Commercializing Conventional and Advanced Liquid Biofuels from Biomass

Task 39
IEA Bioenergy

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From the Task

By Jim McMillan, Jack Saddler and Susan van Dyk

This final issue of the newsletter for 2014 highlights biofuels developments that Task 39 country representatives think will be of interest as well as summarizes some of Task 39's recent work.

It remains interesting times for liquid biofuels.

The significant drop in oil prices (~40%) over the past 6 months is making headlines, with many in the renewable energy sector wondering what detrimental impacts low oil prices will have on the pace of future biofuels development. Opinions vary from concerns that advanced biofuels plants will have difficulty running profitably to suggestions that low oil prices lead to low fuel prices, increased consumption transportation fuels and consequently to an increased demand for liquid fuels, including biofuels (Read article in the Biofuels Digest).

Although the recently completed Climate Change Conference in Lima, Peru did not result in any firmed up commitments to reduce emissions of greenhouse gases (GHG), the role that biofuels could play in climate change mitigation was emphasised. The Global Renewable Fuels Alliance (GFRA) recommended that future policies must include increased use of biofuels, as fully 25-30% of global GHG emissions come from the transportation sector and biofuels can reduce these emissions by 40-90% compared to fossil fuels (Read more).

Task 39 Members - ExCo* and Country Task Representatives

Australia
Stephen Schuck*
Les Edye

Austria
Theodor Zillner*
Dina Bacovsky

Brazil
Ricardo Dornelles*
Paulo Barbosa
Antonio Maria Bonomi
Eduardo Barcelos Platte

Canada
Ed Hogan*
Jack Saddler
Warren Mabee
Stan Blade

Denmark
Jan Bunger*
Michael Persson
Henning Jørgensen
Anders Kristoffersen

Germany
Birger Kerckow*
Jürgen Krahl
Franziska Mueller-Langer

Italy
Gerardo Montanino*
David Chiaramonti
Alessandra Frattini
Stefania Pescarolo

Japan
Takahisa Yano*
Shiro Saka
Kazumichi Uchida

Netherlands
Kees Kwant*
John Neeft

New Zealand
Paul Bennett*
Ian Suckling

Norway
Trond Vaernes*
Karin Øyaas
Judit Sandquist
Gisle Johansen
Berta Guell

South Africa
Thembakazi Mali*
Bernard Prior
Emile van Zyl

South Korea
Kwon-sung Kim*
Jin Suk Lee
Kyu Young Kang
Seonghun Park

Sweden
Asa Forsum*
Maria Nyquist
Jonas Lindmark
Alice Kempe
Anders Holmgren

United States
TBA*
Jim McMillan

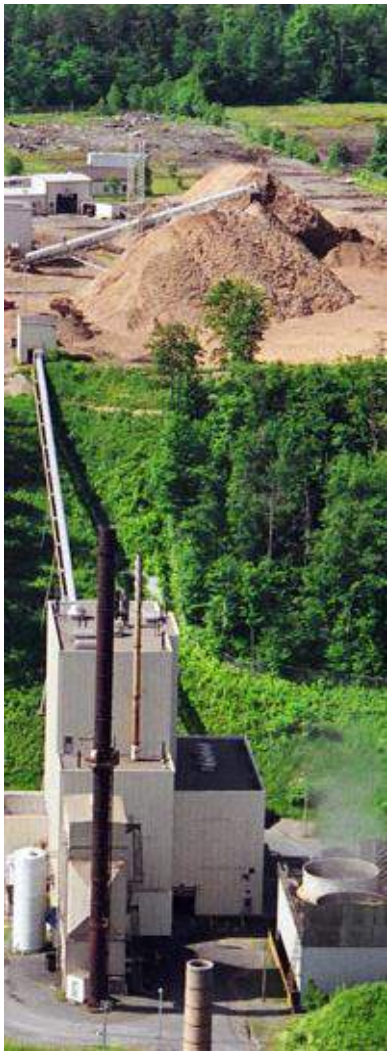


Image Source: esf.edu.com

New conventional (or so-called "first generation") biofuel production facilities continue to be built around the globe and several advanced biofuels facilities are now also operating to produce cellulosic ethanol, including POET-DSM's facility in Iowa, GranBio's plant in Alagoas state in Brazil and Abengoa's biorefinery in Hugoton, Kansas; another DuPont facility in the US is expected to begin operations in early 2015.

