



*District heating plant in Gradiska was built in 1982. It was used for heating 35% of households in the Municipality, as well as for heating commercial and administrative buildings with a total heating area of 148,000 square meters.*

The overall efficiency of the plant was about 60% (produced/delivered energy ratio), due to losses in the old and poorly functioning distribution network. Collection rates for heating services were low; the major issue was the cost of heavy fuel oil used for heating. The annual losses of the district heating plant owned by Municipality were around 0.9 million EUR.

Municipality of Gradiska used public-private-partnership (PPP) model for financing the reconstruction and modernization of the heating plant. The Institute of Ecology and Energy (IEE) Ltd. A private company from Banja Luka took over the complete management of the plant assets for a period of 15 years. According to the provisions of the Concession agreement, the Municipality of Gradiska is entitled to receive 15% of annual profit.

The Investment in reconstructing district heating system and the switch to biomass, included the replacement of boilers that used heavy fuel oil, with two boilers using biomass. The plant has a total installed capacity of 12MW, an annual production of 18 GWh of heat energy, used for heating of approximately 120,000 m<sup>2</sup> of residential and office space. The Heating plant consumes around 8,500 tons of wood chips annually. The total investment was 2.5 million EUR.

The project was coordinated by the investor, and carried out by a consortium of local companies, led by Elnos from Banja Luka. EMPES Banja Luka designed the technical solution and produced the firebox system, ESCO CONTROL PROJECT Belgrade worked on automation control system, TEHNOMETAL Doboje worked on the storage system, transport and automatic usage of fuel, and SAMOTER Banja Luka, that installed chamotte lining of the system.

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The plant was put into operation on 1 January 2014 and was officially opened in April 2014. New management of the district heating plant announced the reconstruction of the entire district heating network, after the termination of the heating season.

Before



After



Stages of development of biomass DH plant in Gradiska:

- CONSTRUCTION PHASE: upgrade or building of additional 400m<sup>2</sup>; building of a platform for the preparation and storage of wood chips;
- PREPARATION AND TRANSPORTATION OF RAW MATERIALS: provision of mill for chipping wood waste; construction of reservoirs for wood chips; construction of system for wood chips transport;
- CONSTRUCTION OF COMBUSTION PLANT – BIOMASS BURNER: construction of primary combustion chambers 2x6MW; construction of the vortex chamber; construction of multicycles; adaptation of existing boiler with installed capacity of 12MW;
- CONSTRUCTION OF SYSTEM FOR AUTOMATIC CONTROL AND REGULATION OF THE PROCESS OF BIOMASS COMBUSTION;

Investment effects

- Quality and stable 24-hour heating mode for all consumers
- Reduced emissions and reduction of local pollution
- Social effect –maintenance of the current level of employment in DH plant and creation of new jobs in collection, preparation and trading of biomass
- Municipal budget relief of 1 million EUR per year (meaning 10% of the annual municipal budget), for the payments for co-financing the procurement of heavy fuel oil
- Additional revenues for Municipal budget (concession fees) that investor pays for the lease of the facilities

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The investor announced the next phase in the project development, with introduction of the cogeneration – production of heat and electricity from biomass, in order to improve utilization of existing capacities.

### Mounting of the first firebox



Facility for wood chips preparation



Facility for wood chips preparation



### Biomass fireboxes



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