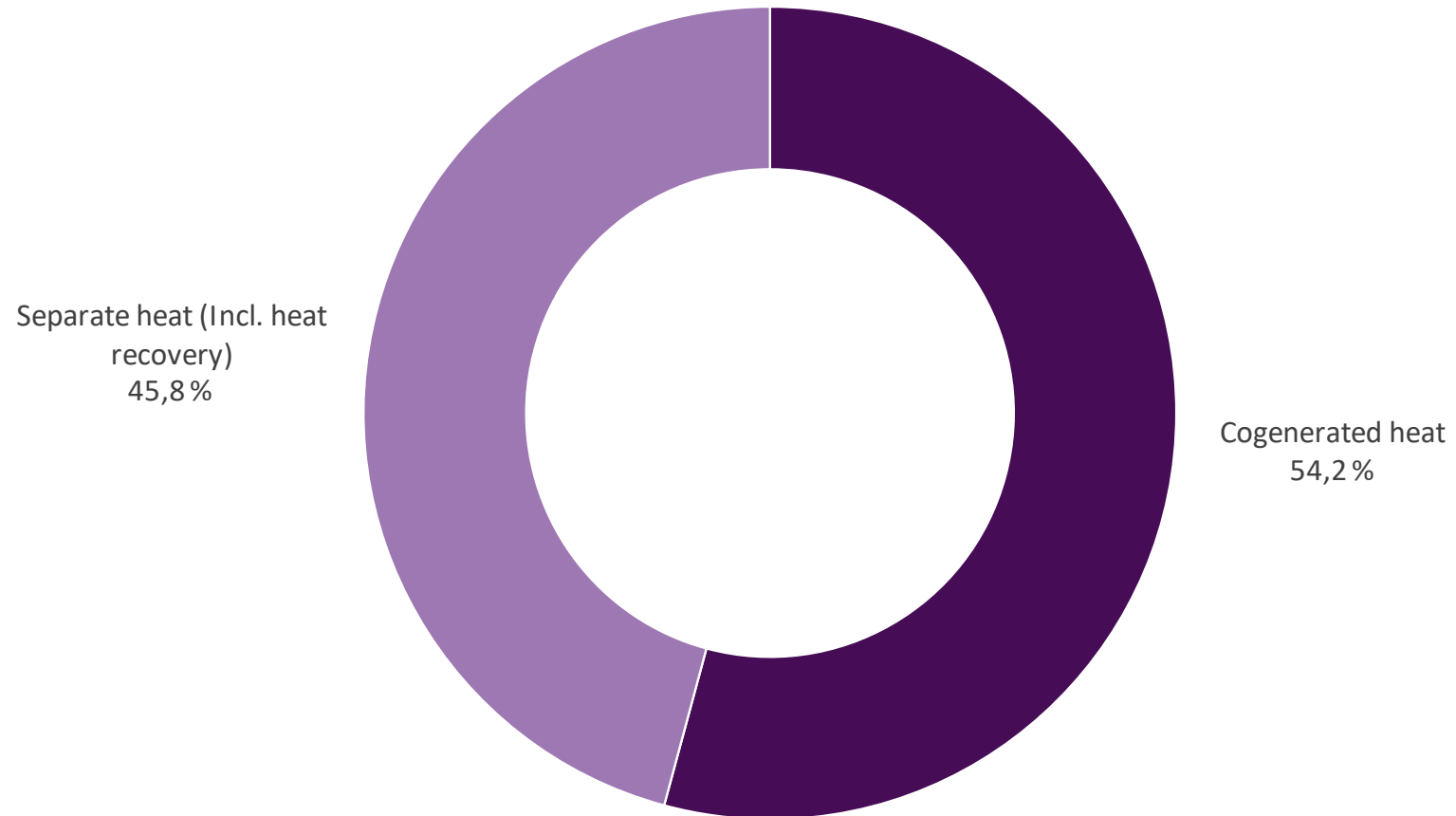
Specific heat consumption in district heated buildings



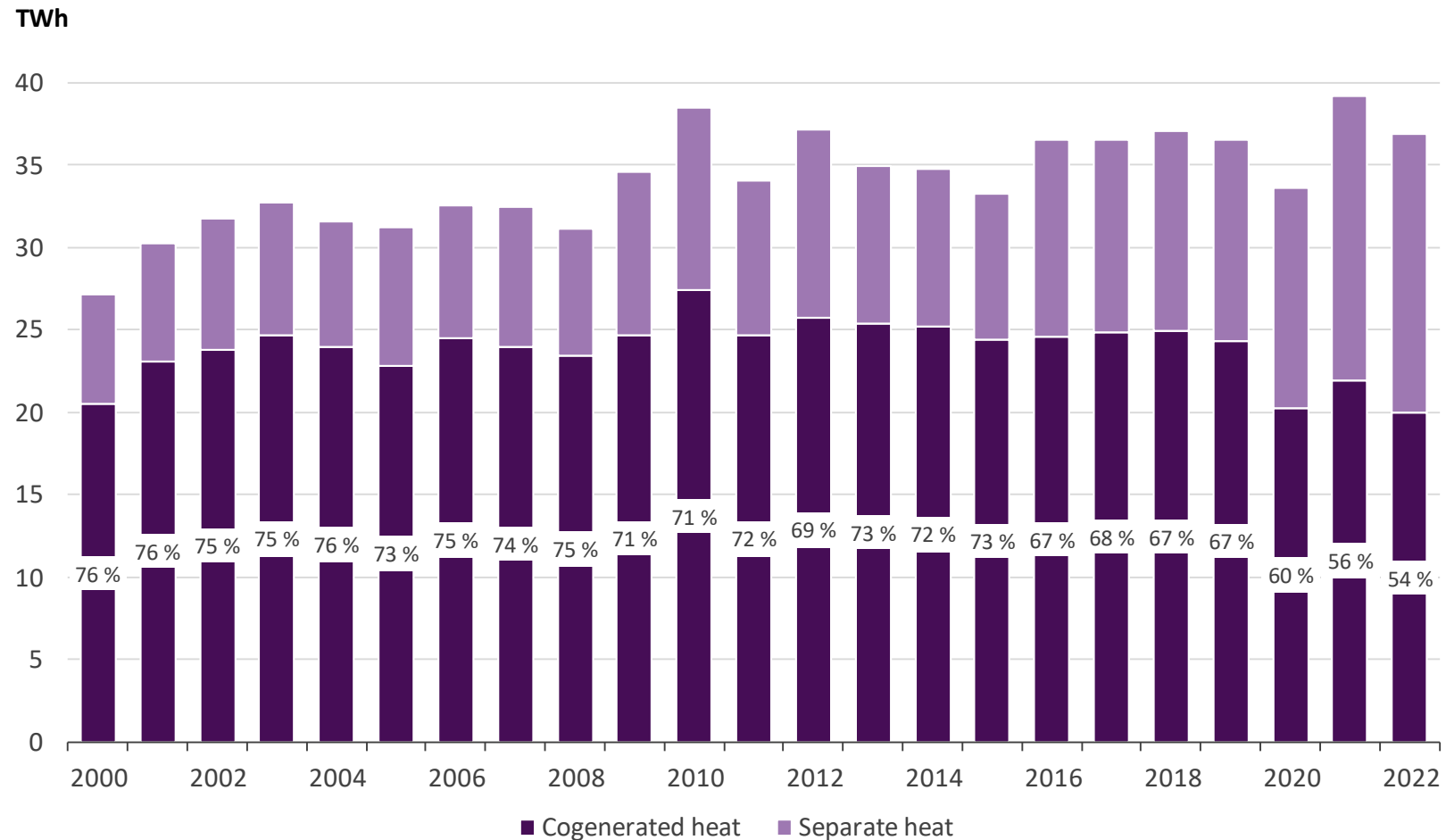
- Includes energy for heating hot tap water

