Commercializing Conventional and Advanced Liquid Biofuels from Biomass

Task 39
IEA Bioenergy

Inside This Issue

From the Task

By Susan van Dyk, Jack Saddler and Jim McMillan

This issue of the Task 39 newsletter highlights biofuels developments of likely interest to Task 39 stakeholders, including some of Task 39's recent work.

The Task recently held a business meeting in Rotorua, New Zealand, in conjunction with an IEA Bioenergy ExCo meeting and an ExCo workshop on Aviation and Marine Biofuels. We would like to thank Ian Suckling and his colleagues at Scion for hosting the Task 39 business meeting. The Task has made progress on various projects over the past year. The report on "The Potential of Biofuels in China" was completed and is published on the Task 39 website (Task39.org). This report examines the historical development of biofuels production in China as part of its strategy to address energy security and climate change concerns. Although the Chinese government has set ambitious targets to increase annual biofuels production to 12.7 billion litres of ethanol and 2.3 billion litres of biodiesel by 2020, it is unlikely that these targets will be met, primarily because biofuels for transport currently take a back seat to other forms of renewables in China's future renewable energy development plans.

The Task 39 pilot and demonstration plants database has been updated and can be accessed at the website: http://demoplants.bioenergy2020.eu. The Update on the Status and Potential for Algal Biofuels Production report, is in its final stages of revision. One of the major conclusions is that, production of bioenergy by algal systems is not likely to be economically feasible in the short-to-medium term, primarily due to the relatively high cost of producing algae.

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Image Source: esf.edu.com

However, in the nearer term, there are opportunities to exploit micro-algae in a biorefinery approach with coproduction of bioenergy/biofuels. Although the final report is not yet available to the general public it is hoped that it will be published on the Task 39 website in late January 2017. A webinar to launch this report is also planned for early 2017.

Other projects making good progress include the Advanced Fuels for Advanced Engines Survey with the final report having a mid-2017 traget date for release. The life cycle analysis (LCA) model comparison project is wrapping up phase one. This has involved a comparison of the LCA of Brazilian ethanol-from-sugarcane (juice), US ethanol-from-corn, and European ethanol-from-wheat, while also comparing the results derived when using either the GREET, GHGenius, BioGrace or the Virtual Sugarcane Biorefinery LCA model.

The latest industry news, policy developments and recently published reports can be found in the News section on page 11. On the policy front, the U.S. EPA released its final rule for renewable volume obligations (RVO) under the renewable fuel standard (RFS), indicating continued policy support for the development of biofuels. The figures for the 2018 biomass-based diesel category are 2.1 billion gallons, up 100 million gallons from 2017. The 2017 advanced biofuel RVO represents nearly a 19 percent growth in one year. For the rest of the RVOs in the EPA's final RFS rule, cellulosic biofuel for 2017 is finalized at 311 million gallons, 35 percent higher than the 2016 standard. The conventional biofuel RVO for 2017 has also been raised from the the 14.8 billion gallons proposed in May, to 15 billion gallons. The total renewable fuels under the RFS for 2017 come in at 19.28 billion gallons, up from the 2016 standards of 18.11 billion gallons. While the increase RVOs values are encouraging, the recent results of the US elections and the background of the individuals appointed to lead agencies such as the US EPA have introduced considerable uncertainty regrading the future of US biofuels policies and the country's climate change mitigation policies more generally.

On Nov. 30, the European Commission released RED II, which proposes to phase out first generation biofuels and introduce new sustainability criteria for forest biomass.

We welcome your feedback. Please direct your comments to Susan van Dyk

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To minimise Indirect Land-Use Change (ILUC) impacts, RED II will introduce a cap on the contribution of food-based biofuels towards the EU renewable energy target, starting at 7% in 2021 and going down progressively to 3.8% in 2030. The proposal was severely criticised by various biofuel organisations in the EU.

Controversially, an EU official admitted that the phasing out of food crop based biofuels was based on public opinion rather than science (Read more here). The European renewable ethanol association (ePURE) weighed in on the debate, stating that "A one-size-fits-all approach to conventional biofuels risks throwing out the good biofuels along with the bad. The Commission should apply its own science and support all sustainable biofuels, including European ethanol. In this way, the Commission can design a policy that incentivises better environmental performance and maximises emissions savings."

Personnel at ePURE argued that "European ethanol is proven to have low ILUC risks and 64% direct GHG savings on average compared to fossil fuel. Phasing this policy out goes contrary to the Commission's scientific analyses and robs transport of a credible green alternative to petrol. Ethanol is needed because other alternatives (e.g., electrification) will not ramp up quickly enough to make a significant contribution to the 18-19% transport emission reductions needed to achieve the EU target of 40% emission reductions by 2030". (Read more here)

In the Aviation Sector, positive policy developments have led to revisions to the EU's Renewable Energy Directive (RED). These changes should help in the development and deployment of aviation and marine fuels. (Read more). The UK government has also proposed extending current renewable transport fuel incentives to aviation (Read more). November also marked Alaska Air's first commercial flight using cellulosic alcohol-to-jet fuel supplied by Gevo.

