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IEA Bioenergy Technology Collaboration Program (TCP) Task 39 (T39) Business Meeting, Ispra, Italy, May 15-16, 2019 – Day 1

Attendance

Australia: Steve Rogers
Brazil: Antonio Bonomi and Rubens Maciel
Canada: Jack Saddler, Alex MacLeod and Don O’Connor
Denmark: Henning Jorgensen
EC/JRC: Adrian O’Connell and Laura Lonza
Germany: Franziska Muller-Langer
Japan: Yuta Shibahara (“Shibby”) and Hiroyuki Asano (“Asano”) new Task 40 Japan member, observing T39 meeting)
Korea: Jin-Suk Lee
Netherlands: Paul Sinnige
New Zealand: Paul Bennett
Norway: Duncan Akporiaye
Sweden: Thomas Ekbom
US: Jim McMillan

Director’s Welcoming Speech

Piotr Szymański, the director of the European Commission Joint Research Center’s (JRC) Directorate C (Energy, Transport and Climate) extended a warm welcome to all of the IEA Bioenergy TCP T39 participants in his opening speech. He gave an overview of JRC’s mission to provide in-house scientific support to a range of European policies. He informed participants about the work of Directorate C and, more specifically, of its alternative fuels group, which computed the greenhouse gas (GHG) default and typical values for the recently adopted Renewable Energy Directive Recast to 2030 (Directive EU/2018/2001 of 21 December 2018) also referred to as RED II.

Task Leader's Welcome

Jim McMillan (JM) from NREL (T39 leader and US Country Representative) welcomed T39 members to the task's first business meeting of 2019. He thanked Laura Lonza (LL) and Adrian O'Connell (AO) for the substantial efforts organizing and hosting the meeting and joint workshop. He discussed the Task's make up for the 2019-2021 triennium including on-going efforts to add new country members such as India, China, Finland, Italy, Mexico and others. He confirmed Ireland is now a new member of the Task, and on behalf of the Task welcomed Stephen Dooley (SD), a professor of energy science at Trinity College Dublin and a fuel combustion and engine emissions expert, to the group as Ireland's Country Representative. (Norway also rejoining the Task was announced at the last task meeting, with Duncan Akporiaye (DA), a research director and biofuels process technology expert at SINTEF, as its Country Representative.) Also welcomed to the meeting were Yuta Shibahara (YS, nickname "Shibby"), a project coordinator in the biomass group within Japan's Energy and Industrial Technology Development Organization (NEDO) as Japan's new lead Country Representative (and his colleague NEDO Hiroyuki Asano who is a new member of IEA Bioenergy Task 40 and attending the Task 39 meeting as an observer); and Paul Sinnige (PS), a senior biofuels advisor at the Netherlands Enterprise Agency as the Netherlands new Country Representative.

JM noted that while India had previously indicated it was also joining the Task, more recently this has become unclear and India's membership status remains pending. The near term prospects for China to join the task are also not apparent despite positive interactions in 2018. Thomas Ekbon (TE), Sweden's Country Representative, noted Estonia is another country expressing possible interest in joining the Task. Paul Bennet (PB, ExCo's New Zealand (NZ) member and current vice-chair and also interim NZ Country Representative for Task 39) confirmed Estonia is already a member of the IEA Bioenergy TCP. Other countries we continue to try to engage, some of whom have previously expressed interest, include Chile, Indonesia, Malaysia, Mexico, Thailand and the United Kingdom. South Africa has left the task for this triennium.

In subsequent discussions about recruiting new member and brainstorming additional routes to outreach to other countries, Don O'Connor (DOC) (Canadian energy assessment expert who leads the Task's LCA advisory group) recommended contacting the US Grains Council, as they're actively looking around the world to identify jurisdictions where conventional biofuels programs might get started. Regarding Finland, which is one of the world's leading countries active in advanced and drop-in biofuels development and commercialization (and thus especially well suited to again become a Task member), Jack Saddler (JS) (T39 associate leader and Country Representative for Canada) noted we would have Finnish companies Neste and UPM participating in the joint IEA Bioenergy TCP T39 - JRC workshop following the business meeting.

JM explained that the focus of T39 is now on renewable transport fuels, i.e., also including gaseous fuels like biomethane, biohydrogen, etc., in addition to liquid biofuels. The T39 Task's name and logo are being updated to reflect this. A few ideas (preliminary graphics) for updating the logo were displayed to catalyse brainstorming and feedback from members was invited. Steve Rogers, Australia's Country Representative, recommended the logo somehow reflect waste feedstocks too. Later in the meeting, Franziska Müller-Langer (FML), head of the biorefinery department at DBFZ, the German Biomass Research Centre, and Germany's Country Representative, suggested that the images accompanying the BC SMART initiative, or something like this, would be good to consider.

