

ENGINEERING
TOMORROW

Danfoss

Leanheat® Building

Optimize the heating network and improve the economy

The solution powered by AI and IoT ensures lower power peaks and satisfied residents in buildings connected to district heating.

Cut peak load up to

30%

and save up to 20%
on energy costs



Next-generation **smart** district heating **solution**

Fully
automated.
**Real-time
optimization.**

A new approach to predict and optimize the heat demand

Danfoss Leanheat® offers a software solution to optimize the heating system of centrally heated multi-family buildings. Fully automated and self-learning, Leanheat® Building provides real-time optimization, not only for substations, but for entire clusters of apartment buildings.

Using the solution, district heating utilities can serve customers more efficiently and with a smaller carbon footprint.

The system collects data from sources inside and outside the building and enables monitoring, data analysis, and the remote-controlled adjustment of parameters. By securing a stable and optimal indoor temperature and humidity level, the day-to-day comfort of residents is hugely improved.

Reduce peak loads up to 30%

Leanheat® Building reduces substation peak loads up to 30%. For the utility company, this means the needs of more customers can be met from existing peak-load capacity with less demand for expensive and environmentally harmful peak-load boilers, and more sales for high-margin base-load heat.

On top of that, the system can also lower the primary-side return temperature.

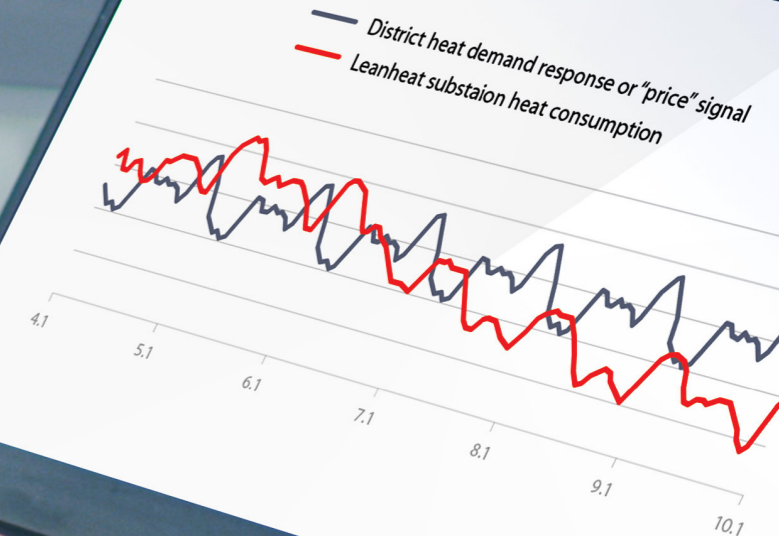
Leanheat®
Building can be
retrofitted into any
building without
major structural
changes

Easy to install and with a healthy return on investment

For the actual heating control, district heating utilities will get the most out of the current hardware with Leanheat® Building. The process will also help to find out the most profitable new investments.

Leanheat® Building can be retrofitted into any building without major structural changes. In most cases the wireless IoT sensors in the individual apartments can work with the existing controller in the substation. And even if new compatible controllers are needed, the structural changes to the heating system are small, allowing the savings from the system to capitalize quickly.

Picture >
The higher
the demand
response signal,
the lower the heat
consumption.



**Cut down
the costs.**
Increase
the comfort.



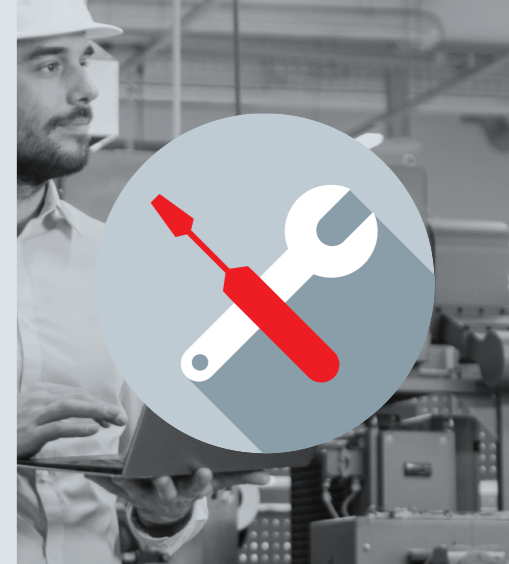
Lower power peaks

Leanheat® Building cuts up to 30% from your peak-load demand and you can meet the need of more customers with your existing peak-load capacity. The AI-based system can help flatten out peak level in cities by predicting heating-demand peaks and adjusting customer heat consumption to either before or after peak hours.



