Assens Fjernvarme Amba - Denmark

VØLUND™ WASTE-TO-ENERGY TECHNOLOGY - BIOMASS-FIRED CHP PLANT

PROJECT CASE HISTORY

The building of the combined heat and power (CHP) plant in Assens is part of the political 1993 biomass agreement aimed at converting all district heating plants larger than 1 MW into biomass-based CHP plants.

The Fjernvarme Amba plant in Assens, Denmark, has the capacity to supply nearly all of the town's 5,400 inhabitants with combined heat and power (CHP).

Assens Fjernvarme Amba is a co-operative society owned by the district heating consumers in Assens. The same company owns and operates the CHP plant.

In October 1997 Assens Fjernvarme Amba contracted with Babcock & Wilcox Renewable (B&W) for the building of the new biomass-fired CHP plant. The plant was delivered as a turnkey plant in March 1999, only 15 months later.

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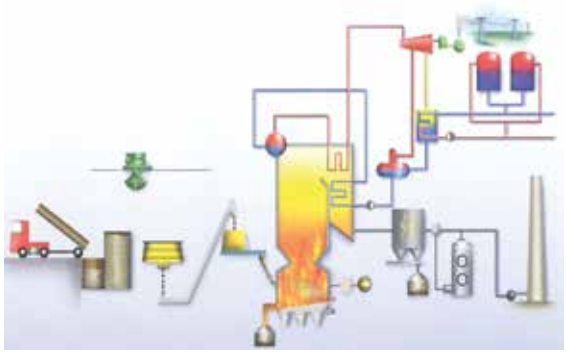

Using Vølund™ technology, B&W designed the boiler for firing a wide range of biofuels, which will consist mainly of forest wood chips with up to 55% moisture, sawdust, chipped clean wood from industry, and wood pellets.

From the wood chip storage the fuel is carried via a conveyor and a buffer silo to two pneumatic throwers which blow the fuel into the furnace. Here a partial drying and gasification takes place while the fuel is still in suspension. The actual combustion takes place on a water-cooled vibrating grate provided with three air zones.

Secondary combustion air and recycled flue gas are added to the furnace combustion zone through a large number of nozzles in the boiler's front and rear walls. Slag and ash are gathered in containers and transported to a deposit site.

After the boiler the flue gases are carried through an electrostatic precipitator to clean the flue gas of fly ash, and subsequently through a flue condenser, if required.

From the boiler the steam is sent through a turbine with a velocity of 12.500 rpm. Via a gear the turbine drives a generator with a velocity of 1500 rpm. The portion of the steam energy which is not utilized in the turbine is converted into heat in two parallel district heat exchangers.

Plant Data	
Energy input	17,3 MW
Electric output	4,7 MW
Electric efficiency	27%
Thermal output, net excl. flue gas condenser	10,3 MW
Thermal efficiency, excl. flue gas condenser	60%
Thermal output, net incl. flue gas condenser	13,8 MW
Thermal efficiency incl. flue gas condenser	80%
Steam temperature, turbine	525°C
Steam pressure, turbine	77 bar
Forward flow temperature	70-90°C
Return temperature	30-45°C
Power generation, annual	26-28.000 MWh
Heat generation, annual	226.000 GJ

Local Flue Gas Limits (based on 10% O_2 in dry flue gas)	Process Values	Units
CO, max	270	mg/Nm³
NO_x	450	mg/Nm³
Dust	40	mg/Nm³

Control and instrumentation

The plant control system is based on a Simatic S7 PLC. The general decentralized control system consists of an IGSS32 operating system with several PC operator stations from which the plant is controlled and alarms and conditions of operation are monitored.

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