In October, an interesting and thought provoking paper was published which discussed the "four forms of magical thinking about the energy transition that are prevalent in the United States". "Rescuing the Low-Carbon Energy Transition from Magical Thinking". This report, by David Hart (Information Technology and Innovation Foundation), looks at "Climate-change denial" which *wishes away* the need for any type of energy transition. "Science push" sees the transition as a mere matter of adequate investment in R&D. "Premature triumphalism" assumes that the necessary technology is available today and that the only barrier to the transition is willpower. "Carbon-price obsession" fixates on a single, simple policy that will by itself drive the transition. The author concludes that, other than the "climate-change denial " philosophy, each of the other three approaches has important contributions to make to a policies that could accelerate the United States along a low-carbon energy path. By following this lead, perhaps the world will move in the same direction? However, tha author cautions, that the advocates of these three distinct approaches must also let go of certain illusions if they are to join together to form the broad coalition that will be required to make a social change of this magnitude. He suggests that current federal policy falls far short, in no small part, because of such *magical thinking*. After reviewing the four forms of *magical thinking*, the paper concludes by recommending an aggressive, smart low-carbon energy innovation-policy agenda.

This end-of-year issue of the Newsletter features an article on biofuels developments in Austria.

We would like to thank our Austrian colleagues, Dina Bacovsky and Andrea Sonnleitner, for preparing this informative report.

As always, we appreciate your feedback. Please send us any ideas on how we might increase the value of these Task 39 newsletters. We hope to hear from you via email to get your feedback and suggestions.

Jim, Jack and Susan

Austria – Biofuels Technology, Research and Development

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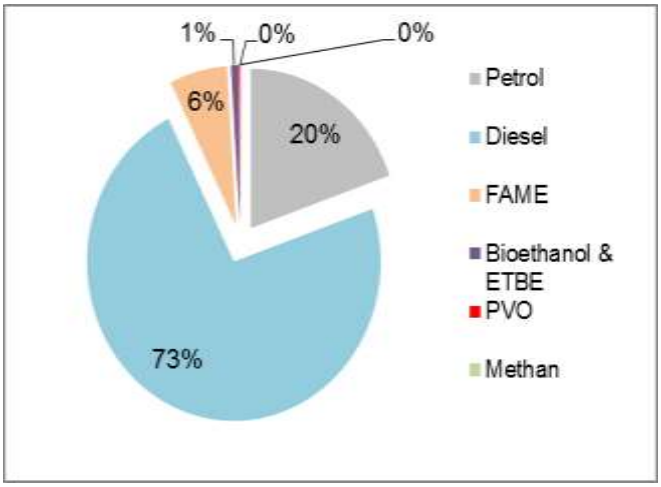
innovations kompetenz

Biofuels production and use in Austria[1]



The market for transportation fuels in Austria is dominated by fossil fuels (92%), mainly diesel fuels (73%) and petrol (20%) (Figure 1, Table 1), with biofuels comprising ~8%.

Detailed consumption figures for 2014 are shown in Figure 1.

Figure 1: Relative shares of fuels in Austria (2014)

Table 1: Total fuels marketed in Austria 2014

Road transport fuel use 2014	Tonnes	GWh
Petrol	1,536,217	18,285
Diesel	5,694,520	68,018
FAME blended	433,547	4,456
FAME other (66% sustainable)	142,986	1,470
Bioethanol & ETBE blended	87,688	731
HVO (hydrotreated vegetable oil)	41,145	503
PVO	16,028	165
Methane	601	8
Total of biofuels blended	**521,235**	**5,187**
Total of biofuels high blends/pure	**200,760**	**2,145**

Domestic FAME (fatty acid methyl ester) production in 2014 was 292,009 tonnes based on rapeseed (72%), used cooking oil (19%), animal fat (8%) and fatty acids (1%). The feedstock was sourced mainly from the Czech Republic and Austria. In 2014 domestic bioethanol production was 182,305 tonnes with 56% from maize and 44% from wheat.

[1] Lichtblau, Günther (Environment Agency Austria): Biofuels in Austria Reporting Year 2014. National Workshop Biofuels, 29.09.2016, Vienna, Austria

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The feedstock was sourced mainly from Austria, the Czech Republic, Hungary and Slovakia. Only about half of the biofuels produced in Austria are used within the country, with trading (export) occuring mainly within the European Union. Production, import and export volumes are depicted in Figure 2.

