

IEA Bioenergy Agreement
Task 33: Thermal Gasification of Biomass
Spring 2002 Task Meeting
Wednesday, June 19, 2002
RAI Conference Center, Amsterdam, The Netherlands

DRAFT MINUTES
September 28, 2002

Attendees : H. Knoef, R. Buehler, E. Kurkela, E. Scoditti, M. Morris, M. Fock, S. Babu, J. Neeft, R. Meijer, N. Barker, R. Rauch, R. Bain, H.F. Christiansen, K. Kwant (part of the meeting), and 2 Observers from Takuma, Japan

Unable to attend: K. Maniatis, E. Winther

The abbreviated one-day Task Meeting was held during the 12th European Biomass Conference. The approved Agenda for the Meeting is shown as Attachment 1. Following the introduction of the two observers from Takuma, Japan, the meeting started with a brief introduction of GasNet by H. Knoef.

GasNet: This EC sponsored European technical activity in biomass gasification was created as a part of the European Thermonet, administered by University of Aston, Birmingham, UK and BGT, Enschede, The Netherlands. GasNet has 21 members which includes several European Countries and industries. In addition, GasNet admits Associate Members for individual meetings for a fee. GasNet is conducting studies on the following topics:

1. Environment, Health, and Safety
2. Feedstock and Feeding
3. Gas Cleaning and Tar Cracking
4. End Use Applications

Topic Leaders are selected for each of the four topics. In addition joint efforts among members are coordinated to prepare Country Reports, Kinetics and Modeling, Technical and Non-technical Barriers, Education, Training, and Public Relations. The first Annual Report for GasNet is now under preparation.

Joint Meeting of Task 33 and GasNet: Task 33 and GasNet will conduct its first joint meeting on October 2 and 3 in Strasbourg, France. H.Knoef and S. Babu will prepare an Agenda for this meeting, which will include a review of on-going studies in Task 33 and GasNet and selected Special Topics considered critical to advance biomass gasification technology.

Review of Task 33 Activities

Task 33 Website: S. Babu has reported on the progress of the Task website at <http://www.gastechnology.org/pub/iea/>. The comments received from the Task Members were incorporated. Further improvements will be made to the site as needed.

Following a general discussion, the participants agreed that there is no need to protect the site with passwords etc., and the site should be accessible to any one.

Review of Subtask Studies

Fuelgas Co-firing (Joint study with Task 32, Biomass Combustion and Cofiring):

R. Meijer will discuss with NOVEM the resources required to complete the study and report the plans to complete the study.

Gas Cleaning for Moving-bed Gasifiers Coupled to Gas Engines (Joint Study with GasNet):

H. Knoef distributed a draft Technology Brief. Participants are requested to send the latest developments on existing moving bed gasification processes to H.Knoef along with any new technologies/processes. The Technology Brief will be periodically updated and posted on the Task 33 website.

Gas Cleaning and Effluent Characterization for CFB and FB Gasifiers:

E. Kurkela distributed a draft Technology Brief. R. Bain was requested to provide the information on Brightstar gasification process to E. Kurkela. The Technology Brief will be periodically updated and posted on the Task 33 website.

Emissions and Effluents, Process Waste Water from all Sources, Emission Regulations, Permitting, Toxicology and Environmental Issues:

H.F. Christiansen and M. Fock presented the subtask progress. The draft report distributed to the Task Leader has a table missing. The Professor from University of Lund who is conducting the work may attend the Fall 2002, Strasbourg Task Meeting to present the current status of this study.

Biomass Gasification to Produce Synthesis Gas, Hydrogen-rich Gas and Hydrogen (Joint Study with IEA Annex 16):

A report was prepared on Hydrogen from Biomass by NREL and submitted to IEA Annex 16, Hydrogen. The report is available as a pdf file at (??):

www.eren.gov/hydrogen/iea/pdfs/hydrogen-biomass.pdf

Tar Protocol: The first part of developing a standard procedure for tar characterization and measurement protocol has been completed and presented in a special session at the 12th European Biomass Gasification Conference. The results of this initial phase, sponsored by EC and several European Countries and USA are posted on :

www.tarweb.net

The next step, subject to funding availability would be a 3-year effort to work towards an ASTM type of standard. It is proposed that future progress of this study should be presented at a future joint meeting with GasNet and with the participation of gas engine manufacturers.

Technical Hurdles and R&D Needs/Solutions: No activity so far.

