

# 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 issue of the newsletter summarizes some of Task 39's recent work and highlights biofuels developments of interest to the larger liquid biofuels stakeholder community. Since the last Newsletter, Task 39 held a formal business meeting in conjunction with the 21<sup>st</sup> International Symposium on Alcohol Fuels (ISAF) (10-14 March 2015, Gwangju, Korea). Task 39 organised two sessions within the 21<sup>st</sup> ISAF conference where seven members of the Task presented on their work and other biofuels developments in their respective countries. The Task also held an informal business meeting at the 37<sup>th</sup> Symposium on Biotechnology for Fuels and Chemicals (SBFC) (27-30 April 2015, San Diego, USA), where it also convened a session on "International Commercialisation Progress" that comprised 6 invited speakers from Iogen, Novozymes, Abengoa, Borregaard, Genomatica and Katzen International, companies at the forefront of advanced biofuels and sustainable bio-based chemicals commercial development worldwide. This evening special topics session was well attended (estimated attendance of 300), reflecting strong on-going interest in this topic within the renewable fuels and chemicals community.



Sarah Teter (Novozymes) (left) and Quang Ngyuen (Abengoa) (right) speaking at the Task 39 co-sponsored Special Topics session on International Commercialisation Progress at the 37th SBFC in San Diego April 29, 2015.

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Image Source: esf.edu.com

Since the last Newsletter, some modest progress has been made towards reducing policy uncertainty in both the EU and the US, albeit policy uncertainty remains a key issue constraining expansion of the sector. In the EU, the EU Parliament voted to cap conventional biofuels share in total transportation consumption at 7% and to require EU member states to set national targets for advanced biofuels (biofuels from certain types of wastes or residues) share in total transportation no later than 18 months after this new EU directive enters into force. In the US, the US Environmental Protection Agency (EPA) announced their intended schedule for finalising renewable volume obligations (RVOs) under the US Renewable Fuel Standard (RFS) for 2014 and 2015. By June 1, the agency intends to propose volume requirements for 2015; by November 30, EPA plans to finalize volume requirements for 2014 and 2015 and resolve a pending waiver petition for 2014. EPA also intends to: propose the RFS volume requirements for 2016 by June 1, and to finalize these by November 30; propose and finalize RFS biomass-based diesel volume requirement for 2017 on the same schedule; and re-propose volume requirements for 2014, by June 1, that reflect the volumes of renewable fuel that were actually produced in the US in 2014. At the time of this writing, EPA's plans were under review by the US administration (Whitehouse).

Despite a challenging market situation for liquid biofuels of all types as a result of the dramatic decrease in crude oil prices over the past 9 months, biofuels continue to feature prominently in industry news reports. Major agencies like the US Energy Information Administration (EIA) also continue to increase their coverage of “non-petroleum” fuels, including biofuels.

EPA reports continue to reflect the production of cellulosic ethanol in the US while Novozymes and Beta Renewables also announced their plans to construct a cellulosic ethanol facility in India.

Interest in drop-in biofuels especially for aviation continues to grow. Production on advanced drop-in hydrotreated vegetable oils continues to increase, with Eni and Total announcing conversion of two oil refineries into biorefineries.



We welcome your feedback. Please direct your comments to [Susan van Dyk](#)

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Advanced biofuels from biomass also continue to be developed, with several companies moving forward with demonstration or commercial facilities. For example, Steeper Energy received funding for a demonstration project based on their hydrothermal liquefaction technology and Fulcrum Bioenergy awarded a US \$200 million engineering, procurement and construction contract to Abengoa to construct its Sierra BioFuels sorted MSW to transportation fuels plant. In addition, UPM-Kymmene's wood-based renewable diesel facility has started production. Beyond these developments, Red Rock Biofuels announced a strategic partnership with Flagship Ventures to construct a commercial scale biorefinery for producing aviation fuels. Oslo airport also became the world's first large commercial airport to offer continuous provision of biofuel directly from its hydrant system as Statoil aviation committed to supply biojet for a period of one year.

Three important reports were released since the last Newsletter that examine long-range forecasts for energy, including fuels for transportation: the IEA World Energy Outlook, ExxonMobil and BP reports. The IEA and ExxonMobil reports agree that use of liquid fuels in transportation will continue to increase despite growing electrification within the transport fleet. Other important reports that can be accessed via hyperlinks provided in the News section of this Newsletter are the E2 Advanced Biofuel Market Report 2014 as well as the US RFA 2015 Ethanol Industry Outlook.

