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Commercializing Conventional and Advanced Liquid Biofuels from Biomass

Task 39
IEA Bioenergy

Inside This Issue

From the Task

By Jim McMillan, Jack Saddler and Susan van Dyk

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

At the beginning of the Northern Hemisphere summer, in May 2014, Task 39 held a business meeting in conjunction with the IEA Bioenergy Executive Committee (ExCo) meeting in Copenhagen. An informative workshop entitled, "Infrastructure compatible transportation fuels", was jointly organized by IEA Bioenergy and the Advanced Motor Fuels (AMF) implementation agreements (IA). Two Task 39 colleagues, Oliver May (DSM) and Sergios Karatzos (UBC/Steeper Energy) gave presentations, respectively providing an industrial perspective and summarizing the Task's recently released report on drop-in biofuels. Following the workshop, Task 39's biannual business meeting was hosted at the University of Copenhagen by Professors Claus Felby (U. Copenhagen) and Henning Jorgensen (Technical University of Denmark) and focused on assessing progress across the Task's various ongoing activities. In addition,Anselm Eisentraut from IEA Headquarters generously joined the meeting and provided an overview of the original assumptions and targets that were used to develop the IEA HQ Biofuels 2050 Roadmap predictions that generated considerable discussion. In the past, through their multi-country expertise and varying perspectives, Task 39 members have played a valuable role to IEA HQ by providing data, assessing technology claims and identifying potential pitfalls that could otherwise detract from the integrity of the IEA's different biofuel predictions. IEA HQ recognizes that some assumptions in the original report have changed such that an update of the 2050 road map may be warranted.

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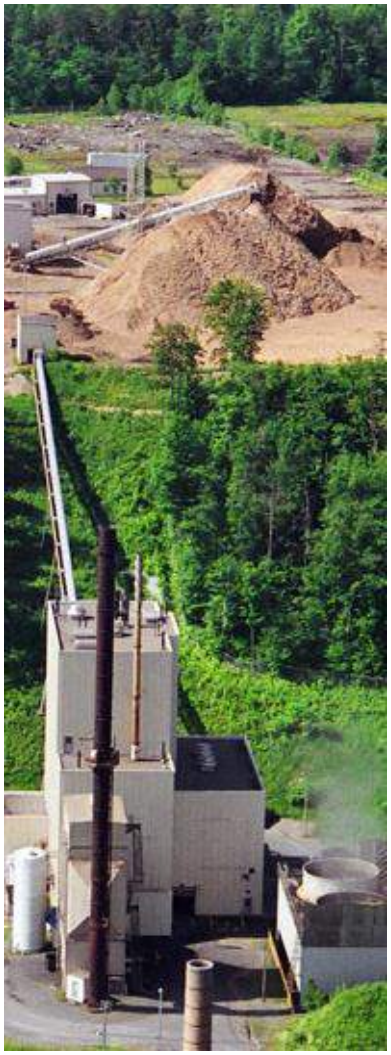

Image Source: esf.edu.com

In particular, since the road map was first drafted, many advanced biofuel plants have not moved to commercialization as quickly as originally had been anticipated. However, with the recent formal opening of the DSM-Poet plant, which joins the operating Chemtex and IneosBIO plants in Italy and Florida, USA, respectively, there are now at least commercial plants running. Looking forward, with the Dupont and Abengoa plants on track to start up commercial operations later this year and other plants also nearing completion in Brazil, there is reason to be optimistic. One of the ongoing activities of the Task is to work with IEA HQ to update and refine IEA's 2050 predictions. A key unknown is how quickly and to what extent the maritime and aviation biofuel markets will develop; biofuels for aviation are expected to continue to grow rapidly compared to other liquid transportation fuels. To this end, Sergios Karatzos, the lead author of the Task 39 drop-in report, gave a detailed presentation which again generated considerable dialogue and resulted in new information and perspectives being incorporated into the final report that was released publically in August, 2014. In summing up, participants agreed that this new report was well-researched/balanced and that drop-in biofuels should remain a priority area for Task 39 to continue to work in. With many airlines and transport companies such as Boeing, Airbus, Maersk and groups such as the US military showing considerable interest in renewable fuels for aviation and shipping applications, drop-in biofuels will likely remain a priority topic for the coming triennium. The Copenhagen meetings concluded with a very informative excursion to Haldor Topsoe, one of the world's major producers of thermochemical catalysts.

Upcoming meetings that Task 39 will participate in include the Fourth International Conference on Lignocellulosic Ethanol (4ICLE), Munich, Germany (23-25 September, 2014) and the 21st International Symposium on Alcohol Fuels (ISAF) (10-14 March 2015, that will be held in Gwangju, Korea. Task 39 will hold its next formal business meeting in association with the 21st ISAF meeting.

