ENGINEERING
TOMORROW

Leanheat® | HEATTO™

Temperature optimization
for district heating networks

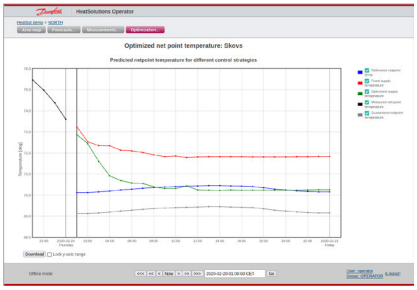
HeatTO™ is a software system for temperature optimization of district heating networks. HeatTO™ uses heat demand forecasts and online measurements from the heating network to control the supply temperature, such that heat losses, heat costs and CO_2 emissions are reduced while security of supply is increased at the same time.

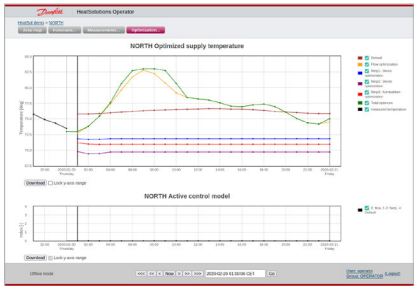
Why do you need **HEATTO™**

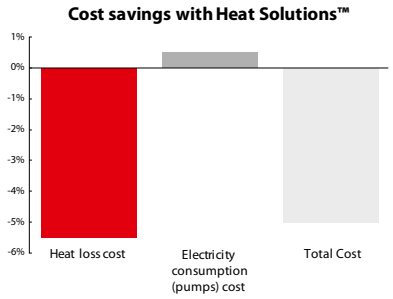
HeatTO™ enables district heating network operators to run their district heating network more efficiently and reliable. HeatTO™ automatically optimizes the inlet temperature to the network, such that customer demands are met and inlet temperature is minimized which reduce heat losses and thereby heat costs.

As an additional environmental benefit, the reductions of fuel consumption will also reduce CO_2 emissions improving the green profile of your district heating network.

When deployed in combination with the two Danfoss Leanheat® services MetFor™ (locally optimized weather forecasting) and HeatFor™ (heat demand forecasting), customers typically reduce pipeline heat losses with 10-20%. The result is a fuel cost reduction of 3-5% or even more in heating networks with a high heat loss.







Key **benefits:**

- Reduces heat losses, fuel costs and CO_2 emissions
- Easy and inexpensive to install, maintain and operate with short payback period
- Reliable, stable and high availability with a proven operational track record of more than 20 years
- Increases security of supply for heat customers
- Low maintenance with minimal interference and interaction required for the client
- Highly flexible. Can be configured to various network configurations with and without dependencies between the networks

HeatTO™ is an industry leading solution which requires minimal effort from the client and yet yields superior results when compared to competing technologies.

How does **HEATTO™ work**

The optimization algorithms in HeatTO™ calculate the optimal supply temperature to the network which will meet the heat and temperature demands and reduce supply temperature to a minimum at the same time. Having accurate demand forecasts, online measurements and efficient control algorithms enables the system to run without unnecessary security margins (too high temperature), such that heat losses, fuel costs and CO_2 emissions are reduced.

For optimal operation, the following data will therefore normally be used as input:

- Local measurements of ambient air temperature, wind speed, solar radiation, etc.
- Meteorological forecasts of the local air temperature, wind speed, etc. for horizons up to the desired operational horizon (typically 12-18 hours for HeatTO™)
- Online measurements of heat load, flow rate, supply and return temperature at the the district heating network supply points
- Online temperature measurements from the district heating network
- User input like required temperature at the consumers

Local climate measurements are preferred but optional, and if not available the system can use meteorological forecast data instead.

In an optimal configuration, HeatTO™ is deployed together with the two Danfoss Leanheat® solutions:

- MetFor for locally optimized weather forecasts
- HeatFor for heat demand forecasting

Which all three seamlessly are provided as an integrated end-to-end solution for forecasting heat demand and optimization of the district heating network temperature.

HeatTO™ is provided as an integrated service from the Danfoss Leanheat® software suite which contains a data collection and validation module. The data collection and validation module collects the necessary data, ensures that the necessary data is available and contains a toolbox for automatic detection and correction of missing and/or erroneous measurements. The module then feeds the validated data into the core HeatTO™ modules which then provide, control, and optimization.

The Danfoss Leanheat® software suite also provides HeatTO™ with data integration modules through either text files, FTP, SFTP or web-services such that HeatTO™ can be seamlessly integrated with the operational system (SCADA) controlling the district heating network.

HeatTO™ is available as a software package installed locally on the client's servers, or as a service hosted on servers operated and maintained by Danfoss.

Key **features:**

- Self-learning and self-calibrating algorithms for optimization of supply temperature of district heating network
- Integrates seamlessly with:
  - Temperature measurements from the district heating network
  - Heat demand forecasts (ideally provided by HeatFor™)
  - Local weather measurements
  - Locally optimized weather forecasts (ideally provided by MetFor™)
- Controls single network or multiple linked networks
- Data integration interfaces based on FTP, SFTP or web-services supporting numerous formats and file types (CSV, XML, SOAP, JSON etc.)
- Runs on all commons server platforms (Windows, Linux)

Danfoss Leanheat® is an innovative suite of AI, IoT & Cloud-based software solutions that empower the entire district energy value chain to optimize operational efficiency and reach decarbonization goals while adding ease and comfort to everyday life.

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