

Multifuel-fired Combined Heat and Power Plant

Måbjergværket Måbjerg, Denmark



Måbjergværket is the first CHP plant in Denmark to use a fuel combination consisting of waste, wood chips, straw and natural gas.

Måbjergværket is owned and operated by DONG Energy in Esbjerg.

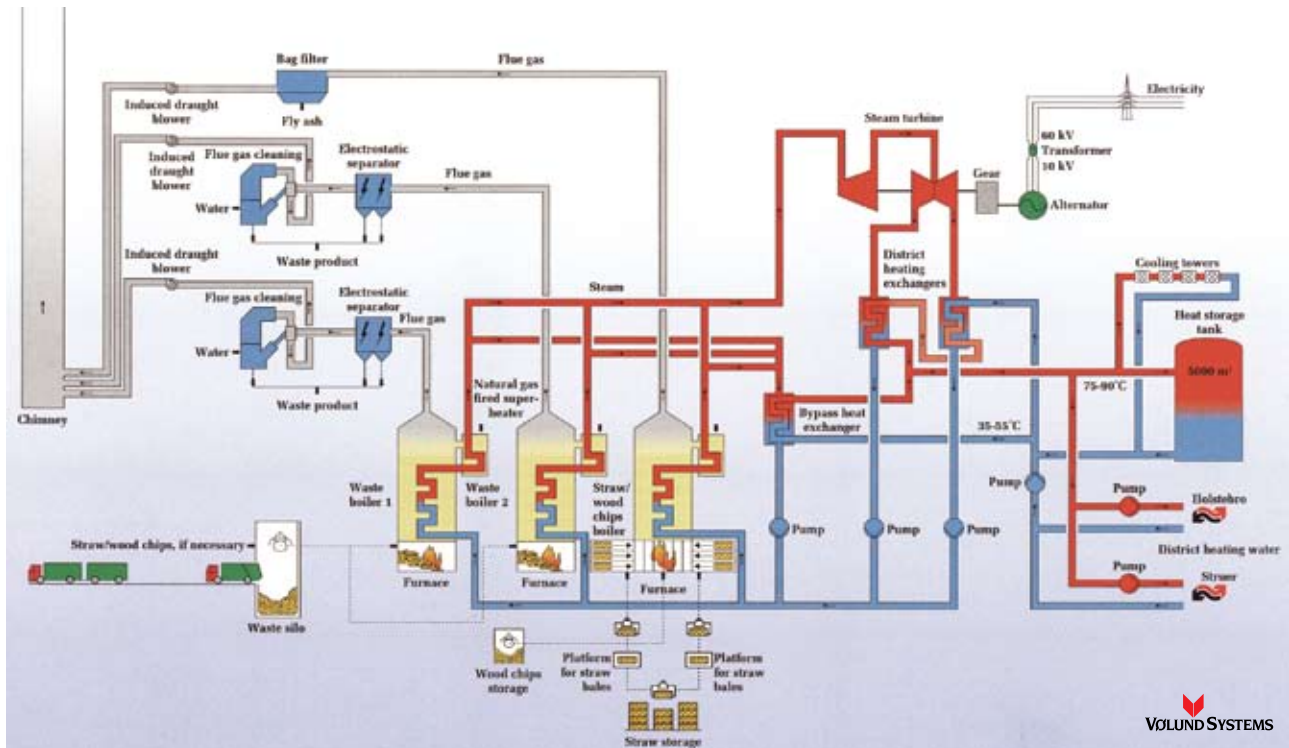
Måbjergværket supplies the approx. 55.000 inhabitants of the cities of Struer and Holstebro with direct heating, and the electricity is delivered to DONG Energy's electricity grid.

In October 1990 Babcock & Wilcox Vølund A/S (BWV) signed a contract for the supply of 2 waste waste-to-energy boilers and 1 biomass boiler, including complete combustion equipment and separate, natural gas fired superheaters for the boilers.

The CHP plant was commissioned at the beginning of 1993.



Multifuel-fired CHP Plant, Måbjerg, Denmark



The waste-to-energy boilers are of the well-known BWV design and have a capacity of 2 x 9 tons of waste per hour.

The waste is stored in a closed silo with a capacity of approx. 1800 tons. From the silo the waste is carried by crane through a lock system into the incineration boilers where drying, gasification and combustion take place on movable step grates.

Straw, wood chips and other biofuels are burnt in one and the same boiler, also of BWV design, suitable for combustion of biofuels. In this boiler straw or wood chips can be fed together with other biofuels at arbitrary quantitative ratios.

The straw combustion system consists of 2 x 3 straw burners in which the combustion takes place continuously from one end of the straw bale – the so-called cigar firing principle.

Wood chips and wood pellets, etc., are delivered to a buffer silo and subsequently carried to 3 pneumatic throwers, which blow the fuel into the furnace. Here the drying and gasification process takes place while the fuel is still in suspension. The actual combustion takes place on a water-cooled vibrating grate.

In 1998 the fuel distribution was 550.000 tons of waste, 31.000 tons of straw, 26.000 tons of wood chips, 3.200 tons of wood pellets, 2.000 tons of different biofuels and 3,7 mio. m³ of natural gas.

Boiler Data		
Boiler	W-t-E/each	Biomass
Load point	100	100 %
Steam flow	8,8	13,5 kg/s
Steam:		
Pressure after superheaters	65	65 bar
Temperature after superheaters	520	520 °C
Fuel flow	9.000	9.350 kg/h
Natural gas	250	92 m ³ /h

Plant Data	
Thermal output at full load approx.	67 MJ/s
Electric output at full load, approx.	28 Mwe
Electric efficiency	27 %
Thermal efficiency	61 %
Annual output of electricity	160 mio kWh
Annual output of heat	1.439.000 GJ

Local Emission Limits	(based on 10% O ₂ in dry flue gas)	
Boiler	Waste	Biomass
Particles	40 mg/Nm ³	30
SO ₂	300 mg/Nm ³	
CO	100 mg/Nm ³	650
NO _x	410 mg/Nm ³	
HCl	50 mg/Nm ³	11

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