Proposed future facilities include DSM's plans for China, GranBio's second cellulosic ethanol facility in Brazil, Biochemtex/Beta Renewables working with Energochemica on a plant in the Slovak Republic and DuPont and Ethanol Europe planning a cellulosic ethanol facility in Macedonia. Brooke Renewables also proposes to build an advanced biofuels and biochemicals plant in Sarawak, Malaysia using Chemtex's Proesa™ conversion technology and Novozymes' enzymes. There is also an increased emphasis on so-called drop-in biofuels, specifically for aviation applications. For example, Norway announced the first airport in the world to supply "biojet" (bio-based aviation fuel) on a regular basis and Japan launched a national aviation biofuel initiative. In addition, Boeing and South African Airways are exploring making biojet from tobacco plants, and Boeing and the Commercial Aircraft Corporation of China have opened a demonstration facility to make biojet from used cooking oil. More details are provided in the News section.

However, high policy uncertainty continues in many biofuels markets, which is limiting current and future investment. In the US, the EPA has further delayed its decision on renewable volume obligations (RVO) until 2015 despite the fact that the volume of advanced biofuels produced by November 2014 already exceeded the 2014 RVO for 2014, with 18.2 million gallons of cellulosic biofuel already produced by this date. In the EU, policy uncertainty is causing ambiguity about future support for advanced biofuels despite some member countries such as Italy announcing their own targets; Italy is targeting advanced biofuels reaching 0.6% of transportation fuel use by 2018, and 1% by 2022. See the News section for links to relevant articles.

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

Task 39 Management:

Operating Agent (Agency):	**Ed Hogan** (Natural Resources Canada)
Task Leader (Agency):	**Jim McMillan** (National Renewable Energy Lab)
Co-Task Leader (Agency):	**Jack Saddler** (Univ. of British Columbia)
Subtask Leaders: (Biochemical conversion, N. America)	**Jim McMillan (NREL, USA)**
(Biochemical conversion, EU):	**Maria Nyquist** (Swedish Energy Agency)
(Link to Advanced Motor Fuels IA):	**Axel Munack** (Thünen Institute, Germany)
(Policy issues, EU):	**Michael Persson** (Inbicon, Denmark)
(Policy issues, North America):	**Warren Mabee** (Queen's U, Canada)
(Implementation Issues):	**Manfred Wörgetter** (BTL Wieselburg, AUT)
Task Coordination:	**Susan van Dyk** (Univ. of British Columbia)

One conclusion from this report is that, despite expanding policy support for increased biofuel production in newer non-OECD markets, such as Southeast Asia, policy support is waning in key markets such as the U.S., EU and Brazil. The IEA also recently published its 2014 World Energy Outlook, concluding, amongst other things, that subsidies for fossil fuels are hindering investments in renewables. The United Nations Conference on Trade and Development (UNCTAD) also issued a new report on "The State of the Biofuels Market: Regulatory, Trade and Development Perspectives", confirming that liquid biofuels now make up 1% of global energy use. The summaries of of these IEA and UN reports can be accessed through the links provided in the News section of this Newsletter.

Colleagues from IEA Task 39 have contributed to much of the work described above. The Task also continues to make progress on its various commissioned reports, including an update to the Task's previous report on algal biofuels ("Current Status and Potential of Algal Biofuels" (2010), available on the Task's website). This project has been expanded into an IEA Bioenergy inter-Task activity that is being jointly led by Les Edye (Australia's representative to Task 39) and Lieve Laurens (NREL) and also involving colleagues from many other IEA Bioenergy Tasks. The update report's scope has been expanded to also include macro algae, heterotrophic production, non-liquid biofuels (e.g., methane) and higher value co-products.

We invite you to join us at upcoming Task 39 sponsored activities including the 21st International Symposium on Alcohol Fuels (ISAF) (10-14 March 2015, Gwangju, Korea) where the Task will convene 2 technical sessions and 37th Symposium on Biotechnology for Fuels and Chemicals (26-30 April 2015, San Diego, USA) where the Task will organize the session on "International progress commercialising advanced biofuels."

