Finnish District heating

EHP Board

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District Heating Year 2013
District heat in Finland year 2013

Heat sales (incl. taxes) 2,33 billion €

Sold heat energy 31,6 TWh

Share of CHP in DH production 74 %

DH networks (trench length) 13 800 km

Average price of dh (incl. taxes) 7,4 c/kWh

Market share of district heat 46 %

- District heating in new construction (2012)
  - Detached houses 17 %
  - Building blocks 96 %
  - Office buildings 95 %
  - School buildings 78 %
  - Commercial buildings 83 %
  - Industrial and storage buildings 45 %
Market share of space heating
Residential, commercial and public buildings

- District heat: 46,0%
- Electricity: 18,6%
- Heat pump: 11,6%
- Light fuel oil: 8,2%
- Wood: 13,1%
- Heavy fuel oil: 1,4%
- Natural gas: 1,1%

Source: Statistics Finland
Net effective heating energy, 2012

Heat pump: includes the electricity consumption of heat pumps
Electricity: includes the electricity consumption of heat distribution equipment and electric sauna stoves
Wood: includes the wood used by sauna stoves
District heat consumption

Theoretical consumption 2013 if it had been a "normal" year in temperatures.
Temperature corrected heat consumption

- Heat consumption TWh/a
- Temperature corrected heat consumption TWh/a

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Number of customers and length of networks

Graph showing the number of customers in PC and the total length of networks in km from 1970 to 2010.
Specific heat consumption in district heated buildings incl. energy for heating hot tap water

![Graph showing specific heat consumption over time](image)

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District heat production and the share of cogenerated heat

![Bar chart showing district heat production and the share of cogenerated heat from 2000 to 2013. The chart indicates the share of cogenerated heat as a percentage for each year, with separate heat production shown in yellow and cogenerated heat in green. The percentages range from 69% to 76%.](chart.png)
Production capacity of district heat and connected heat load of the customers

GW

Production capacity

Connected heat load
Combined heat and power plants as well as stationary heating plants and heat plants
- 104 CHP plants
- 711 stationary HOB’s
- 372 transportable HOB’s (not in the map)

Source: District Heating in Finland 2012, Finnish Energy Industries
Fuel consumption in production of district heat and CHP 2013
- fuel consumption 56,3 TWh

- Coal 26%
- Natural gas 26%
- Peat 13%
- Renewables 29%
- Secondary heat 2%
- Oil 2%
- Others 2%
Fuel consumption in production of district heat and CHP

- Oil
- Coal
- Natural gas
- Peat
- Renewables
- Others

Graph showing the percentage of fuel consumption from 1976 to 2012.
Fuels used in district heat production and CHP production year 2012

Source: District Heating in Finland 2012, Finnish Energy Industries
Domestic renewable energy sources in production of district heat and CHP
Specific carbon dioxide emissions from district heat production

Sources:
Statistics Finland (2000...2011)
Finnish Energy Industries (1976...1999, 2012...2013)
Real price of district heat
Corrected with cost-of-living index, 1.1.1981 = 100

Share of the excise and value added taxes was 30.0% in the average price of district heat year 2013.
The share of district heating companies according to the average heat sales price year 2012 (incl. VAT)

- Weighted average price: 67.8 €/MWh
- Arithmetical average price: 73.8 €/MWh
Prices of district heat and fuels in heat production index, January 2004 = 100

Sources:
Statistics Finland
Energy Authority

CHP = combined heat and power production
Development of energy taxes
Excise taxes of fuels in heat production, consumption tax of electricity

€/MWh

-2
0
2
4
6
8
10
12
14
16
18
20
1990
1993
1994
1995
1997
1998
1999
2003
2006
2007
2008
2011
2013
2015

light fuel oil
heavy fuel oil
hard coal
peat
natural gas
electricity

fuels, non-CHP
fuels, CHP production
Electricity I (others)
Electricity II (industry)
District cooling – delivered energy and connected heat load

Sale MWh

Connected load MW

- Delivered energy
- Connected load


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District Heating in Finland – Regulation and Pricing
District heating companies in Finland

- Around 150 independent district heating companies
  - Own strategies, prices, contracts, customers

- Typically owned by municipalities,
  - 97 % of companies, 86 % of sales

- Around 50 district heating companies produce also electricity (CHP)

- One third of district heat is produced by another company than the one, which distributes it
No specific regulation for district heating

- Traditionally market-oriented approach
  - Free competition between different heating forms in heating markets

- District heating companies are mainly supervised by general legislation like competition and consumer protection legislation, and related authorities

- The Finnish Competition and Consumer Authority considers that DH companies are in so-called dominant market position towards their customers
  - Competition legislation prohibits the misuse of the dominant market position
Voluntary measures

