



Future Trends in Finnish District Heating

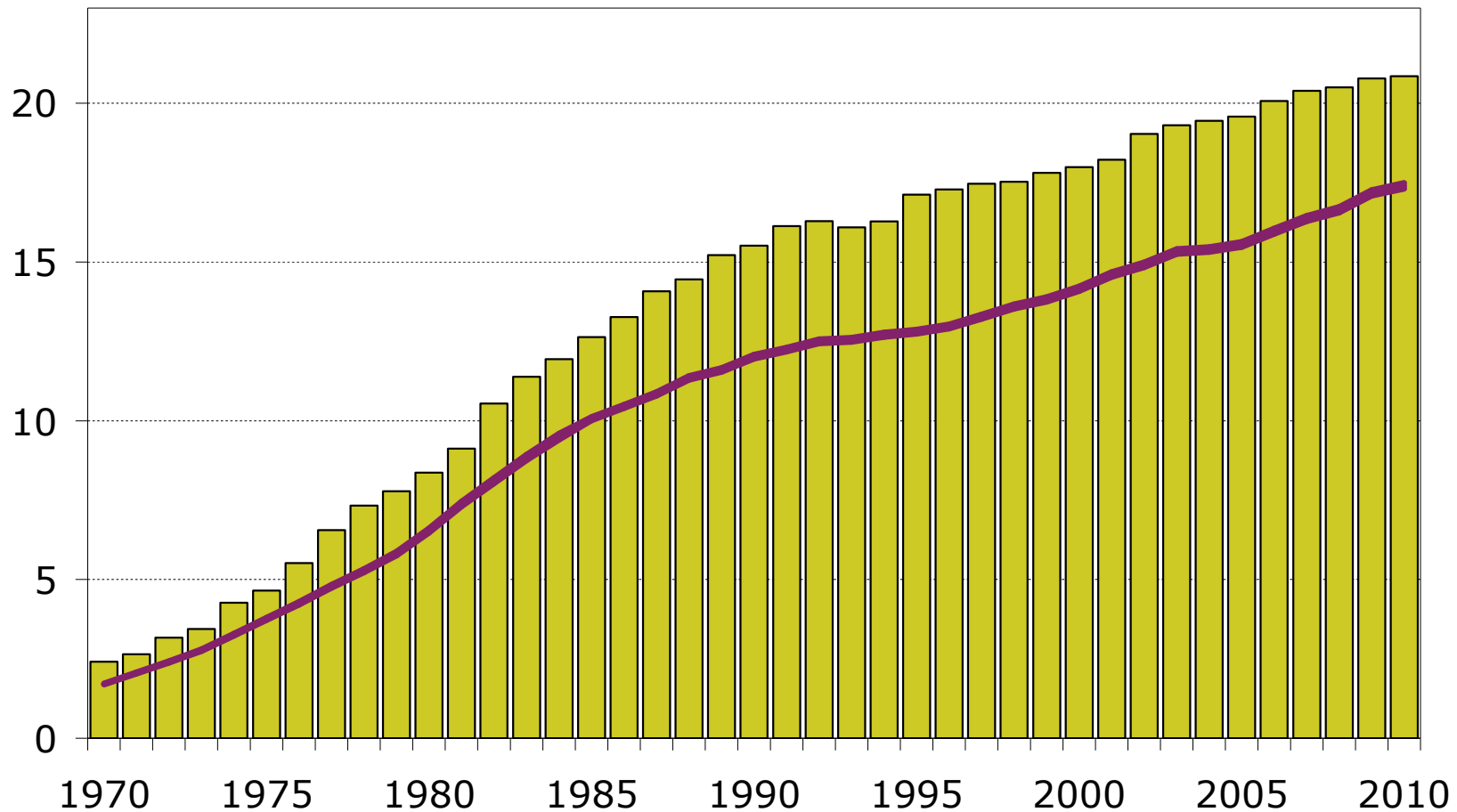
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District heating and cooling 2010

