

IEA Bioenergy Agreement: 2010-2012
Task 33: Thermal Gasification of Biomass
Fourth Semi-annual Task Meeting, 2011

Piteå, Sweden

Tue. 18 to Thu. 20 October 2011

Minutes

Prepared by Dr. Jitka Hrbek, Task secretary, TUV, Austria

Day 1, Tue October 18

The list of attendees, for the Task Meeting include:

Name	Country	Affiliation	email
Reinhard Rauch	Austria	TUW	rrauch@mail.zserv.tuwein.ac.at
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Eric Winther	Denmark	FLS	Erwin@flsmidth.com
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Richard Bain	USA	NREL	Richard.bain@nrel.gov
Eva-Katrin Lindman	Sweden	Fortum	Eva.katrin.lindman@fortum.com

Regrets for inability to attend were received from: Hakan Karatas, MRC, Turkey and a representative from Italy

The Agenda of the Meeting was:

Day 1, Tue, October 18

1. Welcome:
2. Introduction of Task Members and Observers Review and Approval of Agenda
3. **Review and Approval of Minutes from First Semi-annual Task Meeting, 2011, April, Christchurch, New Zealand**
4. **Discussion of Task Member Deliverables**
 - a. Country reports
 - b. Gasification project database**Discussion on 2012 Meetings and workshops**
5. **Country Updates on Biomass Gasification: Detailed Highlights with Technical Information**
 - a. Sweden, Lars Waldheim, WAC
 - b. Finland, Esa Kurkela, VTT

- c. Norway, Judith Sandquist, SINTEF
- d. Netherlands, Bram van der Drift
- e. Austria, Reinhard Rauch, TUW
- f. Germany, Thomas Kolb, ITC-TAB
- g. Switzerland, Martin Ruegsegger, ETC
- h. New Zealand, Jingge Li, Univ. Canterbury
- i. Japan, Mayumi Morita, NEDO
- j. Japan, Tomoko Ogi, AIST
- k. Denmark, Erik Winther, FLS

Day 2, Wed, October 19

Expert workshop on “Biomass Gasification Opportunities in the Forest Industry”

Day 3, Thu, April 14

Site visits: ETC Laboratories, BLG Pilot plant, EF Gasifier, VIPP Pilot plant, DME Pilot plant, MEVA Gasifier + ICE CHP plant, Smurfit Kappa wood intake and wood yard, SunPine tall oil biodiesel plant

Country Updates on Biomass Gasification:

Sweden, Lars Waldheim, Waldheim Consulting:

Energy and climate bill and fuel prices and taxation in Sweden were presented.

R&D and D:

- NER300: bioenergy 5 out of 9 projects proposed to the EU
- Demonstration and SET-plan budget reinforced for FY 2012
- Biorefinery Nrrtorp pre-study initiated

Swedish Centre for Renewable Fuels (f³-fossil free fuels) – will be established as a nationwide knowledge platform and venue for cooperation in the production of renewable fuels and the related system aspects, with highest international credibility

- Budget for 2011-13 (~3 mio. Euro)
- Project areas:
 - System-wide studies
 - Studies for renewable fuels
 - Analysis of synergies between plants and diff. technology platforms
 - Method development for interdisciplinary studies

Swedish Gasification Centre (SFC) – 8 Academies and 9 companies

- CDGB (Centre for Direct Gasification of Biomass)
- CIGB (Centre for Indirect Gasification of Biomass)
- B4G (Biomass for Gasification, Entrained Flow Centre)

Chalmers

- Biogas production via thermal conversion (from lab-scale to 80 MW SNG)
- Indirect gasification: 2-4 MW_{fuel} gasifier integrated on the return leg of Chalmers 12 MW_{fuel} CFB boiler