In terms of Task scope, FML asked if electrofuels or Power to X (PtX) fuels were part of T39's mandate. JS clarified that, yes, as noted in the Task's prolongation proposal, T39 intends to follow PtX developments (as well as other progress on other emerging routes to biofuels such as algae). So far

these approaches remain at an early development stage and until further developed/demonstrated are likely to be secondary rather than primary foci for the task.

JM then discussed a few outstanding items:

1. The Implementation Agenda (IA) report and its executive summary are now posted in the members-only area of the website and are not yet public. The Task needs to finalise comments and members approve their respective country chapters before this report will become public and available on the publicly accessible section of the T39 website.
2. 2-page summaries for policymakers are still needed for recent reports including the marine, drop-in and implementation agendas reports. Alex MacLeod (AM, Canada's member of IEA Bioenergy Executive Committee (ExCo) and Task 39's operating agent) and PB (ExCo member for NZ and Vice-Chair of ExCo) noted these 2-page summaries should be developed in coordination with the ExCo's Communications Team. (This also applies to proposed changes to Task 39's logo and webpage refresh.) FML developed and will share with the group the 2-pager provided to AMF TCP for the Adv. Fuels for Adv. Engines Survey report.
3. Regarding Task interactions with GBEP (the Global BioEnergy Partnership), contacts are being established and strengthening, and we anticipate more interaction this triennium. GBEP is organizing a Bioenergy Week in the Philippines in June. JM was asked to attend and provide a keynote but he isn't able to do this. Nonetheless, T39 members would be welcome to take part in this meeting.
4. T39 also plans to continue to collaborate with IRENA on emerging markets, with a special focus on countries not yet involved in T39. Unfortunately our primary contact at IRENA, Jeff Skeer, unexpectedly passed away earlier this year so we are in the process of identifying a new primary IRENA contact. (Note: in meetings the following week, IRENA bioenergy analyst Toshimasa Masuyama was identified as an interim contact for Task 39 pending re-filling of the position Jeff Skeer held.)

Participants were reminded that T39 is an IEA Bioenergy Technology Collaboration Program (TCP); as such, although coordinating with and being responsive to IEA HQ, the Task is not officially within the IEA but rather part of the IEA Bioenergy TCP. As such, care should be taken to try to avoid incorrectly referring the task as "IEA Task 39" as this can create confusion and misunderstanding.

A general discussion wrapped up this part of the agenda. TE noted that electrification is increasingly being seen as the ultimate answer to future efforts to establish low-carbon transport, making it harder to defend/support the role of biofuels in decarbonizing transport. JS recommended the view that short and mid-term considerations are relevant, with electrification of light duty transport envisioned. However, for heavy duty transport (i.e., aviation, marine, and long-haul freight and rail transport) there remains a strong role for biofuels for a considerable time ahead based on many market forecasts as well as feedback gained through the task's excellent engagement with industry.

One of the strengths of Task 39 continues to be that about 50% of its member countries are non-European. As a result, critical issues being discussed in one country / world region can be much less relevant in others (e.g., ILUC, conventional biofuels, specific sustainability concerns, etc.). As will be covered/demonstrated in the workshop, with its broad representation of countries spanning the globe, the Task is particularly well set-up to assess and compare the strengths and weaknesses of different policies and "sustainability" models (such as biofuels LCA models) that have a big impact on how one estimates / quantifies the carbon intensity of transportation fuels and the potential for renewable biofuels to be used to decarbonize transport.

Review of activities covered

Newsletters (and website)

The consensus was that the Task's newsletters are working well, with their 3 times per year publication frequency about right. They are generally upbeat and positive, though realistic and not pie in the sky. Similarly, the Task 39 website is good, but could do with an update (e.g., to fresh the look including logo, etc.). The Netherlands followed by Denmark and then Germany are scheduled to write the feature stories for the next three newsletters. FML indicated willingness to go prior to Denmark if desired however this decision wasn't finalized. The next newsletter is planned to be issued in late June, and the following one in later November/early December.

Meetings

TE updated the group on plans to hold the Task's second business meeting of 2019 in Stockholm later this year in conjunction with Sweden's 2019 Advanced Biofuels Conference (ABC). The Task 39 business meeting will run for a day-and-a-half, nominally on Monday-Tuesday, 16-17 September, with the afternoon of 17 Sept used for a joint technical tour with ABC attendees. It is hoped that some Task 39 members will agree to also give talks within the main ABC conference being held 18-19 Sept (i.e., similar to what we did at the previous Gothenburg meeting in 2017).

