District Heating in Finland 2020

Energiateollisuus

Kaukolämpö

District heating in Finland 2020

(Finnish Energy)
ISSN 0786-4809

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1. District heating 2020

Finnish Energy compiles district heating statistics based on the information collected from the companies. The objective is to reliably and transparently describe the district heating operations in Finland as well as serve as a foundation towards sustainable advocacy. These annually published statistical tables contain detailed and comprehensive information of the district heating operations in Finland in 2020. Tables are available as Excel files at Finnish Energy website: www.energia.fi/en/newsroom/publications/district_heating_statistics

1.1 General knowledge

Statistical tables contain information from those member companies of Finnish Energy that answered to the statistical survey. Information was also collected from those wholesale companies that deliver district heat to companies already answering to the survey.

This publication contains statistics from 108 district heating companies and from 74 wholesale companies.

Table 1. General information on district heating year 2020

	Year 2020	Change compared to 2019
Total supply	33 600 GWh	- 8,0 %
DH production by fuels	29 100 GWh	- 11,1 %
Net production of electricity in CHP production	8 700 GWh	- 21,0 %
Fuel energy consumed	43 000 GWh	- 13,3 %
Heat recovery and heat produced by heat pumps	4 500 GWh	+ 17,9 %
DH consumption	30 100 GWh	- 9,3 %
of which the share of dwelling houses	54,7 %	+ 2,0 p.p.
Customers:		
❖ Number	157 300 pcs	+ 1,2 %
❖ The contracted heat power	19 200 MW	+ 0,5 %
❖ Building volume	1013 million m^3	+ 0,9 %
❖ of which the share of dwelling houses	46,2 %	- 0,1 p.p.
Average selling price		
❖ Arithmetic value	83,91 €/MWh	+ 2,0 %
❖ Weighted by sales	82,23 €/MWh	+ 1,7 %
Total length of DH networks	15 570 km	+ 0,9 %

1.2 Municipalities with district heating

The district heating companies included in this publication distributed district heat in 178 municipalities.

Main energy source of DH production	Number of municipalities
Biomass and other carbon neutral heat sources	150
Peat	20
Natural gas	5
Hard coal	0
Oil	0
Other or unknown	3