- Goal of activity: to demonstrate
 - how an indirect gasifier could be built
 - a robust method for catalytic reformation of the gas to a syngas containing only CH₄, H₂, CO, CO₂, H₂O
 - an energy efficiency for dry biomass to clean syngas
- 22 researchers work at Chalmers, activity divided into:
 - Gasification process
 - Gas cleaning
 - High temperature corrosion

Swedish Gas Centre

- Gasification and gasification database
- Co-production of SNG and FT diesel
- International Gasification Seminar
- Particulate contaminants from indirect gasifiers (in planning)
- Autothermal regenerative POX tar reactor (in planning, Lund Technical Univ)

KTH School of Chemical Engineering

- Long experience of R&D within gasification. Activities started in 1970's.
- 75 kW pressurized (30 bar) air & steam/oxygen FB gasifier with secondary reactor
- 50 kW air & steam/oxygen FB gasifier
- 5 kW air & steam/oxygen FB gasifier
- Test rigs for catalytic deactivation and particle separation concepts
- Tar analysis equipment
- Online alkali analyses
- Projects:
 - Demonstration of improved catalysts and reactor designs for the production of SNG
 - SNG for smart gas grids
 - SYNCON: Novel synthesis process concepts for efficient chemicals/fuel production from biomass
 - DeMiTar: development and market implementation of PID and FID tar analyzers
 - HTAG – high temperature air gasification

ETC

- Host for DP1: Chemrec black liquor, biomass
- VIPP gasifier: biomass, cyclone gasification, WESP, scrubber, engine CHP
- PEBG: pressurized entrained flow gasification, 1MW, 15 bar

Värnamo – pressurized combined cycle:

- Supplier: Bioflow (Foster-Wheeler, Sydkraft)
- Fuel: 18 MW
- Power: 6 MW
- Heat: 9 MW
- 18 bar
- Typhoon GT

VVBGC project status

- Engineering initiated in January 2010
- Project terminated in Feb. 2011 because of difficulties in attracting additional partners to close industrial funding targets

GoBiGas

- Biomass to biomethane 65 – 70 %
- Energy efficiency > 90%
- Phase 1:
 - Demo plant, 20 MW generating 160 GWh/y
 - In operation early 2013
 - Allothermal (in-direct) gasification
 - Gasification: cooperation between Metso Power and Repotec
 - Methanation: cooperation with Haldor Topsøe
- Phase 2:
 - 80-100MW generating 640-800 GWh/y
 - Technology not yet chosen

Black Liquor Gasification Activities

- Development plant for oxygen-blown high pressure BTL gasification (located at the Smurfit Kappa mill in Piteå, Sweden)
- 30bar
- Capacity 20 metric tons/day of black liquor solids
- Used for technical development and design verification
- Started up 2005, now in operation, more than 12 000 operating hours

Black Liquor Demonstration Activities

- Domsjö and Chemrec in collaboration
- Feed: 200 MW of sodium sulphite liquor
- Products: 100 000 t/y of DME or 140 000 t/y of methanol or a mixture of both

E.ON

- Biomass to SNG
- Bio2G

Värmlandsmetanol

- Permitting is on-going
- No grant financing requested
- Planned construction start “as soon as permits are in place”
- FBG, forest residues, 100 000 t/y of fuel grade, methanol plus district heating 15 MW_{th}

Rottneros Biorefinery AB

BioMethanol opportunities:

- 150-200 kton BioMethanol via wood or blackliquor gasification
- Capital expenditure of 3 bill. SEK per project

MEVA

- Test unit, 10 kW_{th}, gas engine, in operation at ETC Piteå
- The first commercial unit, 1,2 MW_{el} under commissioning at Horlax, Piteå
- Target market is co-gen. plant, 2-20 MW_{th}, 1-10 MW_{el}

Cortus Wood Roll

- Indirectly heated gasification in industrial scale
- Successful syngas (CO/H₂) production during autumn 2011
- Relocation to Köpling planned
- Demo plant:
 - Power: 5 MW

- Fuel: 30 TPD DS of biomass
- Product: 1550 Nm³/h synthesis gas
- Investment 6,5 mill. euro

Finland, Esa Kurkela, VTT:

Syngas route to biofuels was studied in VTT in UCG-project during 2004-2007.