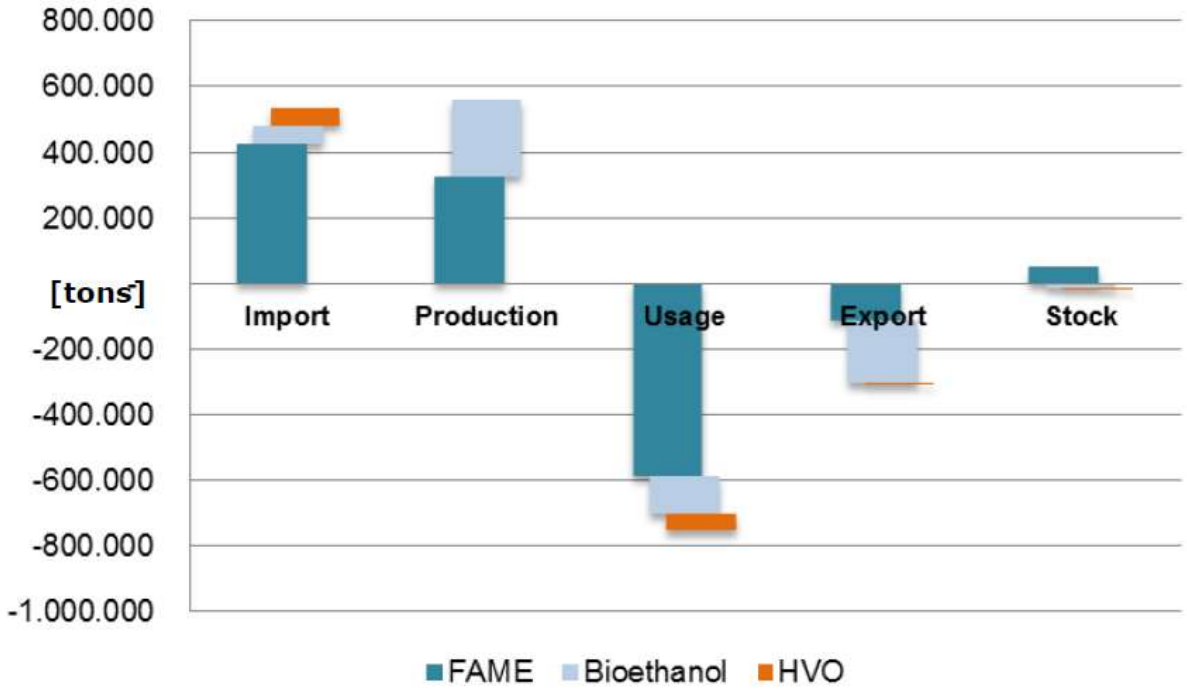

Figure 2: Biofuels in Austria – market overview

ISCC is the main certification scheme used to certify the sustainability of the marketed biofuels and their feedstocks, for FAME approximately 45% ISCC EU and 22% ISCC DE, for bioethanol approximately 10% ISCC EU and 50% ISCC DE, and for HVO 92% ISCC EU. The CO_2 and GHG savings of biofuels in 2014 was approximately 2,000,000 tonnes, at an energetic substitution of 9.3%. The introduction of biofuels is the single most effective measure for decarbonisation of Austria's transport sector, and Austria is on track to reach its 2020 GHG emission reduction goals in the biofuels and bioenergy sector.

Austrian Technology Providers

Vogelbusch Biocommodities[2] are widely renowned for their conventional bioethanol technology, for which they offer all services from feedstock to end product. In the production of advanced bioethanol, the company's focus is on the downstream processes. Two interesting pathways are being followed: fermentation of lignocellulosic biomass, and gasification of lignocellulosic biomass and municipal solid waste (MSW). Vogelbusch has been involved in the INBICON 2nd generation demonstration plant, and delivered downstream technology for this facility (fermentation, distillation). A variety of lignocellulosic feedstocks were tested (i.e., straw, bagasse, palm empty fruit bunches and corn stover). Vogelbusch has also been involved in the INEOS Bio facility that uses MSW as feedstock for gasification and then ferments the syngas to bioethanol. INEOS Bio's second generation commercial syngas fermentation demonstration plant was commissioned in 2013, and technology upgrades were undertaken in 2014. However, to date there has been no confirmed bioethanol production and the facility is now up for sale.

Figure 3 provides a comparison of starch, cellulose and syngas fermentation-based bioethanol production technologies.

[2] Lehr, Markus (Vogelbusch Biocommodities): Commercial facilities for the production of lignocellulosic ethanol. National Workshop Biofuels, 29.09.2016, Vienna, Austria

	Starch based	Cellulosic based	Syngas fermentation
Raw material	wheat / corn	wheat straw	biomass
Yield l alcohol / t raw material	390	200 - 280	200 - 260
Fermentation time hours	60 – 70	150 – 200	< 1
Alcohol content %vol in mash	11 – 16	7 - 10	3 – 6
Viscosity cP	30 – 50	100 - 200	1 - 5
Steam consumption t /1000 l alc			
Upstream (Hydrolysis)	0.3 – 0.4	2.0 – 4.0	-
Distillation / Dehydration	1.2 – 2.0	1.4 – 2.5	1.8 – 4.5
Evaporation / Drying	1.8 – 2.0	2.5 – 4.0	???
By products	DDGS	lignin C5 fraction → thermal / electrical power	thermal / electrical power

Figure 3: Comparison of different bioethanol technologies

REPOTEC (Renewable Power Technologies)[3] views biomass gasification as a key technology for the production of biofuels. The combined heat and power (CHP) plant in Güssing (Austria) has been operational since 2002, using a steam blown fluidized bed gasifier, and producing high quality syngas for production of biofuels. Methanation of the syngas is performed in a 1 MW BioSNG demoplant at 300°C and 1-5 bar using a nickel catalyst. This was the reference project for the GoBiGas BioSNG plant (in Sweden), which has been operational since 2013. The GoBiGas facility was started up using wood pellets as a feedstock, producing 20 MW SNG (synthetic natural gas) and 6 MW thermal power for district heating, achieving a total efficiency of 81%. The facility has recently switched to using wood chips as feedstock.

Repotec with its partners also develops technologies for the production of Fischer-Tropsch (FT)-diesel and biohydrogen. Their FT-pilot plant uses syngas, cleaned to completely remove any sulfur contaminants, followed by FT synthesis. The capacity of the pilot plant is 1 barrel per day of FT-diesel. There is another pilot plant focused on the production of hydrogen. For this process, the H_2 content in the syngas is increased by a CO-shift-reaction, followed by a CO_2-separation step, and through pressure swing adsorption clean hydrogen is produced, which can be used in industrial plants or directly in fuel cells. Based on this pilot plant, a demonstration plant with capacity of 30 MW H_2 and 10 MW heat was developed.

Other technology providers in Austria include BDI and Andritz. **BDI** develops technologies for energy generation from by- and waste products. BDI provides customized turnkey BioDiesel and BioGas plants using technologies that were developed in-house. **Andritz**, with long years of experience in the pulp and paper industry, offers pre-treatment equipment for lignocellulosic ethanol facilities.