District heat supply 2022

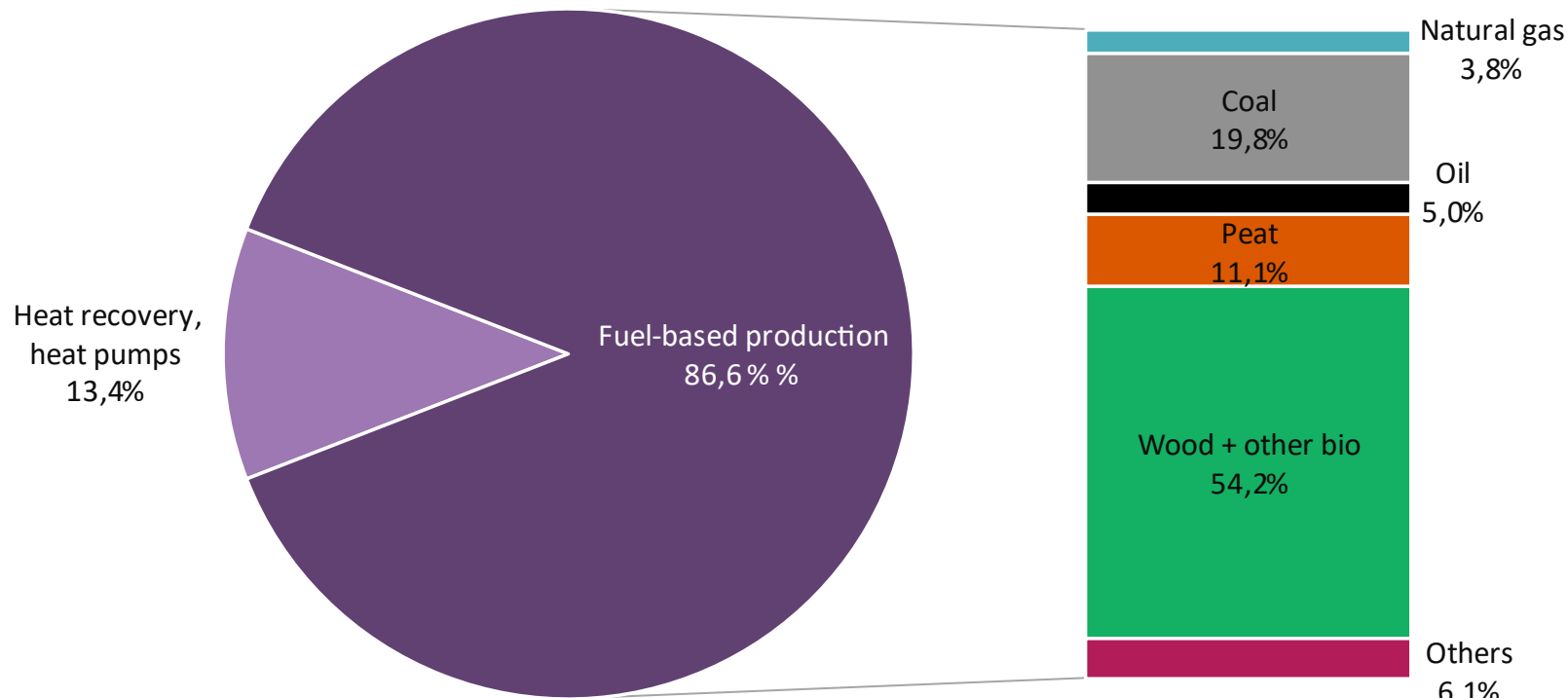
Total 33,0 TWh



District heat supply and the share of cogeneration

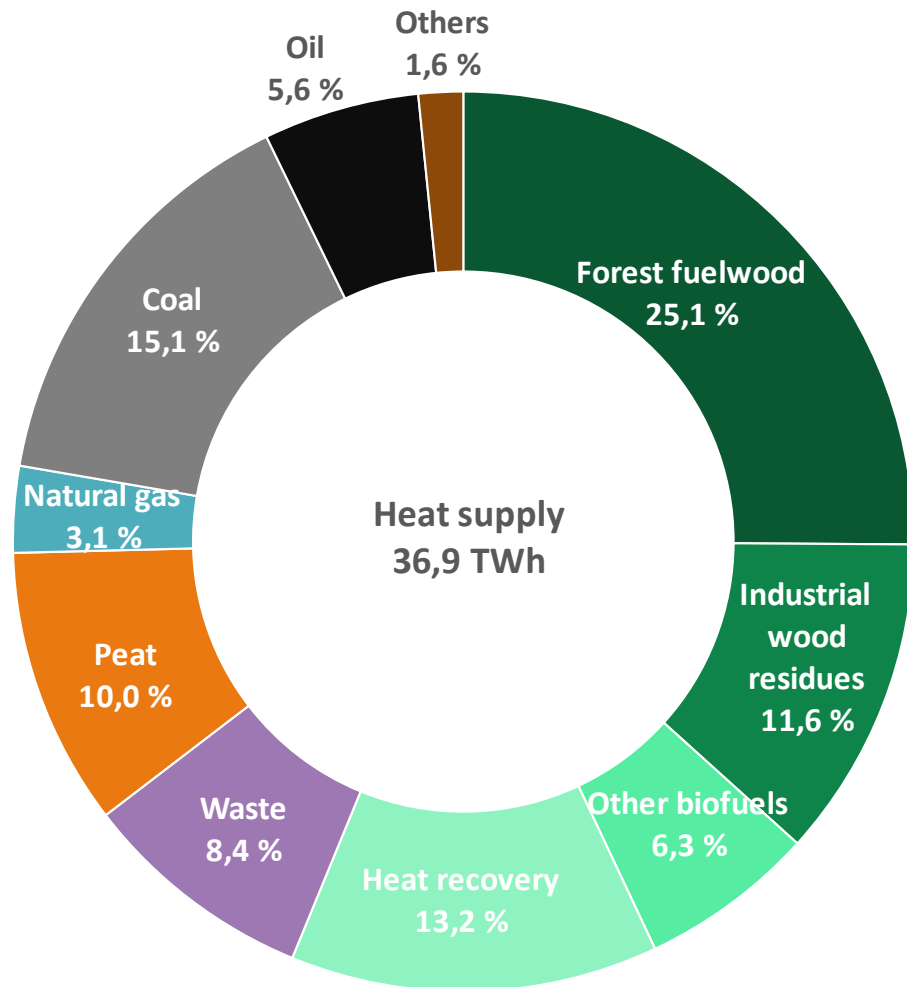


District heat supply as well as the fuels used for DH and cogeneration



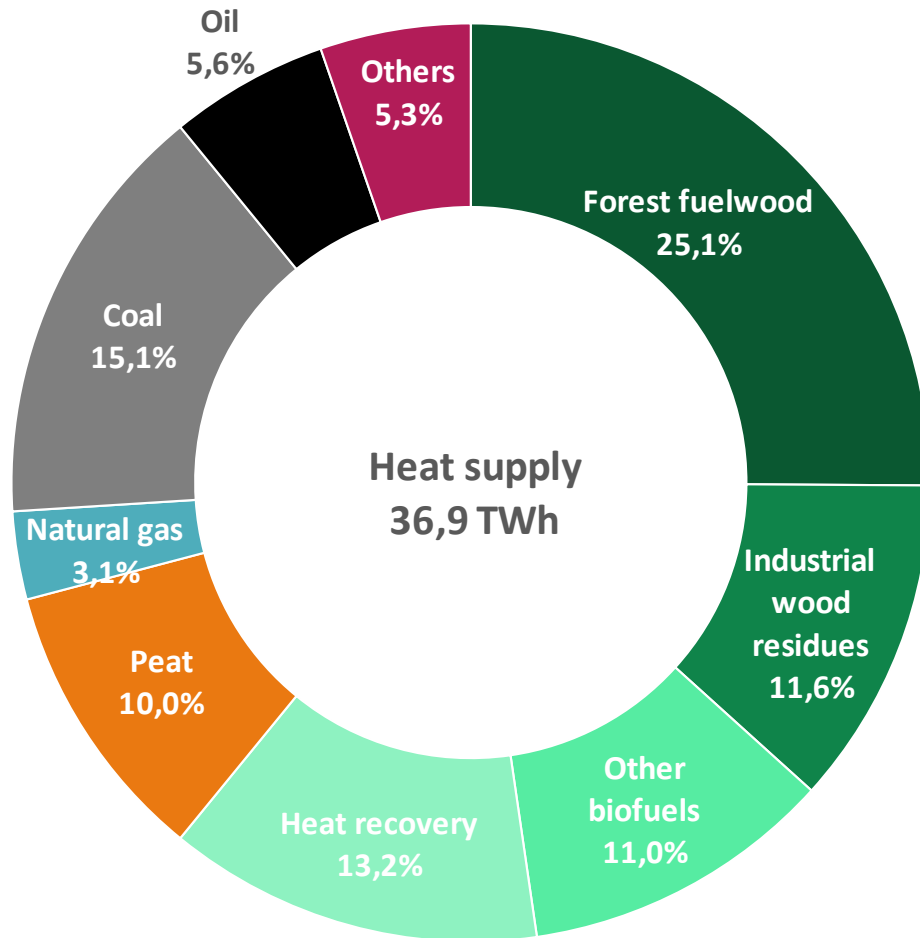
Total district heat supply	36,9 TWh
District heat production by fuels	31,8 TWh
Net production of electricity in CHP production	8,1 TWh
Fuel energy consumed	48,6 TWh
Heat recovery and heat produced by heat pumps	4,9 TWh

Energy sources for district heat supply in 2022 by fuel category



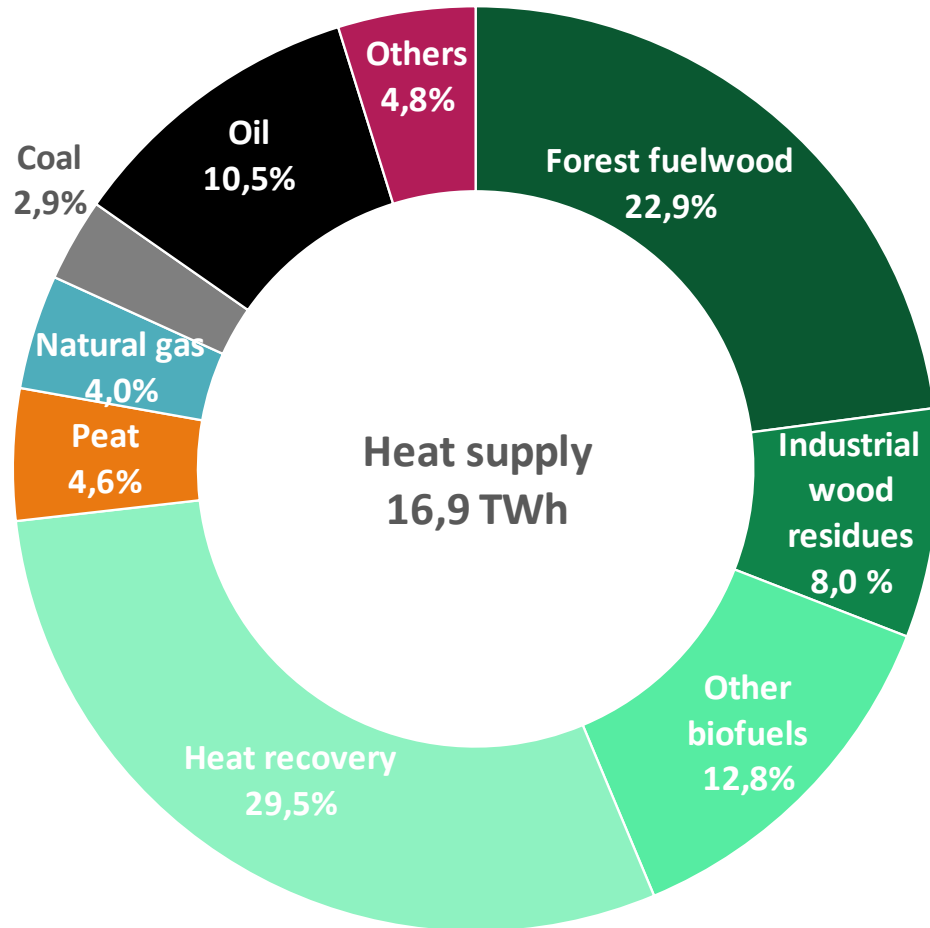
- Waste category includes municipal waste, recovered fuels, demolition wood, impregnated wood, plastic waste and hazardous waste.
 - Bio share of waste is 54 % and fossil share 46 %.
- Other biofuels: other biofuels and mixed fuels
- Others: electricity, steam, hydrogen

Energy sources for district heat supply in 2022



- Carbon neutral: 61 %
 - Renewables + Heat recovery
 - Domestic*: 76 %
 - Carbon neutral + Peat + share from "Others"
 - Share of imported fossil fuels in district heat supply 24 %
-
- Heat recovery: Heat energy which would be wasted otherwise, e.g. from the sewage, flue gases or from the district cooling return water
 - Other biofuels: Biodegradable share of the municipal and industrial waste and other bio-based fuels
 - Others: Non-biodegradable share of municipal and mixed waste, plastic and hazardous waste, electricity, steam, hydrogen
- * = All biomass is considered domestic. From "Others" all waste, steam, hydrogen and 85 % of electricity are considered domestic.

