

## Tirano Teleriscaldamento

### District heating

#### Main CHP plant indicators

Heat capacity (total)	MW <sub>th</sub>	1.1
Electrical capacity (total)	MW <sub>el</sub>	20
Technology	ORC CHP	
Number of units	1	
Manufacturer	Turboden	
Type of fuel	Biomass	
Heat: yearly generation	MWh	2,400
Electricity: yearly generation	MWh	8,800
Year of construction	2003	
Total investment costs	EUR	n. a.
Financing	Own funds Loans	
State support	Feed-in tariff, tax reduction	
Location	Via Polveriera, 50 23037 - Tirano (SO)	

#### Picture



#### General description of the case

The first biomass CHP plant based on an Organic Rankine Cycle turbogenerator in Italy has been successfully put in operation on June 2003. The system provides heat and electricity to the Northern Italy town of Tirano, located in

Valtellina (SO) and has been supported by funding from Regione Lombardia. The plant has an overall efficiency of about 89 % considering the combined production of heat and electricity; a nominal electricity capacity of 1100 kW with a net efficiency of 18 % from thermal oil to electric power and of about 15 % from biomass to electricity. The cogeneration plant produces electricity and heat for the city of Tirano, with an overall efficiency of 92 %. The central heating of Tirano has a total installed capacity of 20 MW thermal, given by 3 biomass boilers. The plant provides thermal and electrical energy eco-compatible to more than 500 users in the municipality of Tirano through a network of piping that extends for 28 km. Overall, homes are heated with district heating for a total volume of 1.4 million cubic meters.

The plant uses biomass, such as untreated and unused wood waste (e.g. pruning of forest residues, bark and waste from sawmills and industries). The timber comes from the surrounding area to reduce the impact of transport: waste material produced from the processing of wood from local sawmills in the form of wood chips delivered weekly; an additional supply comes from maintenance of the forests of the Valtellina, Valle Camonica and Engadina, and from maintenance of urban green space and the pruning of the vines.

The combustion of wood releases the same amount of CO<sub>2</sub> that the tree has received from the atmosphere during its growth. The CO<sub>2</sub> balance is zero and, therefore, climate neutrality is achieved (or Climaneutral), a fundamental principle to help combat the greenhouse effect.

A biomass fired thermal oil boiler supplies heat through a thermal oil circuit to an ORC unit, which produces electricity and gives heat to a hot water circuit (district heating). Most of the biomass feeding the plant is supplied by local sawmills (saw dust, barks, wood chips). The biomass CHP plant in Tirano is equipped with two biomass fired hot water boilers and biomass fired thermal oil boiler.

## **Success factors**

- Biomass availability.
- Social acceptance e local support.
- High thermal energy demand in a small area.
- Incentives and state support.
- Externalities.

## **Main barriers**

The biomass CHP plant works successfully.

## **Conclusions**

Italy has a great biomass potential for heat and power production.

Electricity generated from renewable sources has the priority for connecting to the grid.

Currently the incentives scheme for biomass is a feed-in tariff (22/28 cent € according to the type of material) for size < 1 MWe.