The first Task 39 business meeting of 2020 will be held in Sao Paulo, Brazil, March 30th to April 1st, prior to the BBEST conference. The new IEA Bioenergy Task 45 (Sustainability) also plans to hold a Task meeting in association with this BBEST conference and has suggested holding a joint Task 45-Task 39 workshop either on its own or within the BBEST conference. JM and JS will work with T45 leadership to try and firm up these tentative suggestions. [Note: at ExCo83 meeting held in Utrecht the week after our meeting in Ispra, IEA Bioenergy agreed to also hold its first Executive Committee (ExCo) meeting of 2020 in conjunction with the BBEST 2020 conference.]

Australia has volunteered to hold the IEA Bioenergy end-of-triennium ExCo meeting in late 2021, and Task 39 has agreed to hold its last-of-the-triennium meeting in conjunction with this meeting. A consensus was not reached on where to hold our second business meeting of 2020, nor the first business meetings of 2021. Japan, Denmark and Germany were all discussed/"volunteered" as possibilities for these future meetings. Jim and Jack will follow up to try and firm up the dates and locations of these two meetings.

Reports

Mobilising Sustainable Bioenergy Supply Chains (proposed inter-Task report)

This project has been carried over from the last triennium. We hope to establish a more effective collaboration with the feedstock and trade tasks, Task 43 and Task 40, respectively. However, a detailed scope and timeline for completion remain to be established.

Algal report

This report was successfully completed during the last triennium and is highly cited. We will continue to monitor this topic, recognizing that it is likely that a more of multi-product biorefinery approach, rather than just producing biofuels, will be the road to greater commercialization of algal-based production (coproduction) of biofuels.

Marine Drop-in report

This report was finished in 2017 and it is being highly cited. Given significant on-going development of biofuels for marine applications, the Task intends to update the report on during 2019/2020.

Advanced biofuels for advanced engines survey report

This report has been completed, thanks to the good work of FML and colleagues in Germany. We hope to better profile this report by developing a two page summary with the ExCo communications team. The work also involved input from the Advanced Motor Fuels (AMF) TCP, although the work was funded solely by Task 39. *Note re: extending work in this area, T39 is invited to join a meeting of the AMF and Efficient Combustion TCPs to be held in Montreux, Switzerland 3-8 November 2019. While a full Task meeting is unlikely so close to the Sept 2019 meeting in Sweden, it is hoped that some Task members will be able to attend with a goal to network and identify future joint work with these TCPs.*

Pilot, demo and commercial plant database

Dina Bacovsky (DB) continues to coordinate this effort. However, while some companies are forthcoming about recent developments and demoplant(s) status, it has proven very difficult to get detailed/useful/up-to-date information from many companies. For example, Lanzatech and Gevo are well established, so information from these companies is more available than it is from newer or earlier stage advanced biofuel companies. Although one of the Task's strengths is to impartially assess the data provided by the companies, companies sometimes "exaggerate/falsify" their information and it remains difficult for the Task / Task members to act as an effective auditor. It was also suggested that the data base be more frequently updated

LCA Model Comparison report(s)

This effort was led by Antonio Bonomi (AB) and colleagues at CTBE. It represents a joint effort with Task 38 (prior Sustainability task) and was initially guided by Task 38's Helena Chum albeit solely funded by Task 39. This topic is covered in greater later below, as it was presented on later in the business meeting as well as in the workshop.

Implementation Agendas Update report

This report is completed in terms of content. However, as discussed earlier, JM believes further "polishing" of some of its country-specific chapters is warranted before moving the final report to the public section of the Task 39 website. Country representative were asked to review their respective chapters/sections and respond to Mahmood Ebadian (ME) and JM as soon as possible.

Drop-in Update report

This report was completed and sent out to Country Representatives in December. The full report and executive summary are posted on the Task website in the members only area and it remains embargoed until July, whereupon it will become public (i.e., moved to the public side of the website).

Outstanding activities

JS spoke about other opportunities, particularly how Task 39 might tie in with other IEA Bioenergy Tasks in the current triennium, and specifically who might take the lead for any joint work. As usual, funding is limited with a typical project having access to \$25-30k year to fund part of a post-doc or equivalent and highly leveraging existing (separately funded work), such as colleagues at CTBE were able to do for the LCA model comparison work leveraging CTBE's Virtual Sugarcane Biorefinery (VSB) assessment tool development and refinement effort.

