

Energy Year 2022 District Heating

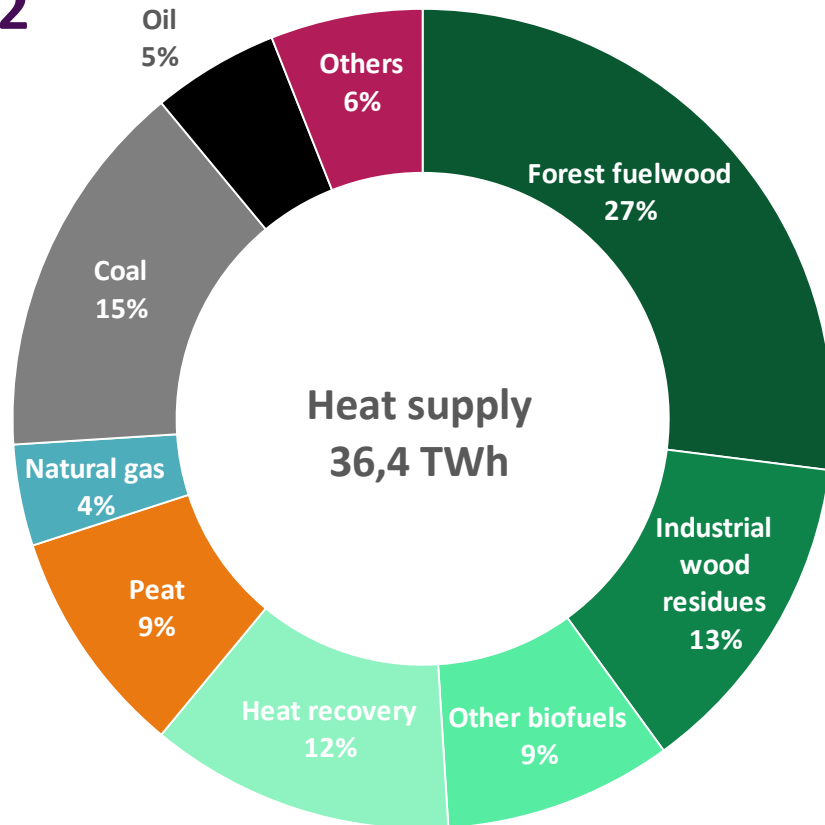
26.01.2022

Finnish Energy

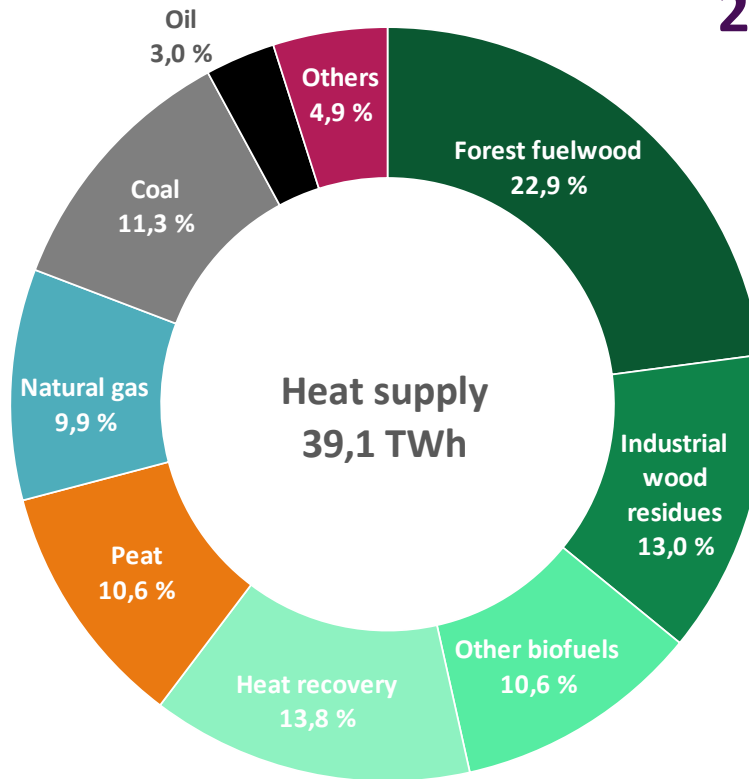
Fuels have changed – fuels imported from Russia have been replaced

Share of renewables and heat recovery increased from 60 percent to 61 percent

2022

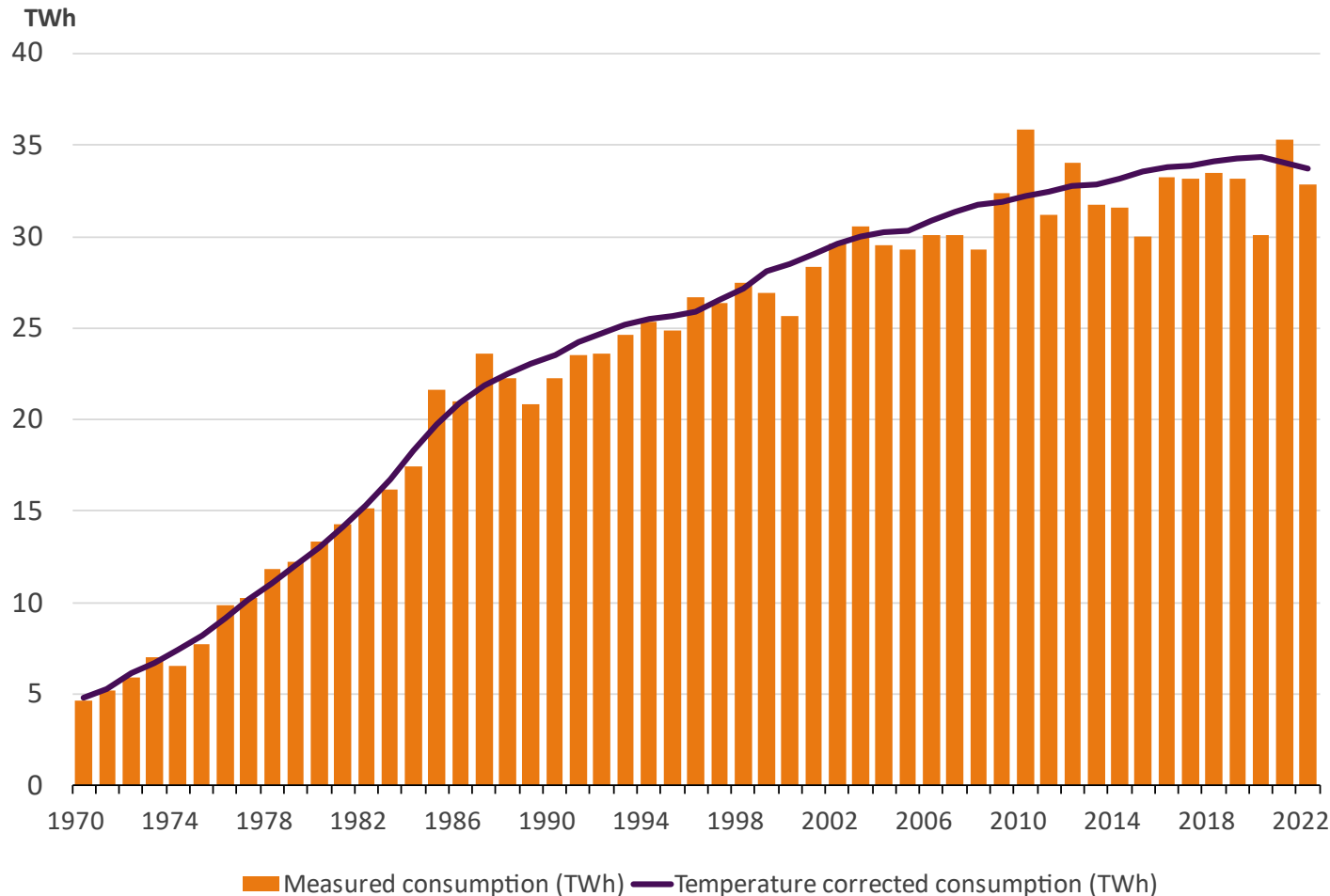


2021



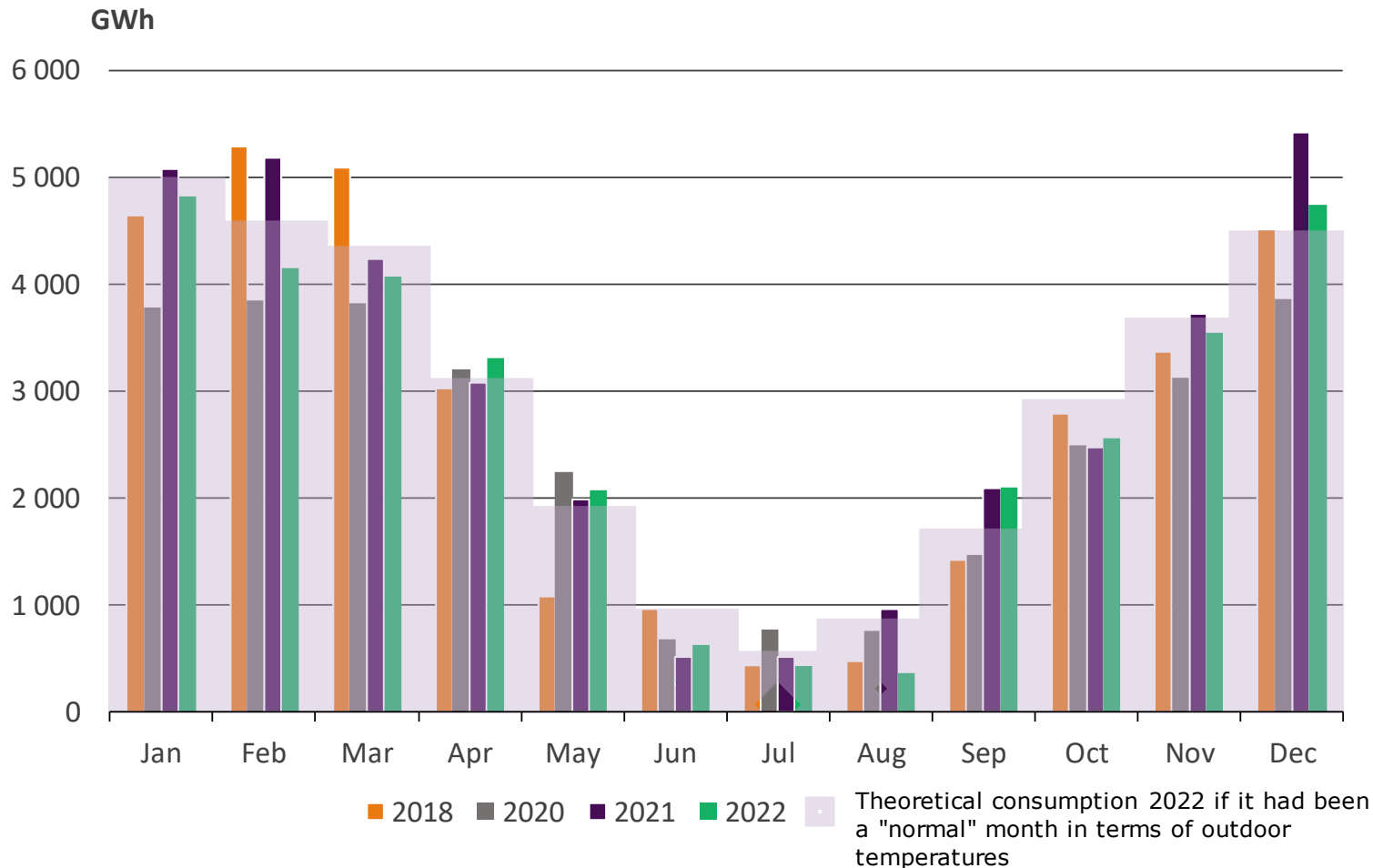
- Recovered (recycled) heat: energy that would otherwise go to waste
- Other biofuels: includes also the bio share of municipal waste
- Other: non-bio share of municipal waste, plastic or hazardous waste, electricity.

