



## CONSTRUCTION OF BIOMASS CHP PLANT IN WOOD PROCESSING COMPANY STRIZIVOJNA HRAST LTD. IN CROATIA

*The company Strizivojna Hrast Ltd., Croatian parquet flooring maker, decided in 2009 to increase energy efficiency by replacing existing diesel aggregated with the CHP system using wood residue from the production process..*

The company was processing around 60,000 m<sup>3</sup> of wood annually. The company had plans to increase the production, in which case the amount of wood-processing residue would be 42,000 m<sup>3</sup>. The main driver for the project was the inability of HEP – Croatian state-owned electric utility to supply sufficient electricity for the functioning of the production of parquet flooring. This project was the first biomass CHP project in Croatia based on the use of residue from wood-processing production.

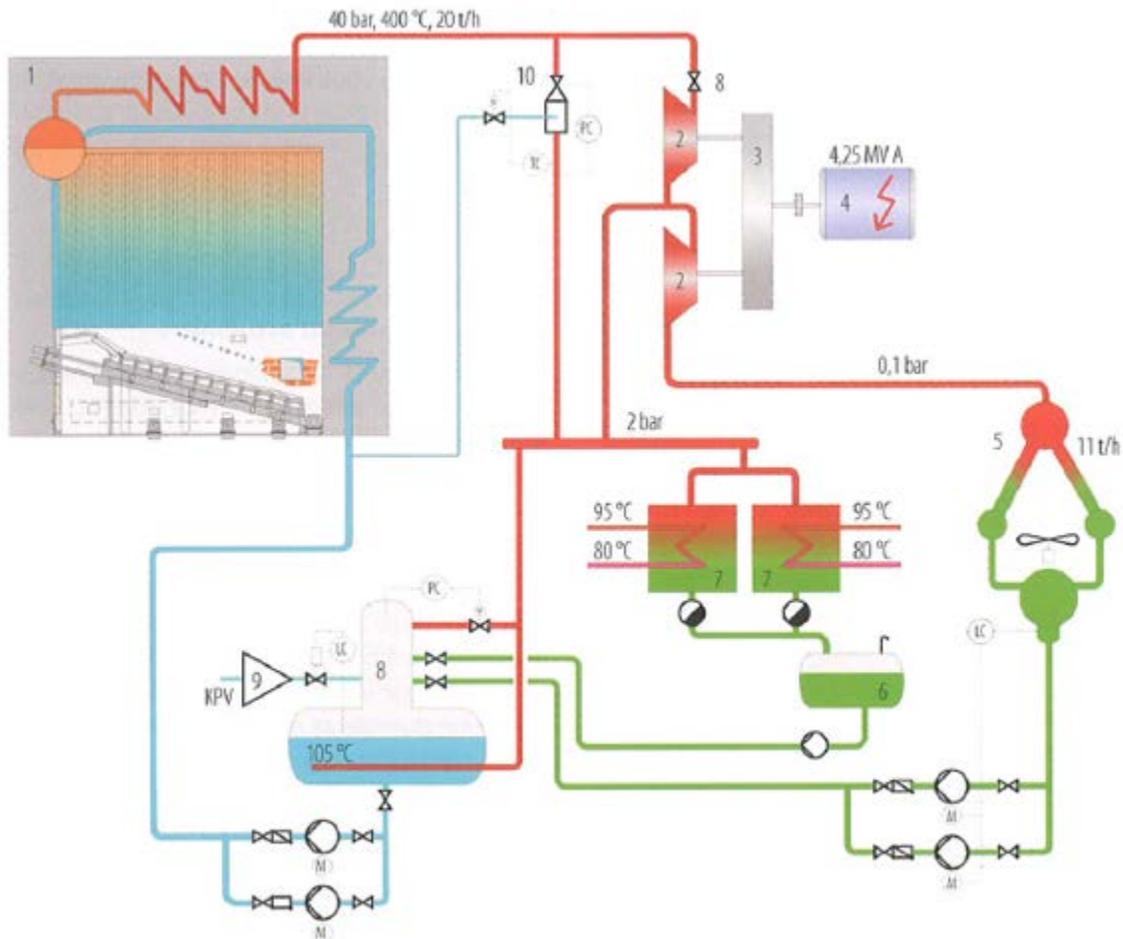


A deliverable of Heat Wisely, public awareness raising project on biomass-based heating in the Western Balkans



Company Enerkon from Zagreb designed technical solutions for biomass CHP system, with installed capacity of 3.3 MWe+6 MWth. The company PHB Automatizacija worked on automation control system, Energocontrol was in charge of the electric-technical part, and Leko of the construction works.

The following scheme illustrates technical solution applied in biomass CHP plant Strizivojna.



1. Steam boiler on wood chips
2. Steam turbine
3. Reductor
4. Generator
5. Air condenser
6. Condenser tank
7. Heat exchangers 2x3 MW
8. Water tank
9. Reduction-cooling station

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The project was financed through different sources: commercial loan, support from HEP ESCO/World Bank – 1.5 million EUR loan, Croatian Bank for Reconstruction and Development (HBOR), Croatian Fund for Environmental Protection (FZOE) - interest-free loan, grant from the Croatian Ministry of Regional Development and Forestry. The total cost of the project was 117 million HRK (15 million EUR).

Biomass storage



Biomass boiler



Chemical-technical preparation of water



Expected lifetime of the biomass CHP is 20 years, and the calculated payback period is 4.5 years. Results of the financial analysis were positive: the internal rate of return (IRR) is 27.68%, compared to interest rate of 8%, therefore the project can be considered profitable.

The biomass CHP plant was put in operation in October 2011. Since then, it produced electricity at a subsidized price for the next 12 years. The price is determined in Croatian kuna, and A deliverable of Heat Wisely, public awareness raising project on biomass-based heating in the Western Balkans



corrected annually for the inflation rate. The subsidized price for electricity from biomass CHP plant was:

2013	1.2556 HRK/kWh	0.1657 EUR/kWh
2014	1.2832 HRK/kWh	0.1681 EUR/kWh
2015	1.2806 HRK/kWh	0.1683 EUR/kWh

Annual production of electricity is around 17.75 GWh. The heat produced is used for the company needs (wood-drying, and different production processes).

Electrical equipment for boiler control



Heat station



Following the success of the project, the company announced the development of two more biomass CHP plants. The plant in Slavonski Brod, developed by the Strizivojna's Hrast sister company Slavonia Wood Industry, was constructed with an installed capacity of 4.66 MWe + 12 MWth, and is currently under commissioning (2015). Total cost of the investment is estimated to be 17 million EUR.

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Turbine-Generator



Chimney tower



Multi-cyclone and filter