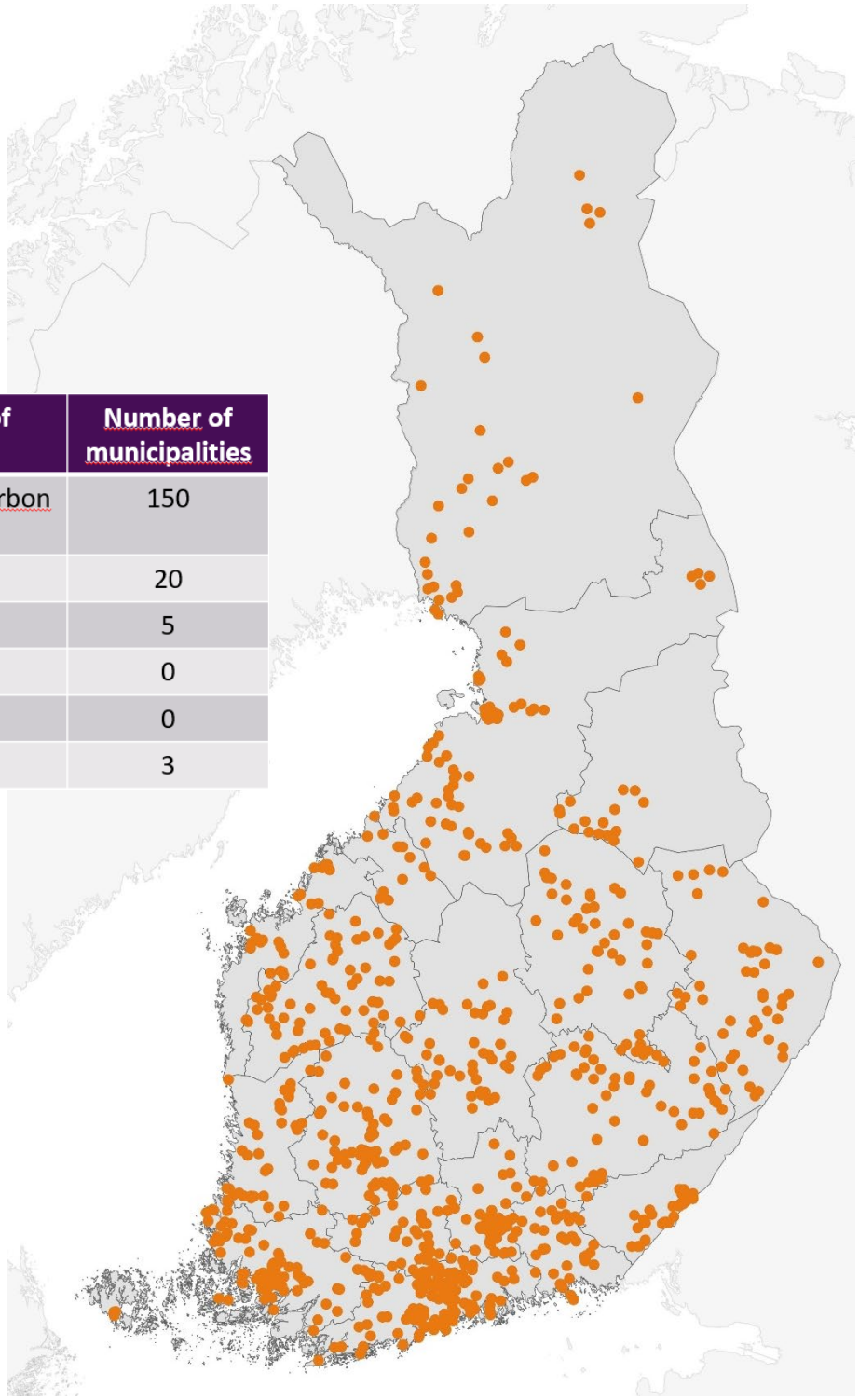

Figure 1 District heating production units at the end of year 2020. The locations are within the right municipalities but do not present the exact locations.

1.3 District heating networks and production units

The length of the district heating network at the end of year 2020 was 15 570 km which increased 150 km from the previous year. The development of the network length since 1970 is presented in Figure 5.

There were 106 power plants with a district heating capacity of 9 000 MW. Power output of these CHP plants totaled 5 800 MW. Moreover, there were 849 stationary heating plants as well as 24 separate heat recovery or heat pump units. The aggregated heat capacity of the above-mentioned was 14 200 MW. The companies also had 294 transportable heating plants with an overall capacity of 1 000 MW.

1.4 District heat production and fuel energy

The total supply of the district heat was 33 600 GWh whereof 29 100 GWh was produced with fuels. The remaining 4 500 GWh was produced with heat recovery and heat pumps. Heat recovery and the production of the heat pumps increased by 103 % during the past five years. 60,2 % of the total supply was produced in CHP plants or comparable cogeneration heat from gas turbines, gas engines or diesel engines. The electricity produced in the CHP plants was 8 700 GWh.

In total, 43 000 GWh of fuels were used to produce district heat and CHP electricity. The share of fuels used for separate DH production was 10 300 GWh. The percentage distribution of the fuels in 2020 is presented below in Figure 2. The energy sources of the district heat supply in 2019 and in 2020 are presented in Figure 3.