Review and Update on Energy Conversion Devices: E. Scoditti distributed a draft Technology Brief prepared with assistance from N. Barker. M.Fock, R. Bain, and S.Babu and other participants are requested to send any new information on energy conversion devices to E. Scoditti and N. Barker. The Technology Brief will be periodically updated and posted on the Task 33 website.

MSW/RDF Gasification and Energy Recovery (Joint Study with Task 36, Energy from Integrated Solid Waste Management Systems and Techno-economic Assessment for Bioenergy Applications): M. Morris will send the TPS survey of MSW/RDF gasifiers that was prepared a few years back in pdf format to S. Babu for posting on the Task 33 website.

Regulations and Permitting (Joint Study with GasNet): R. Buehler listed 6 potential concerns that could lead to explosions. R. Buehler distributed a questionnaire for review and comments. All responses should be sent back to him as soon as possible.

Country Reports (Joint Study with GasNet): K. Kwant reported that review and revisions to Country Reports are in progress. He requested the revised reports should be forwarded electronically to him with in the next 2 to 3 months. S. Babu may combine his R&D updates with the Country Reports.

Highlights of Country Reports

The Netherlands: HOST, a Netherlands company is building a pilot plant gasifier (details??) near Enschede.

Switzerland: Xylowatt has modified the Indian Institute of Science gasifier to European standards. The gasifier is instrumented for unattended operation. The Pyroforce, AHWT gasifier is now in continuous operation during weekdays and requires operator assistance.

Finland: A 1982 Bioneer gasifier is still in operation. Of the others, all except for one are operated as needed. The Pietersaari Ahlstrom CFBG is in continuous operation firing a lime kiln at the paper mill. Lahti plant is in continuous operation and the feed now contains more waste plastic materials. VTT has developed a new design for gasifying waste materials with plastics. A 1 MWth fluidized bed gasifier is developed with dry gas filters, made of 3M bag filters operating at 400 F. About 95% of dust is collected along with significant HCl capture?? Small-scale down draft and updraft gasifiers are in operation in Laapland. The updraft gasifiers are firing boilers and the downdraft gasifiers are firing gas engines. NOVEL(?)/Condense OY is still in search of the first commercial sales (for??). VTT has developed a Ni based monolith that effectively removes tars at 900 C. Upto 4000 hours of continuous operation has been demonstrated. VTT has developed a new catalyst that effectively decomposes NH₃ but it is sensitive to sulfur. E. Kurkela will determine if there is a 1997 Foster Wheeler/Ahlstrom report on fluidized bed combustion (?) of a waste stream containing 90% plastics and 10% aluminum. In this scheme the aluminum is recovered for metal recycle.

Italy: Recently, ENEA has installed a 3.8 MWth moving bed gasifier in China. Add additional info???

Sweden: The mothballed Varnamo plant may be reactivated to produce DME from biomass derived synthesis gas.

Denmark: Current R&D activities are focused on emissions reduction by catalytic combustion of biomass derived fuel gases, membrane separation to upgrade raw product gases, supercritical submerged gasification of biomass materials such as straw. Gasification of straw at <650 C retains most of the Cl and K with the residual char that may contain about 3% of the feed carbon.

USA: Current limits on NO_x emission from biomass based power generation units is 0.14 lbs/MWh. This will be reduced to 0.05 lbs/MWh by ?? The status of SilvaGas process was presented at the 12th Biomass Conference. USDOE EE-RE has been reorganized. All biomass projects including black liquor are consolidated into a single biomass program.

UK: Incentives are provided for co-firing with biomass. 25% capital grants are available for state-of-the-art combustion employing 50% energy feed stocks for >20 MWe (?) capacity. Incentives are also provided for 1 MWe small CHP plants using biomass. Advanced power generation schemes with 40% or higher electrical efficiency qualify for 40% of eligible costs. A total of £ 66 MM of incentives is made available.

Current RD&D programs include development of Alstom's high mass flow rate LCV fuel gas turbine integrated with an air compressor at £ 2.9 MM and evaluation of microturbines using fuel gas from the three Northern Ireland biomass gasifiers. One problem with microturbines is H₂ embrittlement in the waste heat recovery heat exchanger operating at about 700 C (??).

Future Meetings:

Fall 2002 - Joint meeting with GasNet on Wed. October 2 and Thursday, October 3 at the Holiday Inn in Strasbourg, France.

Spring 2003 – If approved by GasNet the second joint meeting between Task 33 and GasNet will be held in UK. N. Barker will coordinate the organization of this meeting with H. Knoef.

Fall 2003 – Joint meeting with Tasks 32 and 36 during the week of September 28, 2003 in Yokohama, Japan.