The Task also continues to progress its various commissioned reports and planning for the next triennium that will run 2016-2018. The major report focus since the last newsletter has been on updating the Task's previous report on algal biofuels, Current Status and Potential for Algal Biofuels Production, published in 2010 (available on the Task's website). 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. This report is scheduled to be completed by the end of 2015. Task 39 is also in the process of updating its database on advanced biofuel pilot, demonstration and commercial facilities (<http://demoplants.bioenergy2020.eu/>). The task also progressed planning of a future Task report to compare leading LCA models used to assess greenhouse gas emissions of advanced biofuels pathways.

As readers of past issues know, the major feature of each Task newsletter is a more in-depth article on biofuels developments in one of Task 39's participating member countries. This Newsletter features an update on activities in Denmark and we would like to extend our sincere thanks to our Danish colleagues Claus Felby and Henning Jorgenson for jointly authoring an informative report on biofuels development in Denmark.

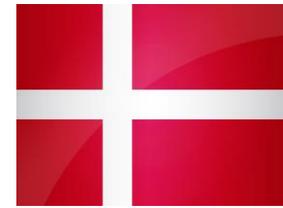
As always, we appreciate your feedback and ask you to please share with us any ideas you have for how we can continue to increase the value of these Task 39 newsletters.

*Jim, Jack and Susan*

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# Biofuel research and commercial development in Denmark

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## General introduction - A fossil free energy supply by 2050

In 2012, the Danish parliament decided on a new climate act, which calls for an energy supply totally free of fossil fuels by 2050. This goal has brought forward long term policies on both energy infrastructure and energy research. The backbone of the renewable energy supply will be wind, biomass and solar. In 2014, the share of renewable energy was 27% of which biomass accounted for approximately 66%. Currently biomass is used to replace coal, but as the wind energy sector is expanded more biomass can be allocated to the transport sector. Electric vehicles will be part of the transport sector, but it is generally recognised that liquid fuels will be needed. There are no specific national policies or regulations on advanced biofuels, as a general EU policy on advanced biofuels is still in the making. The Danish energy sector recently implemented their own set of biomass sustainability criteria. The principles in the Danish rules are close to the UK legislation on a sustainable biomass supply.

All gasoline and diesel sold at filling stations are blends of 5.75% ethanol or biodiesel. The major part of the ethanol is imported from Brazil, but for biodiesel it is difficult to get precise information about the sourcing. The EU target of 10% renewable energy in the transport sector by 2020 will only to a limited degree be covered by electric vehicles, and the amount of biofuel consumption is expected to increase.

The national target for a fully renewable energy supply keeps biofuels on the research agenda, but there has been a shift towards Biorefining, with lignin processing and alternative protein supply gaining increased interest.

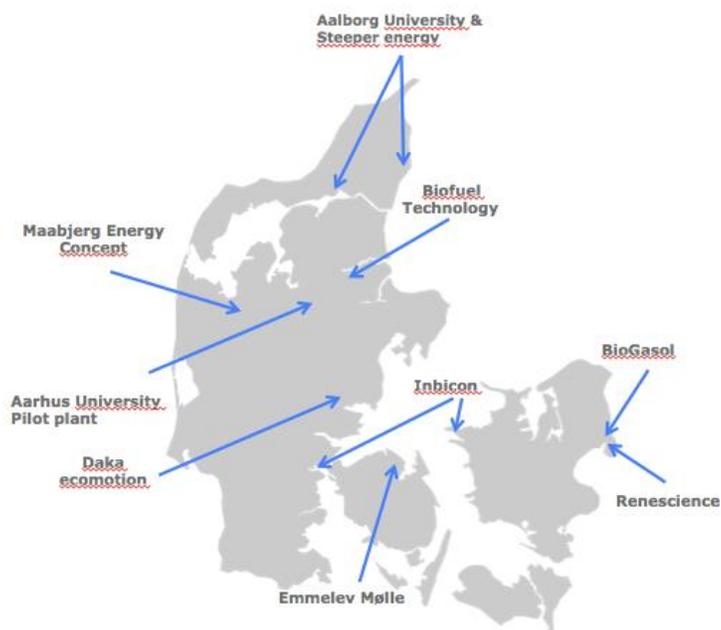
The food versus fuel debate has caused a political preference for advanced biofuels, but further national action, e.g., a specific mandate for cellulosic ethanol or similar, is awaiting the long delayed EU policy on advanced biofuels.