* LUNCH *

[T39 Member Country Updates \(PDF's of all PowerPoint will be posted in the members only section of the Task 39 website\)](#)

Austria: (Presented by JS on behalf of DB) See presentation.

Australia: (Presented by SR.) There has been a change in the senior federal government person in the bioenergy area (Scott Morrison). A very convincing GHG carbon price graph was presented, showing how GHG's are increasing. However, there is currently no national renewable fuels target. There are currently three ethanol plants running, some on starch and some on sugar. However, all of the plants are operating under capacity. Australia's lipids/used cooking oils are mostly bought by Neste, made into BTL in Singapore and then shipped to California. Elections will soon occur and, if elected, Labour hope to act on climate change with a 50% renewable electricity target by 2050. There is huge potential for renewable energy production in Australia, but it is not currently a priority.

Brazil: (Presented by AB and Rubens Maciel.) AB and RM described Brazil's domestic energy mix, which has a high level of renewables, especially hydro and biopower. The current biorefinery approach allows changing between sugar and ethanol production. There are currently two "2nd gen" ethanol plants running in Brazil. Biofuel feedstocks include eucalyptus, sugar cane and soya bean. An overview of the important Renovabio policy was given. Although there is still a 57% level of fossil fuels use in Brazil, hydrous ethanol (~E95, balance water) is used in flex cars and anhydrous E27 ethanol in gasoline. As detailed in the first 2019 issue of T39 Newsletter, RenovaBio also mandates hybrid electric/flex fuel vehicles. As most ethanol plants operate for only 200 days per year (difficult to harvest cane during rainy season) some plants are planning to use corn grain to extend their operating period. Soybean with animal fat and castor oil are the main biodiesel feedstocks. Brazil is also a partner in an Horizons 2020 project to develop biojet fuel.

AB noted that there is not sufficient refining capacity for biofuels so either petroleum refiners turn to significant co-processing in their operations or bio-refining becomes a much bigger issue than it is today.

Although soil impacts are currently being looked at in order to maintain/improve sugar cane yields, which have been detrimentally impacted by mechanical harvesting, sugarcane yields per hectare have quadrupled over past decades. The new RenovaBio policy targets enabling significant increases in the countries ethanol and biodiesel production. However, society in general is not happy to pay more for renewables as environmental concerns are a lower priority for the current government. Regarding the 2nd generation plants, Raizen has had problems with pretreatment and its second generation demonstration plant only ran for 3 or 4 months before needing to repair to its pretreatment reactor). Granbio is said to be producing 70 million litres of cellulosic ethanol per year.

In theory the use of bagasse for cellulosic ethanol would enable another 2000 l of ethanol production per ha, almost doubling current production. However, the electricity market uses a lot of bagasse and there is little technological risk to that route and significant investments in power co-generation have been made at many plants. Therefore, using bagasse for biofuels remains challenging, as does using sugarcane straw (often remaining in the field after mechanical harvest) considering of the additional costs incurred for sustainable removal from fields and transport to sugar-ethanol mills.

Canada: (Presented by JS.) Energy is a shared responsibility of the Provinces and the Federal Governments. Canada aims to reduce its carbon emissions while improving the economy. The government's goal is to reduce GHG by 80% by 2030. Current carbon taxes are \$20 Canadian dollars/tonne and will rise to \$50 by 2050. There are provincial mandates, which match or exceed

these federal mandates. The Federal Clean Fuel Standard (CFS) includes transport, industry and buildings. The government hopes that the CFS will be published in 2020 and come into force in 2022. There are a number of programs and investment that support these goals, e.g., Sustainable Development Technology Canada, Sky's the Limit Challenge for aviation, etc. Notably, in British Columbia, the province most aggressively pursuing decarbonization, the provincial government is investing CAN\$ 900 million into clean energy initiatives under the CleanBC initiative (<https://cleanbc.gov.bc.ca/>)

Denmark: (Presented by Henning Jorgensen.) Denmark targets 55% of all energy to come from renewable sources by 2030. In the New Danish "Energy Agreements" published in June 2018, only 7 lines out of 19 pages were on bioenergy! They comprise a rather vague will to define ambitious CO2 emission reduction levels for heavy duty vehicles and to allocate funding to support green mobility which were expected to be defined in late 2018 but this has not yet happened. Currently Denmark derives about one third of its energy from renewables. There is a heavy focus on renewable energy from wind while reducing the use of biomass for energy. Energy research is important, with a budget of around 80 million euros per year by 2020. Denmark has a climate policy which includes aspirations to ban the sale of diesel and gasoline cars by 2030. The goal is to have 1 million electric cars on the road by 2030. With new elections coming up in June, all parties use climate change in their campaigns, focusing mostly on electrification of transport whereas biofuels are mentioned in a minor tone and mostly with reference to shipping and aviation. Several HTL initiatives are on-going at a pilot scale. For example, the NextGenRoadFuels Horizon 2020 project with Aalborg with Steeper Energy as partners. As Denmark has lots of biogas facilities, reforming of CO2 to methane by changing the equilibrium by excess H2 might be pursued, to give 30 – 40% methane. The Vilum Centre for the Science of Sustainable Fuels and Chemicals is prioritizing development of PtX fuels.