[3] Aichernig, Christian (REPOTEC): Biomass gasification – key technology for the production of biofuels. National Workshop Biofuels, 29.09.2016, Vienna, Austria

Biofuels Research and Development

Researchers at **JOANNEUM RESEARCH**[4] have been assessing life cycles of biofuels and bioenergy chains since the start of biodiesel production in Austria. During the course of a recent, EU-funded project, "Improving the Sustainability of Fatty Acid Methyl Esters (FAME – Biodiesel)," ten options for the improvement of the GHG balances of FAME were identified. The assessment used the GHG standard values as given in Annex V of the EU's Renewable Energy Directive (RED) to define the base cases. Technology improvements were applied to the base cases and analyzed with respect to their effect on costs and GHG emissions. The most important results for each improvement option were summarized in fact sheets. Recommendations for the future development of the RED GHG-calculation methodology were derived and are stated in the report. Key findings of the assessment include that a significant GHG reduction compared to the RED values is possible, if best available technology (BAT) is applied, and that the GHG reduction potential is relatively high in the agricultural production steps and relatively low in the processing steps. Improvement options are depicted in Figure 4.

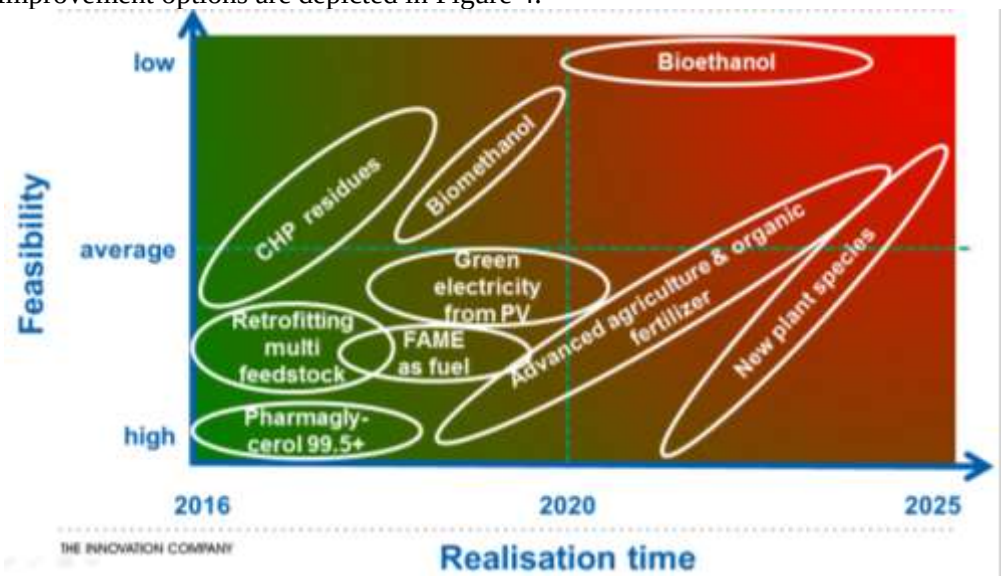

Figure 4: Overall assessment of the GHG reduction improvement options based on feasibility and realization time

The **University of Applied Sciences in Upper Austria in Wels**[5] has been active in research on conventional and advanced bioethanol production since 2004, with a focus on steam explosion, process and yeast optimization. Other projects have dealt with the combination of different feedstocks and the social aspects and sustainability of advanced bioethanol. Since 2016 the research group has focused on biorefinery research including microalgae.

One of the technologies researched and developed at the **Technical University of Vienna**[6] is the FT-route for the production of synthetic biofuels. Wood chips are gasified with steam, the raw syngas is cleaned and conditioned, and then used for FT-synthesis. About half of the resulting FT-products are already in the diesel range, and from the resulting FT-waxes a large share can be further processed through a hydro-(co)-processing step into HPFT-Fuels (diesel and kerosene), waxes and purge gas (see Figure 5). Their FT lab scale plant has been in operation since 2005, producing 5-10 kg/day of FT raw product in a slurry reactor. This plant has just been scaled up to a 1 barrel per day facility. In the future the expansion to a wider variety of feedstocks including MSW and residues is planned.

[4] Jungmeier, Gerfried (JOANNEUM RESEARCH): Sustainability of Fatty Acid Methyl Esters (FAME) – Assessment of improving options. National Workshop Biofuels, 29.09.2016, Vienna, Austria

[5] Jäger, Alexander (University of Applied Sciences Campus Wels): Bioethanol from straw, endless story?! "Biofuel production caught between political restrictions and advances in research". National Workshop Biofuels, 29.09.2016, Vienna, Austria

[6] Rauch, Reinhard (Technical University of Vienna): Production of FT-Diesel. National Workshop Biofuels, 29.09.2016, Vienna, Austria

