Leanheat® Production

Minimize energy loss in the distribution network and achieve substantial energy savings

World-class district energy management, optimization, and planning tool.

5-10%
reduction of heat loss in the district energy network

Great savings potential with the district energy optimization tool Leanheat® Production

More than

95%

load forecast accuracy helps reduce carbon emissions

## Digitalization enables 4th generation of district energy

Digitalization allows optimization of the district energy system and enables remote control. By doing so, it is paving the way for predictive maintenance, improving reliability, uptime, and service life of the system.

In district energy we are seeing a shift from a single-source to a multi-source energy supply; for instance supermarkets and industries supplying surplus heat into the system. Closely related to this, district energy systems are increasingly replacing fossil fuels with renewable energy sources. Supplies from renewables, particularly solar and wind, fluctuate much more than traditional fuels. These changes call for highly flexible systems that run efficiently at low temperatures and that can be supplemented easily with new energy sources and new supply areas. And these modern systems are part of what we call the 4th generation of district heating.

Solutions are available today
Technologies and know-how for the digitalization of district energy are available today. Danfoss offers a one-stop-shop for smart components and software applications for the control and optimization of the district energy system, from plant and distribution level to users.

Leanheat® Production from Danfoss is setting the standard in the 4th generation of district energy and allows users to exploit the many benefits of digitalization:
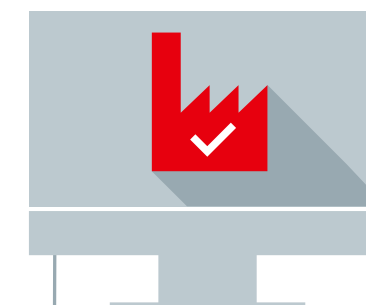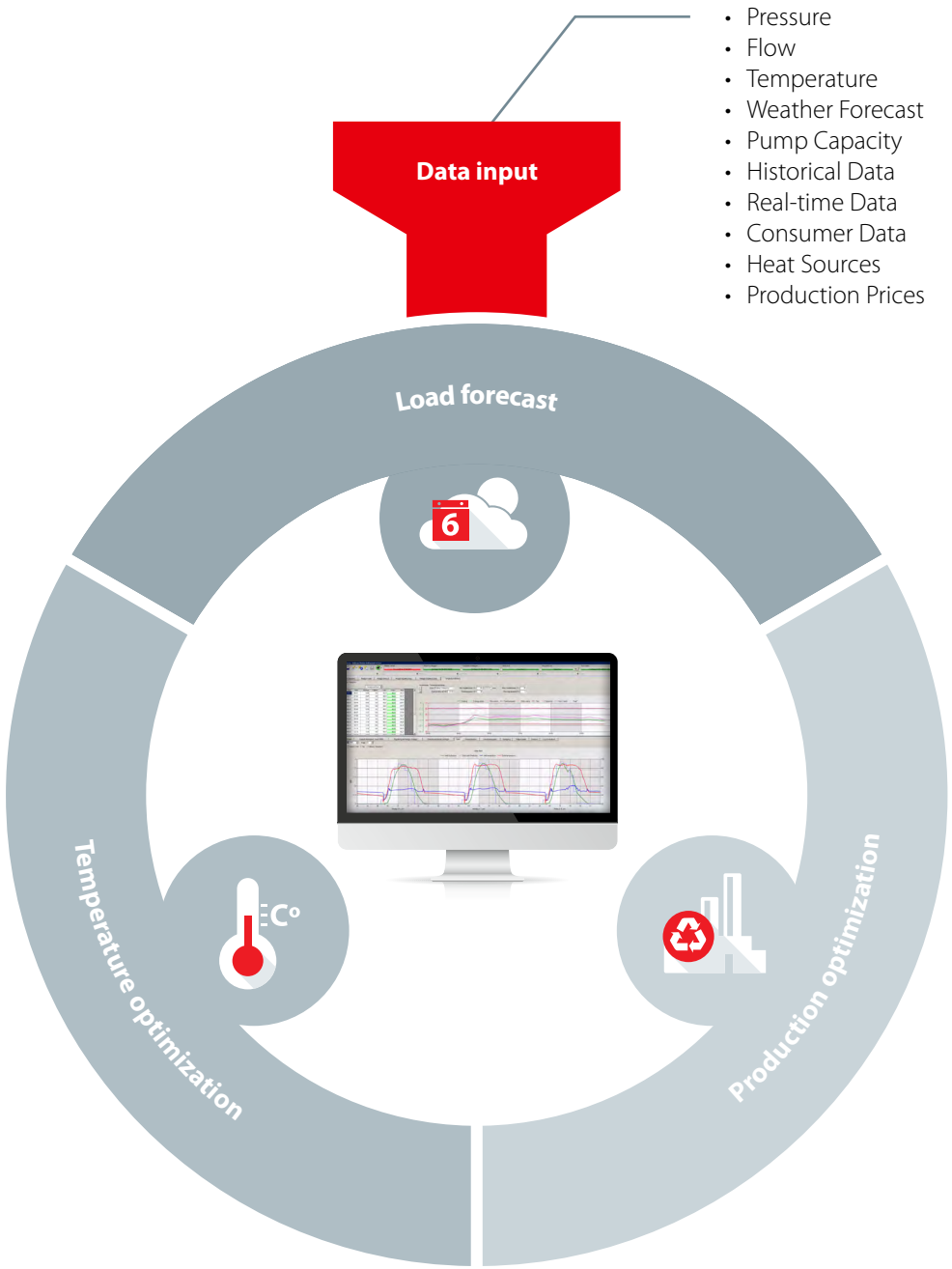
✓ Major reductions of heat loss in network

