

ENGINEERING
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Danfoss

Case Story

Fully equipped **Danfoss substations** replace old district heating installations

Clinical Centre Belgrade, Serbia

35-40%
saved energy costs

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Fully Equipped Danfoss Substations Replace Old District Heating Installations

At Belgrade's main hospital the heat and hot water systems have been modernized. A new gas fired engine in combination with 58 new substations and a new district heating system has let to security of supply, 35-40 % of saved energy costs and a dramatic fall in pollution level.

Down in the cellar under the maternity clinic at the central Belgrade hospital a dirty and hot job is being done. Workers from the Serbian company Projektomontaža are on job de-installing old district heating and hot water pipes and installations, so that a new top modern substation can replace them. A job for the future, since modernization of the district heating systems of Belgrade is preparing Serbian energy supply for many years to come. The municipality believes, that combined heat and power in combination with district heating systems is simply the most efficient way of supplying energy. Especially when you have already got the network like here in Belgrade.

Huge savings

"The installation of 58 new Danfoss substations will estimated save us 35-40% in energy costs", chief engineer of the hospital, Mr Ratomir Ivosevic explains us while showing us around. He continues: "We get a central monitoring system, a full new network of pipes between the substations and a new boiler house with a

gas fired engine. It replaces 17 old polluting oil- and coal fired boilers, which were spread all over the hospital area", he says.

The hospital is the biggest and most specialized in the country and has more than 50 buildings placed at more than 100.000 square meters of land in the centre of Belgrade. "A reliable energy system is simply crucial since the most complicated surgeries and operations of the country take place here. Now we finally got it, so we are very satisfied," Ratomir Ivosevic says.

Different needs

The substations at the Belgrade hospital are equipped with separate heat exchangers for district heating and for sanitary water for each building. In the buildings themselves the new substations take care of the required amount of hot water and heat connected to the gas fired engine, the central energy source of the hospital.

"The major advantage for us is the ability to conduct a very accurate regime of temperatures, so that we only deliver what is acquired. We supply institutes, clinics and storage facilities and they have very different needs. Depending on purpose of the object the requirements are extremely varying - and are also depending on time of the day and of the week. Some buildings demand 24 hours of supply, some not. One of the very significant advantages of the system is the

programming. When to turn on and off, up and down, is now totally computerized. And thanks to the central operating system you can detect any malfunction very early and then intervene. In the end this all results in huge energy savings and gives the hospital a better economy", Ratomir Ivosevic says.

Solution providers

Jelena Jocić, Marketing Communication coordinator from Danfoss Serbia, is accompanying us in the cellar at the central Belgrade hospital. "We are delivering total substations as a package, not just components. And exactly this approach is making us strong. Our background is our long-term high standards within district heating technology. To this we add the cooperation with local partners - contractors, installers, producers and system integrators and this is a key element in our work. This kind of package solutions fit to anyone, who needs to modernize their systems", Jelena Jocić says.



This is a Danfoss substation

A fully equipped prefabricated substation is delivered from Danfoss to the customer. The installation and commissioning on the spot are done in close co-operation with long-time Danfoss partner Traco and the contracting company Projektomontaza.

The Danfoss substation is a complete product - designed and tested according to the controls, flow as well as heat transfer requirements of the installation. It is equipped with

controls and components, which together with pipes and pumps are the core elements of the substations.

The range of Danfoss controls on the welded substations covers plate heat exchangers, electronic controllers (for weather compensation) and sensors as well as motorized control valves, differential pressure and flow controllers and heat meters. All control functions are optimized according to the design of the substation. The project is financed by the World Bank.

Facts on installed Danfoss substations:

Capacity range:

- Indirect heating: 100-2000 kW and more
- Indirect heating and DHW production: 10-350 kW and more

Type of heat exchangers: Brazed

Temperature range:

- Heating: 110-75/70-90 °C
- DHW: 70-25/10-60 °C

PN range: PN16

Connection type: Flange

Delivery year	Indirect heating	Indirect heating + DHW	Total No. of substations
2005	0	3	3
2006	5	22	27
2007	6	22	28

Tabel 1: Danfoss substations delivered to Clinical Centre Belgrade

Fight against climate change: Micro CHP in combination with district heating

The use of district heating connected to micro CHPs is a main recommendation in the EU energy strategy in order to reach the 2020 emission goals.

CHP in combination with a district heating system is an extremely effective way of supplying energy, since the surplus heat from producing electricity is used for heating.

Replacing old oil- or coal-fired boilers with one effective central natural gas fired engine can save huge amounts of energy. This engine is connected to locally placed substations through a district heating network. A central monitoring system gives the possibility to conduct a very accurate regime of temperatures, so that nothing more than the acquired heat is delivered.

CHP in combination with district heating systems will bring down the pollution level in accordance with European Union standards. A modern

central natural gas engine lets out much less CO₂ than old oil- or coal fired boilers and is therefore the better choice in the fight against climate changes.

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