- Three consortiums are presently planning second-generation BTL biorefineries in Finland.
- The planned capacities are 100 000 – 200 000 ton/y of diesel.
- EU's funding (NER300) has been applied, decisions at the end of 2012
- Investment euro 400-800 mio.

Gasification and gas cleaning process developed and tested at VTT on 1MW scale, 4000 operating hours with different wood residues:

- New innovative technology:
 - Gasifier targets:
 - no ash-related problems
 - Simple design and high reliability
 - High C-conversion to gas and tar
 - Low oxygen consumption
 - Gas cleaning targets:
 - Complete tar decomposition
 - 60-80 % methane reforming
 - H₂/CO ratios suitable to FT synthesis

Process chain of the Varkaus test plant and Andritz Carbona active projects were introduced.

Atmospheric-pressure CFB/BFB gasification for kilns and boilers:

- Commercial lime-kiln gasifiers constructed in 1980's by Ahlström
- New development by Foster Wheeler in 1990's for boiler applications

Gasifiers (15-150 MW) now offered by:

- Andritz Carbona
- Foster Wheeler
- Metso Power

New CFB gasification plants are in commissioning/under construction:

- 2 new gasifiers (2x80 MW) at Lahti (waste-to-energy plant) (Metso)
- One large gasifier (140 MW) in Vaasa (Metso)
- Lime kiln gasifier (48MW) at Joutseno (Andritz)
- Lime kiln gasifier (12 MW) at Varkaus was returned to air-blown operation mode after successful test campaigns for Neste Oil and Stora Enso (Foster Wheeler)

Metso gasification projects:

Vaskiluodon Voima – Substituting Biomass for Coal in a PC boiler

- 140 MW_{th} gasifier adjoined to the existing 560 MW coal-fired power plant
- PC boiler in operation since 1982
- Coal consumption 400 000 – 500 000 t/y
- Enables biomass to replace up to 40% of coal
- Production capacity: 230 MW_{el}, 170 MW_{th}
- Total investment 40 mio. Euro

Metso scope:

- Fuel receiving and handling
- Drying

- Gasification
- Boiler modification
- Automation, electrification and instrumentation

Lahti Energia – Gasification Power Plant

- 2x80 MW_{th} gasifiers, waste-derived fuel, 50 MW_{el}, 90 MW_{th}

Metso scope:

- Fuel handling
- Gasifier
- Gas cooling
- Gas filter
- Gas boiler and flue gas cleaning
- Start up April 2012
- Total investment 157 mio. Euro

SME companies are developing small-scale gasifiers for gas engines targeting to 100 – 500 kW_{el}.

New R&D project at VTT with 5 SME companies is planned for 2012.

Biomass-to-syngas projects at VTT in 2011 were presented:

- NEXTUCG (2007-11): proposal – large FT production unit
- Production of SNG or H₂ from biomass (2011-14)
- USA-cooperation project on evaluation of gasification-based systems (2011-2012) – co-utilization of biomass and coal for liquids and electricity and combinations of biotechnical and thermochemical routes
- NORDYNGAS (2010-2014): pressurized gasification, system studies related to integrated plants to pulp and paper industries
- GASIFICATION REACTIVITY (2011-2014): fundamental research with Åbo Akademi and Jyväskylä Univ.

LahtiStreams IP (Advanced Integrated Waste Management and WtE Demo)

- Waste processing and material recovery
- SRD/RDF production
- Advanced high efficiency WTE plant
- Further treatment of ashes

Norway, Judit Sandquist, SINTEF Energy:

Biomass gasification has not got a long history in Norway. There is fundamental research at Universities, applied research. Small scale waste-to-energy applications are being developed.