Temperature corrected heat consumption decreased from the previous year



- District heat consumption 32,8 TWh
 - The heating season was 0,4 °C warmer than normal year and 1,2 °C warmer than previous year.
- Temperature corrected district heat consumption 33,8 TWh
 - Temperature correction takes into account annual temperature differences.

Monthly district heat demand



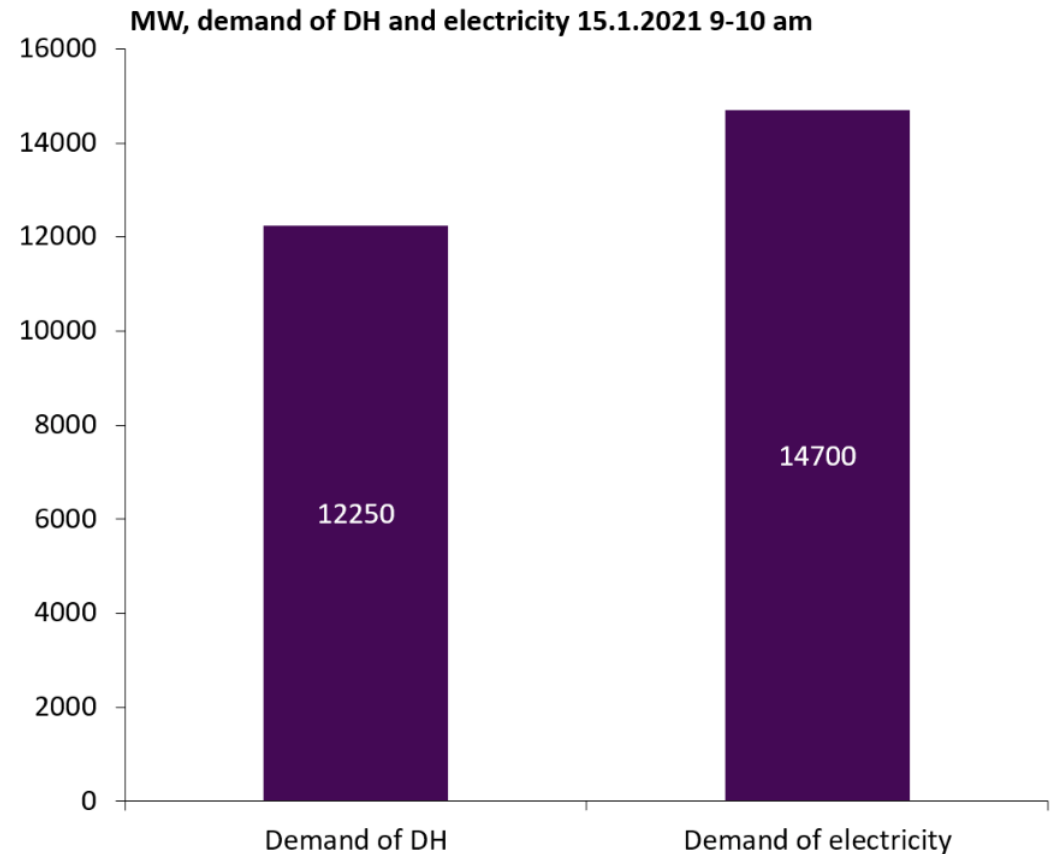
Year 2022 was 0,4 °C warmer than the normal period of 1991-2020

- 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.

Electricity vs heat demand in winter

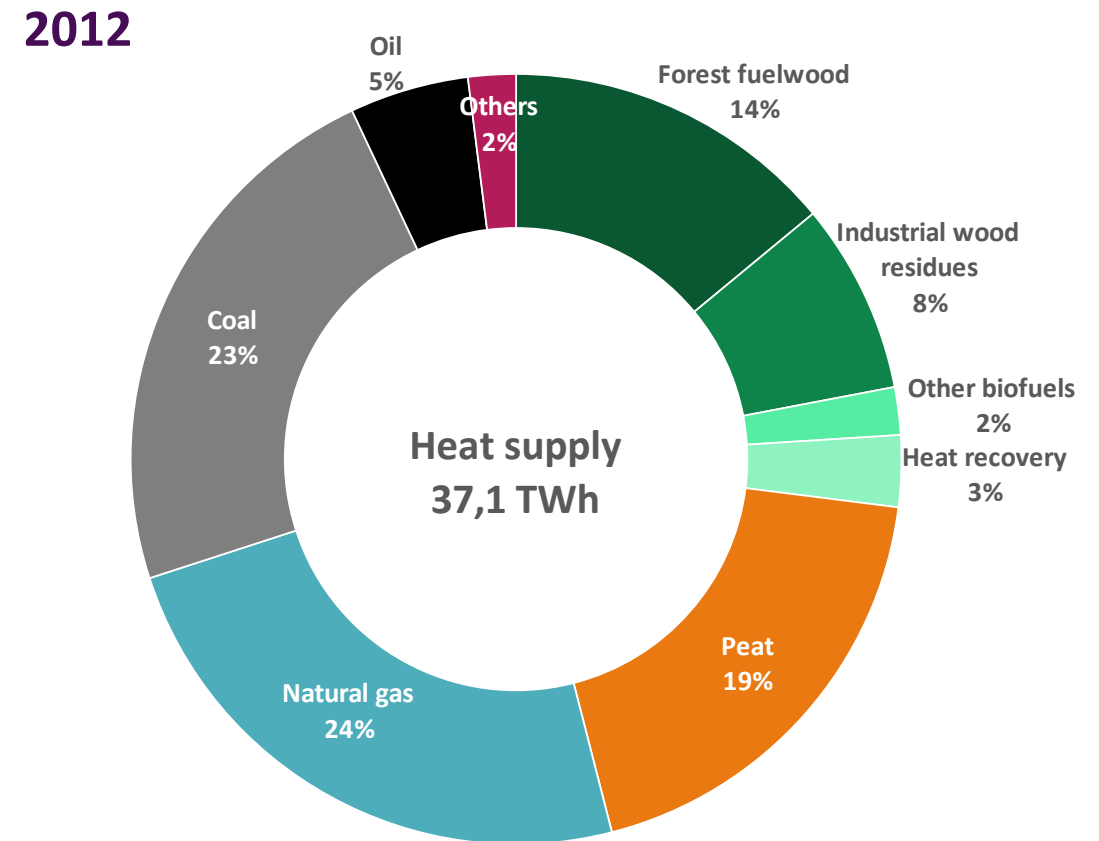
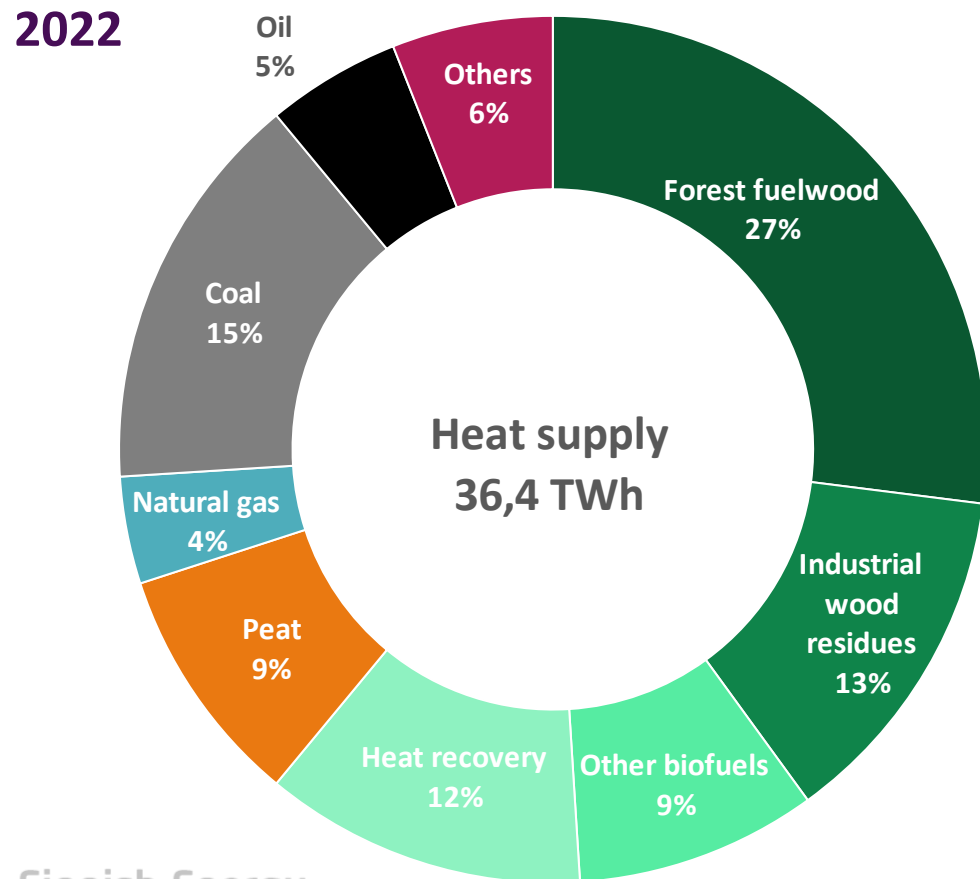
- Demand of district heating (DH) at the time of the peak consumption is about the same magnitude as the demand for electricity. On annual basis the demand of electricity is higher than DH (ca. 85 TWh vs. 35 TWh)
- Combined Heat and Power (CHP) plants produce a significant amount of electricity (3 000 MW) while producing heat.
- District heating reduces electricity demand peaks, in addition to electricity production