✓ Significant energy savings

✓ Better utilization of production output

Maximize energy efficiency with
Leanheat® Production

Leanheat® Production is an advanced software tool for forecasting, planning, and optimizing district energy production and distribution. The tool consists of three modules, as shown in the figure below, with the load forecast working as the indispensable cornerstone, enabling users to assess heat consumption six days ahead, optimize the supply temperature, and optimize production units based on price and availability. This leads to reductions of heat loss in networks, realization of energy savings, and better utilization of production. It makes an investment in Leanheat® Production very sound, typically with a payback time of approximately 1 to 2 years.
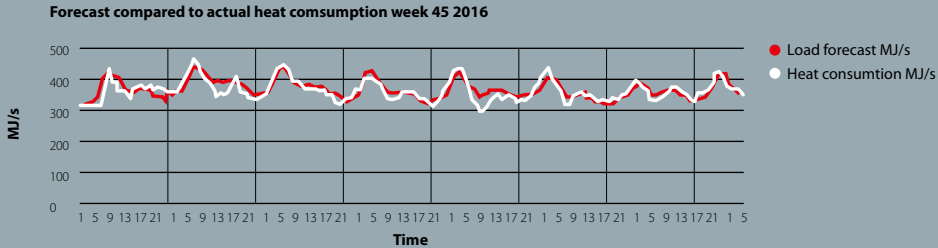
- Pressure
- Flow
- Temperature
- Weather Forecast
- Pump Capacity
- Historical Data
- Real-time Data
- Consumer Data
- Heat Sources
- Production Prices

Data input

Load forecast

Temperature optimization

Production optimization

Load forecast

Predicting the exact heat consumption
in the district heating network

The load forecaster is the foundation for running temperature and production optimization. By combining SCADA real-time data, online weather forecast data, and historical data, the Leanheat® Production can predict the heat consumption six days ahead with more than 95% accuracy. This allows users to act proactively and ensure a reliable operation.
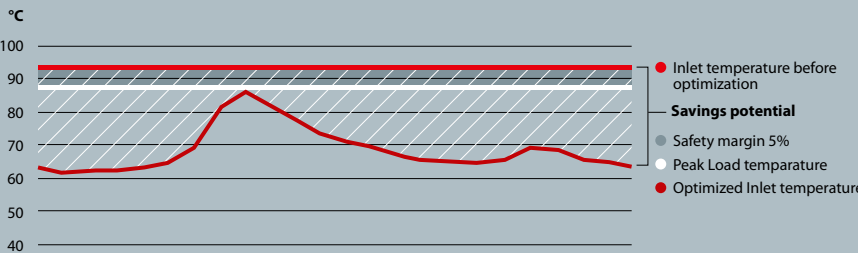
Forecast compared to actual heat comsumption week 45 2016

MJ/s

500
400
300
200
100
0

1 5 9 13 17 21 1 5 9 13 17 21 1 5 9 13 17 21 1 5 9 13 17 21 1 5 9 13 17 21 1 5 9 13 17 21 1 5 9 13 17 21 1 5

Time

- Load forecast MJ/s
- Heat consumtion MJ/s

Temperature optimization

Reduction of heat loss by 5-10% leads
to big annual cost savings

Based on the load forecast, it is possible to reduce the inlet flow temperature and reduce the heat loss considerably. Huge annual energy and cost savings are achieved and carbon emissions will be reduced considerably.

°C

100
90
80
70
60
50
40

- Inlet temperature before optimization
- **Savings potential**
- Safety margin 5%
- Peak Load temparature
- Optimized Inlet temperature

Production optimization

Save between 1-3% on fuel costs
by choosing the right mix of sources

Leanheat® Production makes it easy for you to find the most cost-effective heat-production solution. The forecast six days ahead allows you to optimize your planning activities by moving the most expensive peak-load production from oil, coal and gas to renewable sources.