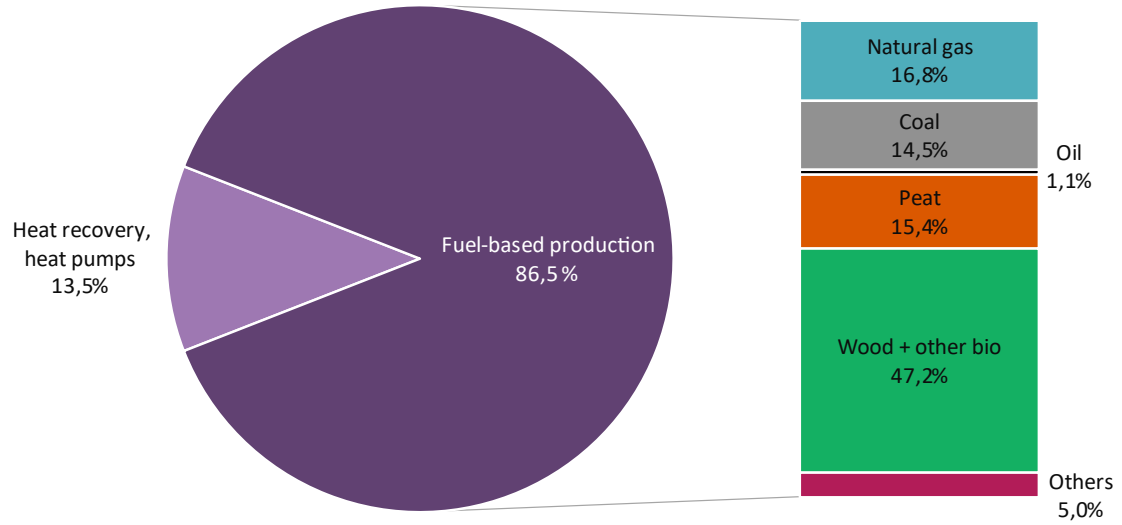

Figure 2. Fuels used to produce district heat and CHP electricity in year 2020.

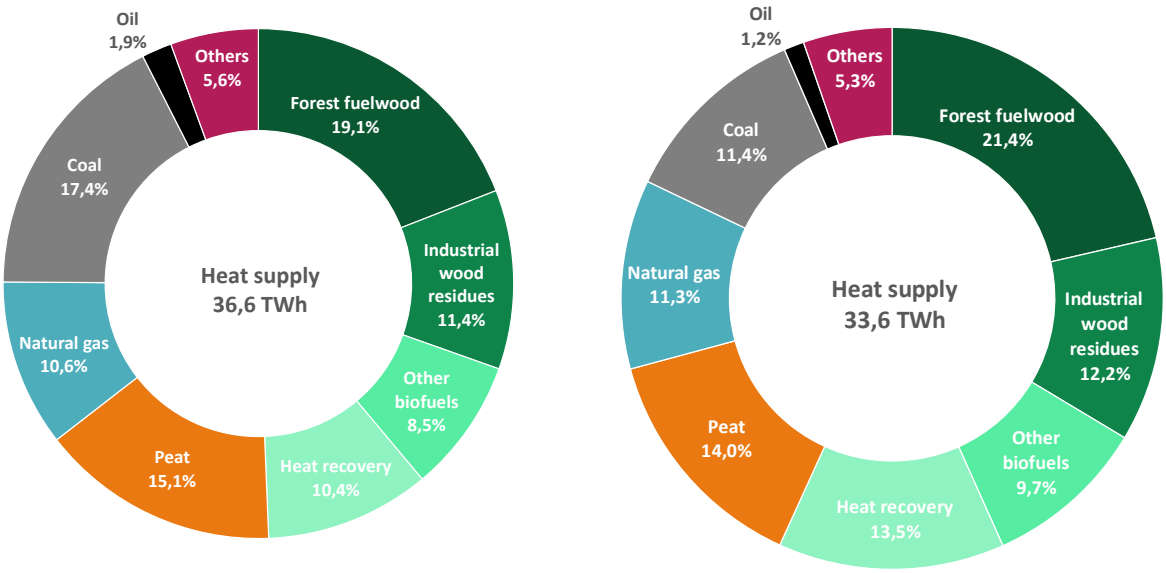

Figure 3. Energy sources of district heating supply in 2019 (left) and in 2020 (right)

1.5 Emissions

The specific emissions of district heating were 110,0 gCO_2/kWh which is 20,7 % less than in 2019. The fuels used in combined heat and power production have been allocated to district heat according to the benefit allocation method.