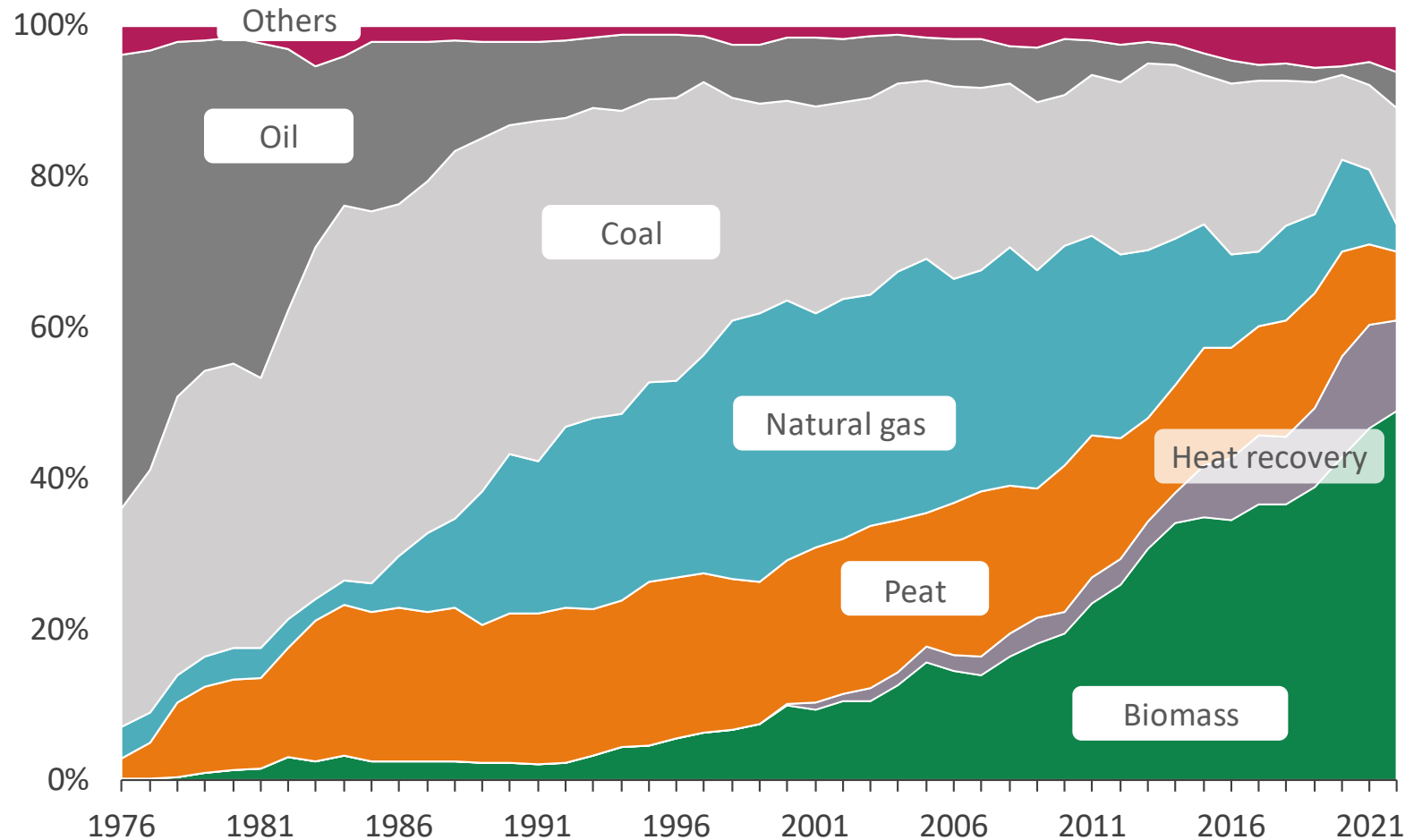
CO₂-neutral district heating at high level

Share of renewables has almost doubled and share of heat recovery has more than tripled during last ten years

Share of renewables has increased from 24 to 49 percent and heat recovery from 3 to 12 percent



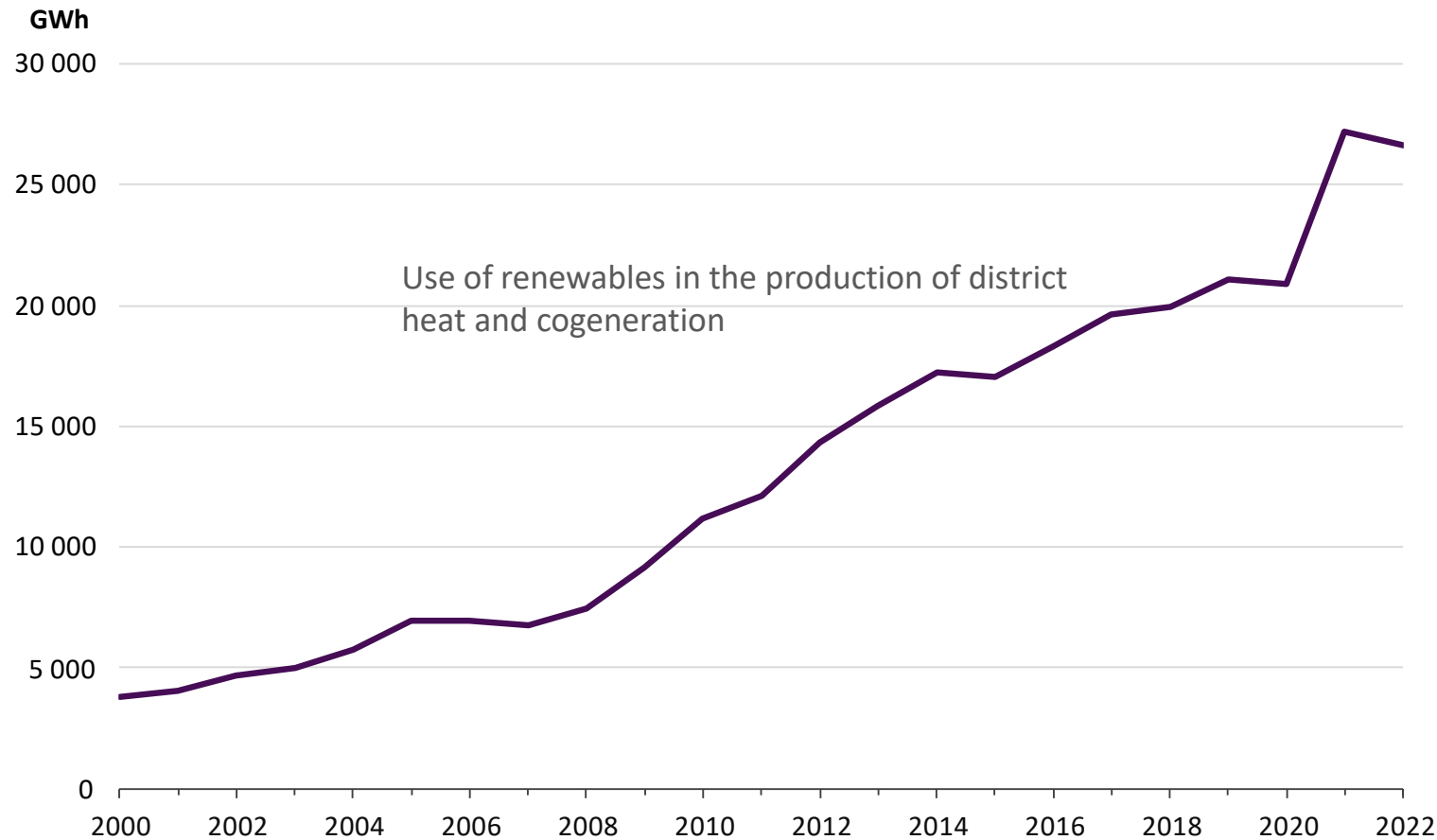
Share of renewables and recovered heat well more than a half in district heat supply



- Fossil fuels have increasingly been replaced by biomass and recovered heat.
- Use of biomass has more than doubled during last decade.
- Amount of recovered heat has more than tripled since 2010. Recovered heat consists mainly of waste heat. Fuel consumption is avoided by making use of surplus heat.

