Biomass Cogeneration Power Plant

For Sale in Spring 2023

PPO - 128

1. Technical features summary

Description	
Location	Western Europe
Type of plant	Cogeneration with diathermic oil
Start-up date	20.12.2012
Shutdown date	31.03.2019
Operating hours	~ 48.000 hours
District heating	Yes
Fuel	Virgin Wood Biomass
Boiler thermal power	12,9 MWt
Turbine Brand / Type	Fincantieri 36 CE
Turbine electric power	3080 kWe
Steam temperature	380° C
Steam pressure	36 bar
Alternator Brand / Type	LEROY SOMER LSA56 BS5 – 4P
Alternator power	3850 kVA

2. Operating data

Year	En. production	En. transmitted	Operational hrs.		Biomass	Thermal values
	[MWh]	[MWh]	[h]	[%]	[ton]	[MWht]
2013	13.696	10.641	5.343	61%	35.133	16.011
2014	20.710	15.964	8.351	95%	51.272	14.258
2015	11.535	7.580	8.502	97%	31.609	14.761
2016	14.049	10.267	7.421	85%	37.002	15.268
2017	18.589	14.287	8.222	94%	40.406	15.247
2018	18.474	16.036	8.137	93%	42.970	15.089

3. The Plant

3.1 Operating principle (Location Western Europe)

The cogeneration plant is powered by virgin wood biomass (wood chips); it generates electrical energy through a steam turbine and provides hot water at 105°C (in the winter period) or 85°C (in the summer period) to the heating network of the Beneficiary (2 communities), with a total length (outgoing / return) of approximately 15 km.

3.2 Facilities and operation details

The electrical energy produced is entirely transferred to the grid, net of the plant's consumption. The plant is located on the site of a previous plant, which was decommissioned to construct the current one, keeping only part of the existing structures (storage and wood chip loading tank, electrical cabin, ash storage area, weighing platform). The plant consists of:

- Mobile grate biomass furnace;
- Diathermic oil boiler equipped with an evaporator and a superheater for producing saturated steam, as well as economizers for preheating the heating network's water;
- Turbo-alternator consisting of a multistage regulated spillage steam turbine;
- Smoke treatment system consisting of a bag filter;
- Evaporative towers for condensing the steam discharge from the turbine;
- Back-up boiler fueled by natural gas;
- Emergency generator powered by diesel fuel.

The smoke produced by the combustion of virgin wood chips (reaching a maximum temperature of 1000°C) heats the diathermic oil up to 300°C, which transfers heat to the water to produce saturated steam at a pressure of 36 bar. This steam is sent to the multistage condensation and regulated extraction steam turbine. The mechanical energy generated in the turbine is transformed into electrical energy by an alternator. The heat necessary for the heating network is obtained from the spilled steam from the turbine and sent to a steam/liquid heat exchanger for producing hot water

which is then fed into the network. The combustion smoke temperature is reduced through an economizer, which lowers the smoke temperature from 300°C to 160°C by preheating the feed water from 103°C to 165°C. After passing through the bag filter, the smoke is conveyed to the chimney, from which it exits at a temperature lower than 160°C. All the parameters related to air pollutant emissions are continuously measured and monitored in the chimney.

4. Fuel

The fuel used in biomass cogeneration plants is virgin wooden chips, which comes from dedicated crops or from exclusively mechanical processing of non-dedicated agricultural crops, from forestry interventions, from forest maintenance and pruning. The biomass is preferred to be obtained from production and/or storage points located within a radius of 70 km from the plant site (short chain) in order to obtain recognition of the Green Certificates with a multiplying factor of K 1.8. Only when the biomass is not available within the short chain, it is purchased from suppliers located beyond 70 km.

5. Products of combustion

During combustion, biomass produces ash in the 2-5% weight ratio to the biomass itself. The ashes are of two types: heavy or "wet" ashes, coarser, collected from conveyor belts placed under the boiler grate, and light or "dry" ashes, finer, intercepted by the sleeve filter system. All ashes are conveyed through chutes from hoppers to special bins or big bags, removed by operators, and stored until they are collected by specialized companies, who dispose of them in accordance with the applicable regulations.