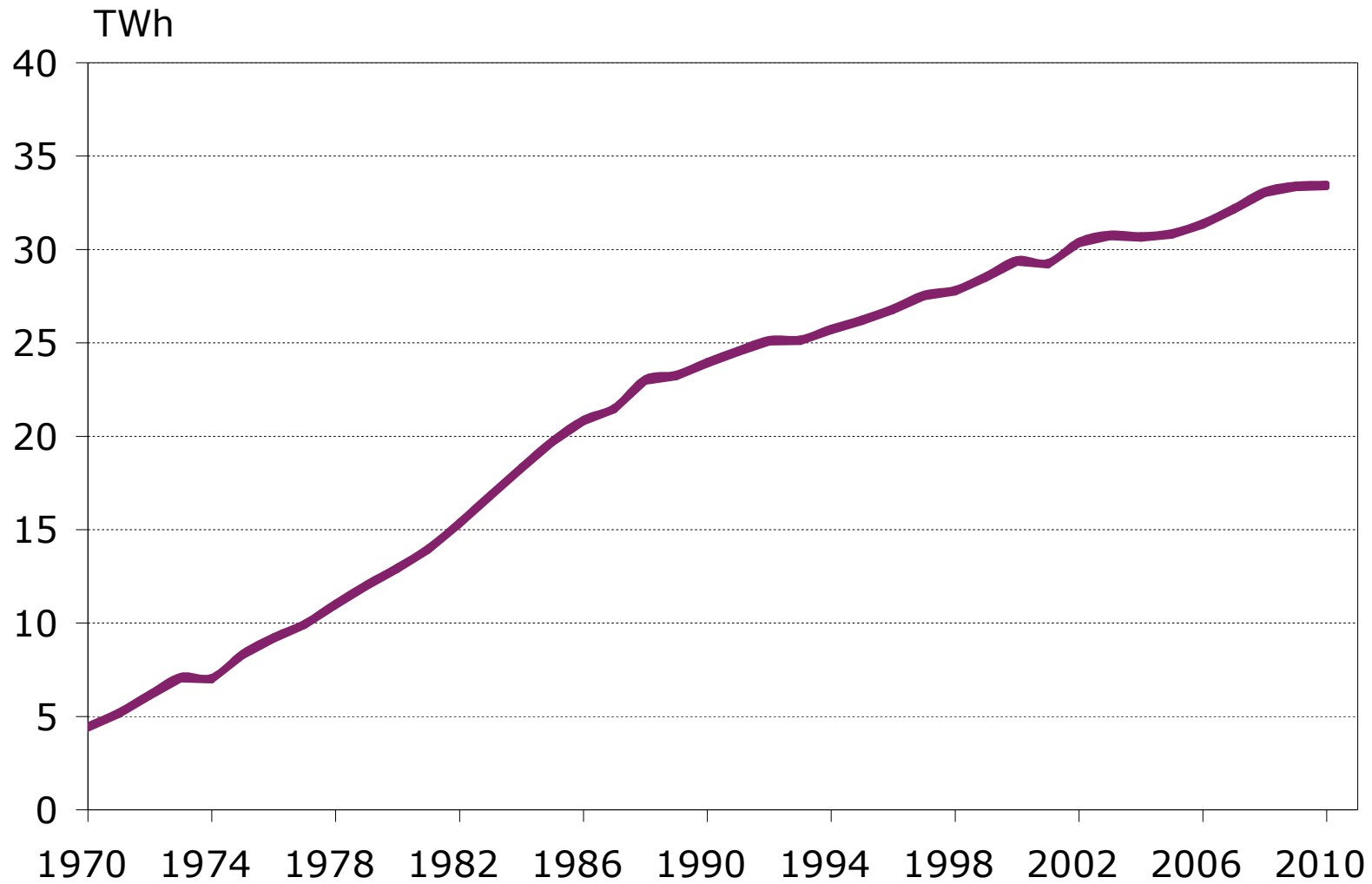
- Heat sales (incl. taxes) 1 970 mill. €
- Sold heat energy 35,8 TWh
- Average price of DH (incl. taxes) 5,51 c/kWh
- Inhabitants in DH apartments 2,6 mill.
- Market share of district heat 49 %
- Sold district cooling energy 110 GWh