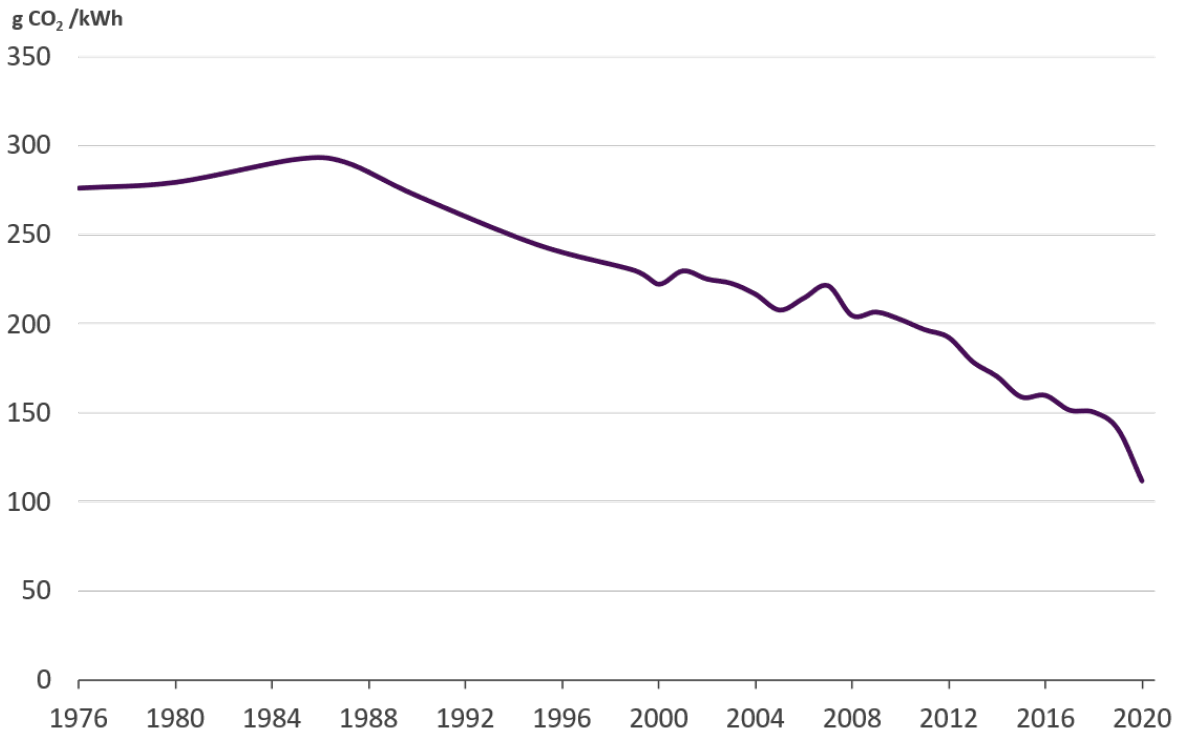

Figure 4. Specific emissions of district heating production (Sources: Statistics Finland, Finnish Energy)

1.6 Customers

The number of customers at the end of year 2020 was 157 300 (1,2 % increase from year 2019) and their connected heat load was 19 200 MW (+ 0,5 %). The development of the number of customers since 1970 is presented in figure 5. The number of customers was divided among sectors as follows: dwelling houses 80 %, industry 4 % and other customers 16 %.