European Commission: (Presented by LL.) RED I was overviewed and the RED Recast to 2030 (RED II) explained. (Note: this information is well summarized in the last Task 39 newsletter.) The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) was also mentioned, which sets only 2 sustainability criteria for biojet fuel to be eligible under the ICAO scheme (in contrast to the 12 criteria under RED II). LL recapped current JRC ALFA group activities, including the development of the co-processing methodology for determining fuel biogenic carbon content and methodology for calculating the GHG intensity for renewable fuels of non-biological origin, including recycled carbon fuels, which are due for adoption in Europe by 2021 as part of the implementation of RED II.

* Coffee *

Germany: (Presented by FML.) The country currently has a 42% CO2 reduction target (from 1990 baseline). Although there is a lot of domestic production and use of biogas, Germany is a net exporter of biodiesel and a net importer of ethanol. The country had a 4% biofuels usage in 2017. Biomethane is reasonably cost effective, at least when priced at the lower end of its cost range, which varies from 5 – 20 EUR/GJ. Since 2010 Germany has had a Mobility and Fuel strategy in place. The country has also developed a new, ambitious, Climate Protection Law that references a ProcessNet Advanced Alternative Liquid Fuels Position Paper (processnet.org). There are many initiatives underway aimed at decarbonizing transport, including 'Energy Transition in the transport sector' (interesting project!) and Refuels, a methanol to gasoline project. Also, at Leipzig Halle, a demonstration of SPK/Multiblend Jet A1 production is taking place that is expected to be finished by the end of 2019. An important topic of discussion in Germany is, How much is carbon intensity being reduced by using biofuels? Despite substantial RD&D and on-going investments, however, according to the EU Germany has to meet its *energy reduction targets*. Perhaps biomethane can help Germany meet its advanced biofuels targets directly.

Ireland: (Presented by SD.) The country imports most of its biofuels. Only 10 companies supply biofuels in Ireland. Although it is technically possible to produce fuels, it is difficult to make money doing so. Although some are trying to get E10 to be used throughout Ireland the compliance costs will prevent meeting the RED II target. Consequently, it will just pay the fines! Ireland recently declared a national climate emergency, however it still relies heavily (94%) on fossil fuels. Research is ongoing on cellulosic feedstocks aimed at producing high biofuel blends and there is an interest in increasing the blend wall.

Japan: (Presented by YS.) The country is targeting rapid GHG reductions, 26% by 2030 compared to 2013, and 80% by 2050. However, there is decreasing fuel demand in Japan (gasoline, -22%; diesel, -9%; jet roughly stable, -1%). Simply increasing ethanol blending will mean more imports from Brazil, not increased domestic production. The current NEDO R&D Projects for Biomass Energy & Fuels were described and include cellulosic ethanol demo production, algae development, and cellulosic biomass to jet projects. The micro algae Bio Jet Fuel Production demo project for the period 2017-2020 was covered in some detail and includes fast breeding *Botryococcus braunii* in Saraburi Province, Thailand. The project is championed by the Siam Cement Group.

Korea: (Presented by Jin-Suk Lee.) Not much progress to update on since the last country report. The little biofuel that is used is used in the power sector to meet the targets for renewable power of 7% in 2020, 10% in 2024, and 20% in 2030. Although Korea does use some biodiesel in transport the future goal is more general, with 20% of power derived from renewable energy by 2030. Currently, FAME-type biodiesel is produced from used cooking oils (almost 50%), PFAD (30%), palm oil (20%), with the balance using coconut oil, animal fats, etc. as they are relatively inexpensive feedstocks. Although B3 is mandatory, most of the 2 million tonnes of bio-fuel produced is used in the power sector to displace heavy fuel oil.

Note: the suggested order of presentations was changed at this time as we were running late and we wanted to ensure that Susan van Dyk (SVD) and ME had time to skype in remotely from British Columbia.