Production capacity of district heat and connected heat load of the customers

GW

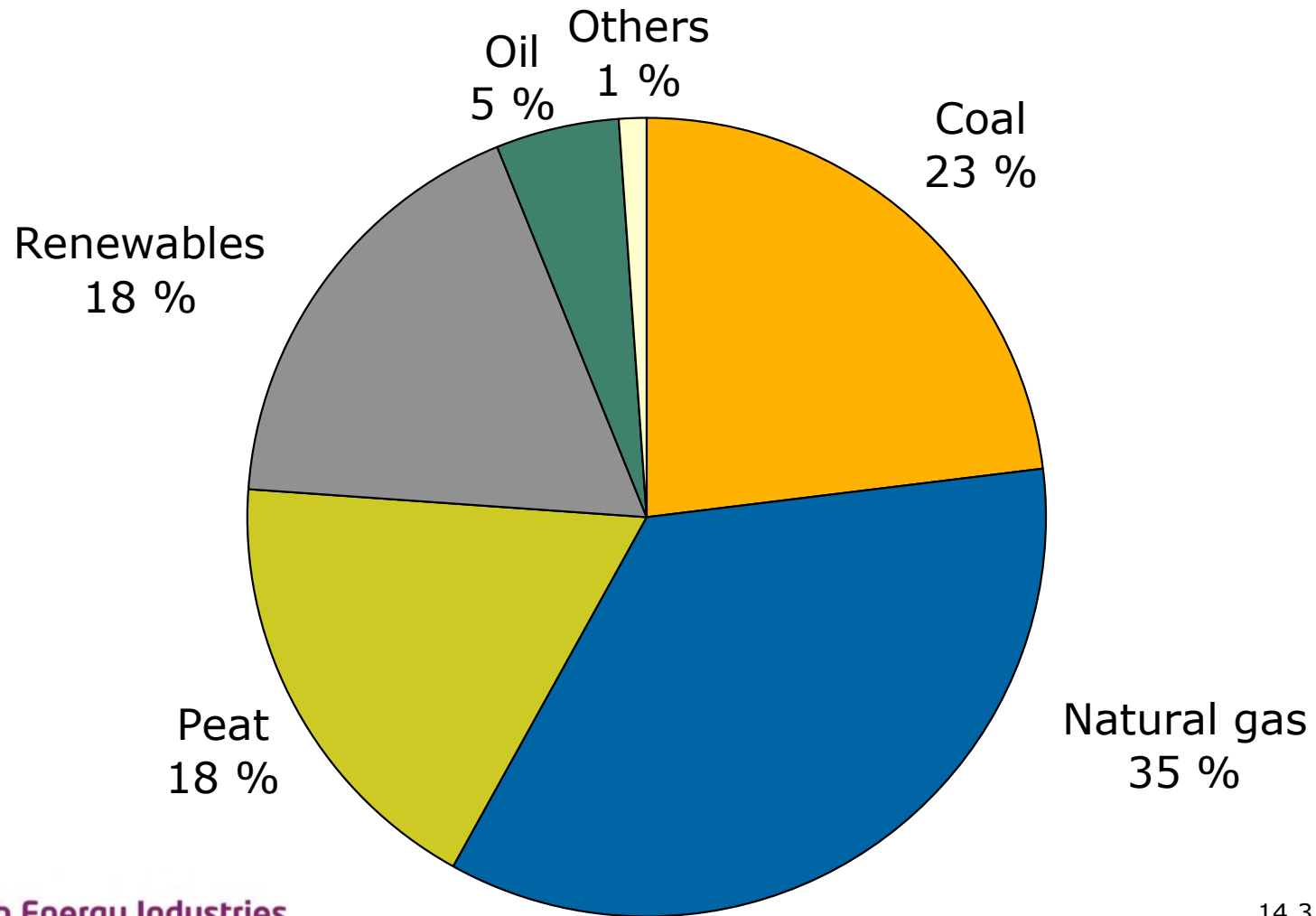


Temperature corrected district heat consumption, TWh

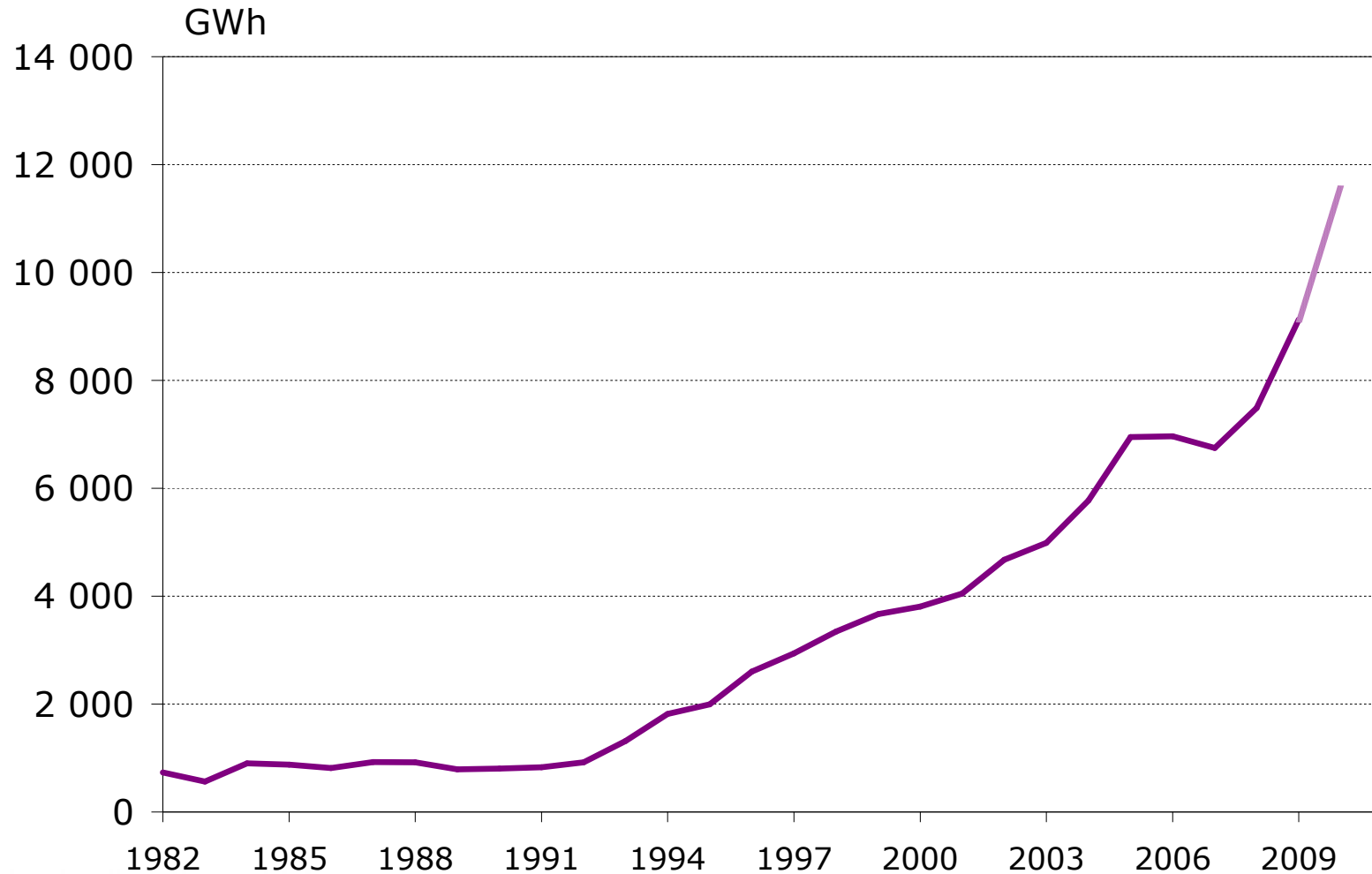


Fuel consumption in production of district heat and CHP 2010

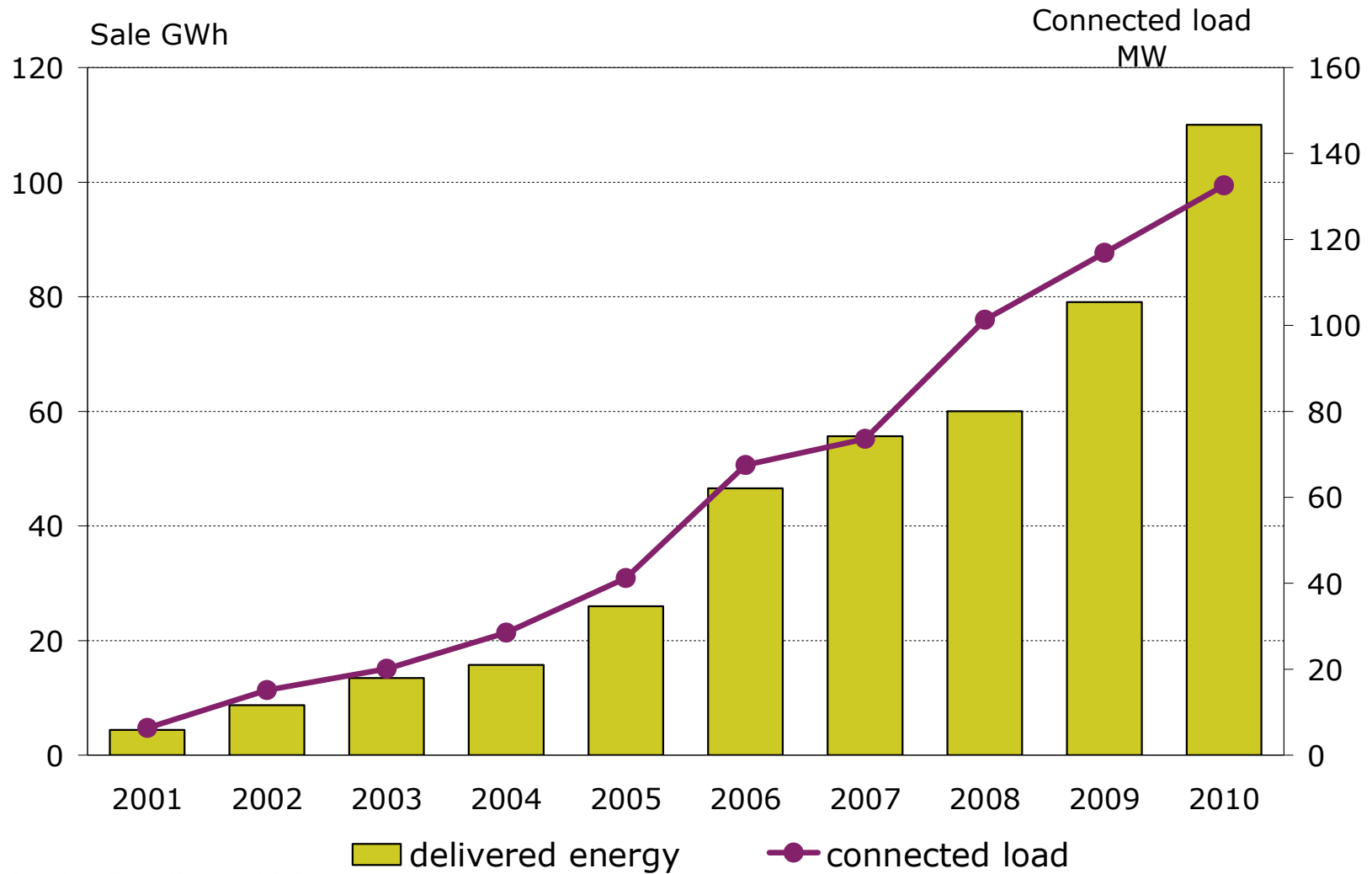
- fuel consumption 64,3 TWh



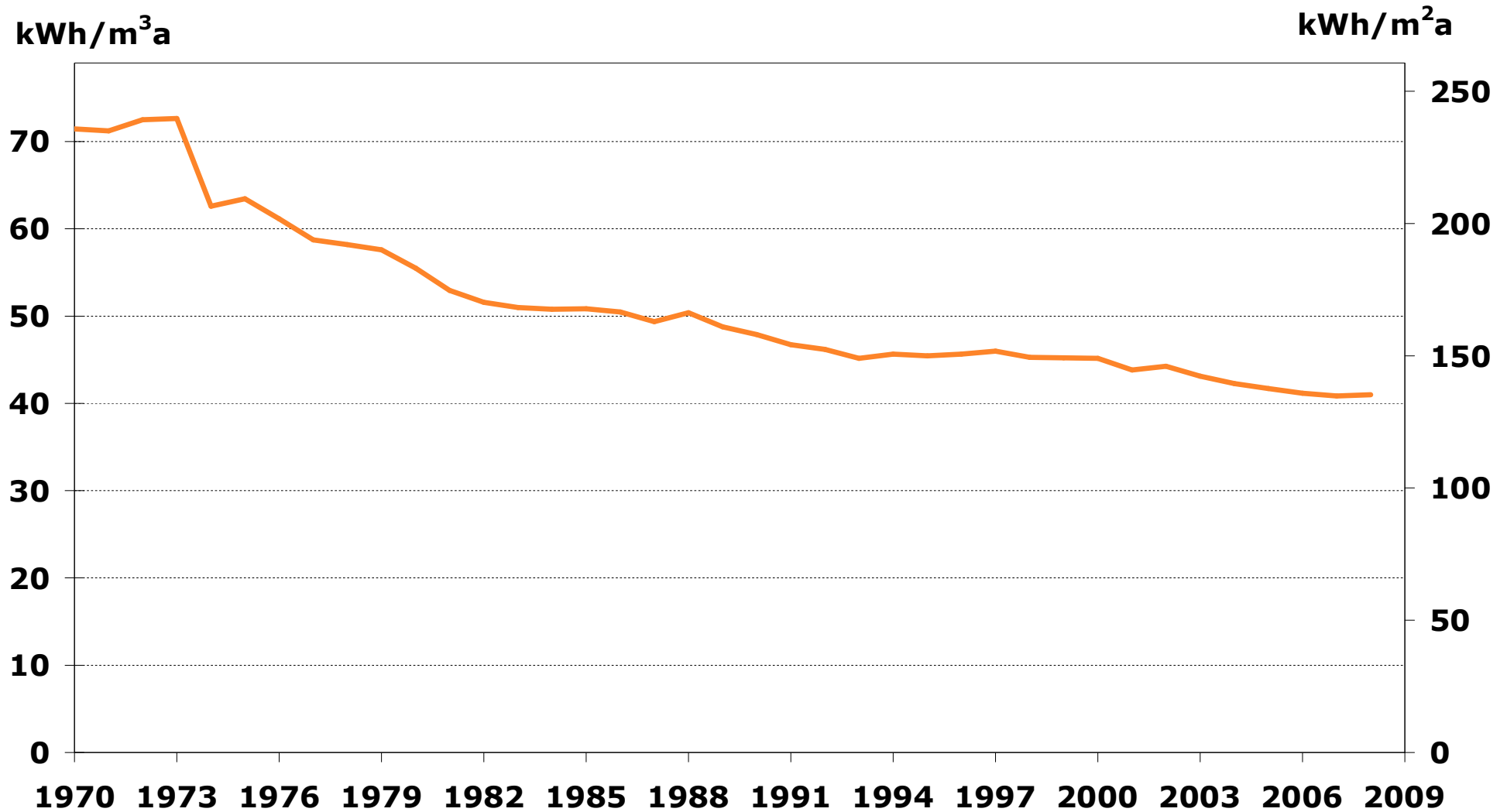
Domestic renewable energy sources in production of district heat and CHP



District cooling – delivered energy and connected heat load



Specific heat consumption in district heated buildings incl. energy for heating hot tap water



Key factors for change of DH business in Finland