As already mentioned, Task 39 issued the full and executive summary versions of "The potential and challenges of drop-in biofuels" reports, which are now available on Task 39's website (www.task39.org). This drop-in report was profiled (lead article) in the 12 August issue of Biofuels Digest in a story entitled: "The Hydrogen Wall. Looking at the prospects for drop-in biofuels" (Read article).

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

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The summary written by Biofuels Digest echoed one of the main conclusions of the report: "Due primarily to the significant processing and resource requirements (e.g., sufficient hydrogen supply and effective catalysts) needed to make drop-in biofuels (as compared to "conventional" oxygenated alcohols or FAME biofuels), large scale, large volume production of cost-competitive drop-in biofuels is expected to remain challenging in the near-to-midterm." We hope this report will contribute to ongoing discussions on the potential for drop-in biofuels, especially in sectors such as aviation where there are, as yet, no real alternative, sustainably available, fuels.

A number of other highly relevant reports have also been released since the last Task 39 newsletter (See News section for links).

For example, IEA HQ recently published their Medium Term Market Report which includes forecasts for global biofuel and renewable energy growth. Other reports include: Navigant Research's report on "Biofuels for Transportation Markets," which analyzed emerging markets and future growth opportunities for biofuels, including ethanol, biodiesel, and drop-in biofuels. Projections from this report are that worldwide revenue from biofuels for road transportation will grow from $166.5 billion annually (2014) to $337.8 billion (2022), an increase of over 200%. In Europe, ePure (European renewable ethanol) released a State of the Industry outlook report titled "Renewable ethanol: driving jobs, growth and innovation throughout Europe". Still in Europe, the EU Biofuels Annual 2014 report provided an overview of the European ethanol industry and its likely future, assuming the EU has finally agreed on a cap of 7% for conventional biofuels.

In the US, although there is still uncertainty regarding the Renewable Volume Obligations (RVO) for 2014, the US EPA approved additional cellulosic and advanced biofuels pathways to qualify under the renewable fuels standard (RFS). In Australia, the federal government has repealed its national carbon tax and removed the ethanol subsidy, with both changes negatively impacting the future of biofuels development in Australia. In Asia, Taiwan will phase out its B2 mandate, while Malaysia has delayed implementation of a B5 mandate. In contrast, Brazil continues to support the development of biodiesel, increasing the mandate to 6% in July and planning for a further increase to 7% by November 2014. Brazil also approved an increase in its ethanol mandate to a 27.5% minimum blend which only requires the president to sign it into law..

Conventional biofuels continue to expand in several countries, with sugar- and corn-based ethanol plants being constructed in Angola, Eastern Honduras, South Africa, Zambia and Argentina.

Although there were no cellulosic ethanol RINs produced in the US in May and June, the grand opening of the POET DSM cellulosic ethanol facility a few weeks ago indicates that this will change in the near future. Also, the nearly completed DuPont and Abengoa plants will also soon be contributing to cellulosic ethanol production in the US, and additional cellulosic ethanol facilities have also been announced (e.g., by Patriot Renewable Fuels).

In other parts of the world, the Italian government indicated it hoped to help build three further cellulosic ethanol plants following on the success of the Crescentino facility. M&G Chemicals also announced a joint venture with China-based Anhui Guozhen Co Ltd to build a commercial-scale cellulosic ethanol plant in Fuyang City, Anhui Province, China. Novozymes has also indicated that they are optimistic that a commercial-scale cellulosic ethanol plant in China will be operational within two years, with several more to follow in subsequent years.

The drop-in biofuels area has also seen some recent developments. The start-up of the Diamond Green Diesel facility in Norco, Louisiana, which produces Honeywell Green Diesel™, gave HEFA-based renewable diesel and jet fuel based on UOP technology some profile. Around the same time, Petrixo Oil & Gas announced plans to build a commercial scale plant in the United Arab Emirates, using Honeywell UOP technology to produce 150 million gallons per year of renewable jet fuel and renewable diesel.

In northern Europe, St1 Biofuels Oy announced plans to build an Etanolix® plant producing waste-based bioethanol. The product will be sold to North European Oil Trade Oy of Gothenburg, Sweden. In Asia, Cathay Pacific announced

plans to invest in Fulcrum Bioenergy to produce waste-based jet fuel. In Edmonton, Canada, the Enerkem facility which produces methanol from municipal solid waste had its official opening.