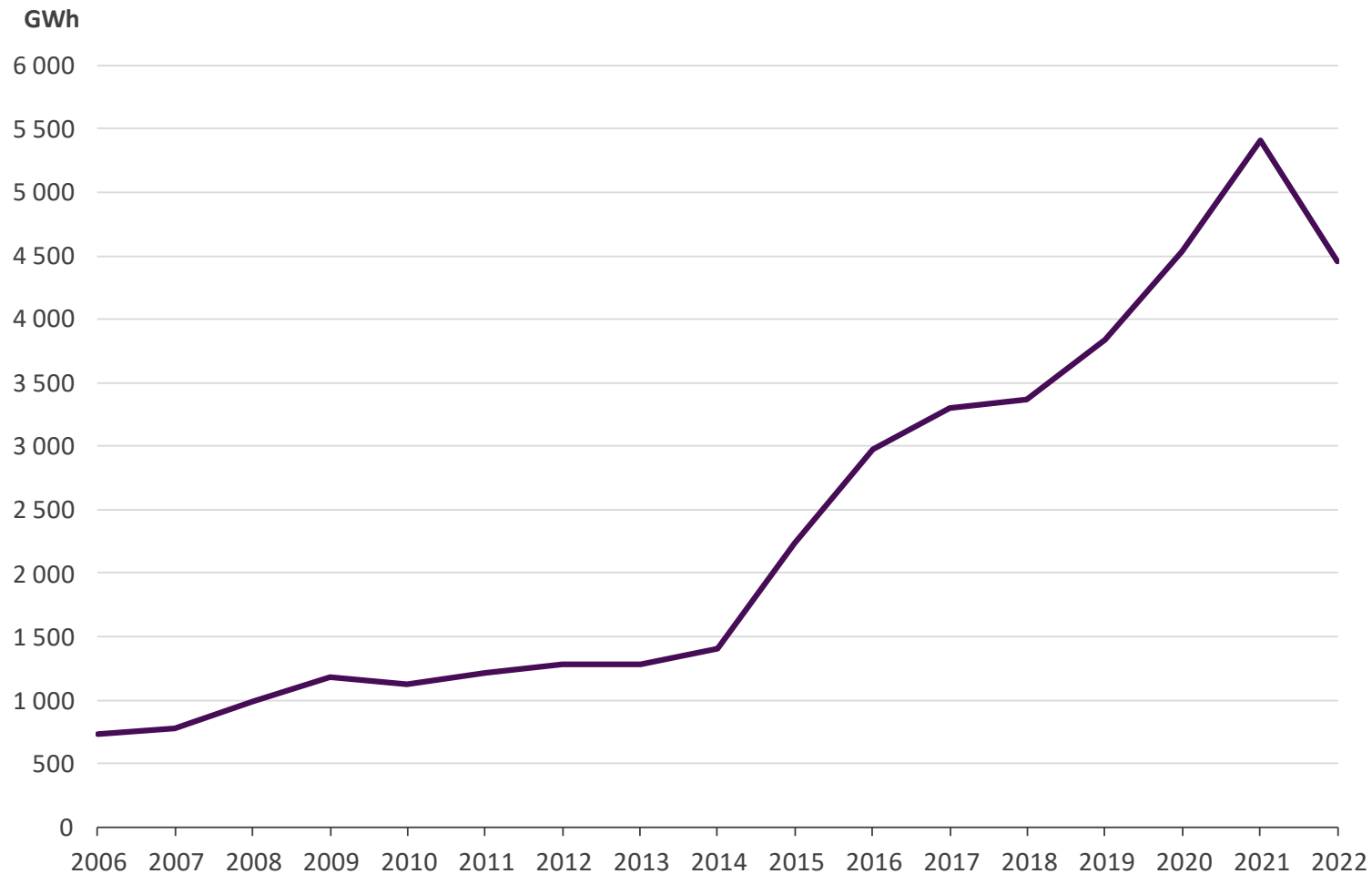
The use of renewables decreased

The reason is the smaller heat demand and the end of fuel imports from Russia



- In municipalities where district heating is provided
 - 75 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, bio share of municipal waste, biogas, biofuel oil.

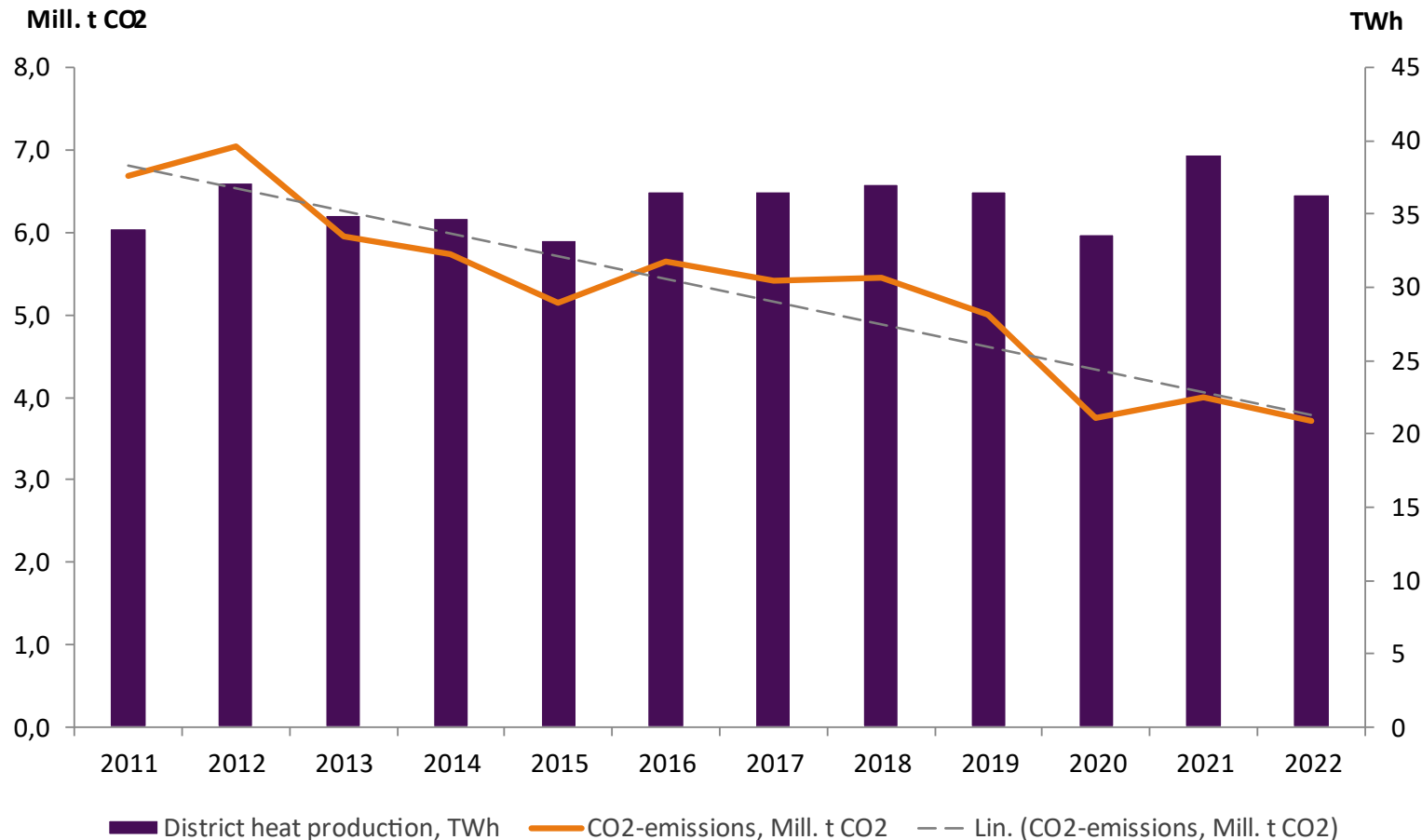
Expensive electricity reduced the use of heat pumps



- Recovered heat consists mainly of waste heat and heat pumps
- High electricity prices and lower heat demand than in 2021 reduced the use of heat pumps
- 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.

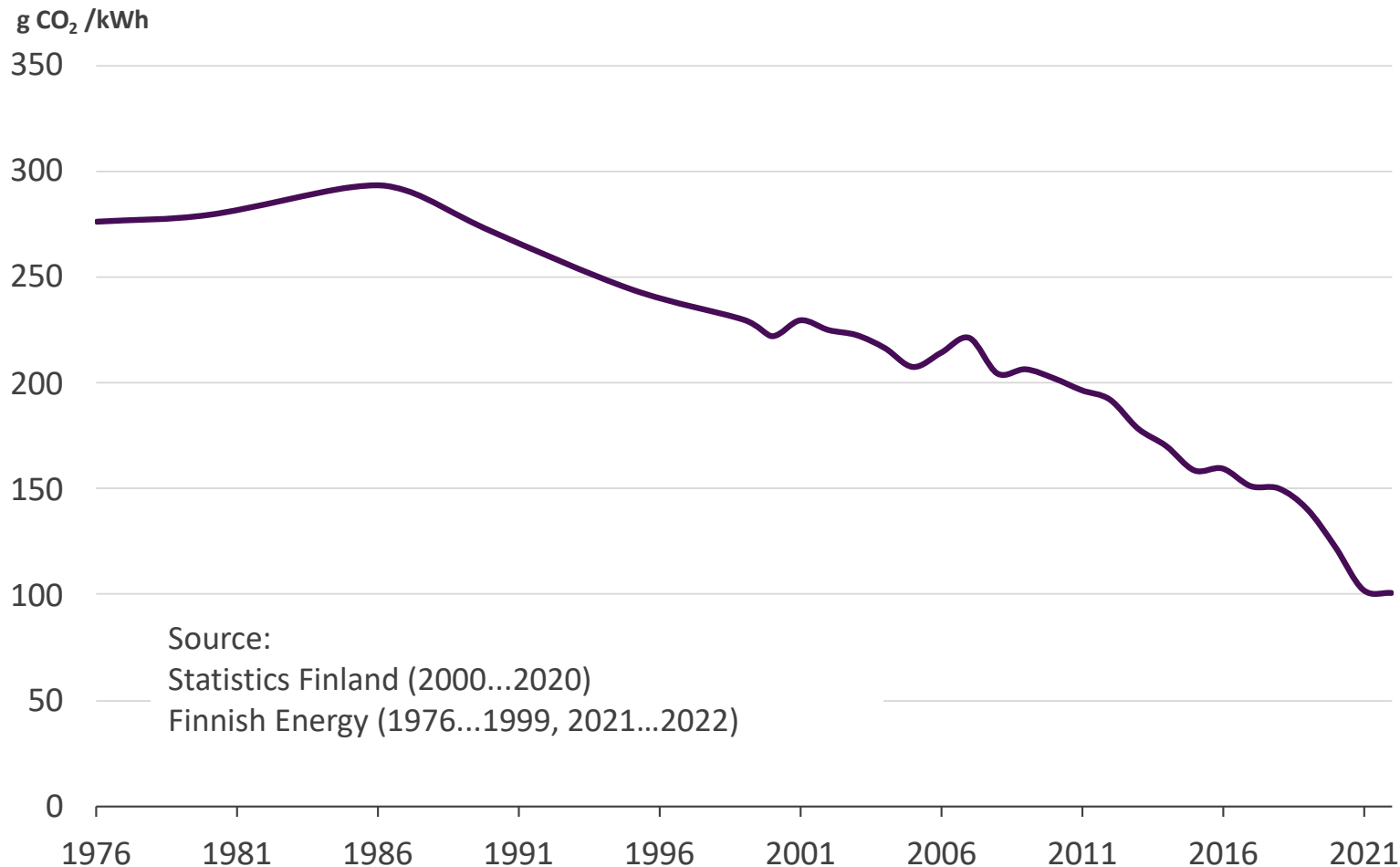
The trend of district heat emissions is strongly declining