External factors	Internal factors
<ul style="list-style-type: none">• Climate change• Emissions reduction• Renewables• Energy efficiency of buildings• Emission trading (CO2)• Volatility of fuel prices and raw materials• Regulation of energy sector• IE-Directive• Energy taxation• Increased competition• Continuation of industrial production• Growth of population	<ul style="list-style-type: none">• Production investments• Ownership policy• New development areas bring growth• Hybrid systems• Change of attitudes is needed• Pricing• Innovations• Services• Customership

FEI's Carbon Neutral Vision 2050: Energy use in buildings / Role of DHC

- Building codes and warming climate decrease specific heat demand of buildings substantially
- Need for heating energy will diminish by 30 % by 2050, the same time heated floor area will increase by 50 %
- Demand for DH will be 25-33 TWh 2050 (2010: 36 TWh).
- DH's market share of space heating will be around 60 %
- DC will become general in cities

FEI's Carbon Neutral Vision 2050: District Heating production in Finland 2050

- Use of fossil fuels decreased
 - Carbon capture utilised – some CHP plants are even carbon sinks (because of using biomass)
- Peat still important
- CO₂ free energy production increased
 - More wood based fuels
 - Nuclear district heat is an option
- Power generation in CHP 25–30 TWh, now 27 TWh
 - Share of bioenergy will increase considerably
 - Power-to-heat ratios higher than today
 - Energy production integrated to the buildings, even some small-scale combined heat and power

FEI's Carbon Neutral Vision 2050: Carbon neutral energy production 2050

- Emissions of power generation and production of district heat 5–7 Mt CO₂, now 30 Mt CO₂
- Production of electricity and district heat grows 40 %
 - Emissions from power generation
280 g/kWh => 30–40 g/kWh
 - Emissions from district heat 220 g/kWh => 25 g/kWh
- Fossil fuels replaced by electricity and DH
 - Traffic: -8 million tons
 - Heating: -3 million tons
 - Industry: -1 million tons

District heat production in Finland 2050

