

Promising results of co-firing of pellets with coal

Turku Energia is a joint stock energy company owned by City of Turku in south-western Finland. Turku Energia provides its customers with electricity, district heat and related services. The district heat network of Turku Energia reaches 85% of Turku residents.

In addition to own power generation, the company buys heat from Fortum Power and Heat. In 2001 Turku Energia's turnover was 110 million € and the number of employees was 301. Electricity sales in 2001 were 1,346 GWh and district heat sales 1,603 GWh.

Turku Energia started cofiring of wood pellets with coal at the Linnankatu 100 MW plant. The cofiring has reduced carbon dioxide emission by 8,500 tons.

Combustion of wood pellets

Strong increase of coal price, taxation favourable to wood fuels and climate protection commitment in the company were behind Turku Energia's decision to test combustion of wood pellets mixed with coal at Linnankatu plant.

Hässelby power plant in Stockholm, Sweden had successfully been cofiring pellets with coal. Turku Energia's staff made a study tour to Hässelby power plant, where 250,000 tons pellets are combusted annually.

Cofiring with existing equipment

Linnankatu 100 MW power plant operates only during the peak loads in winter, 4 to 5 months depending on the year. The plant generates electricity to national grid and heat to the district heat network in relation to the market situation.

Before the test period the power plant used only coal as fuel. The company decided to start combustion of wood pellets by generating 25 GWh during the heating season. That energy amount requires about 5,000 tons of wood pellets and 3,500 tons of coal.

For the cofiring, 10-15 wt% pellets are mixed with coal at the coal receiving building. That is equal to 7% of output. The pellets are crushed to dust with the same hammer mills as coal.

The cofiring of pellets with coal has created only minor problems. Fouling on the back wall of the boiler increased slightly. Bouncing of light pellets on the belt conveyor caused some problems, which was eliminated by building a small wall.

The investments of the new cofiring project totalled in 3,360 € including wages. Hence, no additional investment was required, except for an old chicken-feed bin bought for storing the wood pellets, the cost of which was 420 €.

Turku Energia has not yet decided whether to continue the cofiring test. The decision will be affected by price development of coal and pellets as well as the subsidies for biofuels. In January 2001, the price of coal was 3.6 €/GJ and that of pellets 4.7 €/GJ. Power generated from pellets is supported by 4.20 €/MWh. The price of heavy fuel oil, which Turku Energia also uses for heat generation, was 7.0 €/GJ (25.2 €/MWh).

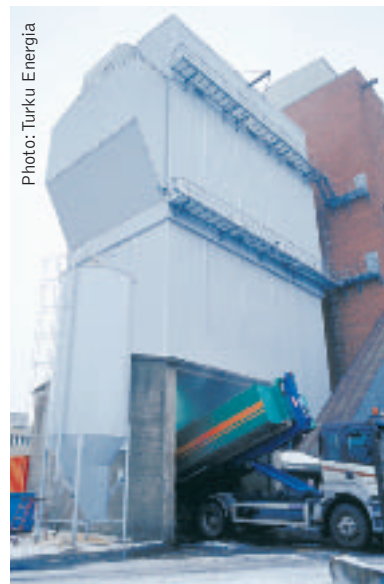


Photo: Turku Energia

Cofiring of wood pellets reduces CO₂ emissions at Linnankatu coal power plant



Energy, Environment,
Sustainable development

Technical data of the Turku Energia's Linnankatu power plant

Boiler	100 MW
Fuels	Coal and wood pellets
Pellet consumption	25 GWh, equal to 5 320 t/a
Investment costs for pellet utilisation	3 364 €
Start-up of pellet combustion	12/2000

Produced by OPET Finland, VTT Processes 1/2002

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Largest consumer of wood pellets in Finland

The co-firing test made Turku Energia the largest consumer of wood pellets in Finland. Biowatti Oy delivers the pellets to Turku. Every day a full trailer truckload of pellets, equal to 35,000 kilos, are transported to Turku from Biowatti's Turenki plant. The load meets the consumption of one day at the power plant. The pellets are blown pneumatically from the truck into intermediate storage.

Biowatti, an affiliate of Metsäliitto Corporation, was founded in 1999 in an old sugar mill in Turenki. The plant has a production capacity of 70,000 tons of pellets per year. To meet the production goal the company needs to start drying of raw material, i.e. sawdust before pelletisation. The company now uses dry cutter shavings as raw material. Cutter shavings are sufficient for pellet production of 20,000 tons/year

Pellet use reduces carbon dioxide emissions

The combustion of wood pellets does not increase carbon dioxide emissions, as



Pellets are mixed with coal before feeding into hammer mills

the carbon dioxide release is bound in the new growth of wood stand. When pellets are used to replace coal the CO₂ emissions decrease at the power plant. At Turku Energia's Linnankatu plant the CO₂ emissions were reduced by 8,500 tons during the test period.

In the future, the proportion of pellets can be increased, if their use proves to be economically feasible. The pellets do neither contain any sulphur. Possible reduction of nitrogen oxides in flue gases will also be monitored.