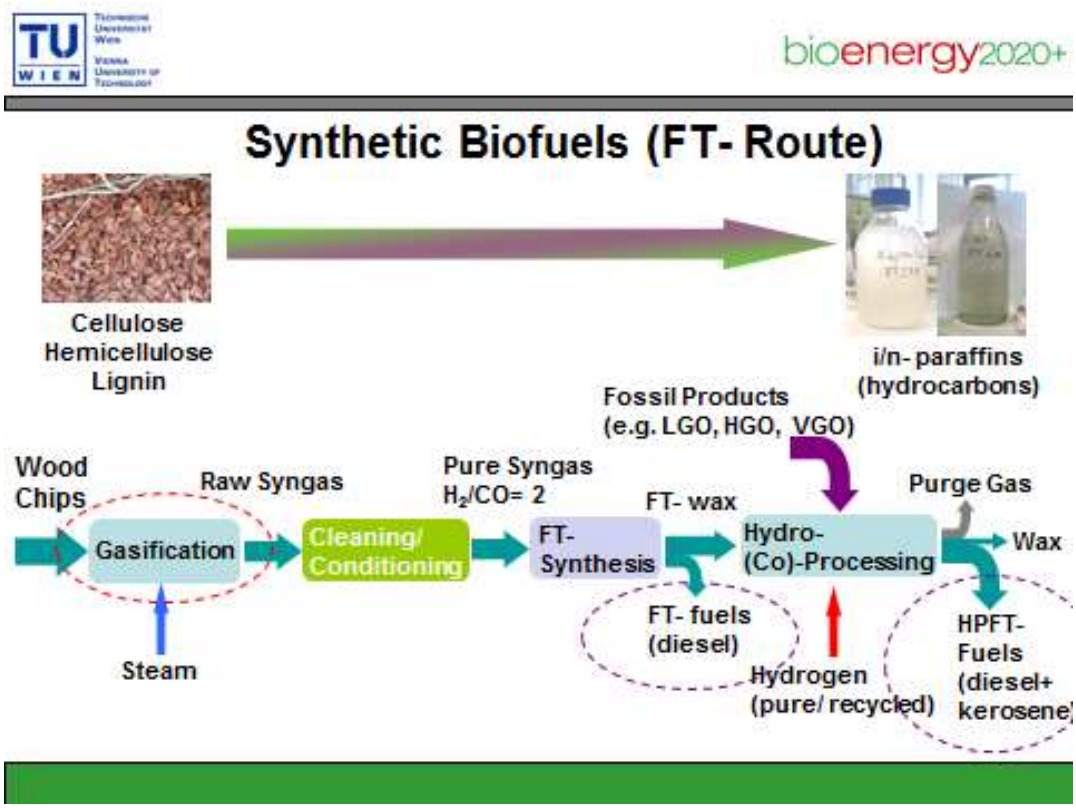

Figure 5: Flow chart of FT-fuel production from lignocellulosic biomass

In the Research Studios Austria project "OptFuel", researchers at the **Energy Institute at the Johannes Keppler University in Linz**[7] worked on a combination of a 2-stage anaerobic digestion of biowaste with power-to-gas (PtG). The goal was to increase the useable carbon production out of biomass and its conversion into a storable energy carrier. A pilot plant was established with a 2-stage fermentation (1st stage hydrogen production, 2nd stage biogas production) followed by a methanation step and a membrane gas separation and cleaning to increase the methane content to more than 96% (see Figure 6). The assessments showed that the operation of the overall system was possible with fluctuating biogas composition. H_2 or CH_4 from PtG can count towards fulfilling the renewables target in the fuel sector as these are considered "advanced biofuels."

[7] Lindorfer, Johannes (Energy Insitute JKU): Research Studio Austria „OptFuel" 2-stage anaerobic digestion of biowaste combined with power-to-gas. National Workshop Biofuels, 29.09.2016, Vienna, Austria

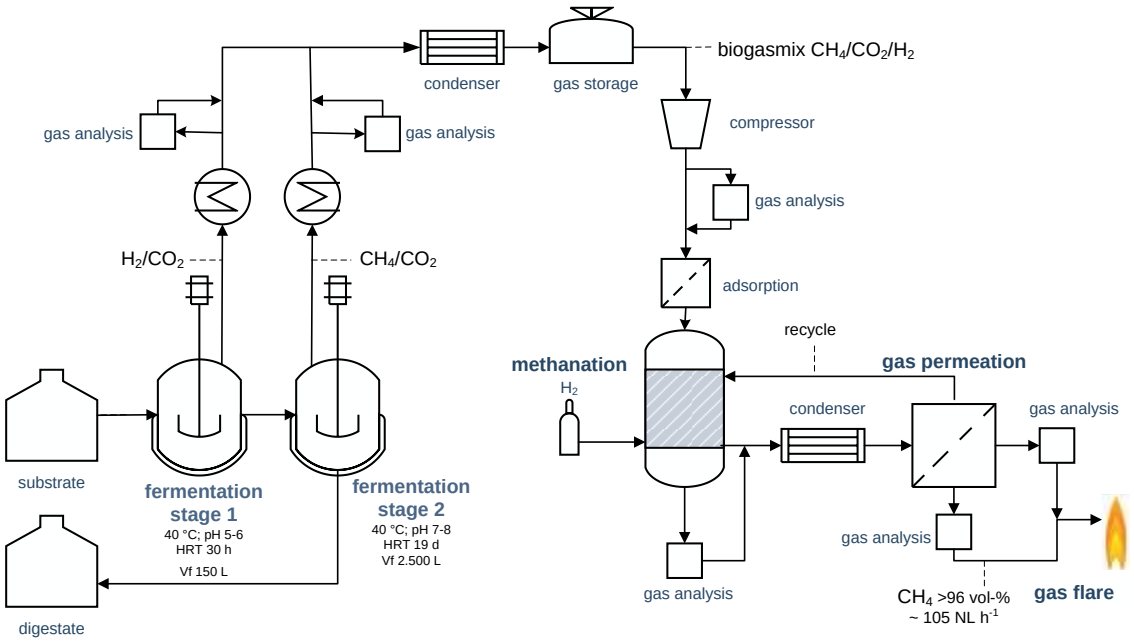

Figure 6: Flow chart of the pilot plant for the OptFuel PtG project

As an alternative to power-to-gas, a research group at **BIOENERGY 2020+**[8] proposed a power-to-liquid concept. Homoacetogenic bacteria can produce acetate, either for sale as a bulk chemical or for further conversion into fuels. In the Hydrorefinery project, in the first step H_2 and CO_2 are used to produce acetate which is then used in a second step either for ABE fermentation or biomethane production. The challenges in this technology are acetate yields, slow growth rates and lag phases. Immobilization of cells is necessary and various materials for this were tested in the project, with the best performance found using linen as the immobilization material.