Energos Gasification Technology

Proven small-scale, energy from waste

- A two-stage thermal process enabled extremely good combustion control, eliminating the need for complicated and expensive flue gas treatments
- The plant was designed to minimize emissions:
 - Low carbon content in bottom ash
 - Simultaneously low and stable CO and NO_x emissions

There are 8 plants in operation (6 in Norway, 1 in Germany, 1 in UK) and 6 plants are under development.

Fiborgtangen Biokraft

Development of a renewable energy plant founded on local waste streams

Development is linked to existing industry, new developments and new business opportunities.

- Gasification plant producing a pure syngas
- CHP plant producing heat and power

- Linked to existing boiler house at Norske Skog Skogn
- Provisions for future renewable materials/chemicals/fuels
- Main study 2011, production 2014

Research in Norway:

- Norwegian Research Council RENERGI

Gasbio – new project within thermochemical biofuels production (duration 4 years)

Partners: SINTEF, Norske Skog, Metso, Statoil, Avinor, NTNU

Objectives: to establish an internationally oriented solid Norwegian competence base within biomass gasification to produce biofuels.

The Netherlands, Bram van der Drift:

Modern industry policy in the Netherlands, more renewable energy ahead

NL Renewable energy – **Green Deal** (between industry and government, 59 deals signed in Oct 2011)

Green deals:

- Green gas (0,2 bcm in 2015, 0,5-0,75 bcm in 2020)
- Large-scale cofiring: keep 10% biomass in coal power plants unchanged till 2015

HoSt (small CFB gasification for difficult fuels)

- Portugal: 3MW_{th} CFB gasifier, OLGA, gas engine
 - Status: commissioning on wood and chicken manure
- 3 ton/h paper rejects plant in NL, gasifier, cooler, cyclones, boiler, steam
 - Start up: 2013

BioMCN (Methanol Chemistry Netherlands)

- The largest 2nd generation biofuels plant worldwide
- Now 30-40% glycerin in Natural Gas reformer (approx. 150MW_{bio-methanol})
- Planned: gasification (Siemens) of 1500 ktonne/y waste wood for 400 ktonne/y methanol

NUON

- 250 MW_{el} coal-based IGCC, ability to co-fire biomass
- Biomass co-firing ongoing; significant extension of co-firing under investigation, implementation depends on government
- MAGNUM-project postponed, coal/biomass gasifiers

ESSENT (RWE)

- 600 MW_{el} coal-fired PF boiler
- Approx. 5000 h/year, cooling remains the biggest problem
- Subsidy scheme for this plant will end in 2013
- Small improvements being carried out
- Major changes depend on politics

DAHLMAN – renewable energy (www.dahlman.nl)

HEVESKES ENERGY (www.heveskesenergy.nl)

- Will construct syngas plant
- Technology: oxygen driven gasification technology by 7 Hills, based on 3-years operational experience

- Feedstock: RDF
- Project Delfzijl: 10 ton/h RDF, start up 2013

SYNVALOR (www.synvalor.com)

- New multi-stage low-tar concept for all, but more specifically difficult fuels
- Based on Vortex reactor designs
- Aimed at affordable (<2.50 €/kWe) and reliable technology
- Test facility erected in October 2011, first test results at the end of 2011

HVC

- 12 MW (waste wood input) plant in preparation
- MILENA and OLGA based
- Phase 1a: heat production (first few years)
- Phase 1b: additional gas cleaning and SNG production
- Start building 2012
- Phase 2: 50-100 MW plant

ECN

- Generating design data 12 MW HVC demo
- Forming the consortium for HVC-demo
- Preparing expert centre with TAQA
- Estimating costs of bioSNG plant (www.sgc.se/gasification2011/programme.asp)
- Long term CAPEX: 1000 \$/kW
- Torrefaction deal closed, demo being build

Austria, Reinhard Rauch, TUV:

Policy targets, energy consumption and renewables in Austria were presented.