Drop-in fuels, and specifically renewable aviation fuels, have also been in the news in Brazil. Amyris has partnered with the Brazilian airline GOL to supply the first commercial airline route using farnesane at a 10% blend. Byogy Renewables Inc. and Brazilian airline partner Avianca have also announced plans to demonstrate the Byogy alcohol-to-jet (ATJ) fuel technology and to accelerate ASTM certification of this fuel. Also in Brazil, Boeing and Embraer announced that they will open a joint research center to advance the development of a sustainable aviation biofuel industry in Brazil.

In conclusion, it has been a busy few months for both Task 39 and the global biofuels sector!

Readers of past newsletters will know that the highlight of the newsletter is a more in-depth description of the biofuels developments occurring within one of Task 39's member countries. Brazil is not only the country that pioneered the development, demonstration and deployment of biofuels. As indicated above, it continues to be at the forefront of technology, commercialization, suitability and policy aspects of conventional, advanced and drop-in biofuels. We would like to thank our Brazilian colleagues at CTBE and Petrobras for their contribution to this newsletter in producing what we hope you will find to be an interesting overview of biofuel developments in Brazil.

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

Jim, Jack and Susan

Biofuels in Brazil

Antonio Maria Bonomi, Paulo Barbosa and Susan van Dyk

Introduction

Brazil was the leader in biofuels production and exports until the USA became the world's largest biofuel producer in 2006 and the leading exporter of biofuels in 2011. Brazilian ethanol from sugarcane is considered the most sustainable biofuel commercialized to date, providing 61% or greater reduction in total life cycle GHG emissions compared to gasoline. Brazilian sugarcane ethanol is considered as an advanced biofuel by the US EPA. (Ref1)

With over 30 years of development, the Brazilian ethanol industry continues to serve as a model for sustainable bioethanol production from sugarcane.

Historical development of Brazilian biofuels - Proalcool and flex-fuel vehicles

Widespread development of biofuels came in response to the first oil crisis in the 1970s as a means to increase energy security and save foreign currency on petroleum purchases. The National Ethanol Programme, Proálcool, was launched at this time and several policies were introduced to promote bioethanol production and consumption,

including the development of vehicles capable of utilizing hydrous (E100) fuels. Flex-fuel vehicles, capable of running on any mixture of gasoline and hydrated ethanol, were introduced in 2003 and currently about 60% of all vehicles in Brazil are flex-fuel, with 90% of new light vehicle sales being flex-fuel vehicles (Ref2). The Brazilian government promotes the sales of flex-fuel vehicles by having lower taxes and preferential interest rates on the purchase of flex-fuel vehicles (USDA Biofuels Annual, 2013).

Figure 1 below demonstrates the effect of the Proalcool program and the introduction of flex-fuel vehicles on the expansion of bioethanol production in Brazil.

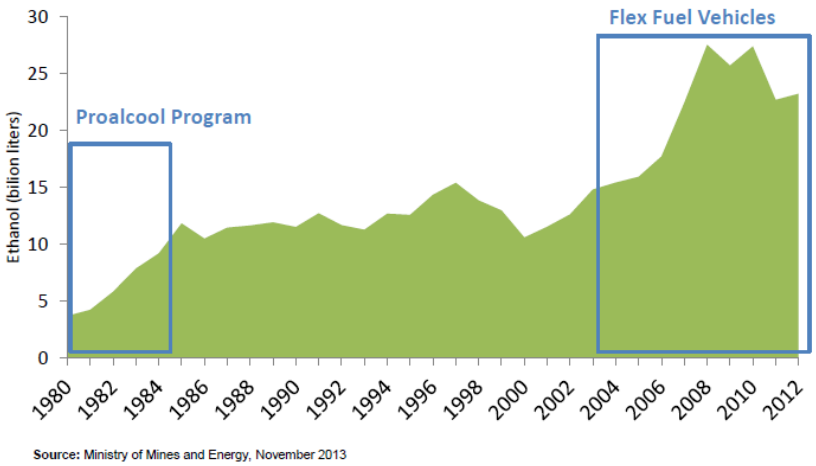


Figure 1. Increase in ethanol production over the period 1980 – 2012, illustrating the impact of the Proalcool program and the introduction of flex-fuel vehicles.

Ethanol Industry in Brazil

There are currently 399 ethanol production facilities in Brazil, comprising a total annual capacity of 40.7 billion litres, although only about 65% of this capacity is used (USDA Biofuels Annual 2013), due to the flexibility of sugar/ethanol production in Brazilian sugarcane plants. In 2013, Brazil's ethanol production was 26.6 billion litres and the current ethanol market share is more than 50% within the light duty vehicle fleet. Mandatory blending of anhydrous ethanol into gasoline at a level of 18-25% has been in place since the 1990s, but from May 1 2013 the mandate was set at 25%. This had an impact on domestic ethanol sales for 2013/2014, which reached 23.07 billion liters, compared to 18.7 billion liters the previous season (Ref3). A further increase in the blend mandate to 27.5% has recently been approved. Brazil is currently the world's second largest exporter of fuel-grade ethanol, with annual exports of approximately 3 billion litres.