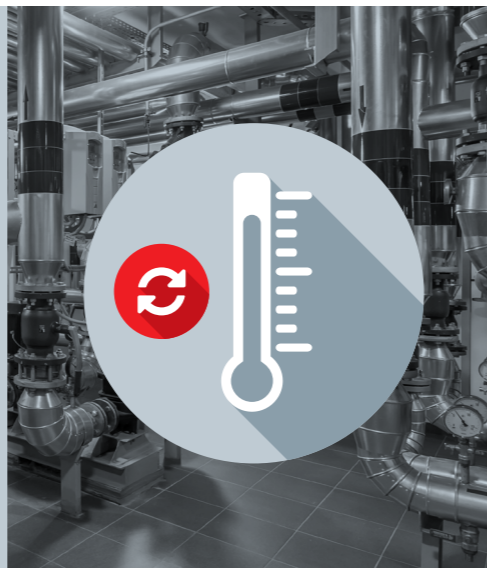
Lower maintenance costs

You can save up to 30% in technical maintenance costs by relying on systems accurate problem-detection. Moreover the Leanheat® Building software solution provides possibilities for new data services and devices to be developed. The AI-based control automates technical maintenance tasks while minimizing failures, repair times, and site visits. With the system, you can send the right team with the right tools to fix a specific problem with no need for extra measurements or analysis.



Lower primary return temperatures

On average, primary-side return temperatures are decreased by 2-4°C in a substation where Leanheat® Building control is enabled. On top of that, systems predictive control is based on precise measurement of indoor climate and outside weather conditions, which ensures that the changes in the room temperature are not even noticeable.



Better energy efficiency

You can save up to 20% of heat consumption in substations. The Leanheat® Building solution uses AI to predict, control and monitor centrally heated buildings. Data from the substation is combined with data collected from IoT wireless sensors located in 10-100% of the individual apartments in the building. AI processes the collected data and the central heating can be optimally controlled taking weather, ventilation and the living patterns of the inhabitants into consideration.



A cloud-based solution ensures reliable and data-driven services

AI generates precise and **accurate models**

Leanheat® Building software utilizes the latest development in artificial intelligence to automatically generate very precise and accurate mathematical thermodynamic models of the controlled buildings.

With a cloud-based solution, the system collects data from:

- Sensors in the apartments
- Substation controllers
- Weather forecasts

Leanheat® Building solution includes:

Peak-load management

Heat source and central hot water production.

Predictive maintenance

Heating imbalance and accurate predictive problem-detection.

Energy efficiency

Predictive, self-learning, and adaptive.

Building monitoring

Controllers, temperatures, relative humidity and absolute humidity.

Mold prevention system

Indoor humidity level compared with outdoor humidity.