A research group at the **ACIB Austrian Centre of Industrial Biotechnology**[9] works on the bioelectrochemical reduction of CO_2 to alternative fuels. Microbial electrochemical technologies link microbial metabolism to an electrochemical system with an interaction between biocatalysts and electrodes. Microorganisms are attached on the electrode surface and serve as "catalysts" for reactions on electrodes. For CO_2 conversion, methanogenic and acetogenic cultures can be used. Biofilms on electrodes for three different carbon materials were investigated. It was shown that Microbial Electrolysis Cells (MECs) are a promising tool for the reduction of CO_2 to liquid and gaseous energy carriers.

[8] Rachbauer, Lydia (BIOENERGY2020+): Utilisation of CO2 and H2 for the production of liquid biofuels. National Workshop Biofuels, 29.09.2016, Vienna, Austria

[9] Schnitzhofer, Wolfgang (acib): Bioelectrochemical reduction of CO2 to alternative fuels. National Workshop Biofuels, 29.09.2016, Vienna, Austria

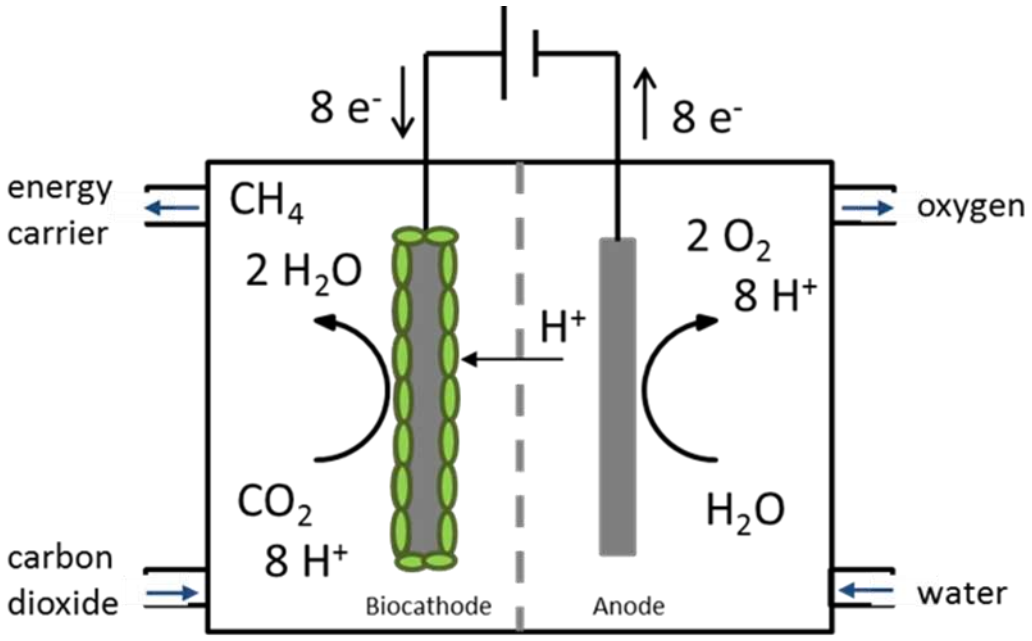

Figure 7: CO_2 reduction in a microbial electrolysis cell (MEC)

Acknowledgements

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Some of the references (footnotes) refer to the National Workshop Biofuels which was held in September 2016 in Vienna, Austria. All presentations of this workshop (in English) are available at: http://www.nwbt.at/content/service/events.

In the News

Reports and Research

Dec 16 - The National Renewable Energy Laboratory recently released its 2015 Renewable Energy Data Book. Download report (Read more)

Dec 9 – UK Industry group Sustainable Aviation (SA) released a comprehensive update of its CO_2 Roadmap first published in 2012. (Read more) Report

Nov 28 – The US Government Accountability Office (GAO) published a report on the Renewable Fuel Standard, concluding that low expected production volumes make it unlikely that advanced biofuels can meet increasing targets. (Read more) Report here. The report was slammed by Jim Lane in Biofuels Digest. (Read more)

Nov 21 – The International Energy Agency released its World Energy Outlook 2016. (Read more and here)

Oct 22 – A new report was published by IRENA, "Innovation Outlook: Advanced Liquid Biofuels". This report indicates that by 2045 advanced biofuels are likely to cost between USD 0.60 and USD 1.10 per litre to produce, meaning that with oil prices above USD 100 per barrel, most advanced biofuels should be able to compete effectively. But the report also predicts that if oil prices remain below USD 80 per barrel, advanced biofuels production will have a difficult time competing with fossil based gasoline and diesel. (Read more) Full report.