CO₂-emissions from district heat production decreased by 7 %



- CO₂-emissions from district heat production in 2022 were 3,7 Million tons and decreased by 7 % from the previous year

Specific CO₂-emissions from district heat production have decreased by 47 % during the last ten years

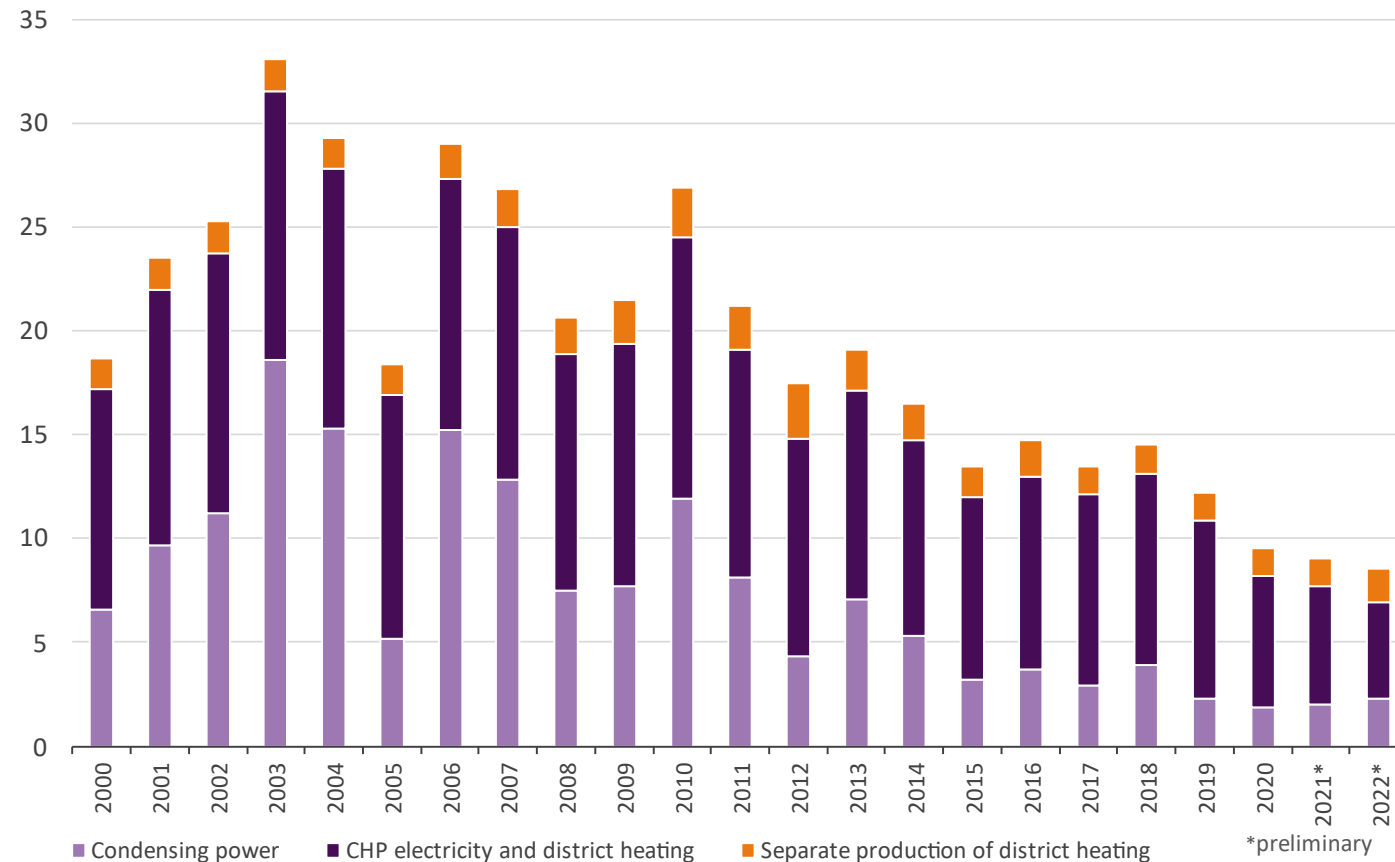


- Specific emissions from district heat production in 2022 were 102 gCO₂/kWh^(*), which
 - Decreased by 0,3 % from the previous year
 - Decreased by 47 % during the last ten years

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

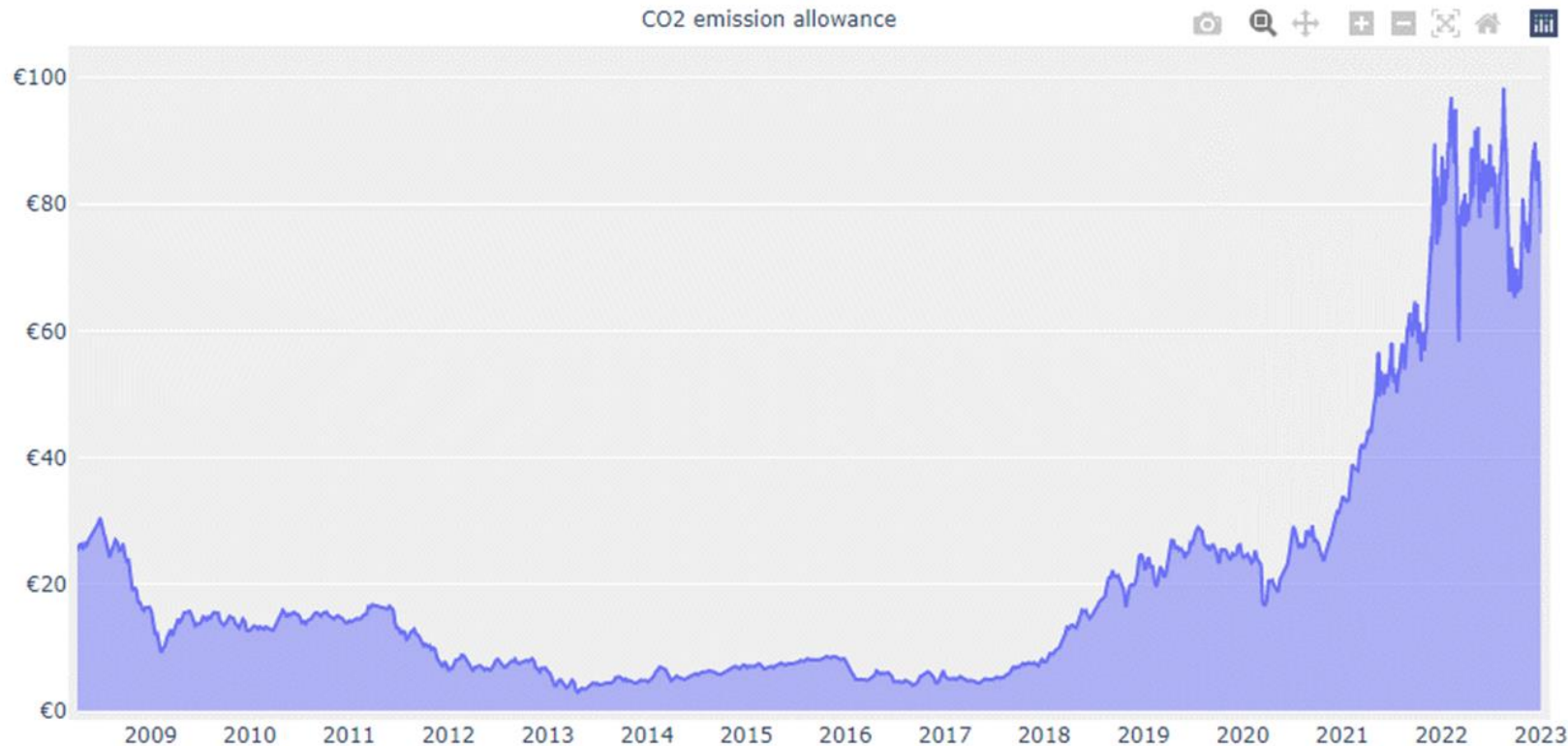
The CO₂-emissions from Finland's energy production are decreasing

million t CO₂



- CO₂-emissions of electricity and district heating production 8,6 million tons in year 2022
- Emissions have declined 74 % compared to 2000s highest emission year 2003