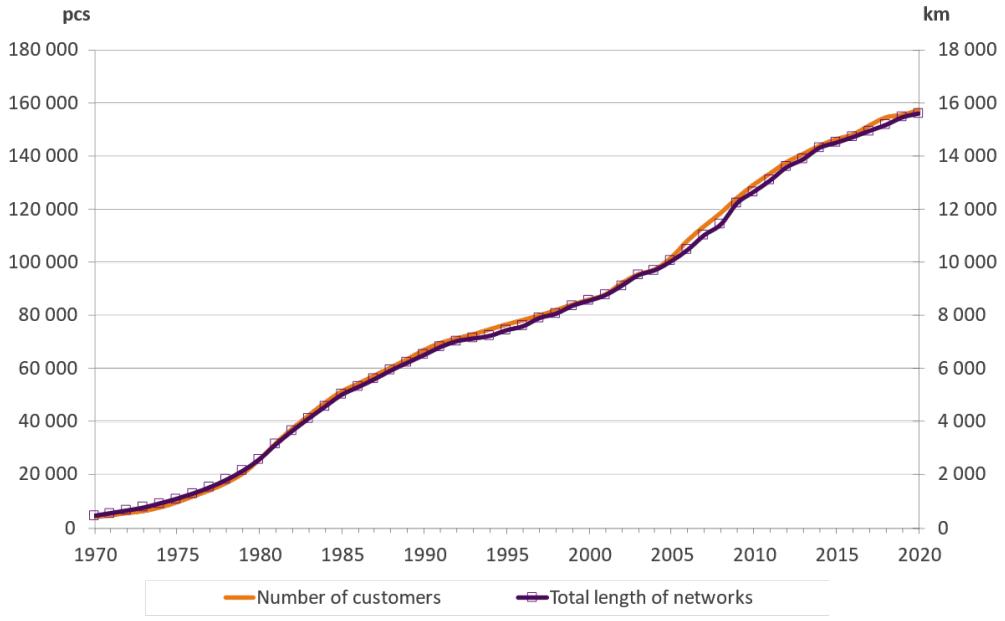

Figure 5. Number of customers and the total length of the DH networks

The heat delivery to the customers was 30 100 GWh in 2020 which was 9,3 % less than in 2019. Temperature corrected heat consumption increased by 0,4 %. The measured heat consumption as well as the temperature corrected heat consumption is presented below in Figure 6. The heat consumption was divided among sectors as follows: dwelling houses 55 %, industry 9 % and other customers 36 %.

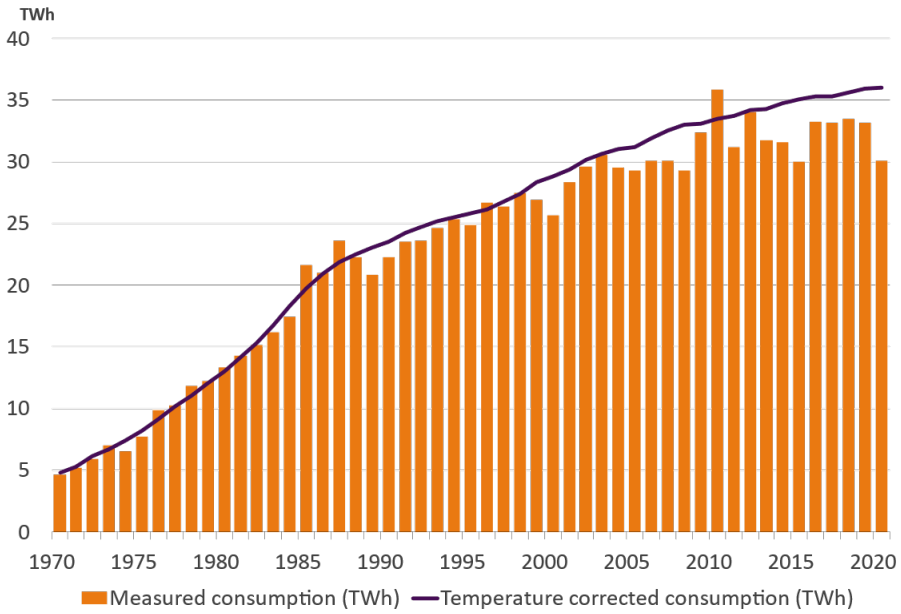

Figure 6. Measured DH consumption and temperature corrected consumption

The building volume of the customers was 1013 million m^3 of which the share of dwelling houses was 46 %, industry 13 % and other customers 41 %. The number of inhabitants living in the buildings heated by district heating was 2,98 million. The share of inhabitants living in buildings heated by district heat in each municipality is presented in statistical table 8.