This production optimization means that your heat is always produced at the best possible price, resulting in up to 3% fuel cost savings.

Gas | Oil | Coal | Wood | Straw | Wind | Geo-thermal | Solar
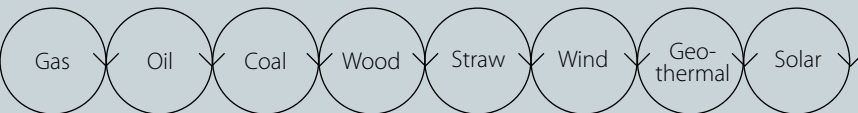
Achieve more with optimization and planning

Leanheat® Production **supports operation staff** in the daily operation by collecting all relevant data

A better overview saves time on planning and makes it easier to make well-founded decisions. The graphical interface of Leanheat® Production enables you to design dashboards according to your personal requirements and combine the visualization of results from different sources.

Leanheat® Production's graphical user interface enables:

- Visualization of the heat consumption forecast
- Visualization of the energy content of thermal energy storage hour by hour
- Visualization of inlet and return temperature hour by hour
- Optimization of operating plants, incl. any capacity limitations and boiler production
- Set-up of a precise optimization model for the plant
- Electricity market planning and reporting, incl. the regulating power, block bid, and intra-day markets
- Display of spot-price forecasts and realized spot prices
- Option to adjust plans in response to any production stops
- Immediate impact analysis of thermal energy storage performance and processes

A solution engineered to match your needs

With the Leanheat® Production modular soultion, you only buy the functionality you need.

The software comprises a series of modules for load forecasting, temperature optimization, and product optimization. The modules can be combined to meet individual needs, meaning that you can go with the full package or just opt for some of the modules, e.g. the load forecast.

How you benefit from working with Leanheat® Production:

- Better overview of network operation
- Easy access to data
- More than 95% load forecast accuracy
- Short ROI (Return On Investment)

Reduce costs with temperature optimization:

- Considerable annual cost savings
- Reduction of heat loss by 5-10%
- Less maintenance and repair of pipeline network due to optimized balance

Achieve savings with production optimization:

- Big fuel savings
- Reduction of costs by 1-3%
- Significant time savings in production planning

Optimize your district energy with **Leanheat® Production**

Leanheat® Production is an excellent and future-proof sofware that helps adjust, reduce, and optimize your energy consumption. By applying big data from many sources, the software application allows you to forecast and optimize the inlet flow temperature and heat production. With Leanheat® Production, Danfoss has proved to be at the forefront in a fast-growing digital world making it possible for professionals to meet the growing needs for energy optimization.

Plant optimization

Leanheat® Production

Network optimization
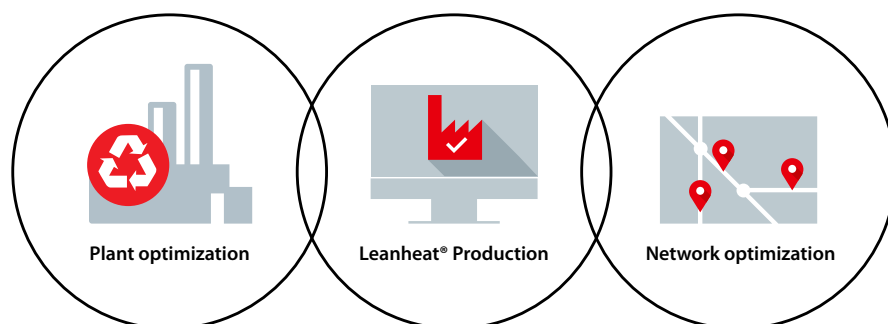
✓ Predicting the exact heat consumption in the district heating network

✓ Reduction of heat loss by 5-10% leads to big annual cost savings

✓ Save betwen 1-3% on fuel costs by choosing the right mix of sources

✓ Low Return On Investment (ROI) – between 0.5 to 2 years

About Danfoss

For more than 75 years, Danfoss has been supplying innovative heating solutions that cover everything from individual components to complete district heating systems. Danfoss engineers technologies that enable the world of tomorrow to do more with less. We employ 24,000 people and serve customers in more than 100 countries. Driven by our customers' needs, we build on years of experience to be at the forefront of innovation, continually supplying components, expertise and complete systems for climate and energy applications.

Today, our advanced, reliable and user-friendly technology help to keep people comfortable and companies competitive across the world. This is how we are Engineering Tomorrow.

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