Ethanol production in Brazil is set to grow substantially, with Petrobras biofuels alone planning to grow its annual production capacity from 1.5 billion litres currently to 5.6 billion litres in 2015. Raizen aims to process up to 80 million tonnes of sugarcane in 2015 (up from 64.5 million tonnes in 2010) and BP aims to process 30 million tonnes of sugarcane in 2016 (up from 7.5 million tonnes in 2010). This expansion will include new plantations as well as acquisition of existing companies.

The size of the Brazilian light duty vehicle fleet was estimated at over 30 million units in 2012, with pure hydrous ethanol and flex fuel powered vehicles together representing over 55 percent of the total fleet. Industry projections are that the share of flex fuel vehicles in the light duty vehicle fleet is likely to reach over 80 percent by 2020. Currently, sales of flex fuel vehicles represent over 95 percent of total monthly vehicle sales, with various incentives in place to promote their sales.

The Brazilian sugarcane and ethanol industry is mainly concentrated in the north eastern and south eastern parts of the country, as shown in Figure 2.

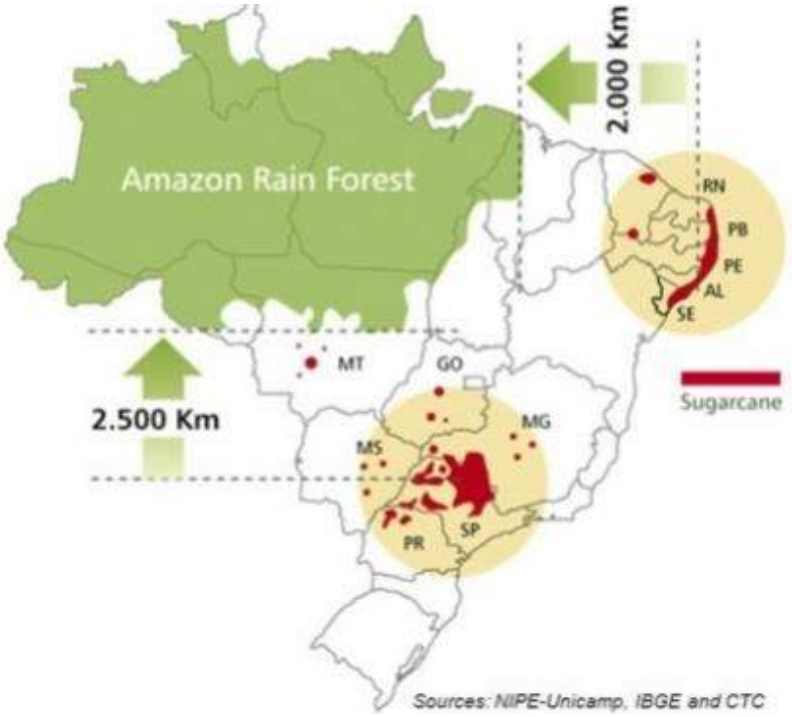


Figure 2. Location of the sugarcane and ethanol industry in Brazil.

In June 2014, it was announced that the Brazilian government will test vehicles at higher ethanol blends over a two-month period. The current blend is 25% but the sugarcane industry is pushing for 27.5%. This increase in the blending mandate has been approved by the House of Representatives and Senate (Ref4).

Increasing the blend level would also benefit Petrobras, the state-run oil company, as they are currently forced to import gasoline and sell it at a loss. Fuel prices are strictly controlled by the government to control inflation (Ref5).

Although sugarcane is the predominant feedstock for ethanol production, Brazil is also expanding into corn-based ethanol in some regions of the country. Usimat, a Brazilian mill in Mato Grosso state, is the first to produce corn-based ethanol, producing ethanol from sugarcane from April until November and then switching to corn for the remaining months, thus allowing it to operate 340 days out of the year (Ref6). These plants use stored sugarcane bagasse (and eventually straw or wood chips) for meeting process and additional energy demands, which keeps GHG emissions and overall energy balance similar to conventional sugarcane ethanol (Ref7).

In February 2014, POET also announced plans for a corn-based ethanol facility in Mato Grosso do Sul, Brazil, which will produce 50 million liters per year. This facility will be constructed as a joint venture between POET and BioUrja Trading LLC. POET eventually plans to expand this model to a total of four facilities (Ref8).