The outlook for biofuels in Denmark is positive. The country has a large biotech industry and several companies dedicated to advanced biofuels. However, the development of a national advanced biofuels industry is delayed by the lack of a coordinated set of EU policies.

## *Demonstration and commercialisation of biofuels*

Only biodiesel is currently produced at a large-scale. There are no large scale ethanol plants at present but a large straw-based facility will come on-line in 2018. There are several demonstration and pilot-scale facilities. A short overview of the main companies and sites (see map) is provided below.

*Inbicon* – This DONG Energy spin-off company has been developing advanced (2G) bioethanol technologies since 2004. Furthermore, they are using their enzyme process technology for processing of household organic waste by the REnescience process. Both technologies are part of DONG New Bio Solutions and integrated into the main company. Several full-scale projects are under development. Together, Inbicon and REnescience have three main sites: their pilot plant and laboratories in Fredericia, their waste processing laboratories and demonstration plant in Copenhagen, and their straw to ethanol demonstration plant in Kalundborg.



### Location of pilot-, demonstration- and large-scale facilities

The demonstration plant in Kalundborg, Denmark, has been running since 2009. For the first few years, the plant was run in a continuous mode 24/7 in order to build operational experience. In 2011, the plant was switched to operation of 1 month campaigns, run 4 times per year. This was done to have time in between operation for rebuilding and improving the process. The plant was rebuilt from a SSF to a SHF process setup in 2011 and for handling of GM microorganisms in 2013. From 2011 to end of 2014, the operational periods were used for testing different equipment, feedstocks, new enzymes or microorganisms. As there were no tests planned for 2015 and because there is yet no mandated market for 2G ethanol in Denmark or the EU, it was decided to put the plant on stand by in 2015.

The technology development and business operations for Inbicon and REnescience are still running full scale at the laboratories and the pilot plants in Fredericia and in Copenhagen. A main focus point is the Maabjerg Energy Concept biorefinery, which is described in more detail later in this article. More information can be found at [www.inbicon.com](http://www.inbicon.com) and <http://www.renescience.com>.

*BioGasol* – This company has built a well equipped pilot-plant in Ballerup near Copenhagen. Their main technology is pretreatment units named Carbofrac. These units are sold at both pilot-scale and larger scale, with capacities ranging from 100 kg/hour to 12 tons/hour. Some years ago there were plans for a demonstration scale plant using the Maxifuel concept; these plans have been put on hold and the company now focuses on process technology. More information is available at <http://www.biogasol.com>.

*Novozymes*, the world largest producer of industrial enzymes, has its headquarters in Copenhagen. The majority of its research activities related to 2<sup>nd</sup> generation bioethanol are performed at its US facilities (in Davis, CA and Franklinton, NC). A smaller group working on biofuels (both 1<sup>st</sup> and 2<sup>nd</sup> generation) is located in Denmark. Novozymes has a partnership with Beta Renewables at the plant in Crescentino, Italy. Furthermore, they are also collaborating with Raizen on their sugarcane bagasse to ethanol plant in Brazil. Novozymes is also actively involved in a number of research projects with Danish universities.

*Terranol A/S* develops and produces yeasts for pentose (C5) and hexose (C6) sugar fermentation for 2nd generation bioethanol production. The company has sold several licences and currently collaborates with Abengoa, Novozymes and Inbicon, among others.

*Biofuel Technology* is a small company located in Hobro. They specialize in biomass logistics and pretreatment technology. They have successfully built a supply technology based on compression of straw into bricks. Currently they have a good market with biogas plants where the compressed straw has several advantages, e.g., a higher water uptake and higher biogas yield. For straw-based ethanol the company is currently developing a pretreatment system adapted to compressed straw. They are collaborating with partners in China on possible large scale use of their technology for cellulosic ethanol production. More information is available at [www.biofueltechnology.dk](http://www.biofueltechnology.dk).

*Steeper Energy*. This Canadian-based company has opened a hydrothermal liquefaction pilot plant in collaboration with Aalborg University. Their biooil process is based on a thermal breakdown of biomass in water at or above 300°C and at near supercritical conditions. Currently they are looking into using this technology to produce diesel for the marine sector. Initial plans for a large-scale production unit have been made.