1.7 Heat sales and sales proceeds

The heat sales to customers during 2020 was 30 090 GWh. The arithmetical average price for heat sales was 83,91 €/MWh. The average price weighted by the heat sales of each district heating company was 82,23 €/MWh. The arithmetical average price was increased by 2,0 % and the weighted price by 1,7 % compared to the previous year. The share of district heating companies according to the average heat sales price (incl. VAT 24 %) is presented in Figure 7.

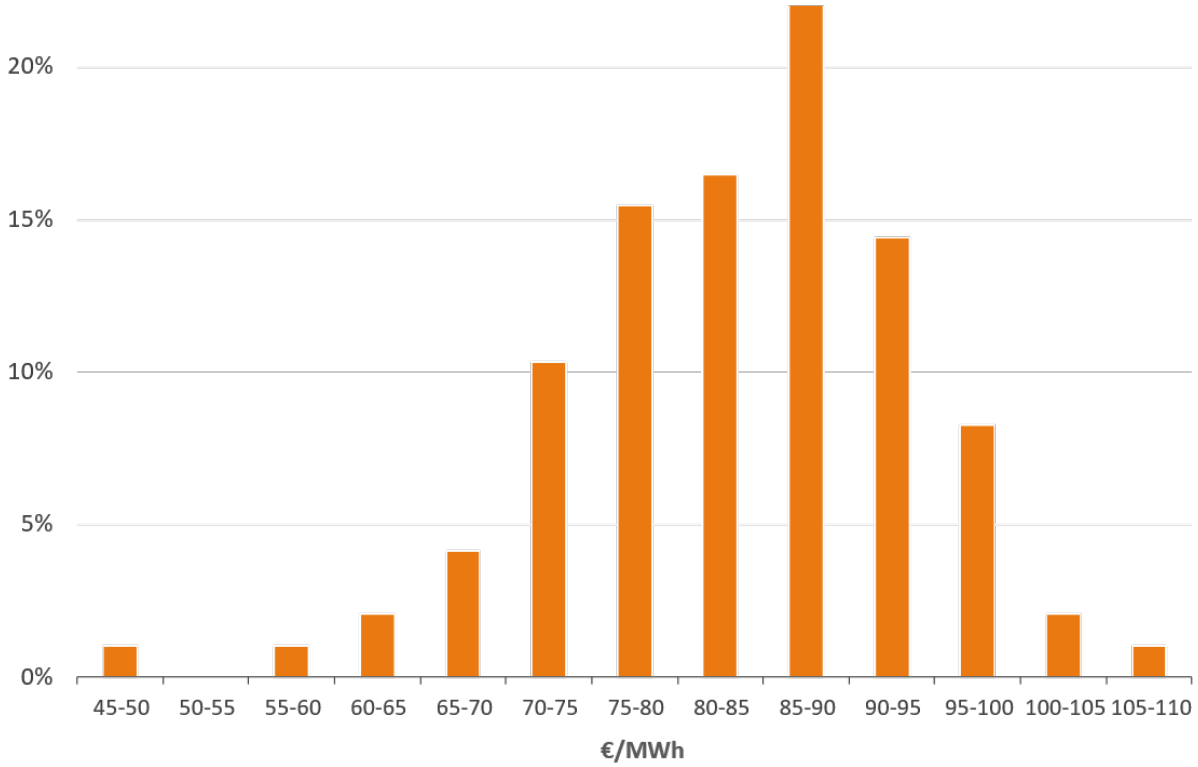

Figure 7. The share of district heating companies according to the average heat sales price (incl. VAT 24 %)

1.8 Specific heat consumption and heating degree day

The specific heat consumption in district heated buildings in 2020 was 35,8 kWh/m^3 or 118,2 kWh/m^2. This value also includes heating of the hot tap water. Temperature corrected specific heat consumption decreased by 0,6 % compared to the previous year and it has decreased by 19 % during this decade. (Figure 8).