Energy sources for separate DH production in 2022

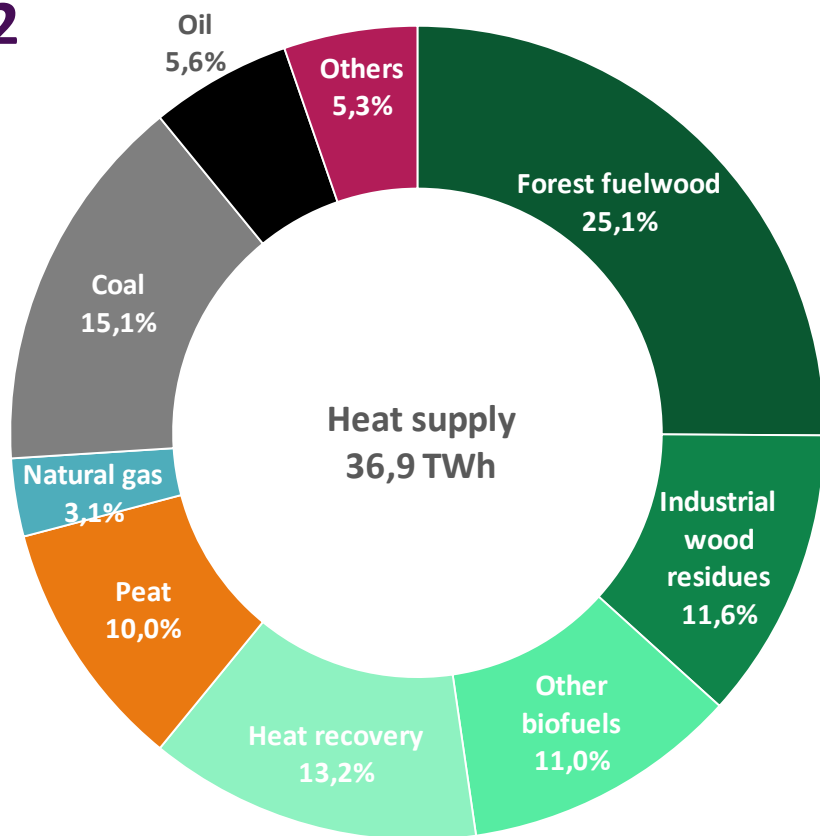


- Carbon neutral: 73 %
 - Renewables + Heat recovery
 - Domestic*: 82 %
 - Carbon neutral + Peat + share from "Others"
 - Share of imported fossil fuels in separate district heat production 18 %

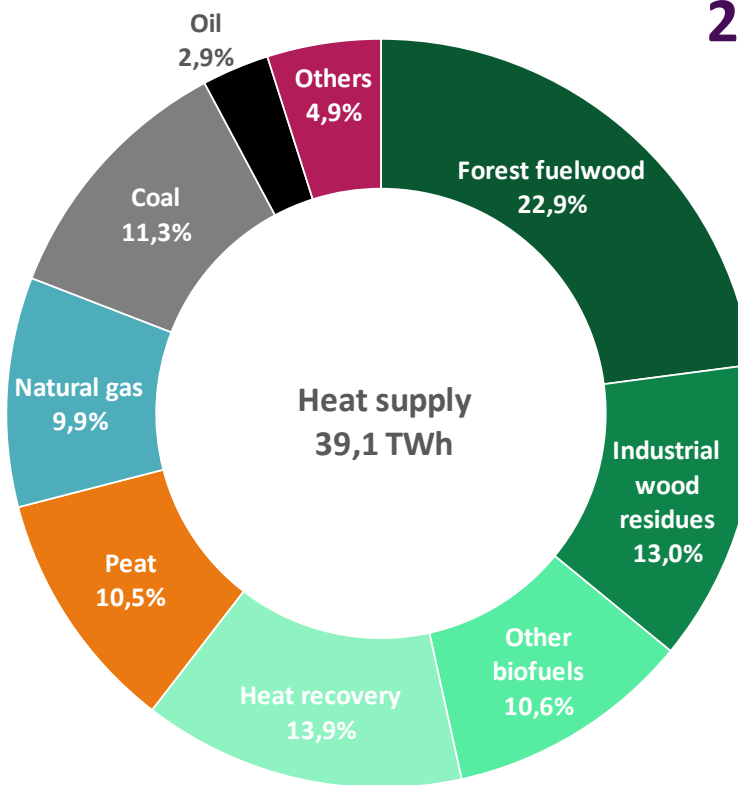
 - Heat recovery: Heat energy which would be wasted otherwise, e.g. from the sewage, flue gases or from the district cooling return water
 - Other biofuels: Biodegradable share of the municipal and industrial waste and other bio-based fuels
 - Others: Non-biodegradable share of municipal and mixed waste, plastic and hazardous waste, electricity, steam, hydrogen
- * = All biomass is considered domestic. From "Others" all waste, steam, hydrogen and 85 % of electricity are considered domestic.

