

Studstrup Power Plant, units 1 & 4

Cofiring coal and straw



Plant description

In 1995 the Danish utility company Elsam converted the 150 MWe pulverised coal-fired Studstrup Power Plant, unit 1, into cofiring of coal and straw for technology demonstration purposes. The conversion consisted of establishing a straw pre-processing plant and modifying the burner system. After plant commissioning in January 1996, a 2-year demonstration program was initiated. The objective of the program was to evaluate influence of cofiring on boiler plant performance, combustion chemistry, heat surface deposits and corrosion, residue quality, emissions and SCR systems.

Based on the two years of large-scale operation under normal power plant conditions, it was concluded that the cofiring technology is viable at least up to a straw share of 20% on energy basis. The boiler performance is only marginally affected. Corrosion is only slightly increased and fouling can be kept within a controllable level. The use of fly ash in the cement industry is possible - for concrete production, the use is restricted.

The technology is by far the cheapest and fastest way to introduce biomass into power production. The cofiring concept has a great competitive edge over stand-alone biomass fired units. Based on the demonstration firing on unit 1 Elsam has converted a 350 MWe PC unit, ie unit 4, into cofiring. The plant was commissioned early 2002 and is now in commercial operation.

Main plant data:

Year of commissioning	1985
Unit & electricity capacity	824 MW/350 MW
Burners	24
Straw fraction	0-10% (on energy basis)
Straw input (full load, 10% straw)	5.6 kg/s
Steam flow	286 kg/s
Superheated steam	240 bar/540°C
Reheated steam	45 bar/540°C

Services provided by Elsam Engineering

Elsam Engineering has been responsible for development of the technology together with national and international universities. Elsam Engineering provided all engineering services except civil engineering which was carried out by a local civil consultant. The conversion was procured according to the split package approach to get the best possible equipment for straw processing. Elsam Engineering was in charge of overall plant performance and complete functioning of the plant. Elsam Engineering developed a highly automated straw reception and transport system that only requires manpower when straw is actually received. This concept has been used at several other biomass-fired power plants.

Studstrup Power Plant, units 1 & 4

Cofiring coal and straw