UPDATE ON DEMOPLANTS DATABASE: It was noted that as well as T39, organizations such as ETIP Bioenergy, SGAB and the ART Fuels Forum also contributed to the development of the database. Increasing interest is being shown in demoplants for upgrading of pyrolysis oils. In DB's absence, the group recommended trying to update the current listings, as several are quite out of date.

Drop-in biofuels and focus on co-processing report: Via Skype (which worked very well!) SVD summarized the Drop-in biofuel report, with a focus on co-processing. She described the work that she and JS had done on sustainable aviation fuels (SAF)/biojet for IRENA in 2017 and the BC SMART (British Columbia-Sustainable Aviation, Marine, Rail and Trucking) fuels report. Of note, the recent Green Aviation Research and Development (GARDN) ATM Project that examined upgrading (by CanMet Ottawa and PNNL) of three biocrudes -- produced by from softwood residues using Fast pyrolysis, Catalytic pyrolysis, and HTL -- to biojet fuel. The ATM report covered what a likely Demo plant would look like, the policy needed and the overall design of a likely supply chain. The presentation described a TEA, LCA and technology ANALYSIS triangle. A proposed T39 project in this area intends to build on this work as well as the past marine biofuels and drop in biofuels reports. The marine biofuels area in particular is anticipated to increase in interest due to low sulphur requirements coming into force in 2020. In all cases, co-processing leveraging existing refinery infrastructure will be one likely strategy. JM noted, with respect to fuel specifications for marine applications, the relevance of gaining an improved understanding of what happens on the engine side, e.g., with low steaming, constant RPMs marine engine operation enabling the use of lower specification bio-based fuels.

Implementations Agenda's update: ME gave a summary of the Implementation Agenda's report comparing and contrasting biofuels policies in Task member countries and beyond. It was acknowledged that sustainability criteria are increasingly being incorporated into policies. As detailed in the uploaded slide deck, ME showed that without biofuel mandates fuel excise reductions/exceptions alone do not seem to be sufficient to incentivize the uptake of biofuels (e.g., South Africa and New Zealand). It was suggested that the next update of this report later in the triennium also include information on global trade of biofuels. JM noted that this could provide an opportunity for joint work with Task 40 (includes Trade).

Netherlands: PS described how decades of taking out subterranean natural gas has been damaging to the ground, resulting in some subsidence. He provided good information on splits, shares and targets resulting from RED II. He referenced the Netherlands commitment to the Paris climate agreement to achieve 49% CO₂ reduction. Mobility's share is supposed to be a reduction of 7.2 mton of CO₂. This includes electrification (2 million EVs in 2030) which are assumed to be zero-emission by default although the decarbonisation of the electricity mix towards 2030 is not really considered in parallel. It also includes some biofuels (27 PJ plus), LNG and LBG. B30 in inland waterways (IWW) is considered with no indications of actions taken for sea-going vessels. A report entitled, 'Mobility in Draft Climate Agreement', a comprehensive policy, is in preparation. The country hopes to keep advanced biofuels at same level after 2020. The Dutch parliament wants information on GHG and energy balances. When transposing the RED II into national targets the NL target are more stringent than requested, with at least 8% replacement without double counting; a cap on conventional biofuels of 5% (lower than 7% EU cap). When considering double-counting, the overall national target for NL is therefore 16.4% replacement by renewable fuels for transport.

IEA TCP T39 Business Meeting Ispra, 2019 – Day 2

Continuation of country reports

New Zealand: (Presented by PB.) NZ has developed a biofuels roadmap and bioenergy strategy. It is on track for power but not for transport. NZ produces a lot of renewable electricity, however biofuels provide only 0.06% of total transport fuels. Although one new tallow biodiesel plant began operation in late 2018, it is not really commercial. However, diesel is taxed much lower than gasoline, which is also part of the motivation. A new energy research centre is being established in NZ. The country also hopes to have a Net zero carbon economy by 2050 to meet the 1.5 C target in support of island nations. The one billion tree policy is also receiving a lot of attention. Drop-in fuels, particularly for marine and air, are of increasing interest in NZ (the port of Auckland and Z Energy are active). NZ's 25 million NZ dollar fund for greening transport is primarily focused on H₂ and EVs.

Sweden: (Presented by TE.) The Swedish Energy Agency held a renewable energy meeting on the 30th April. Regarding the production and use of biofuels, HVO is doing OK, with a slight drop in 2018 vs 2017. GHG reduction quotas are mandated, as they are in Germany. However, new PFAD regulation on making HVO100 has temporarily dropped the amount of HVO from its previously slightly higher levels. Other renewable fuels are on par or cheaper than fossil fuels. Sweden has some fuel cell cars. Volvo Car similarly to Audi indicates no development of new ICE models as of 2026 and no ICE models produced in 2040. E5 is still produced and used, however future use of E85 is uncertain. ED95 use is much stronger. New regulations on waste feedstocks such as PFAD and CTO considered to be non-byproducts that must be traceable. The Advanced Biofuels Conference in Stockholm 17-19 September 2019 will include a trip to Scania. Hopefully, in conjunction with Task 39's next business meeting.