Austrian research organizations and their activities were introduced: Graz University of Technology, Joanneum Research Graz, MCI, Vienna University of Technology, Bioenergy 2020+, FJ-BLT Wieselburg

Austrian companies active in biomass gasification:

- Andritz (now also owner of the Austrian part of Austrian Energy & Environment)
- AGT Agency for Green Technology – low temperature conversion=thermo-catalytic decomposition process operating without air supply
- Austrian Enviro Technologies
- GE Jenbacher
- Ortner Anlagenbau – builds FICFB for CHP applications
- Repotec – builds FICFB gasifiers for CHP, SNG and other synthesis
- SynCraft Engineering GmbH
- Urbas – fixed bed gasification
- Xylogas - fixed bed gasification

Commercial FICFB gasifiers in Austria:

Location:	Güssing	- el. Production using gas engine -8.0 MW _{fuel} , 2.0 MW _{wl} -start up in 2002, in operation
	Oberwart	-gas engine/ORC -8.5 MW _{fuel} , 2.8 MW _{wl}

	-start up in 2008, in operation
Villach	- gas engine -15.0 MW _{fuel} , 3.7 MW _{wl} - in commissioning
Klagenfurt	-gas engine -25.0 MW _{fuel} , 5.5 MW _{wl} -planning
Vienna	-planning -hydrogen production -50 MW _{fuel} , 30 MW _{hydrogen}

Commercial FICFB gasifiers abroad:

Location:	Ulm (DE)	-gas engine/ORC -15.0 MW _{fuel} , 5.3 MW _{wl} -under commissioning -	Göteborg (SW) -planning
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Urbas gasifiers:

- Ruden:
 - 150 kW_{el}/300 kW_{th} + 70 kW_{el}/150 kW_{th}
 - Development since 2001
 - 30 000 operating hours
- Eberndorf:
 - 20 000 oper. hours
 - 2x120 kW_{el} + 70 kW_{el}/650 kW_{th}
 - Start up 2006-8
- Neumarkt:
 - 2x120 kW_{el}/580 kW_{th}
 - Start up 2008
 - 16 000 operating hours
- Sulzbach-Laufen, DE:
 - 130 kW_{el}/280 kW_{th}
 - Start up 2009
- Neukirchen:
 - 2x150 kW_{el}/300 kW_{th}
 - Start up 2011
 - 1000 operating hours
- Konstanz, DE:
 - 150 kW_{el}/300 kW_{th}
 - Start up end of 2011

Germany, Thomas Kolb, KIT:

Choren Gasification Technology:

- ß-plant Freiberg – BTL production in semi industrial scale
 - commissioning end of 2009
 - test runs Oct 2010 at 41.4 MW_{th}

- till June 2011: Low temperature gasifier – 2000 operating hours
Carbo-V and endothermic quench 1000 h
Gasification of residual coke 2000 h

Syndiese program:

Bure-Saudron BtL demonstrator, located in East of France,
1st demonstration, in France, of whole BTL chain

Project objectives:

- technological demonstration
- pre-industrial demonstration
- economic demonstration

Uhde: BioTfuel Project:

- 2 pilot plants being built in France, start up in 2012
- Life-cycle analysis for optimum equilibrium between technical-economical performance and environmental demands

Technology platform bio energy and methane:

Project cancelled in August 2011

Objective: first commercially operated biomass AER gasification plant in Germany (10MW_{th},
FB gasifier)

SWU Stadtwerke Ulm CHP demo plant:

- Wood chips
- 15,1 MW_{th}/4,55 MW_{el}
- Technology based on the FICFB Güssing (Repotec)
- Under construction

Agnion heat pipe reformer – allothermal biomass heatpipe-reformer

- Pilot facility in Pfaffenhofen (500kW_{th})

The bioliq pilot gasifier

Technical:

- 5 MW thermal load
- Fuel: slurry
- Gasification with O₂
- Temperature 1200°C
- Pressure up to 80 bar
- Cooling screen
- Slagging mode
- Operational in 2012