Biodiesel production

Annual biodiesel production in Brazil in 2013 was 2.88 billion litres (2013), much less than for ethanol. Biodiesel production is promoted through a blending mandate. This mandate, which has been set at 5% for several years, was recently increased to 6% (from July 2014) with a further increase to 7% planned for November 2014 (Ref9). It is expected that this will boost biodiesel production in Brazil, but also affect exports of soybean oil (Ref10).

The main feedstock for biodiesel production in Brazil is soybeans (73%), followed by animal tallow (20%) and cottonseed oil (3%). Brazil has 69 facilities authorised to produce biodiesel, with an estimated annual capacity of about 8 billion litres/y, however only 35% of the capacity is currently used (USDA Biofuels Annual 2013).

Forecasts for future production

Projections for increased production of bioethanol and biodiesel in road transport can be found in the IEA World Energy Outlook 2013 (Figure 3), with increased production of ethanol and biodiesel forecast through to 2035.

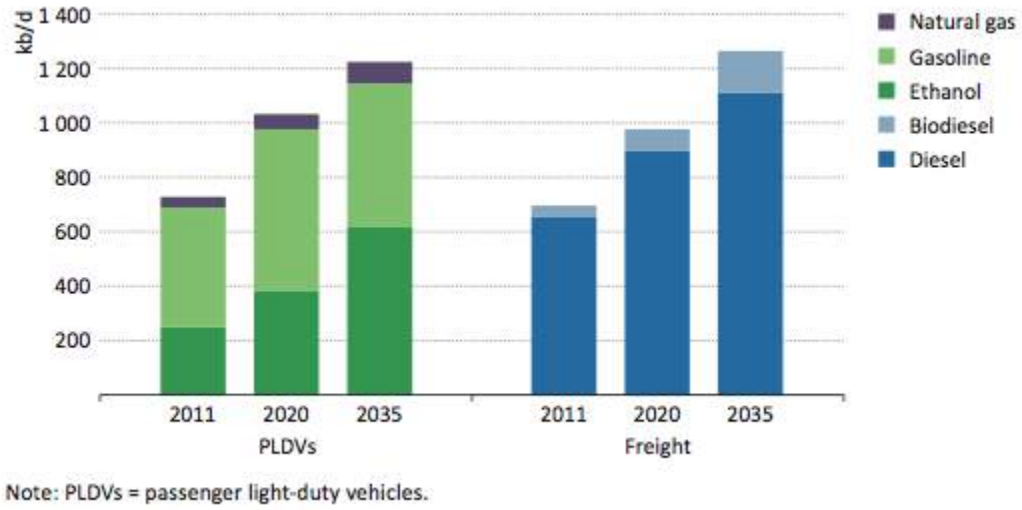


Figure 3. IEA World Energy Outlook projections for road transport fuel demand in Brazil (New Policies Scenario).

New technologies for production (to differentiate from EPA definition)

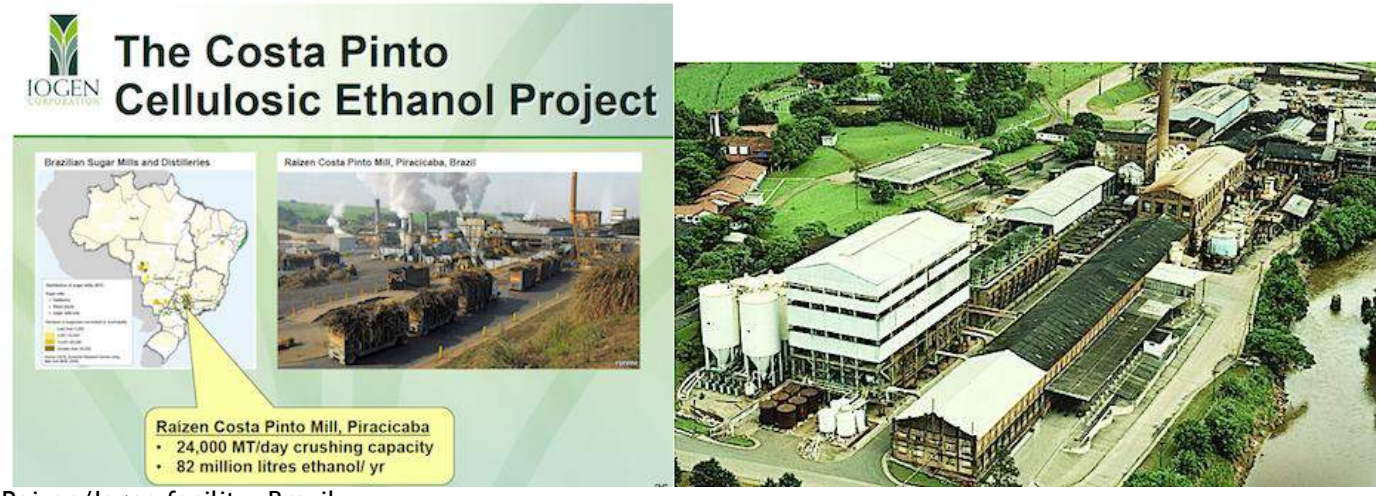
A number of facilities for producing advanced biofuels are operational or under construction. There are no specific policies or incentives to promote the development of advanced biofuels, however the introduction of a government policy that prohibits the burning of sugarcane prior to harvest is fostering new technology development for sugarcane residue valorization.