As readers of past issues know, the major focus of each Task newsletters is a more in-depth description of biofuels developments within one of Task 39's participating member countries. This Newsletter features an update on activities in the Netherlands and we would like to extend our sincere thanks to our colleagues John Neeft, Elke van Thuijl and Oliver May for jointly authoring this most informative country report.

As always, we appreciate your feedback and ask you to please share with us any ideas you have for how we can continue to increase the value of these Task 39 newsletters.

Best wishes for the season. *Jim, Jack and Susan*

Biofuels in The Netherlands

Elke van Thuijl, Oliver May, John Neeft

1. Background and policy

After petroleum, the largest source of energy in the Dutch energy matrix is natural gas and The Netherlands is the second-largest producer and exporter of natural gas in Europe. Natural gas fields are located off-shore in the North Sea, but also onshore, with Groningen boasting one of the ten largest natural gas fields in the world. As a result, natural gas is the major fossil fuel for production of electricity and heat.

The national energy policy aims to secure energy supply for the future and reduce emissions from the energy sector. The current share of renewables in total primary energy consumption is 4.5% in 2013, having increased from 2.4% in 2005 and 3.5% in 2008. Future targets for renewable energy are governed by the European Directive on the promotion of the use of energy from renewable sources (Renewable Energy Directive, EU-RED, 2009/28/EC) which sets an obligatory target for renewable energy sources for the Netherlands at 14% share of final energy consumption by 2020. In September 2013, as part of a national energy agreement in which a broad range of stakeholders was involved, this target was extended to 16% by 2023.

Following the EU-RED, a specific target for a 10% share of renewable energy in *transport* is to be achieved by 2020. This target will mainly be met through the use of liquid biofuels, such as biodiesel and bioethanol. The main driver for biofuel policies in the Netherlands is to decrease GHG emissions from transport. For the Dutch government, guaranteeing the sustainability of biofuels for transport and biomass for electricity and heat production is an important condition of promoting the use of bioenergy in the Netherlands.

As of January 2007, a biofuel obligation has been in place in the Netherlands with the obligation on the oil companies that bring petrol and diesel from excise warehouses onto the Dutch fuel market. The legislation implementing the EU-RED and building upon the existing biofuels obligation scheme that came into force on January 1st 2011. The table below shows the biofuel obligation targets for the period 2007 until 2020.

Table 1 - Biofuel obligations in the Netherlands (percentage by energy)

Year	Petrol	Diesel	Petrol + Diesel
2007	2%	2%	2%
2008	2.5%	2.5%	3.25%
2009	3%	3%	3.75%
2010	3.5%	3.5%	4%
2011	≥3.5%	≥3.5%	4.25%
2012	≥3.5%	≥3.5%	4.5%
2013	≥3.5%	≥3.5%	5%
2014	≥3.5%	≥3.5%	5.5%
2015			6.25%
2016			7%
2017			7.75%
2018			8.5%

2019	9.25%
2020	10%

As of January 2011, biofuels must be in compliance with the sustainability requirements set by the EU-RED in order to count towards the obligatory percentages. Biofuels produced from wastes, residues, non-food cellulosic material and cellulosic material under certain conditions may be double-counted in meeting the obligation. In addition to liquid biofuels, from 2011 onwards, biogas (provided it is sustainable, as demonstrated by the use of a sustainability scheme [1]) and renewable electricity may also be counted towards the targets if they have been supplied to road transport. Biofuels applied in aviation also comply for fulfilling the obligation for renewable energy in transport. In this way, the Dutch government promotes the application of biofuels in the aviation sector.

Biofuels policy and legislation are the responsibility of the Dutch Ministry of Infrastructure and the Environment. As of 2011, the administration, inspection and enforcement of this legislation are the responsibility of the Dutch Emissions Authority (NEa). NEa publishes a yearly report on the amount, type and origin of biofuels supplied to the Dutch market[2]. In 2015, NEa will start operating an electronic register to keep track of the use of renewable energy in transport to assist companies to demonstrate compliance with the obligation. The register will also facilitate the reporting on sustainability characteristics of biofuels consumed by the Dutch transport sector.

2. Biofuels production

In 2013, a physical volume of 478 kton of biofuels was consumed in the Netherlands. A large part of this (ca. 60%) consists of double counted biodiesel produced from wastes and residues. Total national production of biofuel in the same year amounted to ca. 1789 ktons, consisting of 1375 kton biodiesel and Hydrotreated vegetable oil (HVO, also called renewable diesel) and 414 kton of bioethanol and biomethanol (CBS, 2014). The Neste Oil HVO facility, which produces 800 kton/year is pictured below.