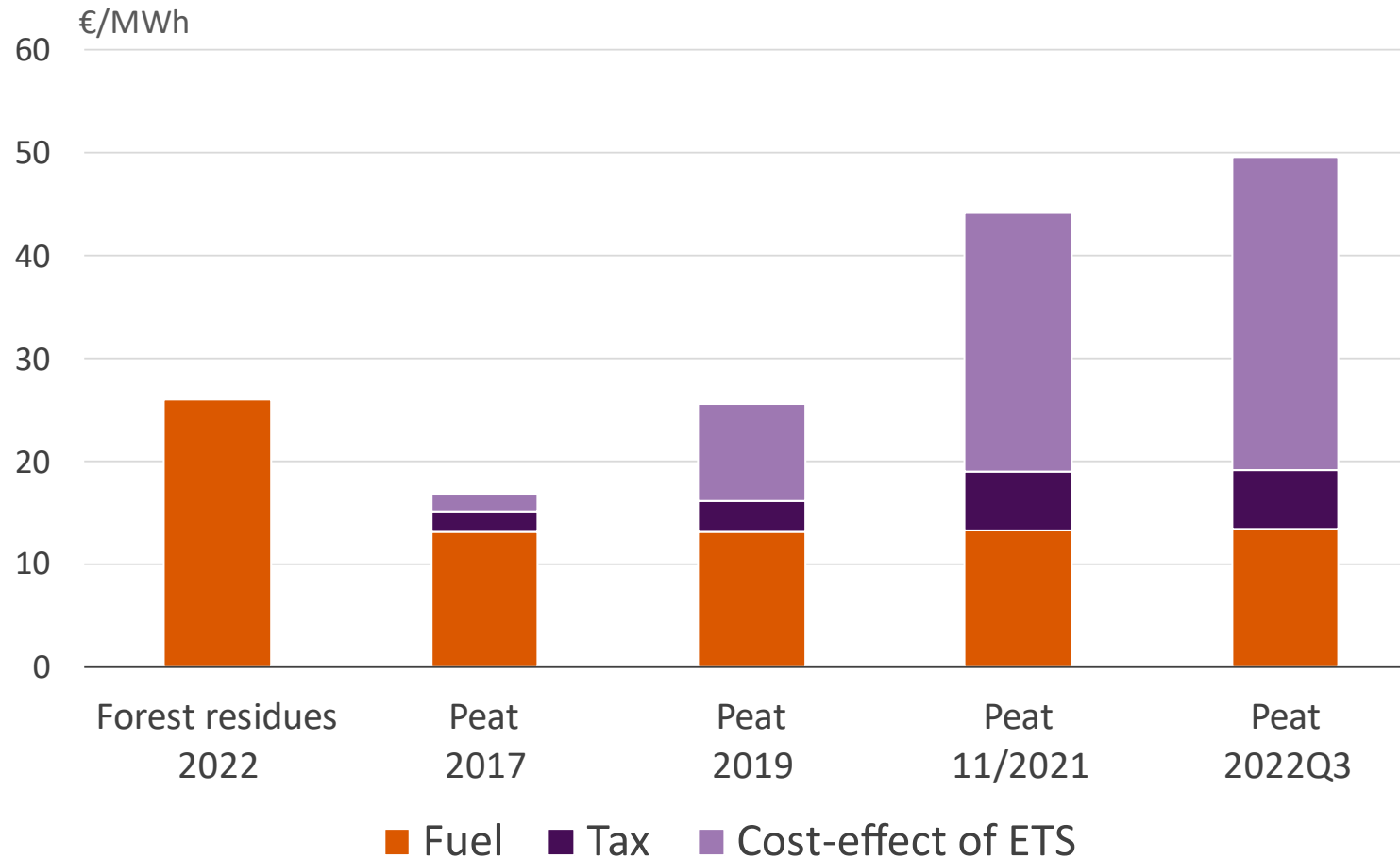
EU's commitment to emission reductions is reflected in allowance prices



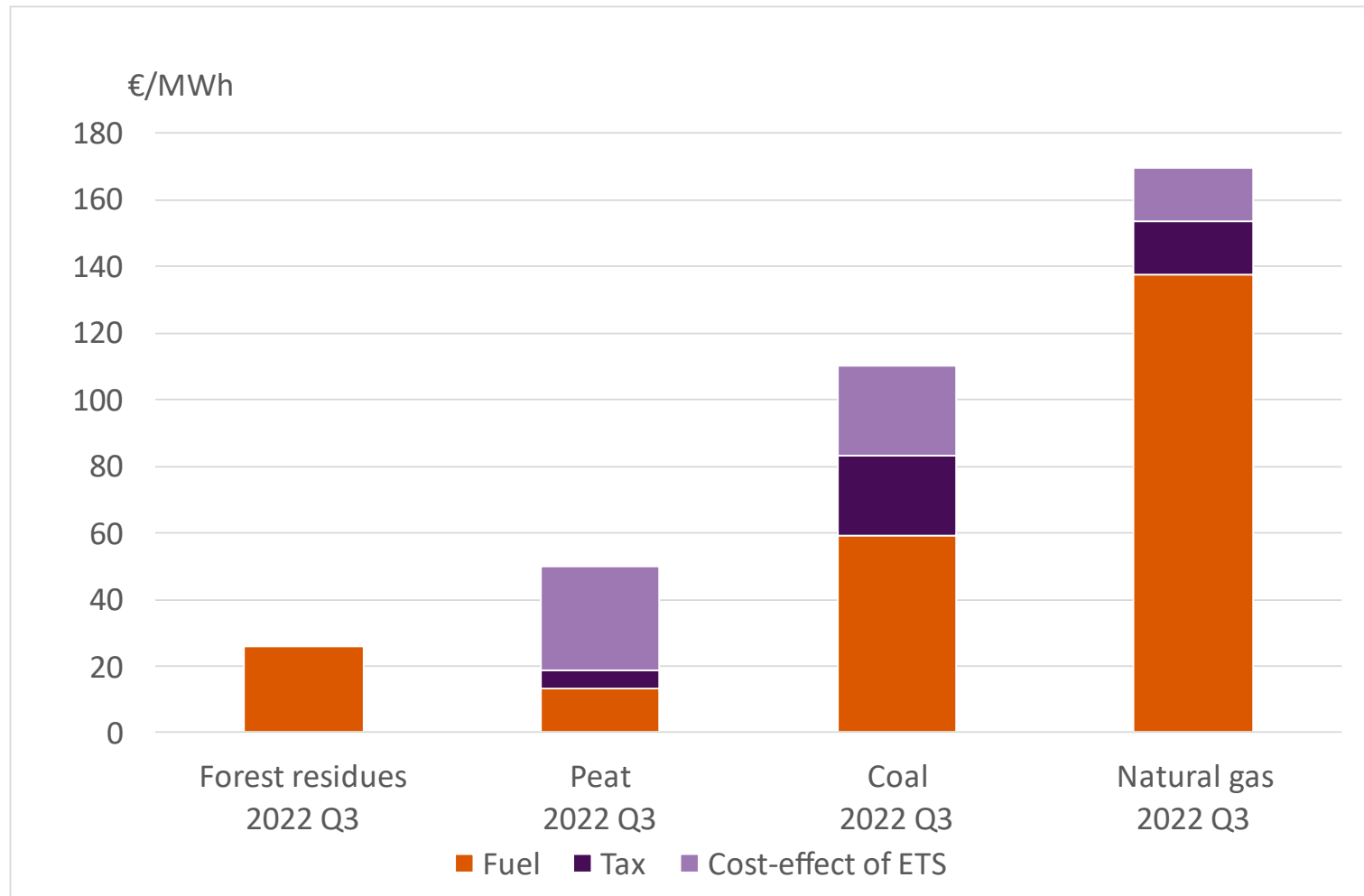
- Increases the production costs of energy produced with fossil fuels.
- High emission cost increases the competitiveness of emission-free district heat