Oct - AEBIOM published a statistical report 2016 on biofuels and bioenergy in Europe. (Download report)

Oct 6 – ePURE released a renewables policy paper. (Read more)

Oct 5 – IEA Bioenergy Countries' Reports published. (Read more) Download report

Oct 4 – A BIO White Paper examines "The myth of high RIN prices as proof of the blend wall". Newly available data challenges the widely accepted assumption that the blend wall – the point at which ethanol blending in gasoline exceeds 10 percent – caused the 2013 spike in Renewable Identification Number (RIN) spot market prices. (Read more)

Oct 4 – The USDA published a new report on the biobased products industry, "Economic Impact Analysis of the Biobased Products Industry 2016." (Read more)

Policy and Regulatory Developments

Dec 10 – Norway to boost biofuel content to 20% by 2020. (Read more)

Dec 9 – The Netherlands' government released its new energy strategy up to 2050. With respect to biofuels, the goal from 2023 is to increase the number of fully electric cars and cars running on hydrogen, and after 2035, only sustainable cars will be sold. In addition, the railway sector will switch completely to green electricity and new public transport buses will be developed that will only run on renewable energy or biofuel. (Read more)

Dec 2 – Advanced biofuels for aviation are set to benefit under proposals to revise EU policy on transport fuels. Revisions to the EU's Renewable Energy Directive (RED) could see preferential rules applied to advanced aviation and marine fuels to support their accelerated deployment. (Read more)

Nov 30 – Major boost for UK biojet as government proposes to extend renewable transport fuel incentives to aviation. (Read more)

Nov 30 – EC releases RED II, which proposes first generation biofuels phase-out and new sustainability criteria for forest biomass. To minimise the Indirect Land-Use Change (ILUC) impacts, RED II will introduce a cap on the contribution of food-based biofuels towards the EU renewable energy target, starting at 7% in 2021 and going down

progressively to 3.8% in 2030. (Read more) This proposal was severely criticised by ePURE as not based on science. (Read more)

Nov 27 – Canada announced that it will adopt a national Low Carbon Fuel Standard. (Read more)

Nov 23 - The U.S. EPA released its final rule for renewable volume obligations (RVO) under the renewable fuel standard (RFS). The figures for the 2018 biomass-based diesel category are 2.1 billion gallons, up 100 million gallons from 2017. The 2017 advanced biofuel RVO represents nearly a 19 percent growth in one year. For the rest of the RVOs in EPA's final RFS rule, cellulosic biofuel for 2017 is finalized at 311 million gallons, 35 percent higher than the 2016 standard. The conventional biofuel RVO for 2017 is also up from the proposal, set at 15 billion gallons compared to the 14.8 billion gallons proposed in May. Total renewable fuels under the RFS for 2017 come in at 19.28 billion gallons, up from the 2016 standards of 18.11 billion gallons. (Read more and here)

Oct 25 - In Indonesia, the Energy and Mineral Resources Ministry has mandated the blending of 20% biodiesel and established a fine of 46 cents per liter against those who do not blend as required. (Read more)

Oct 19 – Indonesia levies palm oil exports to subsidise the biodiesel industry. (Read more)

Sep 25 - ePURE published a report on ethanol's direct greenhouse gas emissions (GHG) savings in the EU. Compared to fossil fuels, GHG savings have increased from 59% in 2014 to 64% in 2015, an increase of 8.5% against the 2014 figure, according to new industry statistics published by the European renewable ethanol association ePURE. (Read more)

Oct 10 - US advanced biofuels production could get a boost under a rule change the Environmental Protection Agency is considering that would allow conventional refineries to receive renewable fuel credits for using drop-in biofuels when making gasoline and diesel. (Read more)

Oct 6 – An agreement on a global market-based mechanism for international aviation was reached at ICAO. (Read more) Further detail of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) can be found on the ICAO website. (Read more) Read the full agreement here.

Sep 27 - Finland has set a national target for 20 percent of all transport fuel to come from renewable sources by 2020, rising to 40 percent by 2030. (Read more)

Sustainability

Dec 9 – UPM Biofuels joins the Roundtable on Sustainable Biomaterials (RSB). UPM's renewable diesel, known as UPM BioVerno, is an innovation that reduces the fuel's life cycle greenhouse gas emissions by up to 80 percent and tailpipe emissions significantly when compared with fossil fuels. This high quality biofuel is produced from a residue of the pulp industry, crude tall oil. (Read more)

Oct 20 – A recently released U.S. Grains Council (USGC) study finds that a significant portion of U.S.-produced corn ethanol will likely meet Japan's 50% greenhouse gas (GHG) reduction threshold over gasoline, supporting the case for that fuel's competitiveness and its sustainability compared to other fuel sources. (Read more) Download full report.

Industry News

Dec 11 – The Abengoa Bioenergy cellulosic plant in Hugoton was purchased by Synata Bio for $48.5 M. (Read more)

Dec 10 – Amyris and the government of Queensland, Australia have entered into a partnership to create an Industrial Biotechnology Hub for production of Amyris's high-value personal care and nutraceutical actives, as well as farnesene-derivative products from sugarcane. (Read more)

Dec 9 – Green Biologics, Inc. n-butanol facility in Minnesota came online after two years of development. The facility was converted from an ethanol plant. (Read more)

Dec 8 - Chinese bioenergy giant Kaidi has decided to move ahead with a planned biodiesel refinery in Kemi, northern Finland. This Kemi plant's primary raw material will be scrap wood and by-products of logging such as roots and stumps. (Read more)

Dec 5 - Four major global metropoles are planning to ban diesel-powered transport by 2025 in favour of walking and cycling to improve air quality in these cities. The mayors of Paris, Mexico City, Madrid, and Athens made the commitments in Mexico at a biennial C40 meeting of city leaders. (Read more)

Dec 2 – United Airlines targets using of 900 million gallons of biojet fuels over the next 10 years. (Read more)

Nov 27 - In Hungary, Pannonia Ethanol Zrt. announces that it has successfully completed a Euro 135 million credit facility agreement with a consortium of Hungarian banks to expand its current production. (Read more)

Nov 25 – British Airways in talks with potential partners as it plans to re-launch a sustainable jet fuel project after the Solena project was cancelled. (Read more)

