

Dynamic Network Leak Detection System in JKP Gradska toplana Niš

In collaboration with the United States Agency for International Development's (USAID) Better Energy project, and with E3 International providing technical leadership, pilot projects at district heating companies in Niš, Sombor, and Knjaževac were implemented prior to the 2022–2023 heating season to demonstrate energy-saving and cost-reducing best practices in system operation.

DHP	Monetary savings (USD/yr)	CO ₂ reduction (t/yr)
Niš	37,000	302
Sombor	91,845	1,565
Knjaževac	18,170	12

JKP Gradska toplana Niš (Niš DHP) Dynamic Network Leak Detection

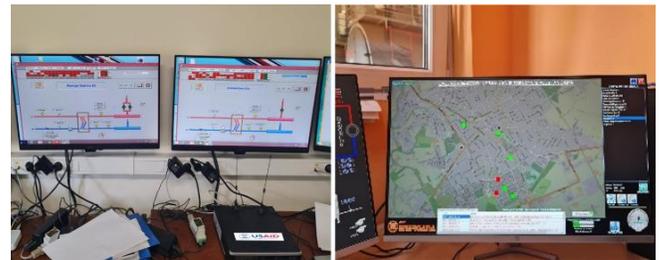
Niš DHP incurs significant energy and water losses in their distribution network. Since the hot water pipes are placed within deep concrete channels, it is not possible to spot and prevent leaks in a timely manner, so system leaks often go unrepaired for extended periods of time. It is necessary to have an optimal overview of the hot water



network and, as a benefit, to quickly find a troubled hot water network zone in case of a breakdown. This requires the installation of equipment at characteristic nodes, i.e., at selected manholes (pressure/flow sensors and temperature sensors and data loggers that work in real

time) to locate leaking pipe sections; plus, portable ultrasonic leak detectors to pinpoint exact leak locations. In addition, installation of a server application (SCADA platform) that maintains the connection with dataloggers which are installed in the manholes is required.

The total length of the distribution route in the district heating system of Niš DHP is ~ 70 km, i.e., ~ 140 km of pipes. Average water losses due to leaking pipes over the past 5 years are 65,000 m³/year – make-up water costs, including the cost of water and gas to heat this water amount to about \$270,000 per year, a significant financial cost for the company. and additional measures should be taken to reduce them further.



Costs and Savings

During the recent 2022-2023 heating season, the dynamic leak detection system proved extremely effective at locating and isolating pipe leaks, and directly resulted in a 14% reduction in make-up water requirements as compared to the 5-year average (56,300 m³ make-up water in 2022/2023 heating season versus 65,000 m³/yr between 2017-2022). Savings in water costs and gas to heat the make-up water amounted to \$37,000. At an installed cost of approximately \$80,000, investment in the dynamic leak detection system has been extremely cost-effective for Niš DHP, providing a 2.2-year simple payback and annual CO₂ reduction of 302 ton/year.

Disclaimer

*This activity was largely implemented by E3 International under its engagement on the USAID Serbia **BETTER ENERGY PROJECT** in cooperation with Chemonics International.*