Neste Oil's renewable diesel (HVO) production plant in Rotterdam. (Copyright Neste Oil)

The table below shows the biofuel production capacity for each production facility in the Netherlands.

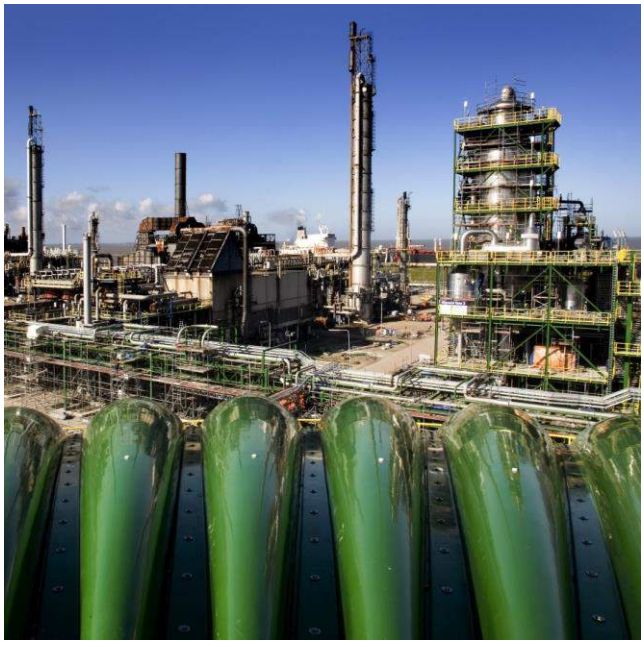
[1] See http://ec.europa.eu/energy/renewables/biofuels/sustainability_schemes_en.htm

[2] see for more information: www.emissieautoriteit.nl (in Dutch language only)

Table 2 - Biofuel production capacity in the Netherlands (kton/year) [source: RVO.nl/GAVE 2014]

Company	Location	Feedstock	Biodiesel	Bioethanol	Methanol	HVO
Biodiesel Kampen	Kampen	UCO	120			
Biopetrol AG Industries	Rotterdam	Rapeseed and soy oil	400			
Eco-Fuels Netherlands	Eemshaven	UCO	66			
Ecoson/Vion	Son	Animal fats	5			
Electrawinds Greenfuels	Sluiskil	UCO, animal fats, vegetable oils	250			
Greenmills/ Biodiesel Amsterdam	Amsterdam	UCO	100			
Sunoil Biodiesel	Emmen	UCO, animal fats	72			
Vesta biofuels	Amsterdam	Vegetable oils (Rape/canola/soy)	200			
Abengoa Bioenergy Netherlands	Rotterdam	Grains and maize		385		
Cargill	Bergen op Zoom	Pentosane stream and process water		32		
BioMCN	Delfzijl	Crude glycerine			200	
Neste Oil Netherlands	Rotterdam	Vegetable oil, wastes, residues, non-edible oils				800

For both biodiesel and bioethanol/biomethanol the national production is much higher than the national consumption and a large volume of the biofuels produced are exported. This also applies to Hydrogenated Vegetable Oil (HVO), for which a large production facility is operated in Rotterdam by Neste Oil. Most biofuel facilities in the Netherlands use feedstocks that are eligible for double counting under the biofuels obligation, mainly Used Cooking Oils (UCO) and animal fats, but also other residues (pentosane stream and process water).



Biomethanol production plant from BioMCN in Delfzijl. (Copyright Jan Pitt)

3. Research, Development and Innovation

The Netherlands has a strong academic network with many of the Universities ranking among the top 300 Universities worldwide, according to the 2014 ARWU ranking[3]. Top institutes in Life Science, Agriculture Science and Engineering include the University of Utrecht, Leiden, Groningen, Nijmegen, Amsterdam, Wageningen, Eindhoven and Delft. This strong fundamental knowledge base and the traditionally close collaboration with and between Dutch companies contribute to a long history of Life Science, Material Science and Agriculture Science innovations.