Energy sources for district heat supply in 2022 and 2021

2022

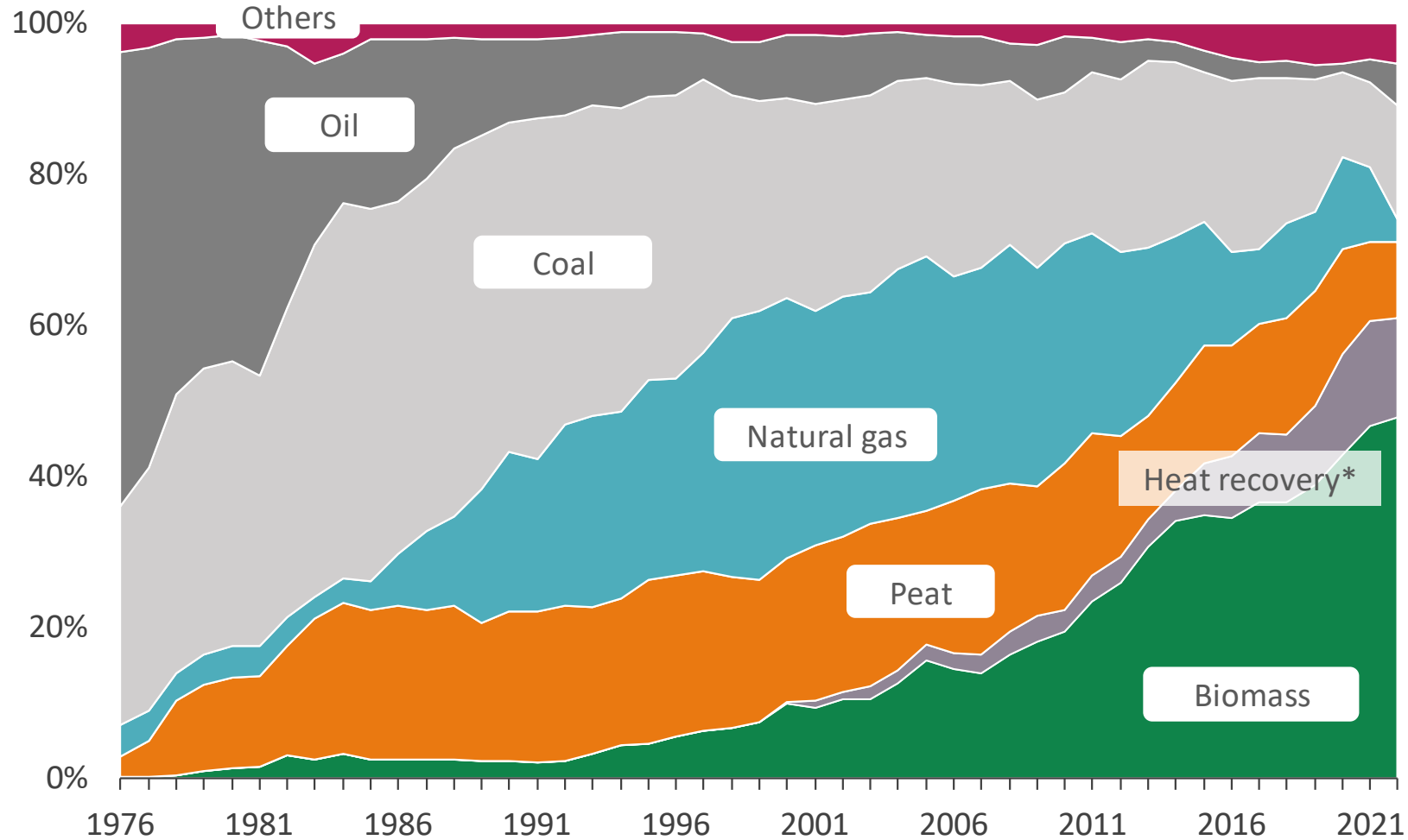


2021



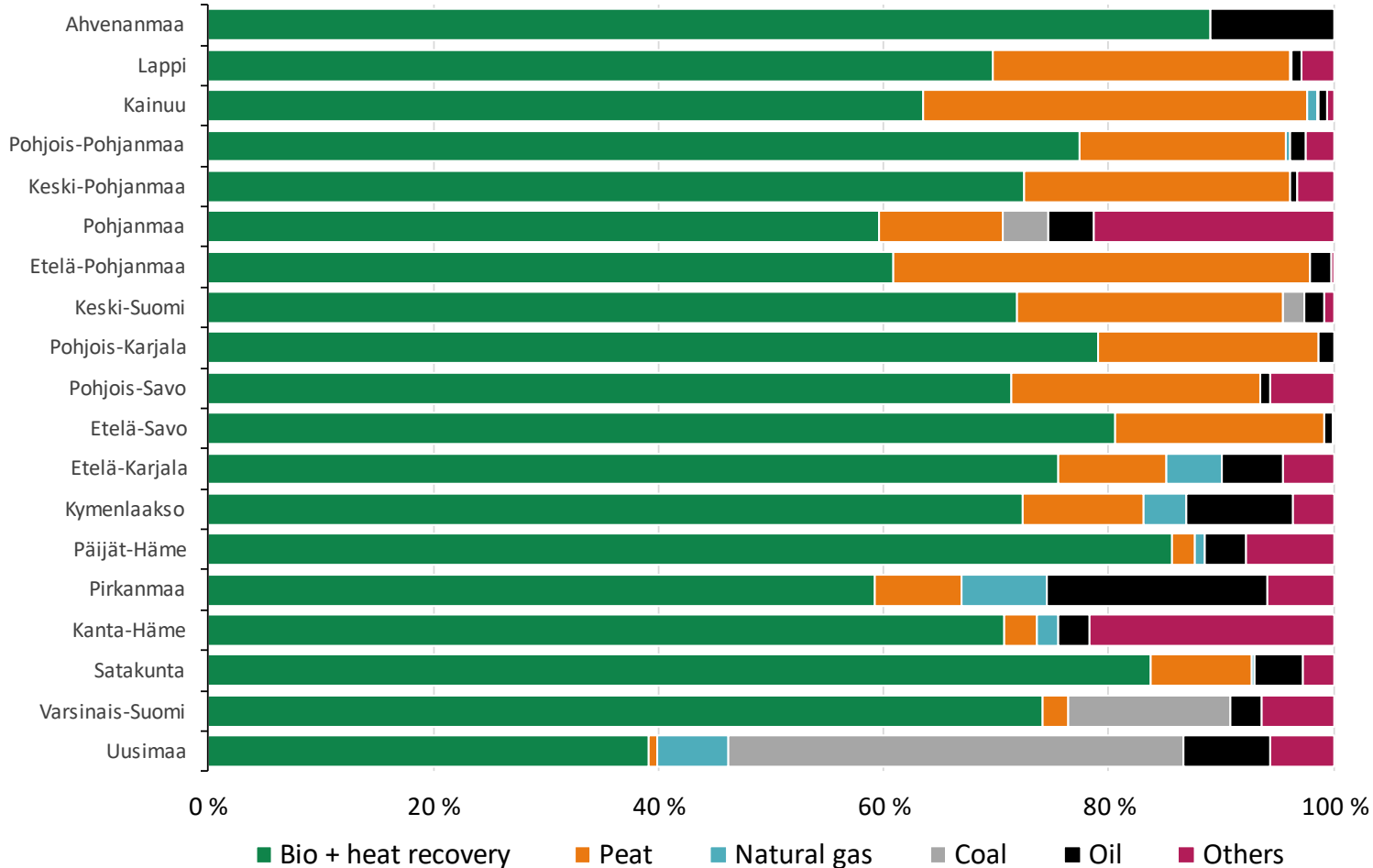
- Recovered (recycled) heat: energy that would otherwise go to waste
- Other biofuels: includes also the bio share of municipal waste
- Other: non-bio share of municipal waste, plastic or hazardous waste, electricity, steam, hydrogen

Energy sources for district heat supply



*includes heat pumps and heat recovery

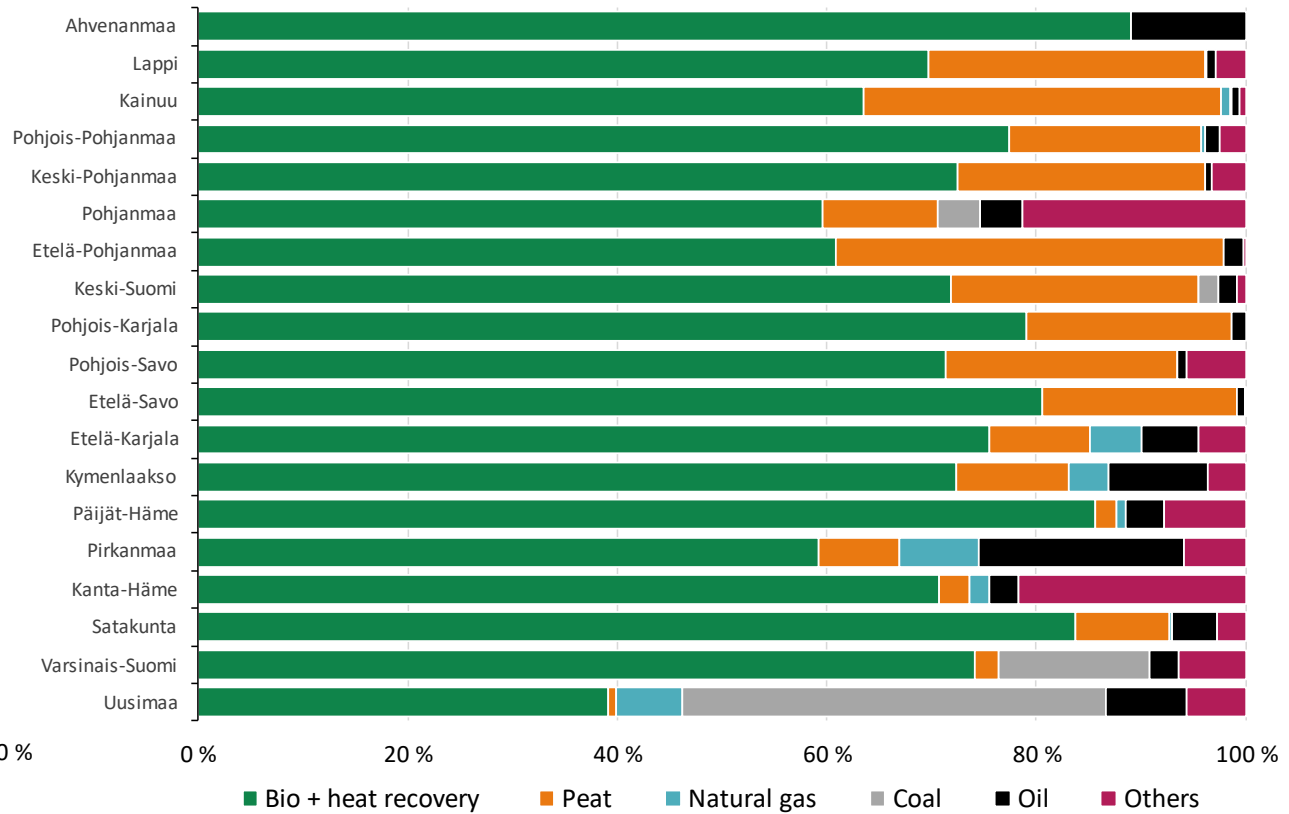
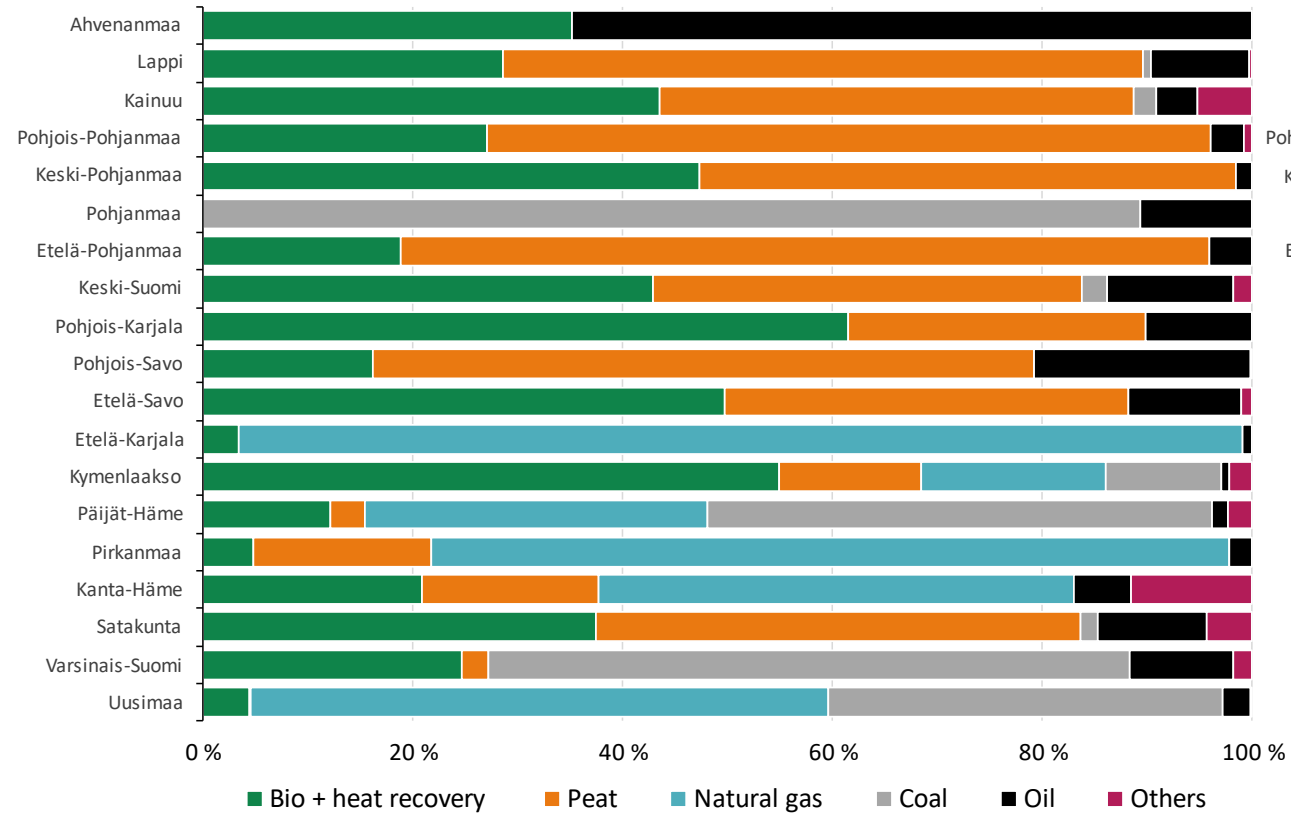
Energy sources for district heat and cogeneration by region in 2022