Norway: (Presented by DA.) Use of biofuels in Norway is quite controversial. Currently, 48% of all new cars that are sold are electric. The biofuels feedstock mix is currently 19% palm oil and 22% rapeseed. Borregaard plans to expand lignocellulosic ethanol production in the near future. Electrification of off-shore facilities is an ongoing debate. The 1989 climate pact between all political parties in Norway has led to the financial support of programs such as Bio4Fuels, Norwegian Centre for Sustainable Bio-based Fuels and Energy. Biokraft liquefied biogas is at 90% of its production capacity while Statkraft is building an HTL demo unit with Steeper Energy. Two conventional refineries are showing serious interest in co-processing along with several start up initiatives supported by State-funded ENOVA (funding all companies across production sectors intending to achieve CO₂eq reductions). Norway via Bio4Fuels will support an HTL conference, 19th November Brussels, which will include companies such as ENI, Steeper, etc. Recommendation that Task 39 is represented at this meeting.

USA: (Presented by JM.) Renewables reached 12% of the energy mix in 2018. Wind and solar are growing quite quickly. Currently the level of ethanol in most gasoline is just above E10, however legislation and infrastructure are moving to E15 (previously restricted to use in non-summer months due to its vapour pressure exceeding specified limits). In 2018, EPA's RIN reporting shows cellulosic ethanol production averaged about two-thirds of a million gallons per month (GPM). In 2019 through March, production has jumped threefold to 2 GPM, which if sustained would be 24 million gallons per year for 2019. Data doesn't show source, so it's unclear how much of the production is from POET-DSM's dedicated cellulosic ethanol plant versus from corn fibre in existing corn ethanol dry mill plants (an increasing number the existing 200 dry mill plants are implementing fiber conversion. Advanced biofuels such as cellulosic ethanol sold into California (CA) are able to apply to both CA's LCFS and the federal level RFS2.

There were 1.8 billion gallons of diesel-type biofuels produced in 2018. Exports dropped. Soya oil remains the largest/main feedstock, however there is increasing use of oleochemical-rich wastes. HVO is taking market share from FAME, reflecting lots of competition for the limited oleochemical resource. Many companies assuming they'll be able to secure this feedstock in the future and over capacity of production facilities in US is likely. Unless new feedstock supplies are identified, there's a train wreck coming. With on-going relatively low oil prices, biofuels are less economically attractive than lower volume higher value products and many companies have redirected their RD&D to chemicals (e.g., Amyris).

Federal funding continues at approximately similar levels as to the recent past however comes in a more polarized environment; the administration proposed major cuts, congress said no and maintained historical funding levels, and so they're continuing to fund key agencies like DOE EERE and its labs like NREL, etc. Changes to marine sulphur limits are impending and refineries gearing up for more desulphurization. There is a big potential demand for biofuels to decarbonize transport (and beyond). Policy differences between jurisdictions often drive perverse outcomes, however, and that is an ongoing problem. Lanzatech technology will be part of new Aemetris plant being built in California to produce cellulosic ethanol from agricultural and wood waste via syngas fermentation. E-mobility taking focus from biofuels. Bioenergy held to a higher standard than other sectors such as the food industry. Blender's tax credit initialized fuel export from Canada to California. Blender's tax credit (1\$ gallon), expired at end of 2017 however expected to be retroactively reinstated as has historically occurred. DOC noted EPA is now defining the revision of targets for the post-2022 period.

Note: information in the Country Reports provides one of the key inputs to the Implementation Agendas report.

Drop-In Biofuels report, Jack Saddler

JS noted that as well as the Task's self-published reports (after their embargo period), the Task also hopes to publish highlights of Task 39 reports in journals (open-access preferably), newsletters, etc., to increase publicity and information dissemination. As highlighted in the recent drop-in biofuels report, there is an increasing focus on "intermediates" (such as lipids/oleochemicals/biocrudes) and their overall "sustainability" as it relates to co-processing. It was highlighted that it is likely there will be increasing competition for lipids. Regarding the thermochemical route to developing biocrudes it is also likely that this will be quite difficult. For example, it will be challenging to incorporate co-processing of biocrudes and track the "green molecules". Currently, the biocrudes producers tend to favour a mass balance approach to track the "bio" component. However, as summarized by DOC towards the end of the workshop, current data does not support this approach.