Amyris's industrial-scale farnesene (Biofene) plant began commercial production in early 2013. It is located in Brotas, São Paulo state, in the southeastern region of Brazil. Amyris uses a proprietary microorganism to convert sugar feedstocks to farnesene, which can be hydroprocessed into aviation fuel, farnesane. The first commercial flight using farnesane took place in 2013, but jet fuel containing a 10% blend with farnesane, jointly developed by Total and Amyris, only recently acquired ASTM certification for Jet A/A1.(Ref11) Supported by Boeing, the Inter-American Development Bank (IDB) and other partners, Amyris is working to bring this new, renewable jet fuel to commercial airlines starting with Brazil's GOL Airlines. (Ref12) (Ref13)

Paraiso Bioenergia mill, Brotas, Sao Paulo. An industrial facility for converting sugarcane into farnesene (Biofene).

Two cellulosic ethanol facilities of 40 million liters per year each are currently planned by Petrobras Biofuel and Raízen. In December 2013, Raizen started construction on a cellulosic ethanol plant to be based on Iogen Energy

technology. This $100 million project, located adjacent to Raízen's Costa Pinto sugar cane mill in Piracicaba, São Paulo, is expected to start up in Q4 2014. Iogen Energy is a joint venture between Raízen and Canada's Iogen Corporation.



Raizen/Iogen facility, Brazil.

GranBio was the first company to announce plans to construct a commercial cellulosic (second-generation) ethanol plant in the Southern Hemisphere in collaboration with Italy's Chemtex, to be based on Chemtex's Proesa technology. This facility will be located in Alagoas State and is scheduled to begin operating in 2014, producing 82 million liters of cellulosic ethanol from bagasse and other feedstocks (Ref14).


GranBio commercial cellulosic ethanol plant, Alagoas, Brazil.

In May 2014, Solazyme, a renewable oil and bioproducts company, announced that its joint venture with Bunge Global Innovation LLC ("Bunge"), a wholly-owned subsidiary of Bunge Limited, had successfully produced its first commercially saleable products at full-scale production at the Solazyme Bunge Renewable Oils plant in Brazil. Both oil and encapsulated lubricant, Encapso™, products have been successfully manufactured. The facility's production is expected to reach nameplate capacity within the next 12-18 months (Ref15).

Solazyme-Bunge commercial facility for production of renewable oil, Moema, Brazil.

Research, Development and Investment in Biofuel production

Funding is provided through the Brazilian state-development bank, Banco Nacional de Desenvolvimento Economico e Social (BNDES). BNDES and Brazil's research-financing agency Finep established the Joint Support Plan for Industrial Technological Innovation in Sugarcane-based Ethanol and Chemistry Sectors (PAISS), which aims to increase productivity in the sector. This is to be done by developing new industrial technologies, for example, advanced cellulosic ("second generation" or "2G") ethanol. BNDES will provide funding of R$ 1.9 billion reais (€624 million) to companies for growing operations at ethanol and sugar plants. BNDES and Finep have so far chosen 35 projects from 29 companies for loans under the PAISS programme. The budget has increased by 30% from the 1.48 billion reais previously scheduled. The PAISS programme's aim is to increase income at plants by generating more value from cane, increasing margins at a time when production costs surge and ethanol prices drop. (See more in Ref16.)

In March 2014, it was announced that BNDESPAR, the investment arm of BNDES, will invest up to R$ 300 million in the sugarcane technology center (Centro de Tecnologia Canavieira S.A. - CTC) by underwriting new shares to be issued by the company. The resources will make up funding to develop new projects for CTC's business plan, a Brazilian company involved in research and development for sugarcane sector technologies.

