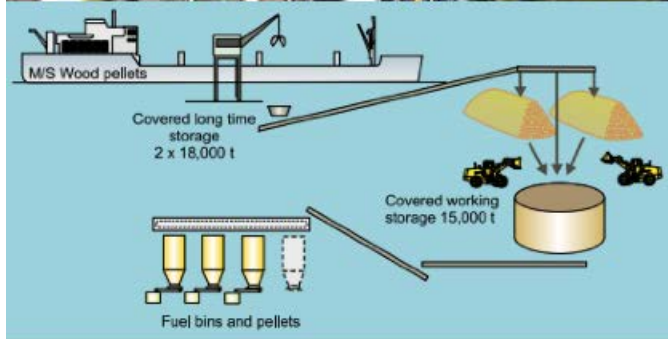




THE WORLD'S LARGEST BIOMASS FIRED HEAT AND POWER PLANT

Avedøre, Copenhagen – Denmark



Plant design data

Process parameters	Values	Units
Steam flow	144	t/h
Steam pressure	310	bar
Steam temperature	583	°C
Energy input	105	MW
Fuel input	26.5	t/h
Feedwater temperature	230	°C
Flue gas temperature after air heater	115	°C
Thermal efficiency	93.2	%
Electrical efficiency, total	49.5	%
Total plant output		
Maximum electrical output	535	MW
Maximum thermal output	620	MJ/s
Local flue gas limits		
CO ₂ max	625	mg/Nm ³
NO _x (calculated as NO ₂)	240	mg/Nm ³

*Based on 6% O₂ in dry flue gas

Avedøre power station is located in Copenhagen in Denmark. It is one of the world's most energy-efficient combined heat and power plants. Avedøre power station produces electricity to the Nordic power grid and district heat to the Copenhagen metropolitan area, for the needs of 280,000 single-family houses.

Coal and oil-fired Avedøre unit 1 started operation in 1990 and multifuelled Avedøre unit 2 in 2001. Avedøre 2 is divided into three modules:

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1. ultra-supercritical boiler plant
2. gas turbine plant
3. biomass plant.

Avedøre 2 uses a multifuel concept. The ultra- supercritical boiler was originally prepared to burn natural gas and heavy fuel oil. The boiler was retrofitted in 2002 to fire 300,000 tonnes of wood pellets annually, as an additional fuel.

The world’s largest straw-fired boiler can burn 150,000 tonnes of straw annually (25 tonnes per hour) which constitutes about 10% of Avedøre 2’s fuel consumption. The straw is fed into the furnace by screw feeders onto a water-cooled vibrating grate where up to 80 percent of the energy content is released by pyrolysis and gasification. The remaining straw/carbon will burn out on the water-cooled vibrating grate. A bag filter system removes more than 99 percent of the particulates from the flue gas leaving the boiler. Slag and ash is carried to containers by a submerged slag conveyor system. Some 50 truckloads of straw a day are transported to Avedøre Power Station from farms situated in eastern Denmark. The ash from the straw is returned to the fields due to its fertiliser value.

In order to keep the wood pellets dry and to minimise dust, all handling is performed in closed systems. Existing coal conveyors are covered, and dust is removed at strategic places by a vacuum cleaning system.

Capacity at full load, net	Fuel data
435 MWe without gas turbines	Ultra-supercritical boiler - natural gas, fuel oil, pulverised wood pellets
585 MWe with gas turbines or	
365 MWe and 475 MWth heat without gas turbines	Biomass plant - straw
505 MW electricity and 565 MWth heat with gas turbines	Gas turbines - natural gas

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