## Biofuel production in Denmark

There are only 2 large scale plants operating, both producing biodiesel.

*Emmelev A/S* - Emmelev Mølle is the only Danish producer of 1st generation biodiesel based on rape seed oil. The annual production is around 100,000 tons of biodiesel, but there are plans for expanding the capacity. The major part of the production is shipped to Germany. Besides biodiesel, glycerine and feed cake are also produced at this plant.



Daka Ecomotion biodiesel plant. (Photograph from Daka homepage)

*Daka Ecomotion* – This company produces a biodiesel product based on refined animal fat waste from slaughterhouses and agricultural by-products. The process is much like plant-based biodiesel production but uses a 2-step process due to a higher content of fatty acids. As waste feedstocks are used, the fuel is classified as a 2<sup>nd</sup> generation advanced fuel. In addition to biodiesel, glycerine and potassium sulphate are also produced. The majority of the production is sold outside Denmark. The total biodiesel production capacity of the plant is 100 ML/year.

## Biogas for transport

The Danish biogas sector has since 2012 been favoured by a price premium for both electricity and transport. The biogas production is expected to increase from 5 PJ to 20 PJ over the next decade, compare to a total energy consumption of 761 PJ. Several new plants are under construction and will be connected to the national gas grid. Approximately 5 USD is paid to the producer for every GJ of biogas sold for transport. However, very few biogas filling

stations are currently available. There is some discussion on projects to convert buses to using biogas, but in the short to medium term biogas is only expected to have limited use as a transport fuel.



**Figure 1. The Maabjerg biogas plant already in operation**

### ***Maabjerg Energy Concept – large scale biorefinery***

Maabjerg Energy Concept (MEC) is planned as an advanced (2G) biorefinery integrating an existing combined heat and power (CHP) power plant with a biogas plant and a planned bioethanol plant. The three plants are located close to each other in Maabjerg near the town of Holstebro, and are expected to be up and running in 2018.

Recently MEC was awarded 79 million Euro from the European NER 300 program. The biorefinery will initially be able to convert straw, manure, waste and other by-products from agriculture and forestry into sugars (C5 and C6), lignin, ethanol, methane, heat and power. As technology develops more products can be added to the portfolio. The essence of the ethanol process is a combination of physical and mechanical pre-treatment and enzymatic hydrolysis. This establishes a sugar platform, where sugars can be fermented into bioethanol or function as ‘building blocks’ for bio-chemicals, biopolymers, food ingredients, etc. The lignin fraction will substitute for wood pellets in the CHP plant. Non-converted carbohydrates, acids and degradation products are used as feed for the biogas plant. This boosts the methane yield from the manure almost 100% and is an important element of the MEC’s overall economics.

The ethanol plant will receive 300,000 tons of straw from barley and wheat per year and will produce 79 million litres of 2G bioethanol. The logistics and the technology including the 2G enzyme mixtures and yeasts have been developed and tested at the large scale test facility Inbicon in Kalundborg, Denmark since 2009.

The MEC advanced biorefinery will be established with built-in flexibility so that it can switch from straw to other feedstock such as green biomass and expand its bio-based product line on the basis of limited extra investments. According to calculations made by the consortium behind the biorefinery, MEC will create around 2,500 jobs in the two-year construction phase and around 1,000 jobs when in full operation. A large proportion of these are local jobs, which will increase local economic development.

More information can be found at <http://www.maabjergenergyconcept.dk>

### **Biofuel research in Denmark**

All universities have activities ongoing within biofuels and biorefineries and a large part of the activities are organised in national projects. Some of the main projects are: Biomass for the 21<sup>st</sup> Century, a large project to convert hydrolysis lignin to a marine diesel fuel and C5 sugars to chemicals ([www.b21st.ku.dk](http://www.b21st.ku.dk)). BioValue is another large project looking at biorefining with a special focus on protein feed and chemicals from non-food biomasses (<http://www.biovalue.dk>). Many of the active projects have large and active participation from industry, which provides an applied focus with a preference for using current infrastructures, i.e., existing demonstration facilities and biomass logistic systems.