Areas of focus will be:

- GM sugarcane
- Mechanization for planting and harvesting
- Trash (a.k.a. field residues) recovery technologies
- Vinasse fertirrigation technologies
- Advanced cogeneration systems (e.g. BIG-GT)
- Fermentation yield and productivity
- Biorefineries – biochemical and thermochemical routes (pretreatment operation, pentose utilization, enzymatic hydrolysis, integration with 1G, pyrolysis, gasification, syngas utilization, others)
- Drop-in biofuels (including bio-jet fuels)
- Oil transesterification using ethanol
- Glycerol utilization.

Besides numerous in house research, development and integration efforts from private companies, there are several other State and academic research institutions focusing on different aspects of biofuel, such as the Brazilian Bioethanol Science and Technology Laboratory (CTBE), Brazilian Agricultural Research Corporation (Embrapa), State University of Campinas (UNICAMP), University of São Paulo (USP), Agronomic Institute of Campinas (IAC), and others.

Brazil is also exploring the potential of microalgae to contribute to advanced ethanol and biodiesel market shares. Brazilian R&D is focussed toward several objectives including collecting and isolating native microalgae with

potential to produce biodiesel, to scale up operations to 1000-5000 litres and to evaluate the quality of the resulting biodiesel.

Current challenges for the biofuels industry

There are several challenges facing the biofuels industry in Brazil at present. The Brazilian government controls gasoline prices and slashed taxes on gasoline to control inflation. As a result, on an energy basis gasoline is cheaper than ethanol in many regions of the country. Nevertheless, flex fuel car owners continue to buy available ethanol. This has had an impact on Petrobras, the national oil company, as they have to import oil and sell gasoline at a loss. Increasing the ethanol blending mandate to 27.5%, as now proposed, will go some way towards alleviating this financial situation for Petrobras, however this increase is unlikely to take place until 2015.

An increase in domestic sources of oil is taking place with the expansion of oil exploration and drilling in the Atlantic and the discovery of large pre-salt oil reserves off the coast, and this is likely to affect ethanol production (Ref18).

Sugarcane harvest yields have been reduced over the last few years due to low sugarcane productivity as a result of:

- long periods of drought;
- a lack of required investment in sugarcane reforming back in 2008;
- mechanization of the harvest which has led to soil compaction; and
- phase-out of pre-harvest burning which has resulted in an increase in pests.

In the News

Reports and Research

(May) Navigant Research published a report on "Biofuels for Transportation Markets" which analyzes emerging markets and future growth opportunities for biofuels, including ethanol, biodiesel, and drop-in biofuels. An Executive Summary of the report can be downloaded for free from the Navigant Research website. Projections from the report show worldwide revenue from biofuels for road transportation growing from $166.5 billion annually (2014) to $337.8 billion (2022). Read more.

(May) The International Renewable Energy Agency (IRENA) published a report entitled, "Renewable Energy and Jobs – Annual Review 2014". This report provides information on jobs in the renewable sector, looking at employment levels in the industry in various countries. Read more

(June) ePure (European renewable ethanol) released a State of the Industry outlook report entitled, "Renewable ethanol: driving jobs, growth and innovation throughout Europe." (Download report)

(July) The EU Biofuels Annual 2014 report provides an overview of the European ethanol industry and its future. Read more.

(Month) The International Energy Agency released its third annual Medium-Term Renewable Energy Market Report, which includes forecasts for global biofuel and renewable energy growth. For the first time, the report also includes an investment outlook. Read more

Policy and Regulatory Developments

(August) In the USA, a decision has not yet been made by the US EPA on the 2014 Renewable Volume Obligation (RVO). It is reported that US EPA has been referred this matter to the Office of Management and Budget for review. A survey by the National Biodiesel Board found that US biodiesel producers were negatively affected by the current policy uncertainty, with nearly 80% of US Biodiesel producers having scaled back production this year and more than half having completely idled production at a plant. Read more

(Month) The US EPA has, however, approved additional cellulosic and advanced biofuels pathways to qualify as advanced biofuels under the RFS, including compressed natural gas produced from biogas, liquefied natural gas produced from biogas and electricity used to power electric vehicles produced from biogas. Read more

(May) EU diplomats agreed to a 7% cap on conventional biofuels made from food crops. Read more and here
The Energy Council of the EU in June reached a political agreement on the draft directive on Indirect land-use change, amending the fuel quality (98/70/EC) and renewable energy (2009/28/EC) directives. Read more

Argentina – The country's biodiesel industry called for more policies to be put in place to rescue the industry.

Australia – The federal government is looking to remove excise tax rebates on fuel, which will impact the tax rebate on ethanol. The government also plans to end the Ethanol Production Grants program by July 2015, as well as to eliminate the ethanol subsidy and repeal the carbon tax.