Source: <https://sandbag.be/index.php/carbon-price-viewer/>

Cost-effect of ETS and taxes increase the price of fossil fuels and peat

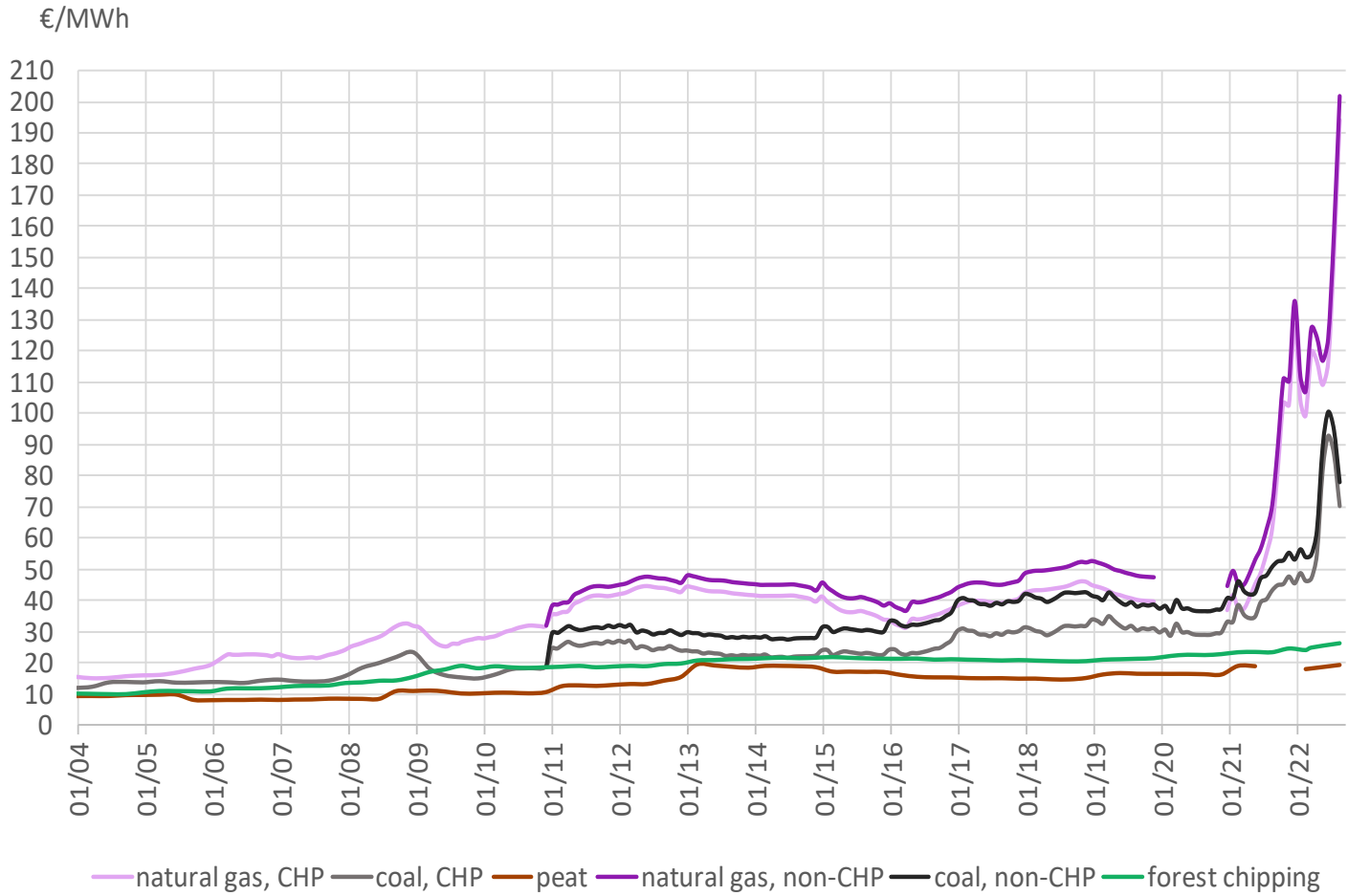


The prices of imported fuels have been high



- Average prices from July-September 2022

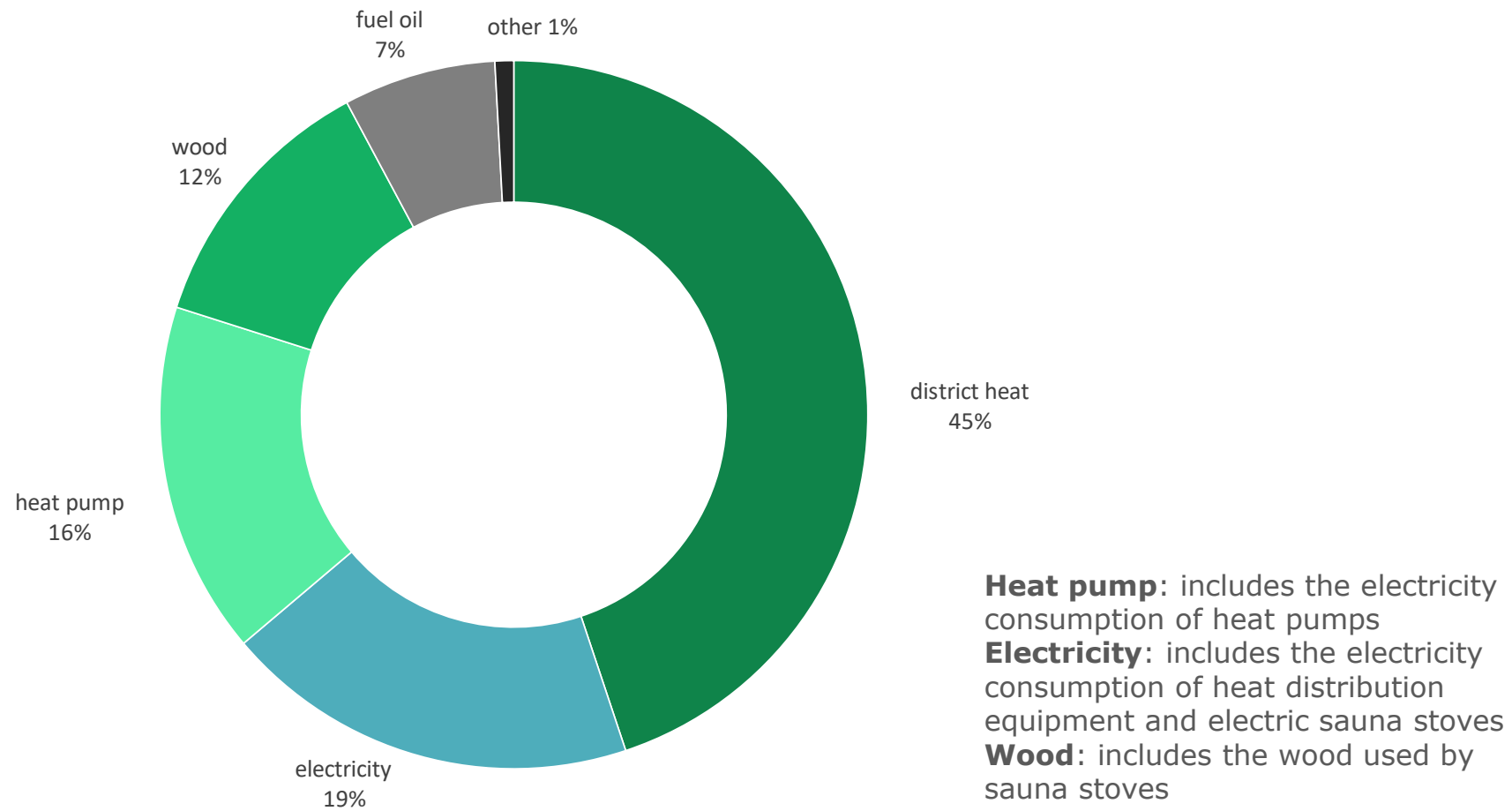
Development of power plant fuel prices



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

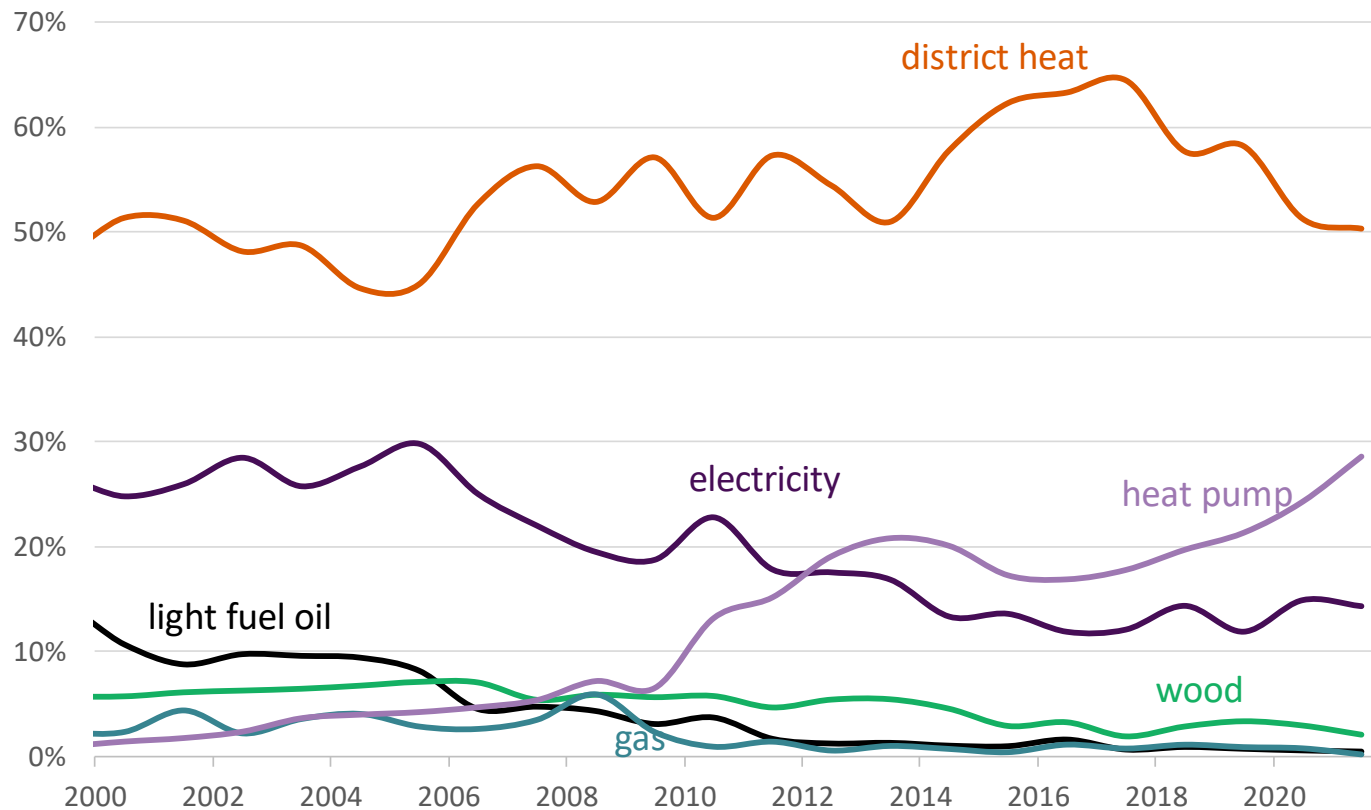
Market share of space heating 2020

Residential, commercial and public buildings



Source: Statistics Finland

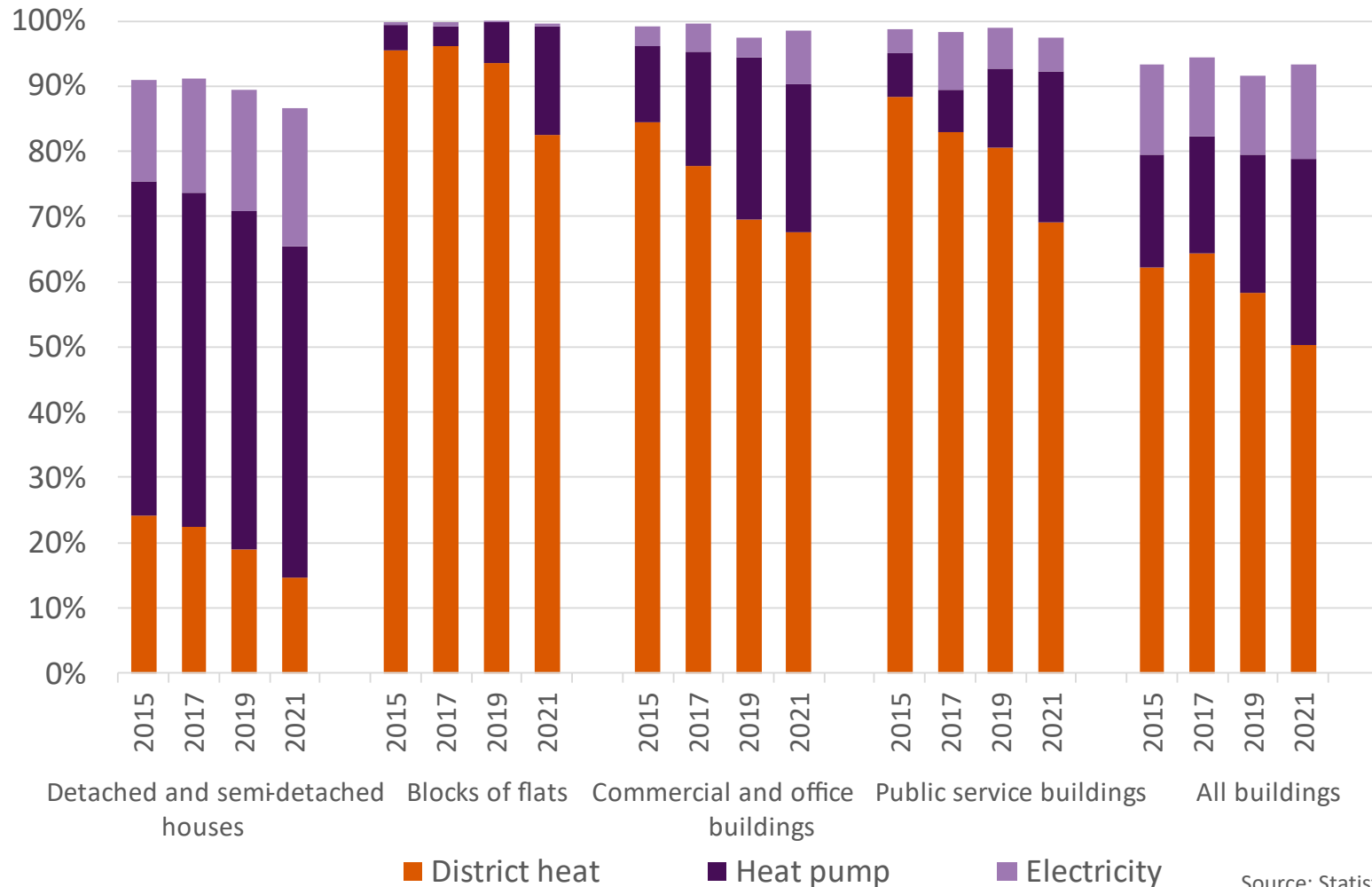
District heating is the most popular method of heating in new buildings