In 2010, the Novo Nordisk Foundation awarded \$120 million USD for the setup of the Novo Nordisk Center for Biosustainability. This center is a collaboration between the Technical University of Denmark (DTU), University of Copenhagen and Chalmers University (in Sweden). From 2016 it will be located on DTU's main campus. The focus of the research is twofold: to identify the most valuable and efficiently produced chemicals that can be made using microorganisms and to improve the production microorganisms. Some of the research is devoted to biopharmaceuticals. More information is available at [www.biosustain.dtu.dk](http://www.biosustain.dtu.dk).

Aarhus University (AU) is building pilot-scale facilities focused on both thermal processing and biorefining of grasses with a special emphasis on protein separation. The grass biorefinery pilot plant at Aarhus University, Foulum, fractionates green biomass like grasses and legumes into a solid fibre fraction and a liquid green juice fraction. The fibre fraction contains the fibre bound protein and will be used for ruminant feed. The soluble protein in the juice is precipitated and recovered into a protein concentrate for monogastric animal feed, expected to compete with soy protein feed. This pilot plant has a high degree of flexibility as reflected by its wide input capacity range of 100-1000 kg biomass (dry matter basis) per hour.

The AU biorefinery pilot plant is located near the AU full scale biogas plant, allowing the possibility for anaerobic digestion and thus production of energy and fertilizer from the residue juice after protein separation. Furthermore, this pilot plant is also located near a twin screw extruder for biomass fractionation and a new hydrothermal conversion (HTC) pilot plant (60 litre wet per hour, maximum pressure of 300 bar, and maximum temperature of 450°C), designed for production of bio-oil and/or chemicals such as binders, from lignin and other biomass residue streams. For more information contact Morten Ambye Jensen ([maj@eng.au.dk](mailto:maj@eng.au.dk)).

The former Risø Laboratories have been merged with the technical university (DTU) and thus no longer exist as a separate entity. All research activities have been moved from the Risø Campus to DTU in Lyngby.

## Danish industry and universities join forces in Biorefining Alliance

BioRefining Alliance is a Danish organisation founded in 2011 by three leading Danish companies – DONG Energy, Novozymes and Haldor Topsøe – and the business organisation Danish Agriculture & Food Council. Today, it has 10 members including Danish universities, companies and organisations. The funding of the organisation comes from the members only, with the largest share paid by industry.

BioRefining Alliance works mainly on a political level to promote Denmark's opportunity to create jobs, to export technologies and to have industry-driven innovation within advanced biorefining in a bioeconomy, where the raw material is sustainable biomass and biowaste. Denmark has already invested a substantial amount of public and private funding in advanced bioeconomy research and development. A main element is the competencies in the whole value chain from agriculture and forestry to biological, thermal and chemical processes to bio-based products. The definition of advanced biorefining includes all types of processes (biological, chemical, thermal, mechanical), which create higher-value products (biofuels, biochemicals, feed, materials, etc.) rather than converting biomass to heat and electricity.

Recently the Biorefining Alliance has advocated for specific advanced biofuel mandates in both Danish and European policy.

More information in both Danish and English can be found at their website, [www.biorefiningalliance.com](http://www.biorefiningalliance.com).

## In the News

### Reports and Research

The US Renewable Fuels Association published their 2015 Ethanol Industry Outlook ([Report](#))

The E2 Advanced Biofuel Market Report 2014 was released in January 2015. According to the report, advanced biofuel annual production capacity in North America (US and Canada) topped 800 million gallons in 2014, up from the previous year and almost double the capacity in 2011 ([Report](#)). The report projects that by 2017, as many as 180 companies are expected to increase their combined annual production capacity to 1.7 billion gallons of advanced biofuel, doubling current capacity. ([Read more](#)) ([Report](#))

(February) The Natural Resources Defense Council (NDRC) published an “Airline Biofuels Sustainability Scorecard” report. According to the report, Air France/KLM is the leader of the pack, followed by British Airways, United Airlines, Virgin Atlantic, Cathay Pacific, and Alaska Airlines. ([Read more](#)) ([Report](#))

(March) E4Tech and Ecofys published a scoping paper for the UK Department for Transport on “Novel Low-carbon Transport Fuels and the RTFO: sustainability implications”. The study considered whether, and how, an emerging class of novel low carbon transport fuels, which are not currently covered by the Renewable Transport Fuel Obligation (RTFO), could receive policy support similar to that received by biofuels. The RTFO currently only supports biofuels from biomass, with other options such as syngas fermentation, hydrogen, etc. not currently included. ([Report](#))