Based on a solid foundation of the chemical, life science as well as the agro industry sector and fostered by national and European public private partnerships the Netherlands is strongly engaged in developments to enable and capture the innovation potential offered by the bio-economy. Next to the development of bio-based chemicals and materials, biofuels developments play an important role, not only for enabling technology developments, but also their implementation in the aviation industry. The section below highlights some examples of R&D activities aimed at biofuels innovations.

3.1 Governmental programs & public private partnerships

3.1.1 National programs

BE-Basic (www.be-basic.org) started in 2010 with an R&D budget of €120 million of which half is funded by the Ministry of Economic Affairs, Agriculture and Innovation as part of the Economic Structure Enhancement Fund (FES). The other half is funded by industry and knowledge institutions. A total of ten flagships cover the research fields needed for the transition to a bio-based economy. Several of the flagships deal with enzyme, strain and bioprocess development related to biofuels (e.g. cellulosic ethanol, iso-butanol, jet fuels). In 2012 the BE-Basic Program became part of the new established BE-Basic Foundation which has an actual R&D budget of €45 million (~ US$ 60 million) per year.

STW (www.stw.nl) is a foundation which supports proposals from any field of applied research with the aim to enhance the utilization of research results. The budget of STW is approximately € 44 million from the Dutch Organization for Scientific Research (NWO), € 22 million from the Ministry of Economic Affairs (EZ), € 10 million from the Ministry of Education, Culture and Science, € 8 million cash and € 10 million in-kind from co-financing partners in research projects. STW is currently supporting approx. 600 projects. Recent biofuels-related demonstration projects include for example the catalytic upgrading of pyrolysis oil based on research at the University of Twente.

CATCH-BIO (www.catchbio.com) is a public private partnership of 21 partners from Dutch universities, research institutes and industry operating in the field of catalysis research. With a budget of € 21 million, this 8-year program (starting in 2007) focus on the development of clean and efficient processes for biomass conversion into low-cost and sustainable biofuels, chemicals and pharmaceuticals. Given the catalysis focus, biofuels related R&D projects are focusing on thermo catalytic conversion technology including the conversion of biosyngas to liquid biofuels at TU Delft, or catalytic conversion of ethanol to hydrocarbons used as alternative fuels based on research done at Leiden University.

[3] http://www.shanghairanking.com/

3.1.2 International collaboration programs

Canada

On May 14th 2014 a 3-year collaboration between the Dutch Biobased Delta foundation and Bioindustrial Innovations Canada was signed. This initiative aims at accelerating the international commercialization of biofuels and materials based on pyrolysis of lignin and sugar derived chemicals.

Brazil

On April 4 2014 representatives of the scientific community of Brazil and the Netherlands, interested in the bioenergy industry and the use of biofuels in aviation, participated in a workshop about the Brazil - Netherlands program on Advanced Integral Sustainable Biofuels Systems (BASIS). The initiative proposes the creation of infrastructure to boost cooperation between the two countries which started in 2010 between FAPESP and BE-Basic Foundation investigating the sustainability of ethanol production, the impacts of biofuel production and sustainable soil management in biomass production, among other topics.

European collaborations

The 7th European framework program supported various collaborations with Dutch academic and industrial participants. For example, the KACELLE project led to a successful demonstration of cellulosic ethanol at DONG energy in Denmark using yeast and enzyme technology developed by the Dutch company DSM. Under Horizon 2020 a variety of biofuels projects with Dutch academic and industrial participants will be supported.

3.2 Examples of Industrial Biofuels Programs

KLM (www.klm.com/csr/en/climate/footprint/biofuels/index.html)

In the framework of the renewed partnership with WWF Netherlands, KLM has declared its intention to strive for a 1% mix of sustainable biofuel throughout the entire fleet by 2015. On 23 November 2009, KLM operated the world's first biofuels demonstration flight with passengers on board, followed by the first commercial flight on bio-kerosene in 2011. KLM together with partners such as Schiphol airport and its Amsterdam based supply chain partner SkyNRG (www.skynrg.com) is supporting various bio-jet fuels innovation initiatives such as ITAKA (Initiative Towards sustainable Kerosene for Aviation)[4], and the RenJet Fuels Climate-KIC funded project[5].

