Danish Energy Agency

Technology Brief

Update of District heating distribution in the Technology Catalogue (Feb 25)

The chapter on the transport of heat by district heating has undergone a comprehensive overhaul. This Update has been prioritised due to the observed price rise. A number of global events and political plans for expansion of district heating areas has driven unprecedented cost increases for materials and labour pertaining to district heating. The update has been prepared by Rambøll.

Before it consisted of a chapter on, and data sheets for, distribution of heat in urban and suburban areas, with additional data for greenfield sights and transmission capability also available. Data on rural district heating has been removed. The datasheet on low temperature district heating has been replaced by a price factor to be multiplied onto other sheets.

Pipes and equipment for district heating networks are a mature technology. Fixed prices are therefore not projected to change, as there is little to be improved by technological development. Mature technologies can still change in real price, as has been seen with district heating pipes over the last years, when the prices for materials and labour rose faster than inflation,

Major changes in updated Technology Catalogue

The following updates can, among others, be found in the chapter and data sheets:

- Updated figures and text for improved clarity.
- A rule-of-thumb for Investments cost for distribution network [M€/km^2] for suburban and city areas, including new areas, for high level cost estimations
- Investment percentage included soft costs as a category, up from installation and materials
- A price for Fixed O&M has been added.
- Data on rural district heating has been removed.
- The datasheet on low temperature district heating has been replaced by a price factor to be multiplied onto other sheets.

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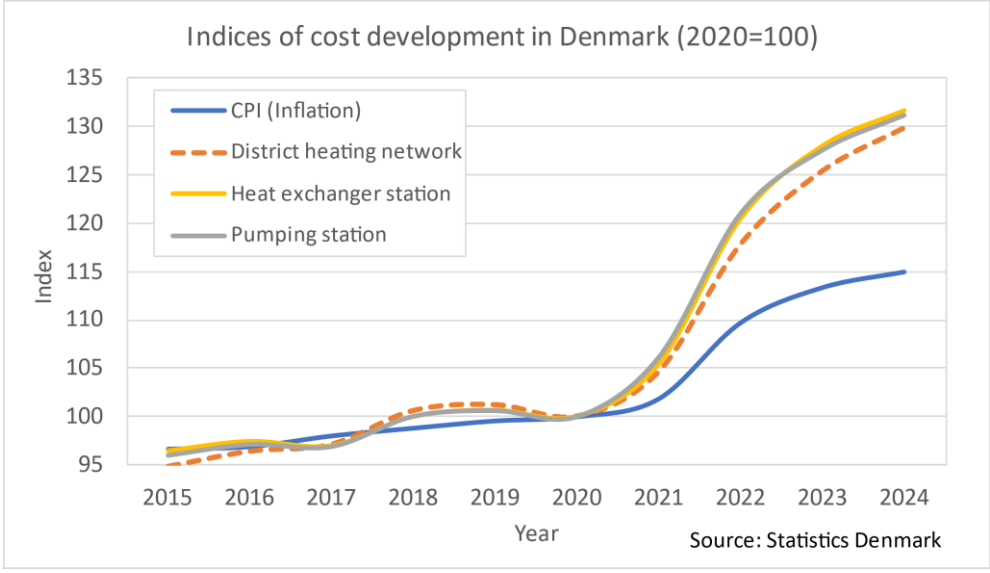
Price changes

- Investment costs on transmission lines have increased by a factor 1.9-2.4 in real prices. Energy losses [% per km] have been set to increase, while auxiliary electricity consumption [%] energy transmitted and construction time has been lowered.
- Variable O&M for suburban has increased by 26%, and fixed O&M has been added. Pumping station above 1 MW are 11% more expensive in fixed prices. Service lines are between 5% and 10% more expensive. And single lines are 10-13% more expensive.
- In cities, variable O&M has increased by 26%, and fixed O&M has been added. Pumping station above 1 MW are 17% more expensive and below 1 MW are 14% more in expensive fixed prices. Service lines are between 9% and 23% more expensive, while single lines are 1-14% more expensive
- New district, Service lines are between 17% and 27% more expensive, and single lines are 20-43% more expensive. Pumping stations are 11% more expensive.
- Heat loss of the district heating network is reduced by 20-25% and the district heating network investment is reduced by up to 5% compared to new areas if Low-temperature district heating (LTDH) is used instead.

The following graph shows how the aggregated prices different components have risen more than inflations:



Key drivers for the recent price:
A variety of global developments have significantly raised the costs associated with establishing district heating networks which means data sheets for the future cost development were no longer indicative:

- *Rising raw material costs:* Global inflation and supply constraints have sharply raised the prices of key materials used in transmission assets.
- *Inflation and higher interest rates:* general inflation and higher material costs drove up prises and created a mismatch between supply and demand. Higher interest rates have increased the general cost for large projects.
- *Energy transition pressure:* The removed political will to install district heating to transition from fossil-fuel energy systems to green energy systems has accelerated the need for investment in transmission networks, further increasing demand for pipes and skilled labour.

Conclusion

The updated data quantify the higher costs of district heating systems in Denmark, while also addressing the rising costs and efficiency changes. Advances in low-temperature systems, better integration with renewable energy, and the flexibility of DH networks continue to position them as a cornerstone of sustainable urban energy solutions. The price for new DH installations will change as it spreads from high density city centers to edges of urban areas.