(May) The US Energy Information Administration (EIA) launched a redesigned International Energy Portal to help users access international energy data and to provide new and expanded tools and capabilities to examine trends in global energy markets. ([Read more](#))

The International Monetary Fund (IMF) published a Working Paper entitled “How Large are Global Energy Subsidies” ([Report](#))

### Policy and Regulatory Developments

(April) The European Parliament voted on April 28 to approve the cap on first-generation biofuels at 7%. ([Read more](#))

US EPA announced dates for finalizing 2014, 2015 and 2016 Renewable Fuel Standard volumes. ([Read more](#))

### Sustainability

(March) In the UK, a study commissioned by Convert2Green (C2G), an energy-from-waste group funded by the Government’s Office for Low Emission Vehicles and Innovate UK, says that used cooking oil-based biodiesel can account for tank to wheel GHG savings of 86%, well-to-wheel GHG savings of 84% and a substitution rate of 85%, with no efficiency loss. ([Read more](#))

The European Environment Agency published a report entitled “Focusing on environmental pressures from long-distance transport.” ([Report](#)) This report presents an overview of transport demand and pressures from the sector on the environment, as well as selected related impacts and policy responses.

### Industry News

(May) Goldman Sachs has cut its long-term crude oil price forecasts for Brent from \$70 to \$55 for 2020. ([Read more](#))

(May) In the US, the share of fuels other than petroleum in transportation reached its highest level since 1954 with 8.5% of fuel from non-petroleum sources in 2014. ([Read more](#))

(April) EPA reported that 7.8 million cellulosic RINs were generated in March, 286,237 D3 RINs were generated for ethanol, with 9.28 million generated for renewable compressed natural gas and 10.25 million for renewable liquefied natural gas. All 19.81 million D3 RINs generated during the first three months of 2015 were generated domestically. No D7 renewable diesel RINs have been generated so far in 2015. ([Read more](#)) After the EPA announcement in July 2014 that cellulosic biogas used as transportation fuel could earn D3 RINs, RIN generation for 2014 amounted to 33.02 million D3 RINs. Of that, 683,000 came from cellulosic ethanol. ([Read more](#))

(April) Taiwan's largest integrated steel maker, China Steel Corp., has announced formal board approval of a 1,400 million TWD (\$46 million USD) capital investment in a LanzaTech commercial ethanol facility. ([Read more](#))

(April) Audi produces first batch of synthetic diesel (e-diesel) from CO<sub>2</sub>. ([Read more](#))

(April) A report from Lux Research indicates that China provides great opportunities for alternative fuels as the country moves to reduce foreign oil imports from the current 50% of domestic demand. However, the opportunity is seen in natural gas vehicles and production of ethanol from coal, rather than biofuels. ([Read more](#))

(March) In Colorado, US, Red Rock Biofuels announced a strategic partnership with Flagship Ventures for the construction of its first commercial scale refinery in Lakeview, Oregon. The facility will convert approximately 140,000 dry tons of woody biomass into at least 12 million gallons per year of renewable, liquid transportation fuels. Southwest Airlines agreed to purchase approximately 3 million gallons per year of Red Rock's low carbon, renewable jet fuel. ([Read more](#))

(March) In Germany, biodiesel exports grew more than 5% in 2014, reaching 506.7 million gallons. ([Read more](#))

(March) In Afghanistan, Springboard Biodiesel announced it has been selected to provide its turn-key, small-scale biodiesel processing system to Bagram Airfield in the Parwan Province of Afghanistan. ([Read more](#))

(March) In the Philippines, Dutch firm Van Kessel Inc. announced plans to invest \$302 million to build the country's largest ethanol plant with feedstocks such as nipa, sweet potatoes, cassava, sweet sorghum and coconuts. ([Read more](#))

(March) In Minnesota, US, Revolution Fuels raised \$983,332 through the sale of equity and securities for its mobile waste oil to biodiesel production facilities. ([Read more](#))

(March) In Brazil and California, Ceres and Raízen announced that they have signed a multi-year collaboration agreement to develop and produce sweet sorghum on an industrial scale. ([Read more](#))