DSM (www.dsm.com) is a global science-based company active in health, nutrition and materials. Their Bio-based Products & Services unit is dedicated to the development of Bio-based Chemicals and Materials as well as Bioenergy solutions. The later include the development of enzymes for biogas applications, biodiesel production from microbial oil, as well as C5 sugar converting yeast and enzyme technology for production of cellulosic bio-ethanol. The latter program has reached commercial demonstration phase at various partners and lead to the formation of a joint venture (POET-DSM) which opened their first commercial 25 million gallon cellulosic bio-ethanol plant on Sept 3 2014.

Dyadic Netherlands (www.dyadic.com) is a subsidiary and the R&D center of Dyadic International. This team of approx. 30 scientists is dedicated to the development of enzymes and enzyme production processes including cellulases for biofuels applications which have been licensed to Abengoa and Codexis.

[4] www.itaka-project.eu

[5] www.climate-kic.org

4. Pilot plants

TNO, Zeist

TNO (www.ecn.nl) is operating a multipurpose pilot including Hydro-Thermal-Upgrading (HTU) to "biocrude" and pretreatment (superheated steam) with a capacity of ~10 kg/h input. In addition, TNO recently launched a mobile pilot plant to refine algae biomass.

Energy research Centre of the Netherlands (ECN), Petten

ECN (www.ecn.nl) is operating a variety of pilot-facilities for biomass pre-treatment, combustion, torrefaction, pyrolysis, (staged) gasification, gas clean-up, gas conditioning, product separation.

Algae Park, Wageningen

Led by Prof. René Wijffels (University of Wageningen), Algae Park (www.wageningenur.nl/en/Expertise-Services/Facilities/AlgaePARC.htm) is a public private partnership piloting different reactor concepts for cultivating microalgae. Available pilot scale cultivation systems are open raceway pond, flat panel photo-bioreactor, horizontal tubular photo-bioreactor and vertically stacked 3D tubular photo-bioreactor.

Bioprocess Pilot Facility (BPF), Delft

BPF (www.bpf.eu/) is an open access pilot facility integrating biomass handling, bench (4 kg dry matter per batch) and pilot pretreatment (40 kg/h, dry matter), hydrolysis, fermentation (from 10 liter – up to 42 m^3) and a large variety of DSP unit operations. The pretreatment section is currently under construction and will be operational in Q1 2015.

The Bioprocess Pilot Facility (BPF) in Delft

Biomass Technology Group (BTG), Enschede

BTG (www.btgworld.com/en) is operating a variety of biomass conversion technologies at bench/pilot scale. Technologies include pyrolysis, torrefaction, gasification and supercritical gas reforming.

In the News

Reports and Research

(September) The Renewable Fuels Association in the US has released a report that further debunks the food vs fuel argument. (Report) (Read more)

(September) The International Energy Agency released its third annual Medium-Term Renewable Energy Market Report which includes forecasts for global biofuel and renewable energy growth (Summary of report) (Read more) The summary indicates that the policy support for increased biofuel production is waning in the key markets of the U.S., EU and Brazil. It is, however, expanding in newer non-OECD markets, such as Southeast Asia.

(November) The International Energy Agency (IEA) published its World Energy Outlook 2014. (Summary of report) One conclusion from the report is that fossil fuel subsidies are hindering renewables investment (Read more)

(November) The United Nations Conference on Trade and Development (UNCTAD) released a new report on "The State of the Biofuels Market: Regulatory, Trade and Development Perspectives" which shows that biofuels now make up 1% of global energy use. (Report)

(December) A report by Sustainable Aviation in the UK identifies potential production volumes of sustainable aviation fuel by 2050 for the UK and the world. The report also outlines the effect these fuels can have on reduction in CO2 emissions. (Read more) (Report) (http://www.sustainableaviation.co.uk/)

Policy and Regulatory Developments

(October) Italy became the first member of the EU to mandate the use of renewable fuel made from inedible crops. The law will require at least 0.6% of all petrol and diesel to contain advanced biofuels from January 2018. This will increase to 1% by 2022. (Read more)

(November) The US EPA announced that it will delay finalization of the 2014 RFS Renewable Volume Obligations until 2015 (Read more) (and here)

(December) The US House of Representatives voted to pass a short-term extension of the biodiesel tax incentive for 2014, which will be retroactive to 1 January 2014. The same package also includes an extension of the second-generation production tax credit for algae and cellulosic biofuel (Read more)