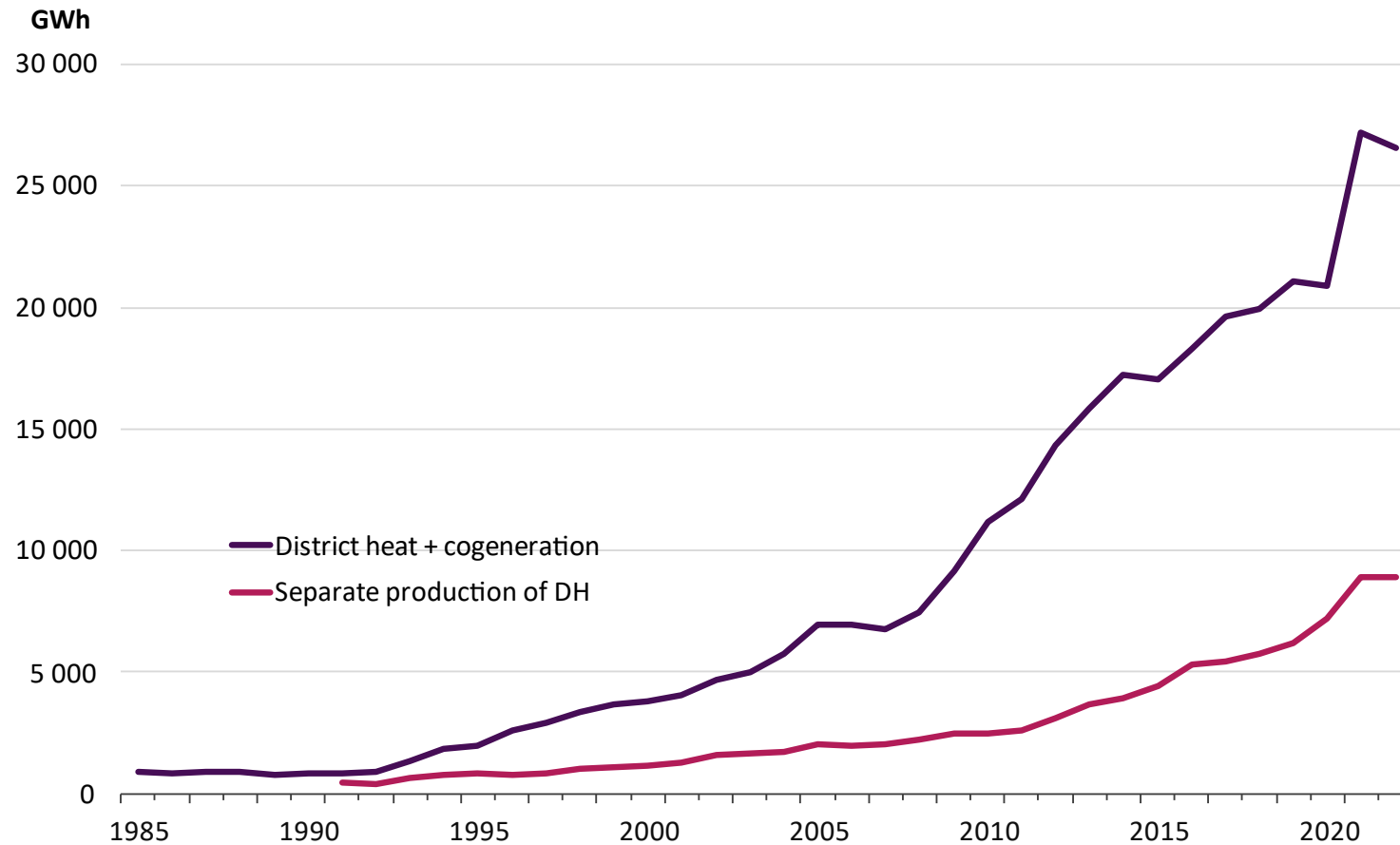
Energy sources for DH and cogeneration by region in 2005 and in 2022

Year 2005

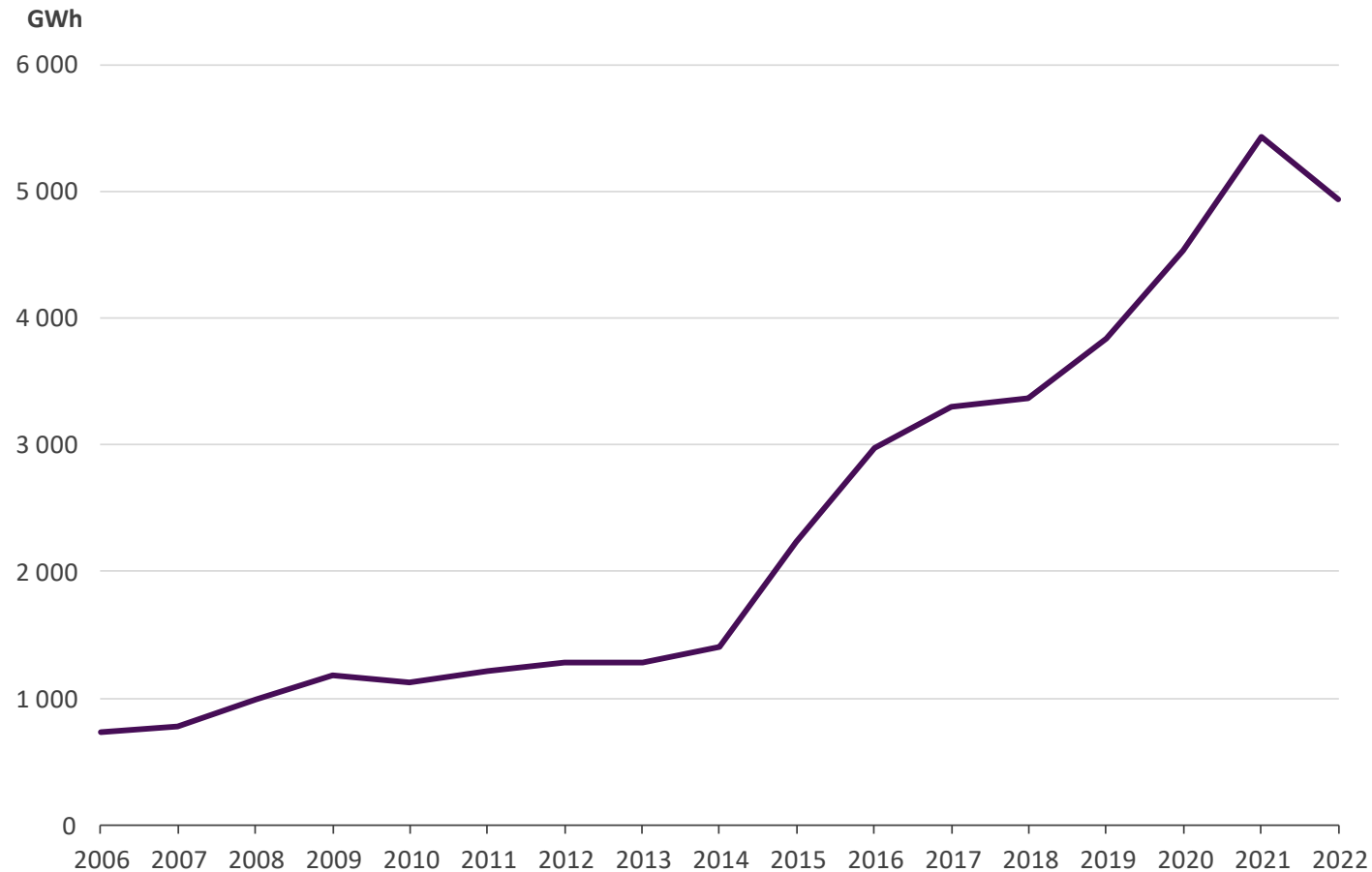
Year 2022



Renewable fuels in the production of district heat and cogeneration



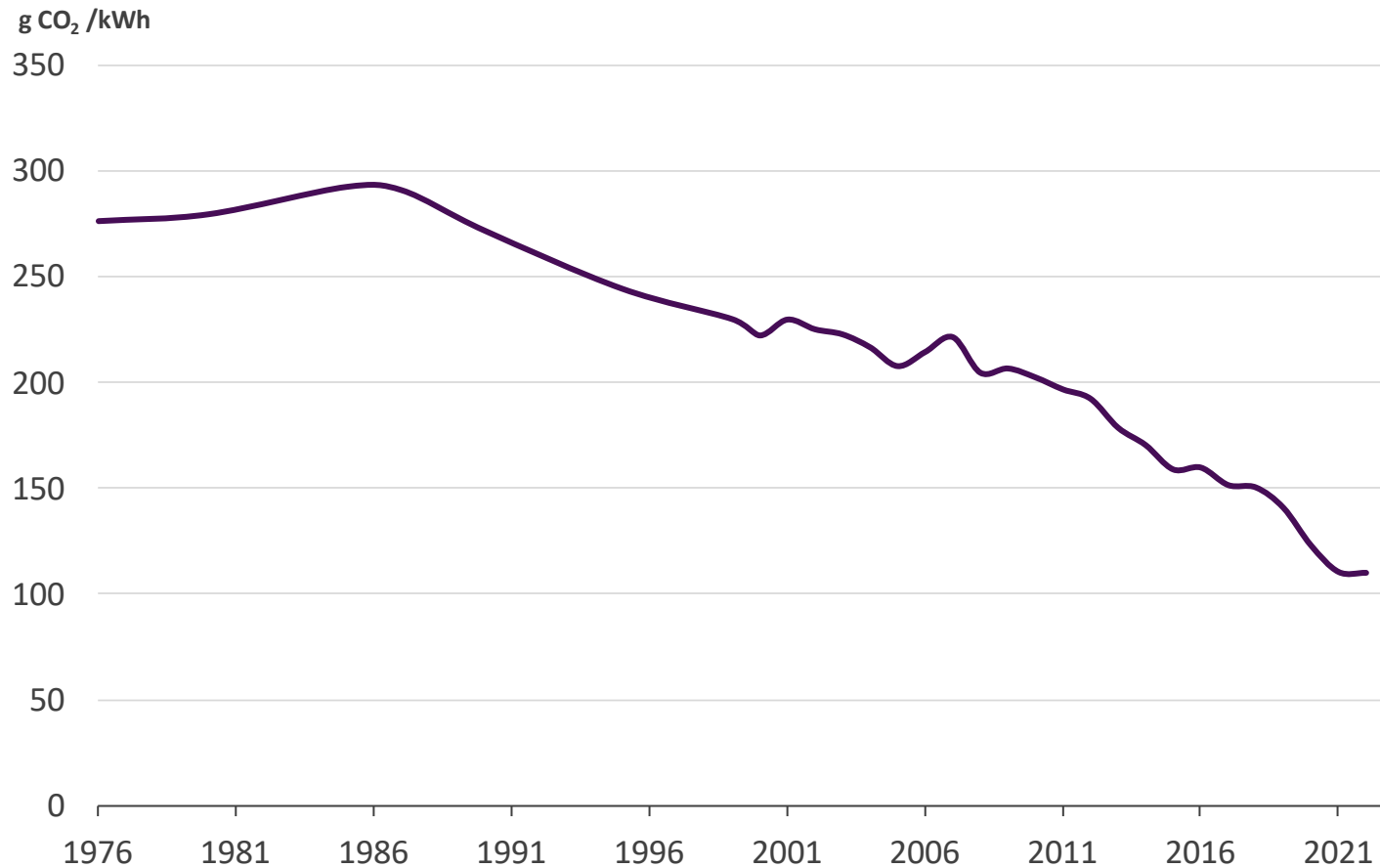
Heat recovery



4 935 GWh of district heat was produced by heat recovery

- Heat recovery by heat exchangers 3 485 GWh
 - The most significant heat sources: flue gases, industrial processes and geothermal energy
- Heat produced by the heat pumps 1 440 GWh
 - The most significant heat sources: sewage, district cooling return water and data centers

