

Full scale test at Grenaa Kraftvarmeværk using briquettes to replace coal and straw.

Purpose:

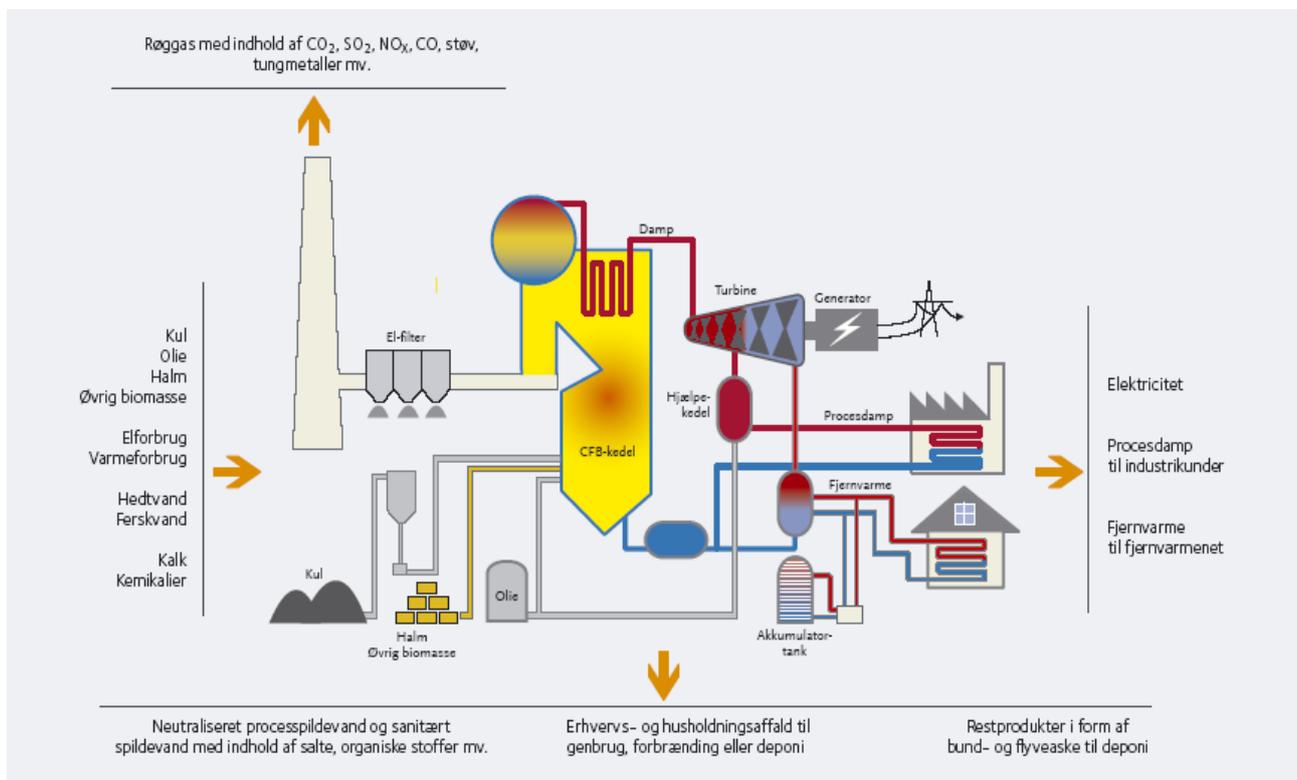
The purpose of the test was to see if it was possible to replace coal with wood briquettes using the existing equipment i.e. receiving system, hammer mill, convey belts, silo etc. Major concern: dust problems during transport and bridge building of materials in silo.

The plant:

Grenaa Kraftvarmeværk is an 88 MW CHP plant (Central heating and Power plant) producing electricity, process steam for industrial customer and central heating for the town of Grenaa and is based on burning a combination of coal and biomass, mainly straw.

The boiler system is a Circulating Fluid Bed type (CFB) and in boiler room the fuel is mixed with an inactive material i.e. sand, ash etc. and the mixture is kept floating by the burning air. Thereby it is possible to achieve an effective burning at a relative low uniform temperature i.e. typically 850 C.

Below please find a diagram of Grenaa Kraftvarmeværk



The briquette:

The briquettes use for the test was made of pine by a C. F. Nielsen BP 4000 Briquette press with a diameter of 60 mm and has a burning value of approx. 17,5 GJ/MT. For the test a truck load of 22 MT was used.

The full scale test:

The briquettes were dump besides the coal grave and pushed into the grave by a front wheel loader, craned into the hammer mill, transported on open conveyor belts to a feeding silo. From the silo the material was transported in a chain conveyor to an auger system feeding the boiler room.

Conclusion/recommendation:

Overall the full scale test was very successful:

- The briquettes were easily crushed to the wanted particle size in the hammer mill
- No problems in transporting the crushed material on open conveyor belts chain conveyor belt and in the auger system
- No bridging of the crushed material in the feeding silo.
- No negative effect in the boiler room

However there are some minor dust problems:

1. When dumping the briquettes into the coal grave. A part of the problem can be overcome by side tipping the briquettes directly into the coal gave.
2. When loading the briquettes into the hammer mill with the crane. This can be overcome with an extension of the existing dust extraction system (minor investment).
3. When the crushed material is falling from the main open conveyor belt to the open conveyor belt feeding the silos. This can be overcome by installing a minor dust extraction system.