Blending mandates:
(September) Philippines raised the biofuel blend volume by 7% (Read more)
(October) Malaysia announced that the biodiesel blending mandate will increase from 5% to 7% (Read more)

Sustainability

(November) A recent study published by Iowa State University raises serious doubts and concerns about the reliability and accuracy of economic models used by regulatory agencies to penalize ethanol for purported indirect land use changes (iLUC). (Read more) (Report)

(December) UPM and WWF Finland have teamed up to discuss and promote the status of wood-based liquid biofuels in Finland and will contribute to RSB certification for wood-based biofuels. (Read more)

Industry News

(September) Soon after the opening of POET-DSM's Project Liberty cellulosic ethanol plant in Iowa, Royal DSM announced that it will focus on establishing a cellulosic ethanol facility in China (read more)

(September) GranBio started cellulosic ethanol production at their 82 million litre per year facility in Alagoas, Brazil (Read more) The existing cellulosic ethanol plant is co-located with a co-generation facility fed by bagasse and

lignin left over from the biochemical conversion process. It is expected to supply 135 GWh of electricity to be sole onto the grid annually after supplying both facilities (Read more) GranBio also announced in October that it plans a second cellulosic ethanol plant comparable in size (Read more).

(September) Syngenta launched its Cellerate cellulosic ethanol process technology which allows existing corn ethanol facilities to maximise production by also converting the corn kernel fiber into cellulosic ethanol as a bolt-on process. The first such bolt-on facility was opened by Quad County Corn Processors and will allow a 6% increase in ethanol production (read more)

(September) In the US, Southwest Airlines signed a purchase agreement with Red Rock Biofuels for renewable jet fuel from forest residues – 3 million gallons per year with the first delivery expected in 2016. (Read more)

(October) Abengoa opened the world's largest cellulosic Biorefinery in Hugoton, Kansas with a capacity of 25 million gallons per year (Read more)

(October) In Madagascar, the Madagascar Energy Company commenced production of ethanol with the facility producing 2,000 litres of fuel per day from sugarcane. (Read more)

(October) Biochemtex and Beta Renewables announced an agreement with Energochemica SE for the construction of a 16.5 million gallon (55,000 ton per year) cellulosic ethanol plant. The plant, which will be constructed in Strazske, Slovak Republic, will also generate power and steam. Start-up is expected in the first half of 2017. (Read more)

(October) Cool Planet Energy Systems was issued a $91MM conditional commitment from the United States Department of Agriculture for a loan guarantee to support construction of the company's first commercial manufacturing plant. The facility will be located at the Port of Alexandria, Louisiana. (Read more)

(October) Emerald Biofuels to use UOP technology (Honeywell's UOP/Eni Ecofining™) for production of renewable diesel to supply the US Department of Defense under the Advanced Drop-in Biofuels Production Project (Read more)

(October) Florida Natural Gas Vehicle Coalition report growth of 200% in fueling stations (Read more)

(October) Japan launches an aviation biofuel initiative with the aim to produce and supply aviation biofuels in time for the Tokyo Olympics in 2020. (Read more)

(October) UK biofuel use in transport reached 4% of the fuel supply during the second quarter of 2014. Ethanol blending is capped at 4.75% but the aim is to achieve the 10% mandate set by the EU for 2020. (Read more)

(October) BlueFire Renewables announced that it will be receiving debt financing up to $270 million from The Export Import Bank of China for its bio-energy project in Fulton, Mississippi. (Read more)

(October) In China, Boeing and Commercial Aircraft Corporation of China opened a demonstration facility that will turn waste cooking oil into sustainable aviation biofuel, producing about 160 gallons per day. The companies estimate that 500 million gallons of biofuel could be made annually from used cooking oil. (Read more)

(October) DuPont, Ethanol Europe and the Republic of Macedonia to build a cellulosic ethanol plant in Skopje, Macedonia. Construction to start in 2016. (Read more)

(November) KiOR announced that it was filing for bankruptcy (Read more)

(November) DuPont reports a delay in completion of their cellulosic ethanol facility in Nevada, Iowa due to labour shortages. Expected completion is now in Q1 of 2015. (Read more)

(November) According to EPA data, the cellulosic ethanol industry produced nearly 18.2 million gallons of ethanol by November 10. (Read more)