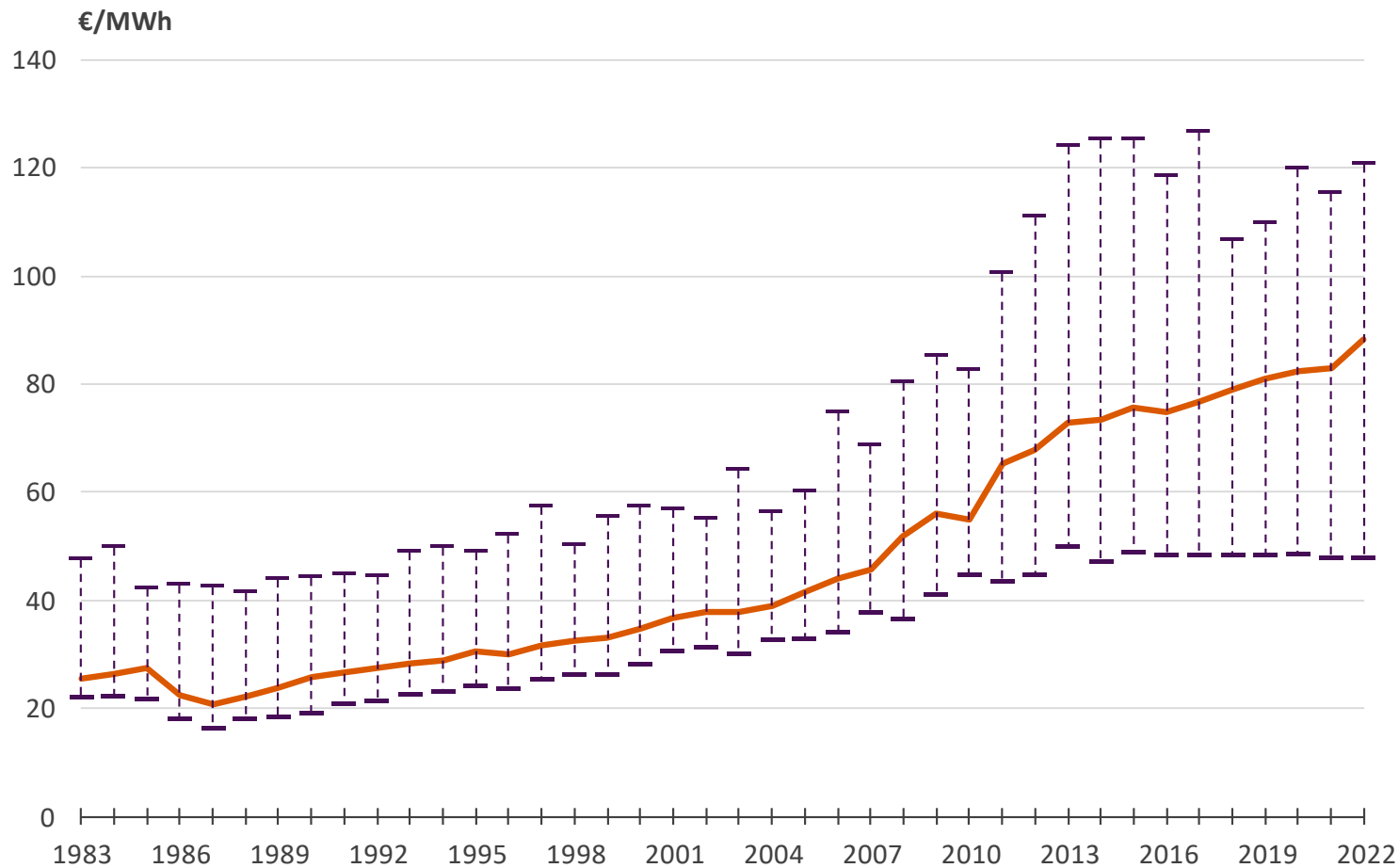
CO₂ -emissions from the district heat supply



- Specific emissions from district heat production in 2022 were 109,9 gCO₂/kWh, which
 - Decreased by 0,4 % from the previous year
 - Decreased by 43 % since 2010
- Fuels used in combined heat and power production were allocated according to the benefit allocation method

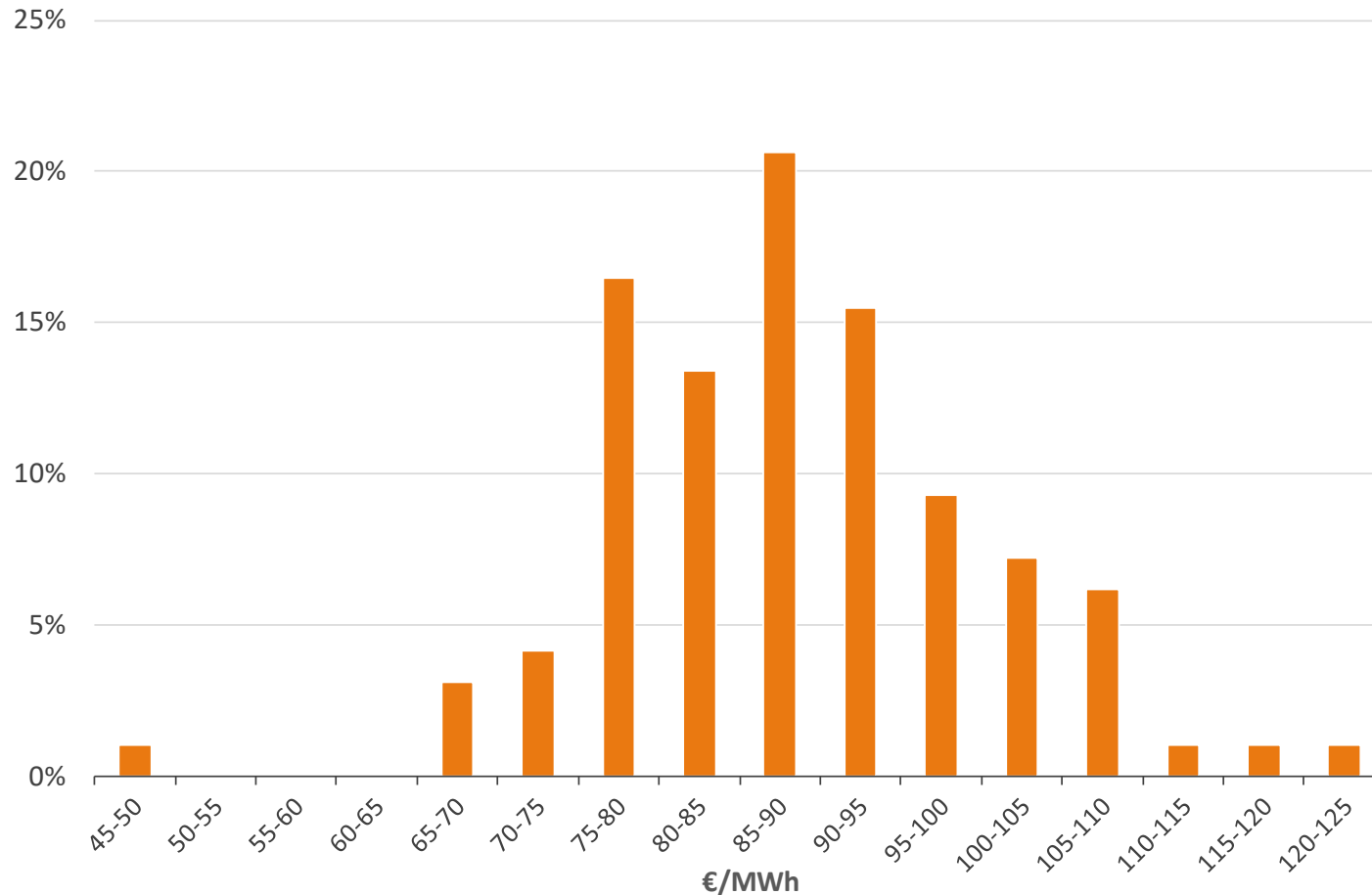
Price of district heat (incl. VAT)

Average, minimum and maximum values



- The price includes all taxes, demand and energy charges as well as other possible annual charges. Connection fees are excluded.

