

Thermal Substation Rehabilitation at JKP Toplana Knjaževac

With support from the United States Agency for International Development's (USAID) Better Energy project, and designed with the technical expertise of E3 International, pilot projects at district heating companies in Niš, Sombor and Knjaževac were implemented prior to the 2022-2023 heating season to showcase best practices in district heating system technologies and operations that can improve system operations, save energy and reduce operating costs.

<i>DHP</i>	<i>Monetary savings (USD/yr)</i>	<i>CO₂ reduction (t/yr)</i>
Niš	37,000	302
Sombor	91,845	1,565
Knjaževac	18,170	12

JKP Toplana Knjaževac (Knjaževac DHP) Thermal Substation Rehabilitation

It was necessary to modernize, automate and optimize the operation of 17 heating substations supplying the heat energy to buildings in Knjaževac – currently substations have no automation and control and all adjustments to meet customer heat demand are made manually. A detailed analysis of each of Knjazavac's 17 heat substations determined that each is equipped with dilapidated and defective mechanical and electrical elements (exchanger, circulating pumps, valves), and also that they lack measuring and control equipment for communication with the command center. This situation makes it impossible to use the system rationally, especially in the transition periods (Oct/Nov and Mar/Apr) – more heat energy is delivered to the consumer than is necessary and as a result, there is an increased consumption of fuel. One substation serving the Kindergarten Milana Punčića 3 is particularly problematic since it directly impacts heat supply to student classrooms which are often under- and over-heated. Automation with the remote control of the heating substation is necessary in order to achieve optimal delivery of heat energy to the school by adjusting the quantity of heat energy in the system in real time to demands and also outside temperature.

As part of the pilot projects, Knjaževac DHP is responsible for installing thermostatic radiator valves on each of the radiators in the school to allow for local heat control (previously, there was no way for the user to adjust the heat level).



Costs and Savings

During the recent 2022-2023 heating season, the thermal substation rehabilitation at Kindergarten proved extremely effective, saving money and improving comfort in the classrooms. Savings at Knjaževac DHP resulting from the pilot project are in the form of reduced biomass consumption from the boiler house serving the kindergarten, and reduced fuel oil consumed on-site at the kindergarten during the coldest days of the year. Based on data collected from the start of the 2022/2023 heating season through shutdown of the heat network in April 2023, the reduction in energy consumption at the Kindergarten compared to the same period last year amounts to a savings of \$18,170 in the cost of fuel oil consumption for the school boiler and wood consumption at DHP's heating plant – the project eliminated the need to use fuel oil in school boiler, saving 12 tons/year of CO₂. At an investment cost of \$19,500, the project provides a simple payback of 1.1 years.

Disclaimer

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