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

- Market share of district heating in 2021
 - All buildings 50 %
 - Residential buildings 54 %
 - Blocks of flats 83 %
 - Detached and semi-detached houses 15 %
- Office buildings 84 %
- Public service buildings 69 %
- Commercial buildings 58 %
- Industrial and mining and quarrying buildings 48 %
- Warehouses 38 %

Main heating method in new buildings

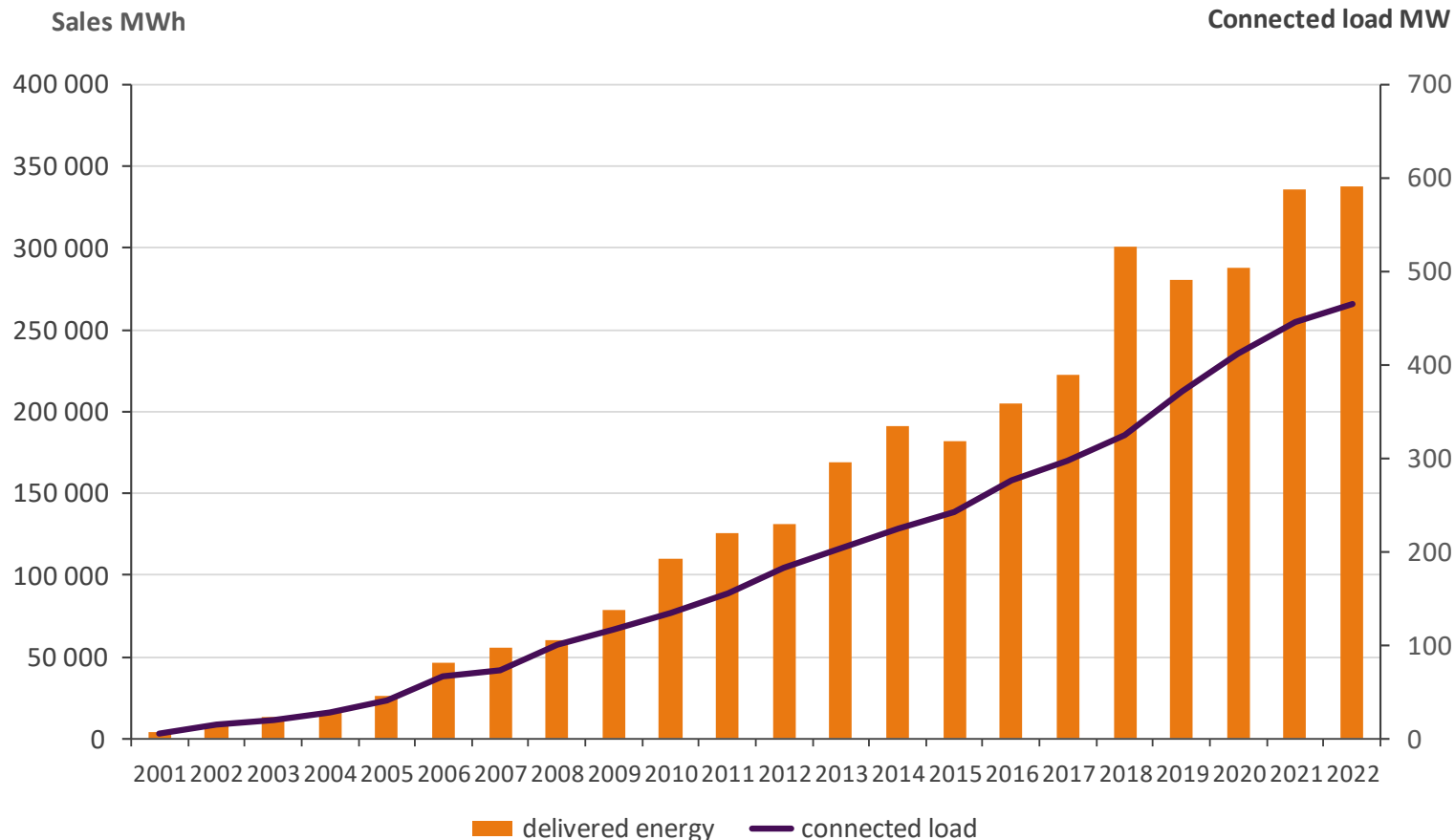


Source: Statistics Finland, Granted building permits (heated cubic volume)

**District cooling is cost-effective
and environmentally friendly**



District cooling business continues to expand

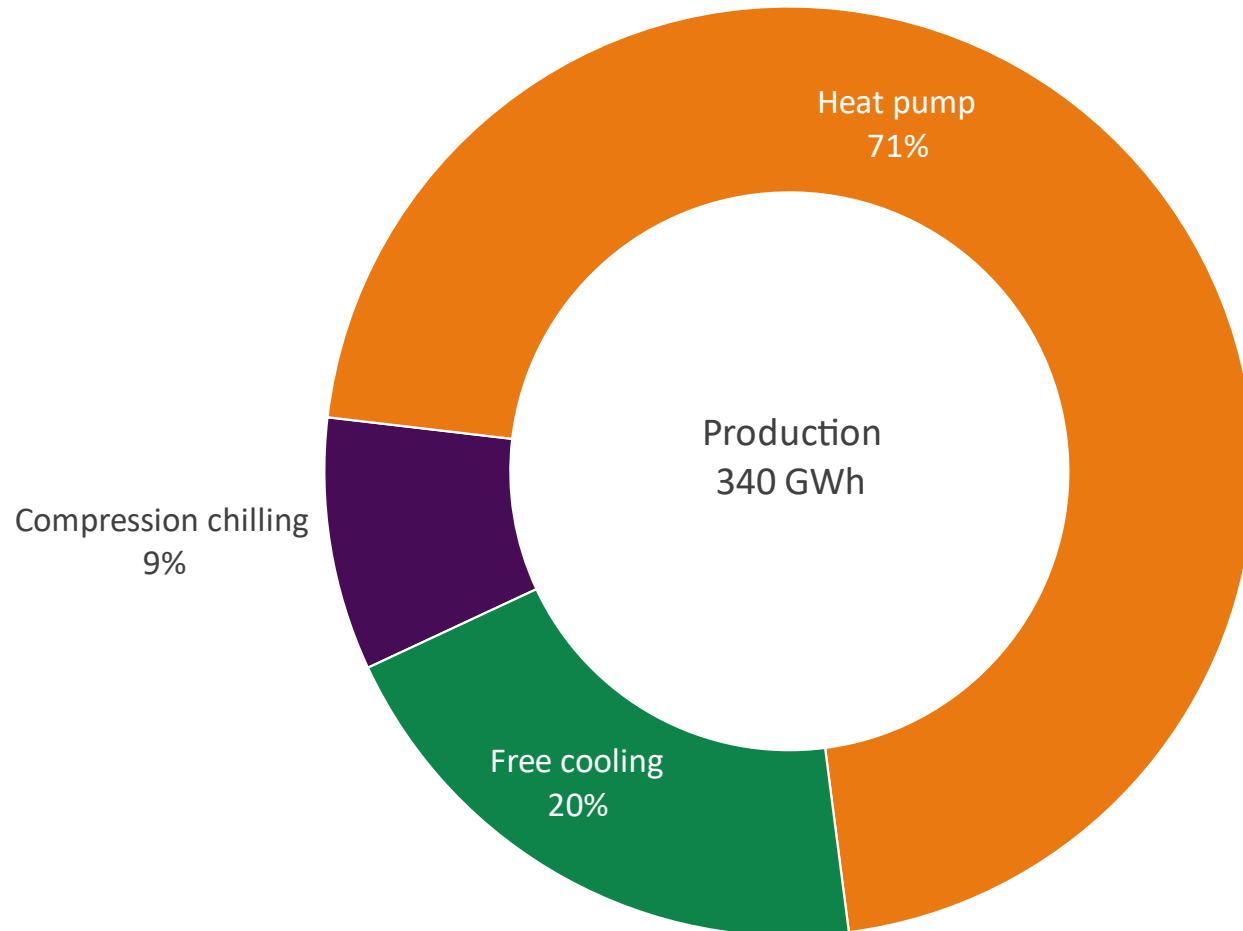


- District cooling sales increased by 1 % from the previous year
- Connected load increased by 4 %

Energy companies which sold district cooling 2022:

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

Energy efficiency with district cooling



- 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.