R&D – Topics:

- Atomization of slurry
- Slurry-burn out
- Syngas quality
- Efficiency
- Process control
- Modeling/scale-up

Fast pyrolysis for slurry production:

Slurry: < 40% wt coke, viscosity < 3 Pas, particle size < 100 µm

Bioliq pyrolysis trial runs in 2011, achieved 24 h continuous operation by approx. 400 kg/h straw-input

Switzerland, Martin Rügsegger, ETECA GmbH

Policy in Switzerland is made by Swiss Federal Office of Energy (SFOE)

Policy & Programs:

Kyoto protocol:

- Emissions reduction of 10% by 2010 – aim not fulfilled

Programs

- REN-Projects by the Cantons (CO₂-contribution)
- Cost-covering remuneration for feed in the electricity grid
- Further info: www.admin.bfe.ch

Facts:

- In 2009 56,15% of Sw. electricity production came from renewable

Research activities:

- PSI
 - Gasification of dry biomass (SNG, CHP)
 - Gasification of moist biomass for SNG production

Industrial gasification activities:

EKZ, Pyroforce, Xylopower AG and Foster Wheeler AG

Thermal gasification plants:

- Aerni in Pratteln
- Holzstrom in Stans
- Woodpower in Wila – out of operation since July 2011
- Woodpower EMPA (approved project in planning)

News:

- EMPA EAWAG Dübendorf decided September 2010 for CHP gasifier Plant
 - Supplier: EWZ and Woodpower
 - Wila-type gasifier
 - 2 x 350 kW_{el}
 - Now detailed planning, awaiting building permission
- 3 MW fuel gas produced by wood gasifier will replace fossil fuel for brick production in rotating furnace. The fuel gas will be produced by 3 gasifier units each 1 MW.
 - Test with 1MW unit gasifier estimated in the beginning of 2012
- PSI: Biomethane development: 20-80 MW BM-to-SNG, Pilot plant in discussion, based on BFB methanation technology

New Zealand, Jingge Li, University of Canterbury

Government strategies and initiatives in New Zealand:

- The government released the two strategies on 30 August 2011 to replace the 2007 version
- The goal: efficient use of the country's diverse energy resources (hydro, geothermal, wind, biomass)
- The aim: to achieve a 50% reduction in GHG from 1990 by 2050
- Target: 90% of the electricity from renewables in 2050 (now 79%)
- Government joined the International Renewable Energy Agency on 1 May 2011

The biodiesel grants scheme (2009)

- Aims to start biodiesel production in NZ
- Grant up to 42,5 cents/l for biodiesel
- The grant is paid to NZ producers who sell 10 000 l or more biodiesel each month

Biomass energy strategy 2010

- It aims at economic growth by increasing production and use of biomass energy and biofuels in NZ
- Target is to increase bioenergy use from current 8,5% to 25% by 2040 including 30% of the country transport fuels
- Target will be implemented in three phases (till 2040)

Status of commercial biomass gasification:

- **Fluidyne Gasification Ltd.** is active overseas (California) with its downdraft process (100kWe-2MWe)
 - Gasifiers with outputs eq. to 250-500 kW_e are to be built with a change of design concept containing the oxidizing bed by 2013-15
- **Windsor Engineering Ltd.** (drying kilns),
 - 1,5 MW gasifier in Rotorua in commissioning as a training facility for wood processing students at the WIT
 - Updraft type
 - Fuel: mixed shavings, hogging, sawdust and bark

Potential commercialization opportunity

- Gasification of demolished timber from the earthquake damaged buildings in Christchurch
- Proposal of UC collaboration with the city council (CHP)

CRL Energy Ltd.

