

# Biomass CHP project

## Forestry CHP

### Main CHP project indicators

Heat capacity (total)	kW <sub>th</sub>	5.100
Electrical capacity (total)	kW <sub>el</sub>	1.150 (gross)
Technology	ORC Cycle	
No. of units	1	
Manufacturer	Thermal Oil Boiler: Uniconfort (Italy) ORC turbogenerator: Turboden (Italy) <a href="http://www.turboden.it">www.turboden.it</a>	
Type of Fuel	Waste wood from wood processing and forestry	
Heat: yearly generation	MWh	31.600
Electricity: yearly generation	MWh	9.200 (gross)
Year of construction	2013	
Total investment costs	EUR	~4.000.000 VAT Excl.
Financing	75% Bank loan 25% private capital	
State support	Feed-in tariff (0,145 €/kWh)	
Return of investment (payback period)	Years	5 years
Location	Sarnitsa, Bulgaria	

### General description of the case

A biomass thermal oil boiler with horizontal oil-tube heat exchanger is fed by a double chain redler with wood chips, sawdust, wood shavings and wood particles. The boiler is capable of combusting fuel with water content of up to 55 % (on wet base) and with ash content of up to 5 % (on dry base). The thermal transfer fluid that is used is Solutia's Therminol 66. The ORC module is a Turboden 12 HRS split turbo generator with silicon oil. The gross electric efficiency of the ORC is expected to reach 24 % (from thermal oil). The condense circuit is water system

with a wood drier and dry air coolers. In case the drying chambers do not use enough heat the excess will be dissipated via the air coolers.

### Picture



### Success factors

The project is in remote area where a lot of biomass is available at good price. The technology is proven and stable and no major malfunctions are expected.

### Main barriers

Unstable political situation in Bulgaria and inconsistency in the policy in the biomass sector and the renewables sector in general.

High risk in the bank due to bad examples in the country with innovative technology, but not yet reliable, for making synthetic gas from wood chips (gasification).

### Comparison: before and after

After this example an increased interest is estimated in the traditional direct combustion of biomass technology and ORC cycles, due to the higher reliability of this technology (over 250 installed units all over the Europe).

### Conclusions

Strive towards overall high efficiency (heat is utilized) and fuel sourcing. Bet only on proven technology and suppliers.