(November) In Germany, Audi and its project partners Climeworks, opened a pilot plant in Dresden producing synthetic diesel fuel from water, CO2 and green electricity. CO2 is extracted from the air, while an electrolysis unit generates hydrogen from water. These are reacted to produce hydrocarbon compounds which is converted to synthetic diesel. (Read more)

(November) In Australia, the biodiesel industry faces great difficulty. From July 2015, the excise-free status of the industry will no longer be in place. Ethanol production grants will also be scrapped from the next financial year. The biodiesel industry also faces strong competition from biodiesel imports from Argentina and Indonesia. Imported fuel receives a subsidy under the Cleaner Fuels Grant (Read more)

(November) Brooke Renewables will provide up to $1 billion over a five-year period to build a second generation bioethanol and biochemical plant in Sarawak, Malaysia, using Beta Renewables processing technology and Novozymes' enzymes. (Read more)

(November) Norway becomes host to the first airport in the world to supply biofuels on a regular basis (Read more)

(November) Renewable Energy Group Inc (REG) celebrated the opening of its Geismar facility south of Baton Rouge. The Biorefinery will be producing renewable hydrocarbon diesel (RHD) from oils and fats using Bio-Synfining technology developed by REG Synthetic Fuels LLC. (Read more)

(December) Boeing completed the world's first flight using "green diesel" made from vegetable oils, waste cooking oil and waste animal fats. The airplane was powered with 15% green diesel and 85% petroleum jet fuel. Green diesel is chemically similar to HEFA aviation biofuels (Read more)

(December) In South Africa, Boeing and South African Airways officially launched Project Solaris to produce biojet based on oilseeds from nicotine-free tobacco plants. The first biojet may be produced as early as next year from 123 acres of crops. (Read more)

(December) Expansion of existing biofuels production in Hungary (Read more), and biodiesel in Malaysia (Read more)

(December) Shell becomes the first major oil company to offer B5 in Hong Kong to commercial customers (Read more)

(December) Gas stations in Vietnam start to offer E5 blends (Read more)

(December) Flights using biofuels: Finnair flew a A330 from Helsinki to New York using a blend of biojet from used cooking oil. (Read more)

(December) BP announced divestment of its lignocellulosic ethanol program. (Read more)

Funding announcements:
(October) The US Department of Energy announced $13.4 million for five advanced biofuels and bioproducts projects. The US DOE also made a $25 million funding opportunity announcement, entitled "Targeted Algal Biofuels and Bioproducts". (Read more)

(December) In the UK, the Department for Transport has launched a GBP25 million competition to build up to three demonstration biofuel plants that will convert waste into biofuels. (Read more)

Upcoming Meetings & Conferences

National Biodiesel Conference 2015
January, 19-22 National Biodiesel Conference and Expo, Fort Worth, Texas, USA

Fuels of the Future 2015
January, 19-20, Berlin, Germany

Lignofuels 2015
January, 21-22, Madrid, Spain

Sugar & Ethanol Asia 2015
February, 10-12, F.O. Lichts Sugar & Ethanol Asia, Bangkok, Thailand

National Ethanol conference 2015
February, 18-20, RFA's 20th Annual National Ethanol Conference, Grapevine, Texas, USA

21st International Symposium on Alcohol Fuels 2015
March, 10-14, Gwangju, Korea

European Algae Biomass 2015
April 22-23, Amsterdam, The Netherlands

37th Symposium on Biotechnology for Fuels and Chemicals 2015
April 27-30, San Diego, California, USA

The 5th International Conference on Algal Biomass, Biofuels and Bioproducts 2015
June 7-10, San Diego, USA

12th Annual BIO World Congress on Industrial Biotechnology 2015
July, 19-22, Montreal, Canada

International Congress on Biofuels & Bioenergy 2015
2015, August 25-27, Valencia, Spain

For more events visit www.task39.org

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:

- 2015 March 10-14, Gwangju, Korea: Formal Task 39 business meeting at the 21st ISAF conference.
- 2015 April 26-30 San Diego: Task 39 sponsored commercialisation session within the Symposium on Biotechnology for Fuels and Chemicals
- 2015 October 27-28 Berlin: Formal Task 39 business meeting and presentations at the "end of triennium" IEA Bioenergy Conference