

ENGINEERING  
TOMORROW

*Danfoss*

Case story | District heating

## Danfoss partners with the city of **Banja Luka** to **decarbonize district energy**

Banja Luka is the second largest city in Bosnia Herzegovina. The city's district heating utility, Banja Luka Eko Toplane, is constantly looking for ways to make heat production, distribution and consumption more energy efficient, while improving comfort for its 20,000 end users. In 2017, as part of its decarbonization goals, the city of Banja Luka and Eko Toplane introduced a new renewable heat source for the district heating system, wood biomass, and set the stage for an ambitious renovation project.

## The Challenge: **Renovate 34 of the city's largest heating substations**

Switching to renewable energy sources was just the beginning. To create lasting energy efficiency improvements, Eko Toplane and the city of Banja Luka knew they needed to optimize their heating substations. The District Heating Utility selected 34 of its heating substations for optimization. The substations have an installed capacity of 57 MW and provide 25% of the district heating system's total heat and flow.

The renovation project had three main objectives: reduce the maximum specific heat consumption by 10%; introduce digitalization, monitoring and predictive maintenance; and lay the foundation for expanding the district heating system and connecting new users by optimizing heat consumption. This would make it possible to extend the network and still meet the requirement of reducing overall heat consumption by 10%. Banja Luka and Eko Toplane selected Danfoss to help them modernize the substations and meet their efficiency goals.



## The Solution: **Danfoss Leanheat® Monitor enables full substation digitalization**

Danfoss worked with Eko Toplane from the project's early stages, helping them to select the heating substations for renovation, choosing the appropriate equipment and handling installation and commissioning. Once the renovation was complete, Danfoss connected all the heating substations to Leanheat® Monitor, so utility managers could monitor, control and maintain substations remotely. At one of the heating substations Danfoss also installed its Titan™ substation application, which uses groundbreaking digital twin technology to ensure correct commissioning, enhanced performance and the lowest possible return temperature.

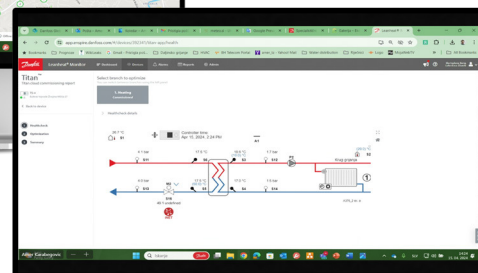
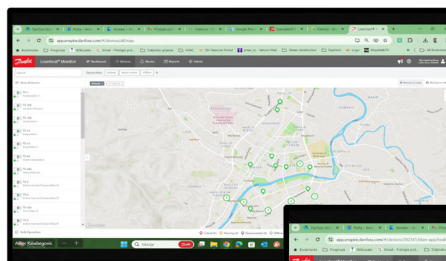
In addition to guiding Banja Luka through the renovation process, Danfoss also wanted to give the city the tools to continue optimizing its heating substations, as Amer Karabegovic, Sales Driver, HydronicS, points out.

Eko Toplane CTO, Dejan Jovisevic, also appreciates this aspect of the collaboration, stating, "Encouraged and trained by experts from Danfoss, we were able to increase our employees' through their direct participation in equipment installation and commissioning."

The city administration and Eko Toplane also asked Danfoss to create a strategic document that would help them create a long-term development strategy for the city's district heating network. The document, "**Strategic guidelines for the development of the district heating system of the City of Banja Luka**", is based on an in-depth analysis of the city's current system and its medium- and long-term development plans. It lists 10 key activities on which the city should base its long-term strategy and has become a key reference for the city going forward.



**One of this project's biggest achievements was equipping Banja Luka with the skills and tools they need to manage future efficiency and transformation projects. We worked with the team to give them the support and guidance necessary, so they would be able to install, connect and commission the equipment independently.**



## The Results: **reduced heat consumption by 10%**

The renovated heating substations are now more balanced in terms of available flows and pressures so they can operate efficiently under local conditions. Thanks to Leanheat® Monitor, utility managers can remotely monitor and manage each heating substation, which has reduced the number of callouts and associated costs. They are also able to carry out predictive maintenance and respond more quickly to system warnings and alarms.

The project met all objectives, including laying the groundwork for new users to be connected to the district heating network and digitalizing the entire system. The District Heating Utility has also started implementing optimization modules and algorithms to manage heat production and distribution, and autonomously operate heating substations to ensure they perform optimally with the lowest return temperature.

These combined measures have resulted in an annual energy saving of 10%.



## **New projects** on the horizon

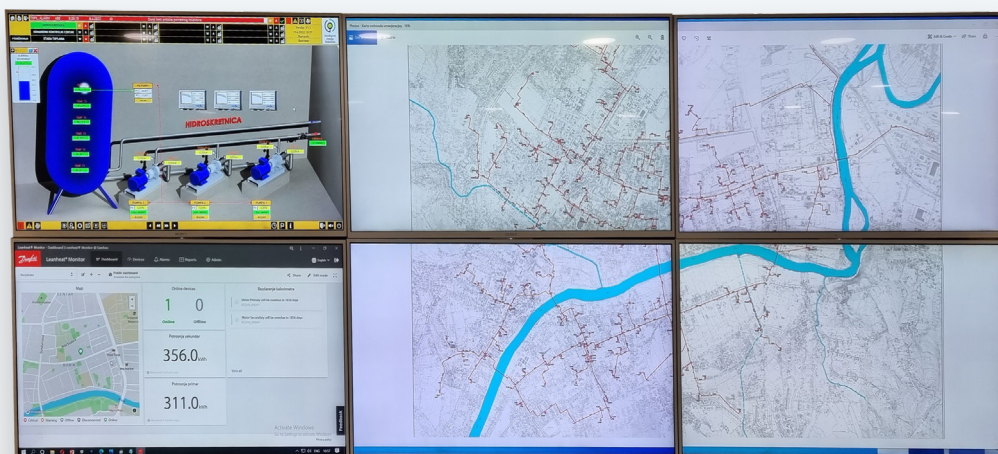
The city of Banja Luka and the district heating utility have recognized Danfoss as a **strategic partner in the field of district energy – advanced components supplier, solution provider and aftersales support**. The next step in the partnership is a project to renovate, digitalize and optimize 100 new heating substations and improve the entire system operation using advanced optimization tools. The District Heating Utility is also implementing Leanheat® Network, Danfoss' thermo-hydraulic modeling tool, developed specifically to help district heating utilities optimize the design and operation of district energy distribution systems.



**“We can say that Danfoss has become a strategic partner of Eko Toplane Banja Luka, and that this is a success story and an extraordinary cooperation that should be characterized as a win-win, because this is the only way to guarantee further technological development that leads towards even better energy efficiency;”**



Dejan Jovisevic concludes.





Fact box:

## **One of Bosnia and Herzegovina's largest district heating systems**

Banja Luka's district heating system is one of the largest in Bosnia and Herzegovina in terms of installed power and length of the district heating system network. Four heating plants supply a total heat power of 123 MW. The total biomass heat capacity is 65 MW. The distribution network is divided into three regions, consisting of the primary hot water and secondary hot water networks fed by the hot water pipeline and local hot springs. The total length of the primary hot water network is 50 kilometers, and the secondary hot water network is 130 kilometers. Heat is delivered through three main hot water pipes to 400 heating substations that generate heat for over 20,000 users and more than 1,500,000 m<sup>2</sup> of heating surface.