4^{th} Task 34 Meeting Triennium 2022-2024
November 14^{th}, 2024
at BTG Biomass Technology Group BV (BTG)
in Enschede/The Netherlands

09:00-17:00 (CET)

Recognition of Meeting Participants

Alex Böhm	(AB)	Task Assistant
Axel Funke	(AF)	Task Lead/ NTL Germany (Minutes)
Bert van de Beld	(BvB)	NTL The Netherlands
Christian Lindfors	(CL)	NTL Finland
Daniele Castello	(DC)	Alternate NTL Denmark
Francois Collard	(FC)	NTL New Zealand (online)
Mike Thorson	(MT)	NTL U.S.
Murlidhar Gupta	(MG)	NTL Canada

Country reports

New Zealand

Importance of marine sector leads to strong activities to lower CO2 emissions with bio-based fuel/ fuel blends (following new ISO 8217:2024 for marine fuel (blends).
Scion is working on catalytic fast pyrolysis in a 1kg/h fluidized bed reactor and ex-situ catalytic upgrading to achieve an oxygen depleted FPBO (~20%). Focus is on fuel properties for drop-in use. Reasonable energy densities are achieved but there are still questions around miscibility and sediments. Investigate potential influences of bio-oil on sediment formation of marine residual fuels. Next steps are to scale up technology and subsequent engine testing.

Finland

Green Fuel Nordic stopped operation primarily due to unfavourable developments in terms of feedstock cost (imported largely from Russia) and energy cost. Original use of the FPBO was for district heating, which was not very profitable. Unclear what will happen to the plant.
Cooperation between Valmet, Circa and VTT to scale up Levoglucosenone production currently being erected in France with a feedstock capacity of 2 t/h (Furacell™ process).
Valmet commissioned a catalytic fast pyrolysis pilot unit with a feedstock capacity of 10 t/day (ex-situ catalysis).
VTT is part of EU Refolution project for production of advanced biofuels via Co-FCC and EU Circular Fuel project for solar assisted fast pyrolysis. The national Bio4all project focusses on optimizing carbon yields by pretreating feedstocks (alkali removal) and produce feeds for a steam cracker via slurryhydrocracking. BioPhenom is looking at isolating phenols from pyrolytic lignin.

Tampere University plan continuing their work with a continuous HTL pilot scale facility with a feeding capacity of 13 L/h.
Abo Akademi University cooperate with Valmet in a bench scale fluidized bed reactor setup but also works on slow pyrolysis.

Denmark

Circlia commissioned an HTL demonstration unit for treatment of sewage sludge to be finally located in Fredericia in Denmark.
Kvasir is planning to build a demo plant also in Fredericia/ Denmark with a capacity of 2 t/day for alcohol solvolysis of wheat straw targeting marine fuels.
Steeper Energy is producing HTL biocrude in the Silva Green Fuel demo unit but it is unknown to which extent operation is/ has been running. Scale up to commercial facilities is planned.
Stiesdal is targeting production of aviation fuel via pyrolysis with their 2 MW plant located in Skive and now build a 20 MW unit at BB Energi/ Denmark.
Mash Makes also primarily targets marine fuels produced via pyrolysis in an auger reactor.
Microwave pyrolysis by Organic Fuel Technology also targets marine fuels with a planned demonstration unit of 400 kg/h feed capacity.
Aalborg works (among others) on capturing CO_2 from HTL offgas (which can achieve up to 90% CO_2 concentration). Pilot unit is being built to be coupled with an HTL unit. Aarhus university has a focus wet oxidation of the aqueous phase. All are very active in EU projects (e.g. Circulair and Cocpit) and national funding schemes (e.g. Low Carb Fuels).

Germany

The German government has initiated work on a 'National Biomass Strategy' to align biomass resources and applications with highest possible impact. These applications will be most likely in the hard to abate sectors biofuels, high temperature process heat, flexible power supply (via CHP) and carbon dioxide removal technologies. It is also foreseeable that there will be a strong focus on agricultural residues.
There are no updates regarding commercial activities. Fraunhofer UMSICHT has finalized their Syn2Fuel project. KIT has wrapped up their bioliq® project by proving the process chain from wheat straw to transportation fuels, including tests in engines and cars. There is a restructuring and the research will be now conducted as part of the newly installed 'Carbon Cycle Lab'. As part of these changes, a new process development unit for fast pyrolysis is planned and at the same time the demonstration unit will be decommissioned.

The Netherlands

BTG is investigating combustion of untreated FPBO in a (modified) diesel engine as part of SmartCHP EU project with little trouble during operation and reasonable outcome in terms of efficiency/ emissions. This concept also delivers flexible power/ heat production. Moreover, upgrading via stabilized and stabilized deoxygenated to yield hydrotreated pyrolysis oil (<0.1 %O, H/C 1.7-2 and O/C <0.01) is followed to produce bio-naphtha, bio-jet fuel and bio-diesel. The respective characteristics of these distillate fractions are largely in line with fuel specs.

US

SAF challenge aims at 3 billion gallons by 2030.
Impact of wate treatment on communities has been a focus the past years, with community wet waste projects emerging.
Alder commissioned a pilot skid at NREL to fractionate FPBO with the aim to ultimately produce SAF.
Metro Vancouver aims at having their HTP system operational through 2025 to treat around 2% of Annacis Island wastewater treatment plant.

PNNL process development unit on HTL incorporating thermal hydrolysis process concepts and oxidation to provide process internal and external heat (planned as extension to existing HTL PDU).

Canada

Canada put carbon emission prices in place that will be constantly increasing until 2030. With more emphasis on maximizing carbon sequestration, new focus is on mobile, decentralized pyrolysis units. CanmetENERGY focusses on low quality biogenic residues and operates different fast pyrolysis reactors as well as HTL batch reactors. NRC is also operating continues 5 kg/h HTL facility with customized solutions for gas turbine and diesel applications.
ONYM has installed a 50 ton/day facility in Quebec and are working on a second unit.
Pyrovac has diversified to produce bio-oil, but also wood vinegar and biochar as well as pyrolytic carbon black.
Vyterra Renewables (subsidiary of Ensyn) is developing a 40 Mio L/year facility in Nova Scotia.

Other business

- Remaining work packages
  It is recognised that drafted chapters of the WP 1.1 are a good starting point but that they are not publishable in the current version.
  Round Robin draft is finalized and is being reviewed internally.
  H2 synergies aims at being finalized end of 2024.
  All NTLs are requested to write an article (~2 pages) for the final PyNe in this triennium highlighting DTL related activities in their specific country.
- Triennium wrap up
  Monthly meetings still necessary? Include internal webinars? There will be an attempt to hold the meeting only every two months and to organise an internal webinar every now and then in between. The feasibility of this will be discussed at the September meeting.
- Upcoming Task 34 meetings
  In the new triennium there will be one task meeting in person each year, planned for Canada 2025, Austria 2026, and Germany 2027. A save the date has been sent around for May 2025 to meet in Canada. NTLs are both fine with meeting at CanmetENERGY (with associated limitations) and meeting externally in a (hotel) meeting room nearby. There is also very positive feedback to extent the meeting and add one day to visit Quebec and local facilities there (e.g. Pyrovac).
- Country reports 2024: This time it is up to Denmark, Finland and India. The official deadline is the 4th of January 2025

Carbonyl content via titration (NREL) as one measure for stability and characterization of upgrading.