Nov 21 - Indian state-run fuel retailers Indian Oil Corp. (IOC), Bharat Petroleum Corp. (BPC), and Hindustan Petroleum Corp. (HPC) will set up around seven second generation (2G) ethanol plants across the country. India is targeting a more than seven-fold expansion in its biofuel market in the next six years according to oil minister Dharmendra Pradhan. Union minister Nitin Gadkari said the government is working up a new policy on non-conventional resources as it plans to take up ethanol blending in petrol to 22.5% and in diesel to 15%. (Read more)

Nov 21 – Hamburg airport using Neste renewable diesel to reduce its reliance on fossil fuels and reduce its carbon footprint. (Read more)

Nov 20 – Novozymes plans to establish a new enzyme production and supply chain facility in India that is expected to be ready for operation in 2018. (Read more)

Nov 15 – Global Bioenergies completed construction of its 100 tons/year demonstration-scale plant for production of isobutene in Germany. (Read more)

Nov 14 – Alaska Airlines announced that the first commercial flight using Gevo's cellulosic renewable alcohol to jet fuel (ATJ) took place, originating in Seattle and flying to Ronald Reagan Washington National Airport. (Read more)

Nov 13 – Gevo enters the gasoline market, selling a 12.5% isobutanol/gasoline blend in Texas. (Read more)

Nov 10 - BP announced that it will invest $30 million in Fulcrum BioEnergy, which makes biofuel from garbage, in a new partnership designed to curb airplane pollution. (Read more)

Nov 10 – Nigeria published a draft policy on biofuel production and distribution which will include significant incentives and funding of N$100 billion for biofuel companies. (Read more)

Nov 1 - Boeing and Commercial Aircraft Corp. of China (COMAC) signed an agreement to expand their joint research collaboration in support of the long-term sustainable growth of commercial aviation. (Read more)

Oct 31 - The city of San Diego has started using Neste renewable diesel in its vehicle fleet consisting of service trucks, refuse packers, dump trucks, construction equipment, and street sweepers, to name a few. (Read more)

Oct 31 – The Port of Seattle has joined with the Carbon War Room and SkyNRG to investigate long-term financing mechanisms that could provide a supply of cost-effective sustainable aviation fuels to all airlines serving Seattle-Tacoma International Airport. (Read more)

Oct 13 - The Indian government announced it will invest $74.8 million in a second generation ethanol plant that will use crop residues as feedstock. (Read more)

Oct 11 - Gevo, Inc., announced it has completed production of the world's first cellulosic renewable jet fuel that is specified for commercial flights. Gevo produced over 1,000 gallons of the cellulosic ATJ as part of the NARA project. (Read more)

Oct 9 – Enerkem aims to expand their MSW gasification to methanol technology in Rotterdam. (Read more) And in Minnesota. (Read more)

Sep 26 - Global Bioenergies joins Preem, Sekab and Sveaskog in the "bio-based gasoline project" in Sweden. Over the coming months, the consortium will study various plant scenarios to profitably convert forestry products and residues into bio-isooctane. (Read more)

Upcoming Meetings & Conferences

2017

January

- National Biodiesel Conference & Expo — January 16-19, 2017 — San Diego, CA
- World Future Energy Summit (WFES) Sustainable Transport — January 16-19, 2017 — Abu Dhabi
- 5th Central European Biomass Conference — January 18-20, 2017 — Graz, Austria
- 14th International Conference on Renewable Mobility "Fuels of the Future 2017" — January 23-24, 2017 — Berlin, Germany

February

- Lignofuels 2017 — February 1-2, 2017 — Helsinki, Finland
- National Ethanol Conference — February 20-22, 2017 — San Diego, CA

March

- ABLC 2017 — March 1-3, 2017 — Washington, DC
- U.S. DOE's Bioenergy Technologies Office 2017 Project Peer Review − March 6–9, 2017 − Denver, CO
- International Conference Progress in Biogas IV — March 8-11, 2017 — Stuttgart, Germany
- Gasification 2017 — March 15-16, 2017 — Helsinki, Finland

April

- 2017 International Biomass Conference & Expo — April 10-12, 2017 — Minneapolis, MN
- Argus Biomass 2017 — April 25-27, 2017 — London, UK
- 3rd Annual Congress on Biofuels and Bioenergy — April 27-28, 2017 — Dubai, UAE

May

- 39th Symposium on Biotechnology for Fuels & Chemicals (SBFC) — May 1-4, 2017 — San Francisco, CA
- Alternative Fuels Conference — May 24-26, 2017 — Italy

June

- RRB-13, the 13th International Conference on Renewable Resources and Biorefineries — June 7-9, 2017 — Wroclaw, Poland
- EUBCE 2017 – 25th European Biomass Conference and Exhibition — June 12-15, 2017 — Stockholmsmaässan, Stockholm, Sweden
- The 7th International Conference on Algal Biomass, Biofuels and Bioproducts — June 18-21, 2017 — Miami, FL
- Fuel Ethanol Workshop (FEW) — June 19-21, 2017 — Minneapolis, MN
- 2017 BIO International Convention — June 19-22, 2017 — San Diego, CA
- Oleofuels 2017 — June 28-29, 2017 — Krakow, Poland

July

- BIO World Congress on Industrial Biotechnology — July 23-26,2017 — Montréal, Canada

IEA Bioenergy Task 39 Meetings

The following is an abbreviated tentative schedule of Task 39 events and meetings planned over the next 9 months. Please contact us for more detailed information:

- Task 39 co-sponsored special topics session on international progress at 39th SBFC, May 1-4, San Francisco, CA.
- Task 39 business meeting in Gothenburg, Sweden later in May, 2017, in conjunction with the ExCo79 meeting being held May 16-18 and the Advanced Biofuels Conference being held May 18-19, 2017.