Cloud data collection

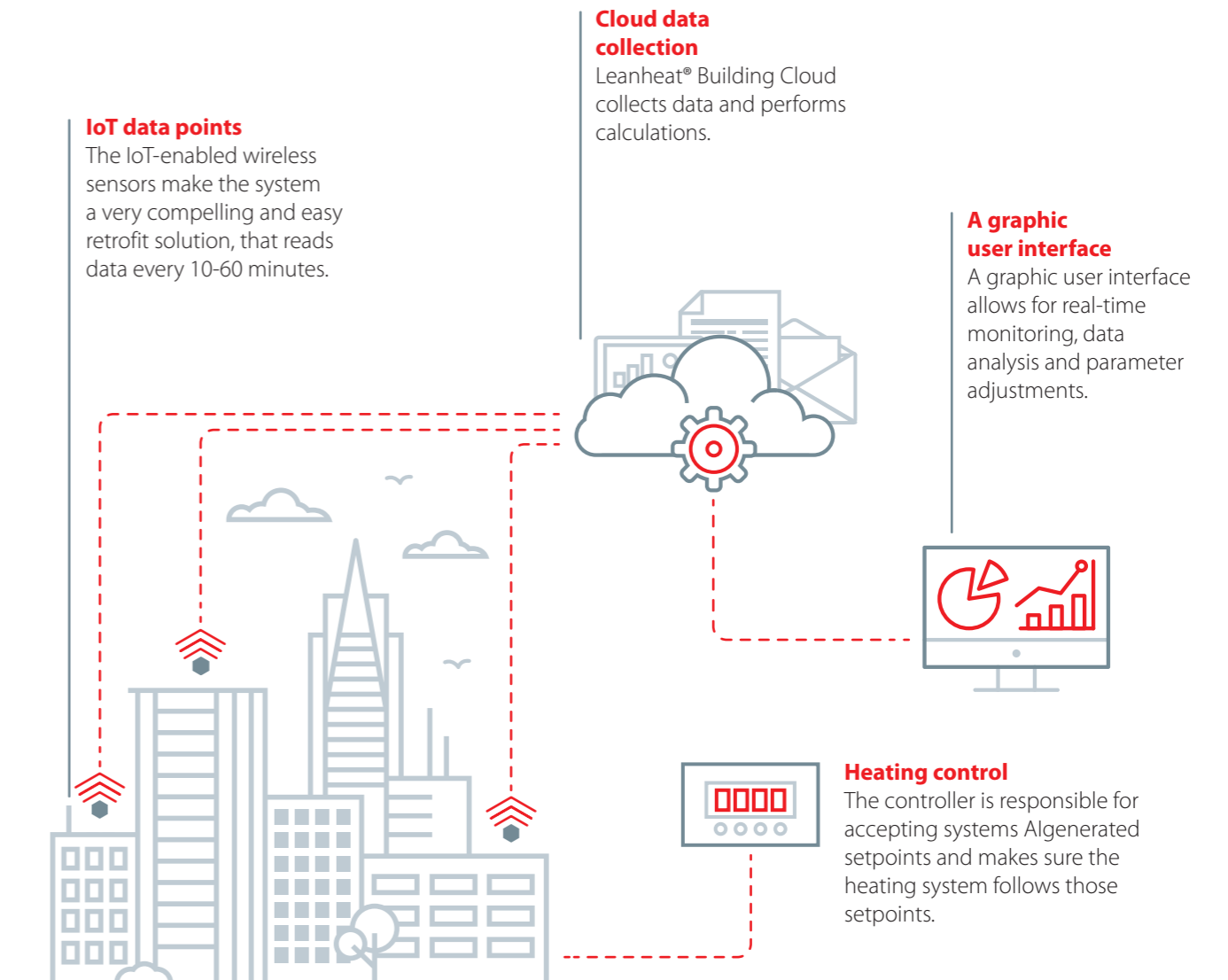
Leanheat® Building Cloud collects data and performs calculations.

IoT data points

The IoT-enabled wireless sensors make the system a very compelling and easy retrofit solution, that reads data every 10-60 minutes.

A graphic user interface

A graphic user interface allows for real-time monitoring, data analysis and parameter adjustments.



* Leanheat® Building is a hardware-independent solution, which can work with most common controllers and indoor sensors. If the substation needs to be upgraded, we can provide one of the most applicable controllers, Danfoss ECL 310.

Case

Fortum District Heating Company

Result

- **Enhanced heat production**
- **New service business**



Customer case

In cooperation with Danfoss Leanheat®, Fortum develops and offers tomorrow's smart district heating solutions. Fortum SmartLiving services help utilities and end customers save both money and the environment.

Target

To optimize the heating system according to the building's indoor temperature and humidity level as well as outdoor temperatures. By connecting the heating system and the energy production, Fortum aims to provide better conditions for both utilities and residents.

Solution

Fortum SmartLiving service is developed together with housing association board members and property managers, and uses Leanheat®'s technology. With the system Fortum is now able to optimize energy production in favor of both utilities and end customers.

Next-generation solutions from the leading provider

Danfoss Leanheat® Building's AI based IoT solution monitors, controls and optimizes the indoor temperature and humidity of buildings heated using district heating. Our solution improves the energy efficiency of properties, increases the operational efficiency of district heating companies and creates a healthier indoor climate for residents.

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 28,000 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 userfriendly technology help to keep people comfortable and companies competitive across the world. This is how we are Engineering Tomorrow.

Read more online at danfoss.com