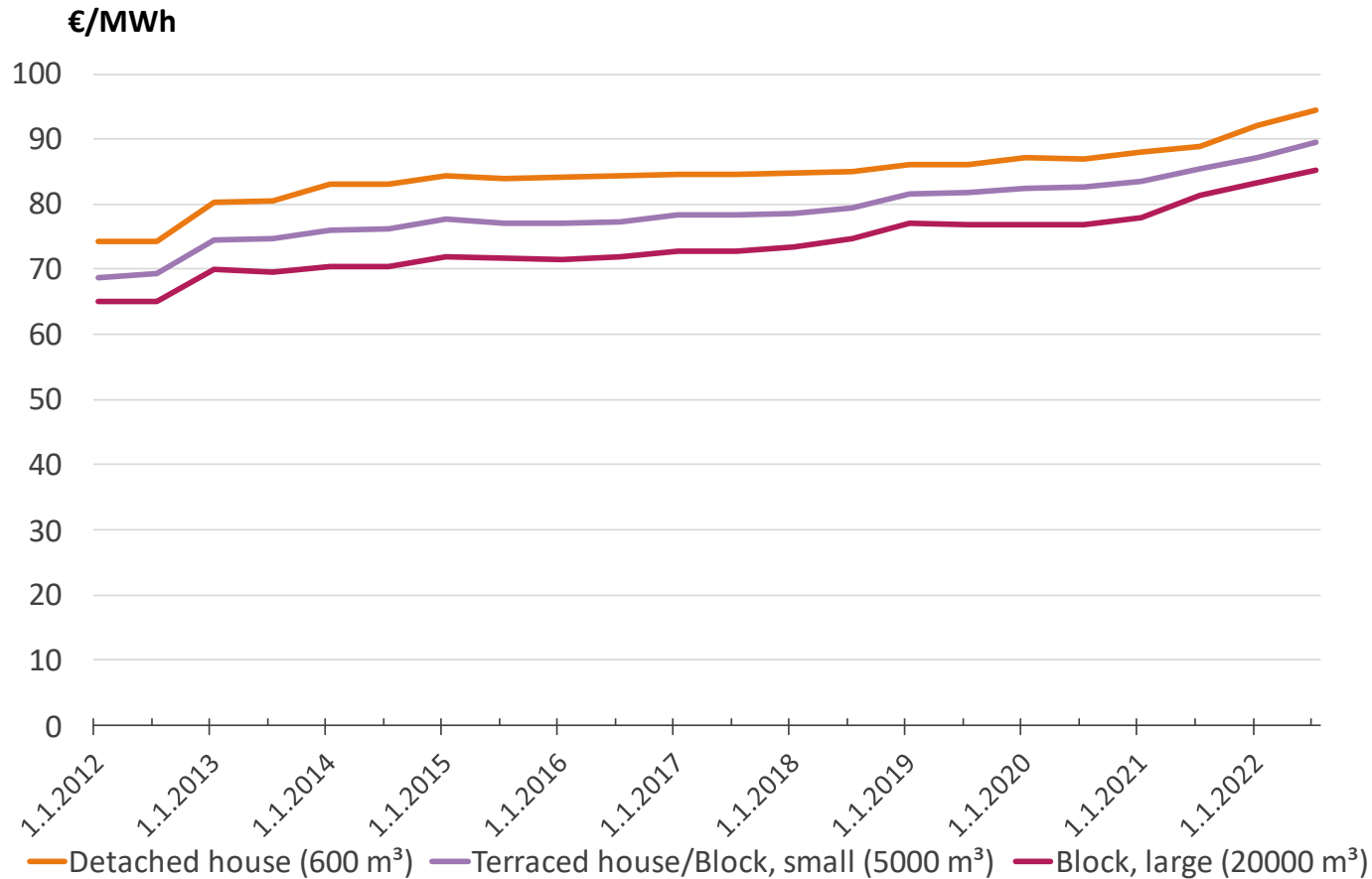
The share of district heating companies according to the average heat sales price in 2022 (incl. VAT)



- The price includes all taxes, demand and energy charges as well as other possible annual charges. Connection fees are excluded.
- Weighted average price: 91,32 €/MWh
- Arithmetical average price: 88,22 €/MWh

Price of district heat in new buildings (€/MWh)

Fixed price + energy fee, incl. taxes

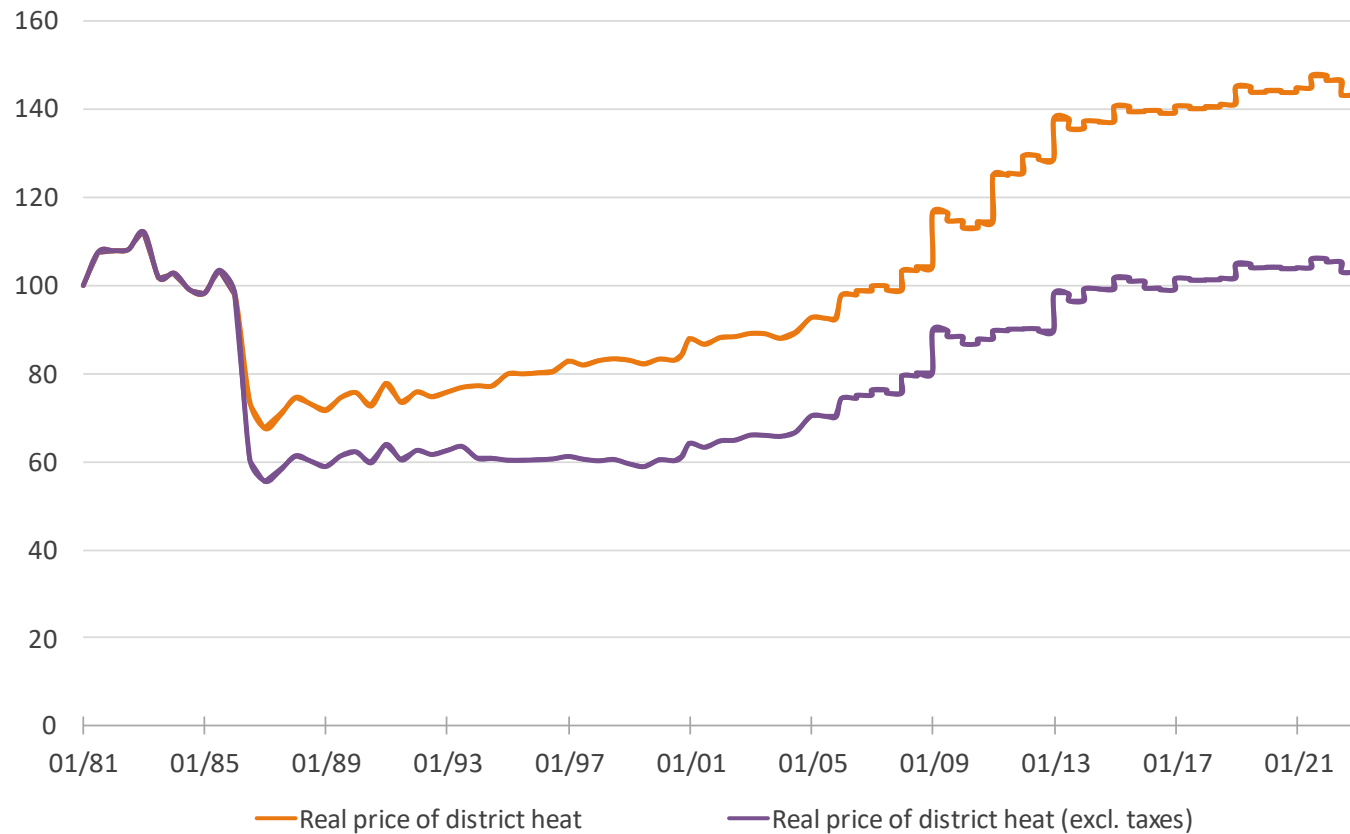


- The price includes all taxes, demand and energy charges as well as other possible annual charges. Connection fees are excluded.