(March) In Uganda, Ugandan, Saudi Arabian and Lebanese investors have invested \$1.8 million to build a 4,000 liter per day cassava-based ethanol plant. ([Read more](#))

(March) In France and Italy, Total and Eni are both looking towards biofuel as a way to reduce or eliminate layoffs brought on by the need to reduce oil refining capacity ([Read more](#)). Eni announced it will convert the Gela refinery in Sicily into its second hydro-treated vegetable oil (HVO) renewable diesel unit, outputting 750,000t/yr. ([Read more](#)) Total will transform the La Mède crude facility into a 500,000-tonne-per-year biorefinery that will manufacture renewable diesel primarily from used oils, as well as renewable feedstock using an HVO process. ([Read more](#))

(March) In Hong Kong, Dragonair, part of the Cathay Pacific Group, operated its first commercial flight using a biofuel blend using a 50:50 blend of fossil-based jet fuel and bio-based jet fuel, refined from 100% used cooking oil as feedstock. ([Read more](#))

(March) In Canada, Steeper Energy received a \$3m grant from the Sustainable Development Technology Canada (SDTC) office. This funding is to be used for the development of an Industrial Scale Pilot Plant to commercialize its proprietary hydrofaction biomass-to-liquids technology platform. The SDTC funds will assist in the completion of Steeper Energy's 100 barrel per day Industrial Scale Demonstration Project. ([Read more](#))

(March) GoBiGas, the world's first demonstration plant for large-scale production of biogas through the gasification of forest residues, began full operation. ([Read more](#))

(February) In Japan, Chevron Lummus Global has teamed with Euglena to construct an aviation biofuel facility, set to come online in 2018 and which will cost upwards of \$250 million. Uglena, or freshwater unicellular organisms, will be the feedstock for the fuel. ([Read more](#))

(January) In India, Novozymes and Beta Renewables are planning to establish a 75 million liter per year cellulosic ethanol plant in Punjab based on paddy straw as feedstock. ([Read more](#))

(January) Beginning March 2015 and lasting for one year, Norwegian oil company, Statoil Aviation, will supply 2.5 million gallons of sustainably produced, certified biofuel into the tanks at Oslo airport, the world's first large commercial airport to offer

continuous provision of biofuel over a long period and to fuel aircraft with biokerosene directly from its hydrant system. ([Read more](#)) Approximately 5,000 flights from Lufthansa, Swiss, Austrian Airlines, Germanwings and Brussels Airlines at the Norwegian capital's airport will use the new eco-friendly mix.

(January) UPM-Kymmene announced that it has started its wood-based renewable diesel plant in Lappeenranta. This plant produces up to 120 MLY of UPM BioVerno diesel, a drop-in biofuel made from hydrotreated crude tall oil. ([Read more](#))

## Upcoming Meetings & Conferences

### [The 5<sup>th</sup> International Conference on Algal Biomass, Biofuels and Bioproducts 2015](#)

7-10 June, San Diego, USA

### [Advanced Bioeconomy Feedstocks Conference \(ABFC\) 2015](#)

9-10 June 2015. New Orleans, USA

### [Oleofuels 2015](#)

10-11 June, Frankfurt, Germany

### [12<sup>th</sup> Annual BIO World Congress on Industrial Biotechnology 2015](#)

19-22 July, Montreal, Canada

### [BioFuelNet Advanced Biofuels Symposium 2015](#)

22 – 24 July, Montreal, Canada

### [International Congress on Biofuels & Bioenergy 2015](#)

25-27 August, Valencia, Spain

### [Advanced Biofuels](#)

16-17 September, Stockholm, Sweden

### [5<sup>th</sup> International Conference on Lignocellulosic Ethanol \(ICLE\) 2015](#)

15-17 September, Brussels, Belgium

### [8th Biofuels International Conference](#)

22-24 September. Porto, Portugal

### [Drop-In Biofuels: International Conference on Microbial Hydrocarbon Production](#)

25-27 October, Frankfurt/Main, Germany

### [National Advanced Biofuels Conference & Expo.](#)

26 – 28 October, Omaha, Nebraska, USA

### [IEA Bioenergy Conference 2015](#)

27-28, October, Berlin, Germany

For more events visit [www.task39.org](http://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 October 25-28 Berlin: Formal Task 39 business meeting (Oct. 25) and presentations at the “end of triennium” IEA Bioenergy Conference (Oct. 27-28).