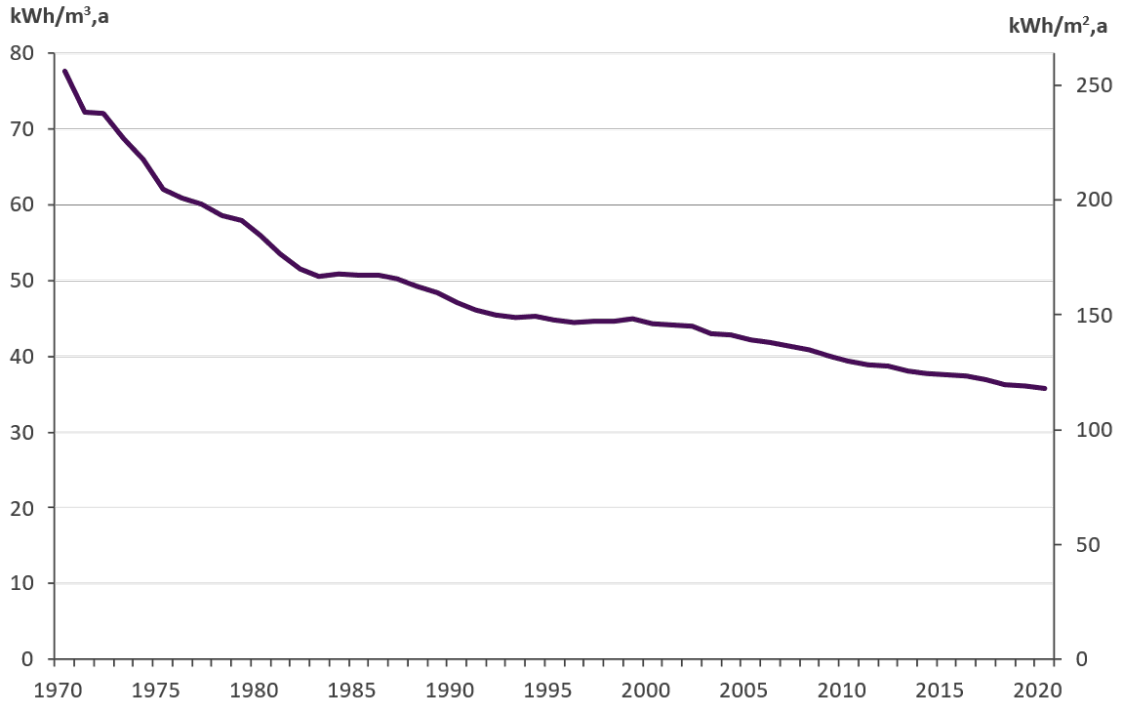

Figure 8. Specific heat consumption in district heated buildings

Year 2020 was significantly warmer than the normal period of 1981…2010. The heating degree day (describing the heating requirement) in 2020 was 21 % lower than the average during the years 1981…2010.

2 Definitions and commentaries

2.1 Symbols

Notations used in the tables mean the following:

Symbol	Explanation
-	No action exists
..	Quantity was missing or was too uncertain to be reported
0	Quantity equals to zero

2.2 Tables in the statistics

These statistics include only those member undertakings that have answered to the survey. The following member undertakings have not answered:

Lapuan Energia Oy
Ähtärin Energia ja Vesi Oy

These statistics include only those wholesale companies that have answered to the survey. The following wholesale companies selling district heat to district heating companies have not answered:

Akonkosken Saha Oy, Alavus
Biotermo Oy, Kuusamo
ER-Saha, Viitasaari
Fine Pine Oy, Lapinlahti
Junnikkala Oy, Kalajoki

Jätevesilaitos, Hämeenlinna
Keitele Energy Oy
Parkanon Listatehdas Oy
Pohjanmaan Biolämpö Oy, Alavus
Rovaniemen kaupunki

UPM-Kymmene Oyj, Jämsänkoski
UPM-Kymmene Oyj, Kaipola
Varmalämmitys Oy

The heat sales of the above mentioned in 2020 was 151,7 GWh and the corresponding amount of fuels and production capacity is missing from the statistics.

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