- R&D on coal gasification for hydrogen production
- 200kW FB gasifier constructed, cooperation with University of Canterbury
- O₂ blown FB gasifier of 50 kW in construction

Status of R&D on biomass gasification:

University of Canterbury:

100kW dual fluid bed (DFB):

- Effect of gas contact time or BFB bed height (results presented, www.ieatask33.org)
- Effect of calcite catalytic bed material on producer gas composition (results presented)
- Now ready for demonstration in gasification of wood pellets for heat or CHP

A cold transparent DFB model for hydrodynamic study

- Objective: to develop design tools for scaling up of the DFB gasifier

Japan, Mayumi Morita, NEDO

Potential

- Forest residues (but problems with collection)
- Food waste (but development of drying technology necessary)

Policy

- Reduction of dependence on fossil fuels in the transportation by 80% by 2030
- Transportation: several eco-friendly technologies
- Bio-fuel technology innovation plan: bioethanol production to make prices competitive with gasoline prices in the medium to long term
- Cool-Earth 50 and Strategic Energy Plan – promote BTL technology

NEDO's activities

- Innovative technology development
- System demonstration
- Development of production system for cellulosic bioethanol (2009-13)
- Development of technologies for high-efficiency conversion of biomass and other energy (2007-2012)
- Strategic development of next generation bioenergy utilization technologies (2010-2016)

Implementation

- Cogeneration
 - ChugaiRo Co
 - Tsukishima Kikai Co.
 - Kawasaki Heavy Industries
 - Shimizu Corporation
- Gasification for Liquid fuels
 - Mitsubishi Heavy Industries

Japan, Tomoko Ogi, AIST

After the earthquake, tsunami and radioactive catastrophe in March 2011 in Japan it is time to rethink the energy options.

- Enforcement of introduction of renewable energy
- Wood gasification for SNG production?

Gasification in Japan

- CHP developed at demonstration stage in a relatively small scale
 - Shimizu Corporation, Chugai Ro Co. Ltd.
- Liquid fuel synthesis developed at bench scale
 - Mitsubishi Heavy Industries Ltd.
 - Entrained flow gasifier (2t biomass/day)
 - Methanol synthesis device
 - TAKUMA Co. Ltd)

Discussion on Scope of Work and Workshop Topics for 2013-2015:

Newsletter

To promote the thermal biomass gasification and to inform the involved public, the newsletter will be published each year and can be found at www.ieatask33.org. The first issue will be finished at the end of the year 2011. The newsletter consists of short overview from the meetings and workshops, interesting information and news from the thermal biomass gasification area.

Workshop Topics:

For the next Triennium, following workshop topics were chosen:

- Bed materials in fluidized bed gasification
- Product gas cleaning and usage
- Tar removal, analysis and formation
- Small scale fixed bed gasification
- Analysis and measurements
- Sustainability
- Fuel pre-treatment, demands of gasifiers on fuel quality
- Drop in fuels

Webpage of our Task, Jitka Hrbek, TUV, Austria

Since the end of July, the new version of the webpage for the Task 33 was activated.

All task members had the opportunity to provide their feedback and to visit the new webpage before the site was activated. The aim was to create a new, clear and informative webpage on thermal gasification of biomass, not just for the task members but also for all specialists in the gasification area and involved public.

In Piteå, the actual status of the webpage was presented.

The webpage contains also the database of gasifiers worldwide. Now, a total of 87 biomass gasification facilities are registered in the database, 68 facilities in member countries.

The gasifiers can be divided by three parameters: technology (co-firing, CHP, synthesis, other innovative), type (pilot, demo, commercial) and status (planned, announced, under construction, under commissioning, operational, on hold).

Most of the gasification facilities, 44%, are used for CHP, 39% for synthesis and only 4% for co-firing. Other innovative technology is covered with 13% of all gasifiers.

There are 48% commercial gasifiers, 27% pilot plants and 25% demonstration plants for gasification facilities in the database. 59% of the gasifiers are in operation.