Real price of district heat

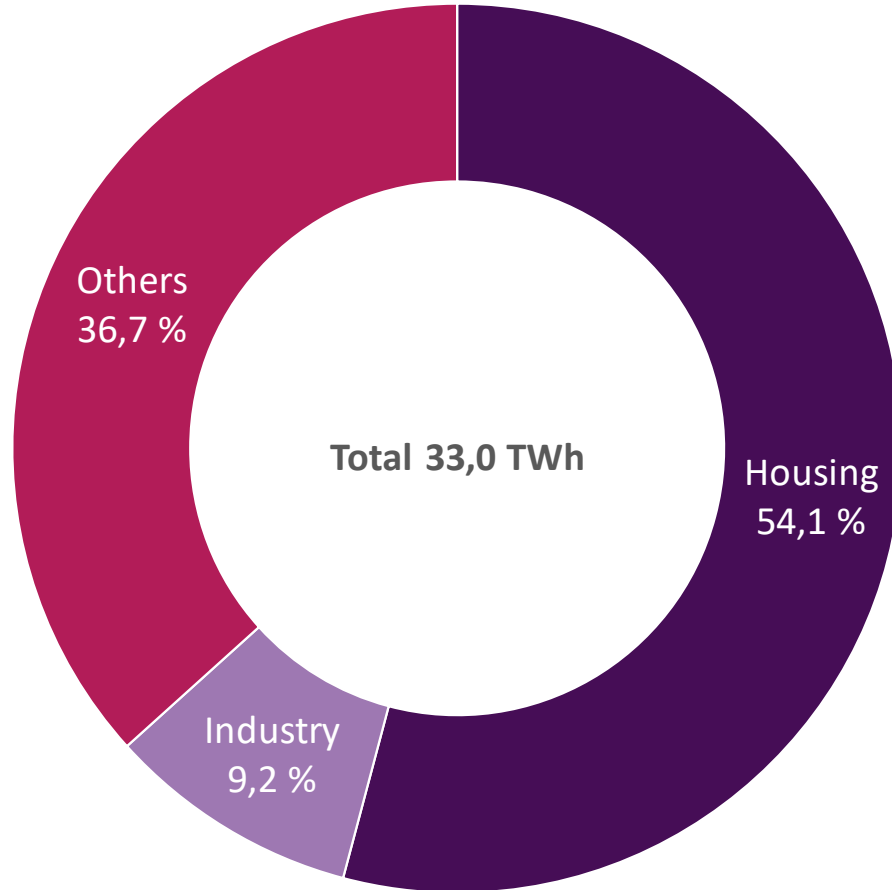
Corrected with cost-of-living index

1.1.1981 = 100

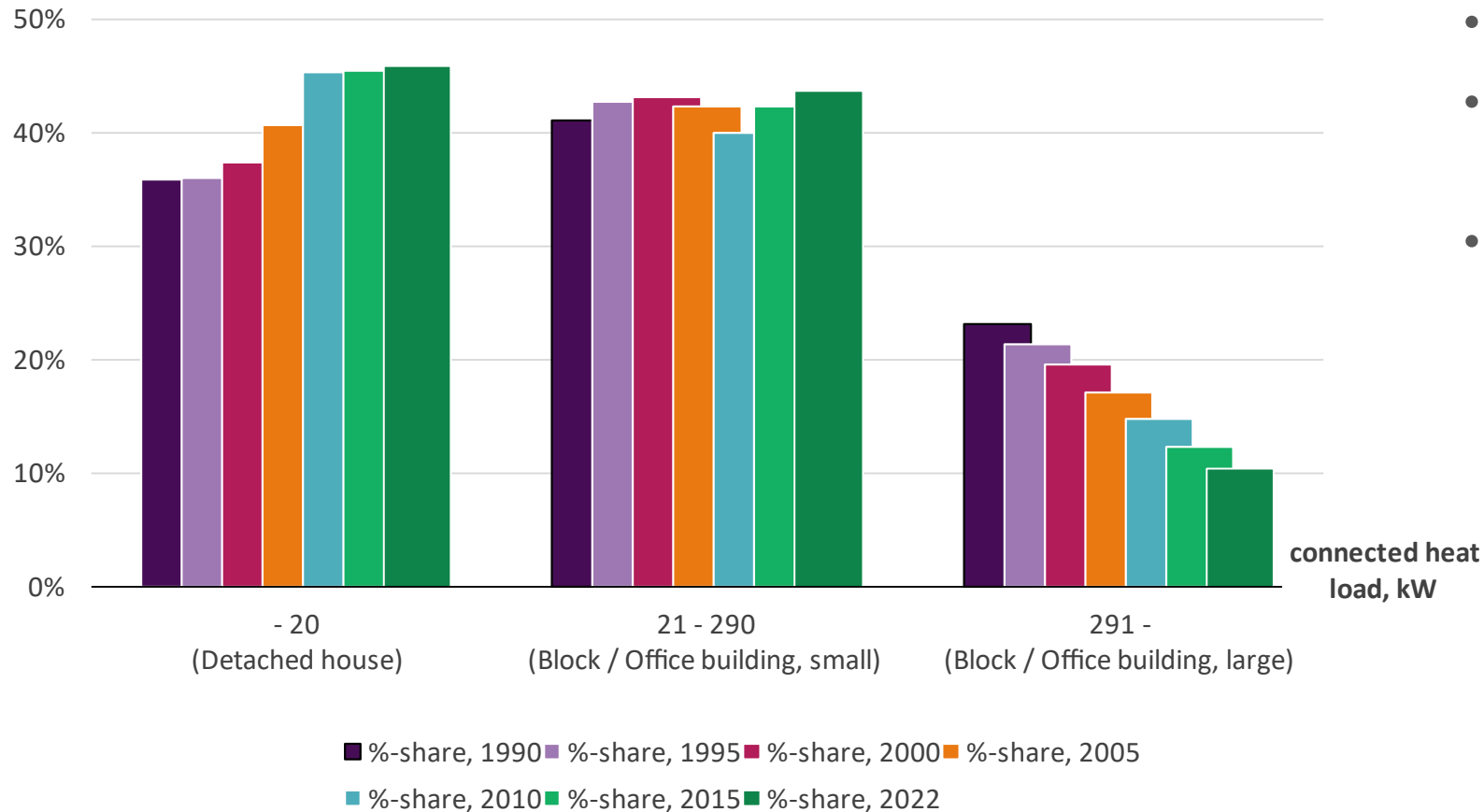


Source: Finnish Energy, District heating prices 07/2022

District heat consumption in 2022

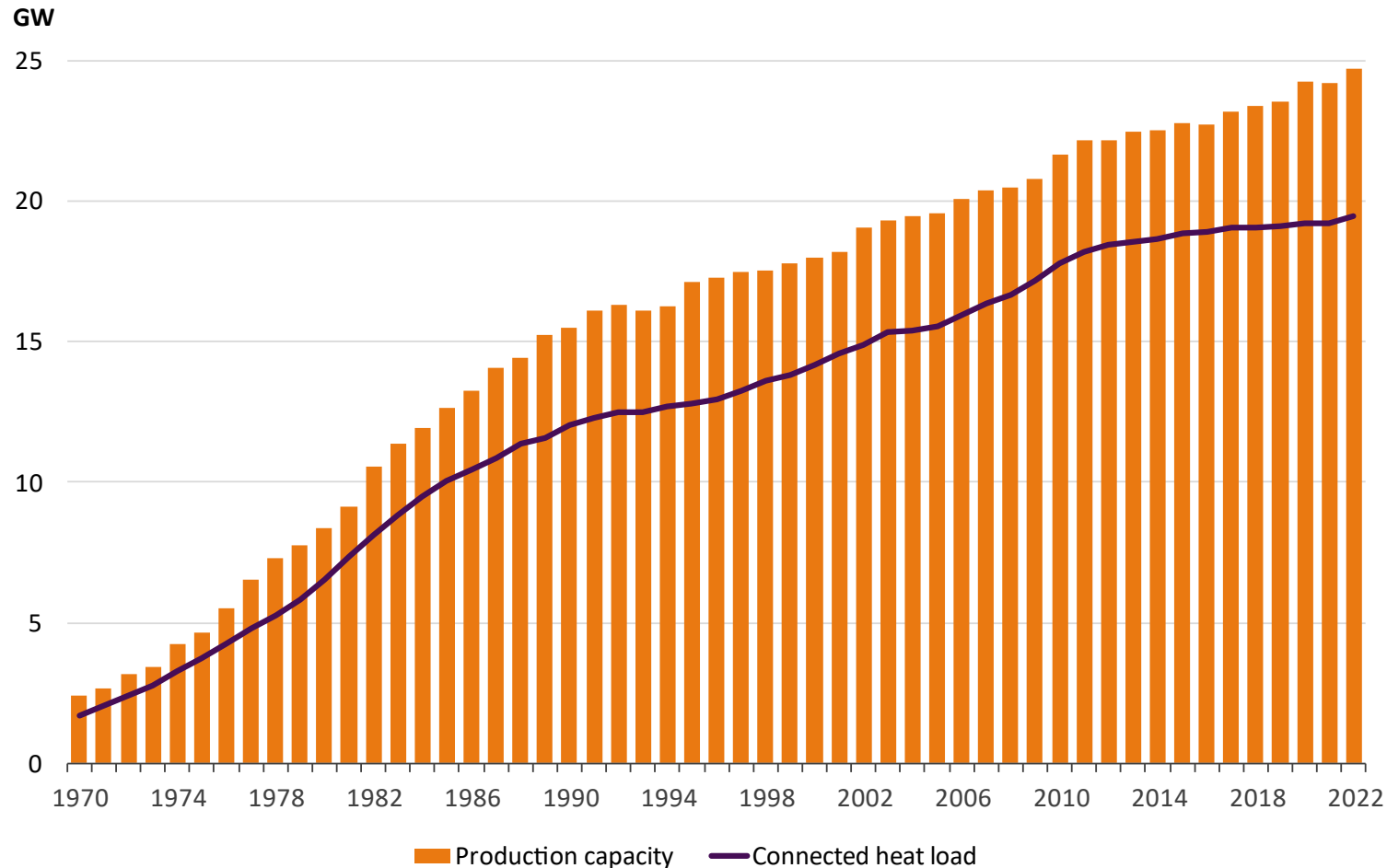


Distribution of customers according to connected heat load

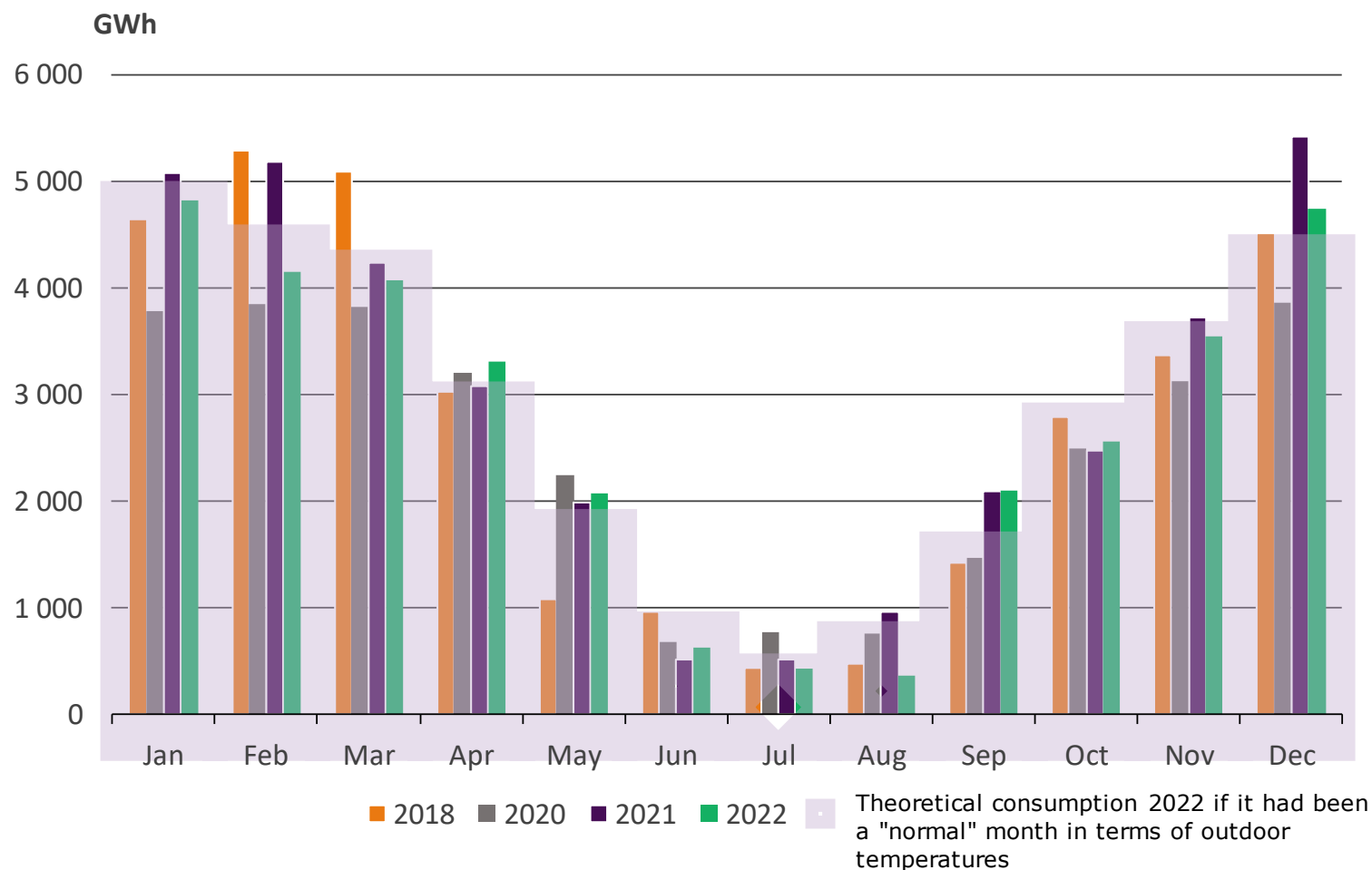


- Number of customers: 160 000
- 120 000 customers in residential buildings
- 2,9 million inhabitants

Production capacity and connected heat load of the customers



Estimated monthly district heat demand



Year 2022 was 0,4 °C warmer than the normal period of 1991-2020

- Only December was colder than normal months during the heating season.
- December was 1,2 °C colder than normal

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