One of the main conclusions from the report is the need for cheaper, sustainably derived feedstocks. This partly driven by biojet demand.

A significant benefit of the drop-in biofuel project has been the strong engagement of the oil refinery sector, many of whom are motivated to "decarbonize" their operations and products.

A short discussion followed where the relevance of co-processing was emphasized along with the importance of enhancing dialogue with fuel producers even further while not losing sight of high blends/neat fuel options.

LCA model comparison study, Antonio Bonomi

AB summarized the biofuels LCA model work to compare leading biofuel life-cycle GHG emissions assessment tools. Phase 1 results, previously uploaded to the task website, were recently published in *Renewable and Sustainable Energy Reviews* 110, (2019). This presentation's focus was on Phase II A, which focused on FAME and HVO/HEFA diesel biofuel pathways and incorporated new European data; the report has already been prepared and posted to the website. In Phase II B, cellulosic ethanol (2G) will also be part of phase II B and its penultimate report will be distributed to the larger group once feedback from the advisory group has been incorporated (note that feedback already received from JRC (AO/LL), awaiting feedback, from Michael Wang, DOC and Mark Staples).

Regarding the Phase II B project on 1G2G ethanol, a mix of feedstocks include sugar cane straw/bagasse, wheat straw, corn stover and forest residues. Standalone 2G plant achieves more performant emissions per unit than integrated 1G2G plant (still lower than 1G only) where the difference can be primarily ascribed to fertilisers which are used in 1G2G and are discounted in 2G. The VSB model is restricted for internal use within CBTE. Regarding the other models, GHGenius and GREET substitute electricity produced from lignin.

Although Task 38 did not contribute any funds to this project, they contributed a considerable amount of "in-kind" support with respect to providing methodological guidance. Helena Chum, in particular, should be acknowledged and thanked. This initial project was successfully led by AB and CTBE. Efforts to extend this task's work in this area will continue under the leadership of DOC with ongoing input from the advisory group which includes AB, AO, Michael Wang and Mark Staples. After input from AB, JM and JS, DOC will circulate a brief outline of the work proposed to be carried out by the LCA group over the coming triennium. Initial ideas discussed included: conducting feedstock to biofuel supply chain analysis to identify CAPEX and OPEX; looking at commercialization with stronger involvement of industry; performing sustainability assessment of biofuel pathways with new sustainability task; identifying key metrics beyond GHG reduction, potentially with GBEP; TEA of advanced biofuels feedstock-to-fuels pathways.

Newsletters and future meetings (recap) and other topics

Meetings

Sweden this year, September 16th-19th 2019. Brazil first half of 2020, Australia for late 2021. Possibility of Germany, Japan or Denmark for late 2020 and early 2021.

Also seeking representation at early Nov. 2019 joint meeting of AMF and Efficient Combustion TCPs.

Newsletters

2019: 1) Brazil, just distributed, 2) Netherlands, to send a draft to ME by early June, so newsletter can be distributed by the end of June; 3) Denmark, to send lead article to ME by early November, so newsletter can be distributed in early December.

Newsletters for 2020: Suggestions will be added to the minutes.

Other topics

Budget: As covered in the posted PowerPoint used to structure the business meeting agenda, the Task budget has been allocated to four areas, recognizing that they do overlap to some extent. This includes Task administration, technology commercialization, policy/market/sustainability & implementation and information dissemination. As demonstrated by projects such as the LCA biofuel model comparison, the Algal bioenergy assessment, the drop-in biofuels and implementation Agendas reports, typical resource allocation for new report projects is enough to cover an individual such as a post-doc/junior scientist at about \$30,000 (US) per year. Projects that were approved include the ongoing database for pilot/demo/commercial biofuel plants, the continuation of the LCA model harmonization, update of the marine/biojet/drop-in biofuels report and implementation agenda reports. In addition to these areas, new proposals to advance Task objectives in any task area of interest are sought and welcomed. JM and JS will follow up with various individuals to identify leads for the initiatives/projects discussed during the business meeting.

Update of Task 39 Logo website: JM presented several ideas for trying to update the Task 39 logo. (Posted with the pdfs from the meeting). Group members were encouraged to send / share any additional ideas for making the Task 39 logo more visually intuitive and appealing.

Close of meeting: The meeting closed with the group thanking AO, LL and JRC for all their hard work in organizing the logistics and hosting a very successful Task 39 meeting. Presentations and notes from the workshop that followed will be covered in a subsequent email.