Next Task Meeting: 17.-19. April 2012 in Turkey

Topic of the workshop proposed: Status of Biomass Gasification Technologies

Final Task Meeting: together with the IEA Bioenergy ExCo conference in Vienna, proposed date of the ExCO will be 12th to 16th November

Day 2, Wed October 19

Expert workshop on “Biomass Gasification Opportunities in the Forest Industry”

Meeting Location: Smurfit Kappa Tech.
Smurfit Kappa Kraftliner Piteå
941 86, Piteå

Table of presentations

Richard Bain, NREL, USA	“Climate change and the P&P industry, the IPCC SSREN Report”
Rikard Gebart, ETC, Sweden	“Swedish BLG R&D program”
Ragnar Stare, Chemrec AB	“Chemrec pilot DP1 and BiomDME project” “Chemrec industrial developments”
Jens Otterstedt, Sveaskog, Sweden	“A forest owner’s perspective on bioenergy”
Rikard Gebart, ETC, Sweden	“Swedish research, the Gasification Centre”
Esa Kurkela, VTT, Finland	“Fluidised-bed gasification R&D at VTT to support industrial development of BTL, SNG or bio-H ₂ ”
Richard Bain NREL, USA	“Biomass gasification Activities in North America”
Reinhard Rauch, TUV, Austria	“Gasification based co-generation”
Timo Honkala, Metso Power, Finland	“Metso gasification”
Kari Salo, Andritz Carbona Oy	“Biomass gasification in P&P industry”
Veikko Jokela, NSE Oy	“NSE gasification”

All presentations can be found at www.ieatask33.org

The list of the workshop participants can be found at attachment I.

Day 3, Thu, October 20

Site Visits

ETC laboratories

- **BLG pilot plant DP1**
 - 3 MW thermal power (20 ton BL/day)
 - 30 bar, 1000 °C
 - Accumulated run time > 13 000 hours (Aug 2011)

- **EF gasifier** (PEBG – Pressurized Entrained flow Biomass Gasification)
 - Project period 2009 – 2012
 - Combining Research, Industry and Society (Triple Helix)
 - Slagging entrained flow gasification of low grade wood-powder
 - Nominal plant capacity: 1 MW at 10 bar
 - Oxygen blown gasification
 - Refractory lined reactor operating at 1200–1500 °C
 - Bubbling quench for cooling and separation
 - Flaring of the product gas (side stream for analysis)

MEVA 1 MW_{el} gasifier

MEVA Innovation AB is a company with focus on research, development and sales of complete small-scale cogeneration systems based on a gasification technology with production of clean fuel gas in a cyclone reactor. MEVA, with very large internal and external expertise, developed VIPP - Vortex Intensive Power Process and found sustainable technical solutions to previously less efficient technologies and can now present a very reliable and cost-effective concept.

Smurfit Kappa wood intake and wood yard

The Kraftliner Mill in Piteå was built during 1960-1962. The production capacity in the beginning was 100 000 tonnes of kraft liner/year. After ten years, in 1972, the capacity was doubled when paper machine 2 was taken into operation. The capacity has increased every year due to continuous investments and improvements, and in 2003 the mill has reached the 700 000 tonnes/year level.

Smurfit Kappa Kraftliner Piteå is Europe's biggest kraft liner producer, with an annual output of some 700 000 tonnes. Kraft liner is a base paper made from fresh fibers and is used for the manufacture of high quality corrugated packaging. Smurfit Kappa Kraftliner Piteå is a part of the Paper Division Europe of the Smurfit Kappa Group.

SunPine tall oil biodiesel plant

SunPine have pioneered a "Wood to Wheel" renewable diesel process technology using crude tall oil, a residual product of the pulp and paper industry, as feedstock. The main product of the process is the SunPine crude tall diesel. A final refinery process step including hydrogenation treatment converts the Sun Pine crude tall diesel to a first class renewable diesel fuel with a very low carbon footprint and excellent well to wheel efficiency. The major by product is the SunPine Bio oil, a high quality tall oil pitch. It can be processed further to recover valuable chemicals including rosin and phytosterols.

Attachment I

Workshop participants list

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