

STOP

STable OPerating conditions for biomass combustion plants

www.sintef.no/stop

Torrefaction reactor – status

During 2011 the torrefaction reactor was built according to specifications provided by SINTEF.

During the installation work, several experiments were performed in order to test the functionality of the reactor. A group of engineers and mechanical specialists were sent from Norway to the producing country, Hungary.

Among the functionalities that were tested in Hungary were

- (a) the rotating screws both in cool and hot conditions
- (b) the heating control
- (c) the signal control (including the control of the sliding valves)
- (d) oxygen leakage
- (e) fuel torrefaction.

In total, four tests were performed revealing a number of challenges that had to be solved.

The most challenging problems were related to the tolerance values set between the screws and their housing. Due to metal expansions during heating there was contact between the moving metal parts which resulted in damages to both the screws and their housing. The problem was solved by relaxing the tolerance values, which resulted in smooth operation.

The reactor was sent from Hungary in early December and arrived in our laboratory the 13th of December. The remaining of the year will be used to link the reactor to our laboratory infrastructure. Early next year initial testing will start.

STOP – the workshop

A workshop for the industry was arranged on the 8th of December in Trondheim.

Representatives from SINTEF, NTNU and industry partners gathered to exchange information and to follow the progress of the STOP project.

An overall status of the STOP project was given, followed by presentations covering most of the deliverables planned for the current year.



The torrefaction reactor pictured in the laboratory in Trondheim on the day of delivery

These included:

- D1.1.2 Fuel upgrading by thermal options – Status
- D1.1.4 Torrefaction reactor experiments
- D1.1.5 Characterization of torrefied fuels in a macro-TGA
- D2.1.2 Combustion properties of torrefied fuels
- D2.2.1 Combustion monitoring options in biomass combustion

In addition, a status of the available torrefaction technologies was given in a presentation entitled "Torrefaction around the world".

The major part of the STOP effort this year will result in the publishing of two journal articles planned to be submitted by the end of this year.

Other news

IEA task 32 activities in Dublin

In the previous STOP newsletter we mentioned the IEA task 32 meeting that was held in Graz, which focused on the development of torrefaction technologies. All presentations from this meeting are available at: www.ieabcc.nl/meetings/task32_2011_graz_torrefaction/index.html

The second task meeting this year was held in Dublin in October. During the task meeting, different issues related to biomass combustion were proposed by representatives from member countries. These were prioritized for the next triennium task activities.

The task meeting was held in conjunction with two workshops: "National workshop on local developments in small scale biomass combustion" and "Processing routes for Solid Recovered Fuels".

The first workshop highlighted the current challenges in Ireland for implementing appropriate biomass combustion technologies and introduced upcoming EU legislation on product requirements (stoves and small scale boilers) and the relevance of health and safety related issues.

The second workshop covered different aspects related to Solid Recovered Fuel combustion and cofiring. The presentations from the two workshops are available on the Task 32 website.

Task 32 organized a visit to a Stirling engine demonstration plant established by Teagasc (the Agriculture and Food Development Authority) in Oak Park, Carlow. Additionally, a field trip was arranged for visiting the Lagan cement kiln with co-incinerating of SRF at Kinnegad (west of Dublin) and the WtE plant of Indaver in Dublin. Liang Wang, SINTEF, participated in all the arrangements: task meeting, workshops and site visits.

The next IEA task 32 meeting is planned 18-20 June 2012 in Milan together with the 20th European Biomass Conference and Exhibition.

Renewable Energy Research Conference 2012

This scientific conference will be arranged 16 - 18 April 2012, in Trondheim, and the focus is on renewable energy technologies.

In addition to interesting lectures on general issues concerning renewable energy, there will be detailed scientific parallel sessions.

Scientists from all areas of environment-friendly energy research will have the opportunity to present and discuss recent technological and scientific achievements in 13 parallel sessions. One session is devoted to Bioenergy including heat, cooling and/or power generation from biomass.

The conference is arranged by SFFE - Centre for Renewable Energy. Further information on www.sffe.no

The 3rd International Conference on Biomass and Waste Combustion

will be arranged 24 - 25 April 2012 in London, UK. The Conference will focus on the technical aspects of biomass and waste combustion. Applied R&D results, new technological innovations as well as best practices for technical solutions and plant operation will be presented.

The conference is jointly organized by three of the key partners of the successful EU project NextGenBioWaste (2006-2010); SINTEF, KEMA and Vattenfall R&D.



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www.sintef.no/NGBWconf_2012

Sweden's Vattenfall upbeat over torrefied pellets test

The Swedish utility Vattenfall sees torrefied biomass as a feasible way of increasing its renewable energy mix, after testing torrefied pellets at its Reuter West combined heat and power (CHP) plant in Berlin, Germany.

The company tested 4300 tons of torrefied pellets co-fired with hard coal at different percentages to test the levels of mixing. They tested the pellets for five days at 20 % of the fuel mix, two days at 35 % and then a further two days at 50 %.

It was stated by Vattenfall that "Co-firing is one of the most economic ways of introducing biomass into our fuel mix". By replacing a fossil fuel with torrefied wood you are directly replacing CO₂ emissions, and because the properties are so similar to coal, you also avoid the expense of having to adapt the plant.

www.argusmedia.com/News/Article?id=769833

On another note, the Energy Research Center of the Netherlands (ECN) has signed a contract with Vattenfall to start the basic engineering for a torrefaction demonstration plant.

www.ecn.nl/nl/nieuws/newsletter-en/2010/june-2010/torrefaction-contract-with-vattenfall/

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