

Grate incineration of biomasses

Titel: 4730 - Joint biomass project: Development of a general model for grate incineration of biomasses.

Project manager: University of Aalborg, Institute of Energy Technology, Lasse Rosendahl - Tel.no. 0045 9635 9240

Grant: PSO - DKK 3,812,000

The project consisted of two parts: establishing test facilities and creating a module describing the process of biomass incineration in grate-fired CHP plant boilers. Establishing the test plant was a success, and it is continuously used by researchers and students, who want to do their final projects on biomass incineration. Creating the module, however, turned out to be much more complicated than expected and so far, the researchers have given up on using that part of the project.

Gasification plant in Græsted

Titel: 5288 - Modelling, verification and long-term testing of a stepped gasification plant's operational characteristics with regards to varying electricity and heating outputs.

Project manager: BioSynergi Proces ApS, Henrik Houmann Jakobsen Tel.no. 0045 4586 1430

Grant: PSO - DKK 1,642,000

This project provided a wider insight into gasification plants based on the so-called Open Core principle. The experiments were carried out at the Castor plant within the CHP plant Græsted Fjernvarme in the north of Zealand, headed by Henrik Houmann Jakobsen from BioSynenergi ApS. The main project activities were reconstructing and testing the plant for operation during part-load experiments; developing start/stop procedures; operational measurements within the reconstructed CHP plant; and developing a static computer model. Back then, when the Castor plant was established based on subsidies from the Danish Energy Agency, it was only designed for full output operation. Upon completing this present project, the load can be reduced to around 40% of the maximum output of 425 kW. The measurement programme showed, amongst other things, that the gasifier produces a fine gas featuring a relatively stable composition.

Gasification plant in Gjøel

Titel: ENS-1373/03-0004 - LIFTOFF gasification plant in Gjøel

Project manager: FORCE Technology, Aage Damsgaard - Tel.no. 0045 7215 7700

Grant: EFP - DKK 2178,000

Originally, the goal of this project was to carry out a measuring programme and finish the development of the gasification plant in Gjøel in the north of Jutland. The plant construction process saw some serious delays, however, which meant that the gasifier was not run in until very recently. Therefore, it has not been possible to carry out a measuring programme, and the resources from this project have been spend on dimensioning and finishing the plant instead.

Alternative additives

Titel: 6532 - Alternative additives

Project manager: Dong Energy A/S, Lasse Tobiasen, Tel.no. 0045 9955 1111

Grant: PSO - DKK 2,600,000

Previous theoretical studies involving various types of additives have generated positive results. Many of these additives, however, are too expensive to be put to practical use in full-scale plants, and the aim of this project was to analyse the possibilities of utilising a number of cheaper alternatives. These were:

- dry matter fractions from degasified manure
- paper sludge
- foundry sand
- used bleaching clay
- anorthosit
- sand
- clay remains

Most of these alternative additives turned out to be unsuitable; either based on the lack of a chemical effect or because of excessive pre-treatment requirements, especially desiccation. Bleaching clay and clay remains were the only additives that were capable of reducing fur, however, clay remains is a very wet clay fraction, and desiccation would make up a significant barrier to utilisation. On the contrary, used bleaching clay requires very little in terms of pre-treatment, making this the most promising suggestion for an alternative additive. Because of its oil content, however, in legal terms, this product is considered a waste product that, amongst other things, carries a fee of DKK 330/tonne. When using additives, larger amounts of ashes must be disposed of. All in all, this might lead to a significant additional expenditure, particularly with regards to fuels with high ash contents such as straw, because additive addition is proportional with the ash content of the fuel. Overall, using alternative additives is not financially attractive because it will lead to a fuel price increase of at least 3%, when using wood as fuel, and 8% when using straw. These expenditures would only outweigh the potential savings on operational and maintenance costs in special circumstances.



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Alternative additives have been tested at Køge CHP plant, amongst other places.