• The branch has strong tradition of voluntary cooperation between companies within the branch association (Finnish Energy Industries)
  – Technical and economical recommendations, guidelines and reports, advice and guidance, education, training, events and seminars, statistics, coordination and funding of research

• Fair District Heating (Reilu kaukolämpö)
  – Voluntary policy instrument, certification of DH companies
  – Some of the requirements:
    o Grounds of the pricing have to be understandable, open and comprehensive
    o Prices have to be public and available for everyone
    o Dialogue between DH-companies, customers and interest groups as well as representatives of them
District heating prices in Finland

• The DH companies are operated on a business basis

• Each company decides its tariffs and prices itself

• No price regulation

• Same tariffs for same kind of customers (residential, industrial, public etc.)

• The prices vary a lot between different companies, depending on the actual operating costs
The share of district heating companies according to the average heat sales price year 2012 (incl. VAT)

- Weighted average price: 67.8 €/MWh
- Arithmetical average price: 73.8 €/MWh
Outcomes of the free competition

- Lowest district heating prices in western Europe and lowest in the EU compared to purchasing power
- Most reliable DH system – availability of 99.98 %
- Average network heat loses 9…10 % - lowest in Europe
- Average make-up water replenishment need per year is 1…1,5
- Highest overall efficiency of CHP-plants (83 %)
Outcomes of the free competition

- Finnish Competition and Consumer Authority gets only a few complaints annually

- DH connection and sales terms of DH companies are mainly uniform in accordance with the recommendations of the Finnish Energy Industries

- Based on the customer satisfaction surveys DH customers are satisfied with DH
Future – no need for regulation

- Studies on regulation and official supervision of district heating

➔ Conclusions
- No need for DH specific legislation
- No need for changing the current official supervision and roles of different authorities
- No cost-effective basis for opening the DH networks (TPA)
- No problems with the price level of DH
- Price raises have been justified by increased costs
Strategy for the DH Sector
Preparation

- Surveys charting customer satisfaction and customer orientation
- Interviews with the sector’s interest groups
- A member survey
- Regional events
- FEI’s DH Committee meetings in spring 2013
- Release at the DH Days in Kuopio on 28.8.2013

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Strategic objectives

- Increasing flexibility and integration
- Developing new business from services and partnerships
- Committing to a carbon-neutral future
Strategic objectives: Increasing flexibility and integration

- Together with customers, DH companies are looking for solutions and operational models to benefit both customers and DH companies.

- DH systems are developed in such a way that they permit utilization of customers’ surplus heat in the DH network on a commercial basis.

- The DH business reacts to changes in customers’ energy consumption and output requirements through both technical and business solutions.

- The competitiveness of DH is ensured in the heating market. A special attention is directed to the competitiveness of CHP.
Strategic objectives: Developing new businesses due to services and partnerships

- The DH sector improves its understanding of customers’ business and technical systems
- DH companies improve the openness of their business and clarify their pricing
- Services supporting the present DH product as well as separate service products are developed
- Cooling solutions become part of the product range of companies in the sector
Strategic objectives: Committing to a carbon-neutral future 2050

- The sector will ensure a carbon-neutral future by 2050
- The pace of concretization must be speeded up through an increasing number of corporate investments and other measures
- The wood fuel market will be developed
- The sector actively participates in developing technological solutions and those enabling carbon-neutral production
- The aim is to make the use of fossil fuels possible during the transition period
Strategic projects 2013-15

- Estimated cost for FEI is around 300 000 euros
- Modification of FEI’s institutional structure of the district heating division to correspond to the new strategy (-10/2013)
- Investigation of the sector’s educational needs and measures to increase necessary education (-6/2014)
- Investigation and popularization of the effect a dominant market position has on business development on the one hand and on the customers on the other hand (according the interpretation of the competition act) (-6/2014)
- Identify ways to engage the customer on price formation. The target is to increase customers understanding on price formation (-8/2014)
Strategic projects 2014-15

- Survey on the potential of small-sized heat production of DH customers (-12/2014)

- Studies on the cooling market (technologies, trends, competitiveness of different solutions, as well as the potentials) (-9/2015)

- Studies on the establishment of new service products, the business opportunities and market values (-9/2015)

- Investigation into utilizing customers’ surplus heat in district heating systems on a technical and commercial basis (-12/2015)

- Investigation of new ways of utilizing district heating and cooling and investigation of possibilities to increase customers’ choices and the potential of more diverse product categories. (-12/2015)
Vision

Diverse energy solutions and services based on district heating and cooling are most wanted by customers. They make it possible to find a shared road to a carbon-neutral future.
Thank you!