

Maribo-Sakskøbing CHP plant

A high efficiency straw-fired power plant



Maribo-Sakskøbing's CHP plant began producing energy for district heating and electricity at the end of 1999. The heat produced is delivered to the district heating nets of Maribo and Sakskøbing, two cities in the southern part of Denmark.

This CHP plant, to which FLS miljø has supplied the boiler island, is the tenth in a row of plants installed by SK Power. The plant is decentralised and the operation and maintenance of the plant is carried out by the staff at the Kyndby Power Station located approximately 120 km from the Maribo-Sakskøbing CHP plant.

90% district heating coverage

This straw-fired CHP plant

produces 10.6 MWe which covers approximately 10,000 households. The plant also produces 20 MW of heat which covers 90% of the two cities' heat needs. The remaining 10% is supplied by an existing plant fired with wood pellets.

The fuel supply

Straw is supplied to the plant by nearby farmers who also receive the ash and slag from the combustion process for use as fertiliser on their fields.

The straw barn has a capacity of 900 tons which corresponds to four days of straw consumption at full load.

Electricity and heat production

The plant has a total efficiency of 89% whereby 29% is

for electricity production and 60% is for heat production.

The boiler, which was supplied by FLS miljø, has been specially designed to accept a steam temperature of 542°C which is shown by a high power efficiency.

This straw-fired plant is another step towards the reduction of carbon dioxide (CO₂) in the atmosphere as straw replaces the use of fossil fuels; sulphur dioxide (SO₂) and nitrogen oxide (NO_x) emissions are thus reduced by as much as 40 tons per year.

Plant composition

This plant is composed of four main systems, straw handling and feeding, boiler island, turbine and generator, and district heating heat exchanger.

The cranes in the barn

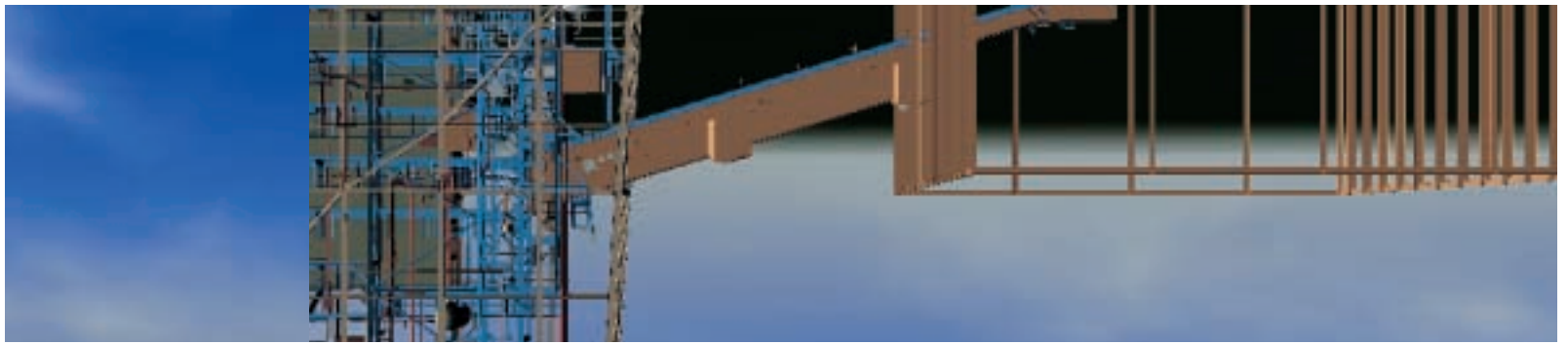


Boiler specification

The plant has the following main data:

Main fuel	Wheat straw
Maximum water content in straw	25 %
Alternative fuel	Wood chips
Fuel consumption	8.1 t/h
Steam production	43.2 t/h
Steam pressure	92 bar
Steam temperature	542°C
Feed water temperature	210°C
Boiler efficiency	92.9 %
Power output (net)	9.7 MW
Thermal output	20 MW
Plant efficiency	89 %





place the straw bales on the automatic conveyor which transports it to the boiler where the straw bales are loosened and ignited in the combustion chamber.

The combustion boiler

The boiler is a FLS miljø high efficiency boiler which produces steam at high temperatures and pressure. The straw is led to a steam turbine which is equipped with a generator for the production of electricity.

After the steam passes the turbine, it is led into two heat exchangers and is then transformed into condensed water. The released energy is used to heat the district heating water from 53°C to 85°C. This water is pumped to the district heating net of Maribo through a 7 km long pipeline and to Saksøbing through a 1.5 km pipeline.

Clean flue gas

The flue gas from the combustion of the straw is cleaned for solid particles through a fabric filter. The cleaning efficiency achieved is 99.99%.

Heat accumulator

The plant is also equipped with a heat accumulator tank which has a storage capacity of 6,000 m³ of hot water at the times where the consumption is low and, at the same time, the stored capacity is used at peak loads when the consumption is high.

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