Brazil – The biodiesel mandate was increased to 6% in July with a further increase to 7% by November 2014 planned. An increased ethanol blending mandate at 27.5% was further approved and should be signed into law by the President.

Taiwan – Will phase out its B2 mandate as motorists have complained about clogged fuel tanks as a result of microbial growth. This is blamed on the 2% biodiesel content.

Malaysia – (June) Implementation of B5 blending delayed by 2 months due to problems with prices and infrastructure.

Sustainability

(Month) Archer Daniels Midland Company announced its intention to exclusively offer Roundtable on Sustainable Palm Oil certified sustainable palm oil to North American customers beginning in 2015.

(June) The Energy Council of the EU reached a political agreement on a draft directive on Indirect land-use change, amending the fuel quality (98/70/EC) and renewable energy (2009/28/EC) directives. Read more

Industry News

(April) Byogy Renewables Inc. and airline partner Avianca Brasil launched a significant initiative for advanced testing of Byogy alcohol-to-jet (ATJ) fuel to accelerate ASTM certification of this fuel as a full replacement to jet fuel from oil. Read more

(May) Boeing and Embraer announced they will open a joint research center to advance a sustainable aviation biofuel industry in Brazil. The research will focus on technologies that address gaps in the supply chain for sustainable aviation biofuel in Brazil, such as feedstock production and processing technologies. The companies' biofuel research center will be located in the Sao Jose dos Campos Technology Park. Read more

Exports from the US – The EIA reported that the US became a net importer of biomass-based diesel in 2013 after being a net exporter in 2012. Read more
On the other hand, US ethanol exports increased by 56% during the first half of the year, to 1.6 billion litres.

(May) Diamond Green Diesel facility in Norco, Louisiana, has started up using the UOP/EniEcofining process technology to produce 130 million gallons per year of Honeywell Green Diesel™, a renewable "drop-in" diesel.

(May) Gevo started making ethanol side-by-side with isobutanol to get revenue while optimizing their isobutanol production process. Read more

(Month) KiOR may sell the company after missing a loan payment on June 30. Read more and also here.

(May) Joule sustainable fuels achieves ASTM compliance; Sunflow-D meets the ASTM D-975 standard for diesel in blend percentages up to 50 percent, while Joule Sunflow-J meets the ASTM D-1655 standard for jet A/A1 in blends up to 25 percent. Read more

(May) Patriot Renewable Fuels planning a co-located Inbicon Biomass Refinery to produce cellulosic ethanol on the site of its existing grain-ethanol facility in Annawan, Illinois. Read more

(May) Proton Power uses low-cost hydrous pyrolysis for production of power and fuels. Claims to be able to make inexpensive hydrogen for less than $2/kg and diesel fuel for $1.75 per gallon. Read more

(August) Virent received EPA registration for its drop-in BioForm Gasoline which can be used in blends up to 45%.

(August) According to data released by the US Energy Information Administration, recent ethanol production volumes are amongst the highest monthly levels ever recorded, 940,000 barrels per day over the past three months.

In the US, cellulosic RINs were generated in April 2014, but not in May or June.

POET-DSM Project Liberty, which produces ethanol from agricultural residues are having their grand opening on 3 September.

Italy - (May) The Italian Ministry of Economic Development announced its intention to investigate the construction of three advanced biofuel facilities in Southern Italy. Read more

Norway - (May) Södra and Statkraft signed a letter of intent to create joint biofuel company based on forest raw material. Read more

Finland - (May) St1 Biofuels Oy will deliver an Etanolix® plant producing waste-based bioethanol to North European Oil Trade Oy in Gothenburg, Sweden. The plant is currently under construction at the St1 refinery in Gothenburg and will have an annual production capacity of 5 million liters of bioethanol. Read more
The Finnish government has also agreed to pay about 30% of the cost of building a biofuel plant in Kajaani.

Tanzania – (May) Agro EcoEnergy, a subsidiary of Swedish EcoEnergy Africa AB, has invested $550 million to develop a sugarcane plantation and facility to produce sugar, ethanol and electricity in Tanzania. Read more

Angola – (June) Biocom is set to start producing ethanol, sugar and electricity by September. Total installed capacity is 30 million litres per year, although the company will start producing 3 million litres of ethanol this year.

France – (June) Deinove and Abengoa announced a 36-month collaboration agreement to develop Deinove's Consolidated Bioprocessing (using Deinococcus bacterium) at industrial scale. Read more

Brazil - (June) The Solazyme Bunge Renewable Oils plant commenced production. Read more

Canada - (June) The Enerkem facility in Edmonton was officially inaugurated. This facility produces methanol from municipal solid waste, with a capacity of 38 million liters per year. The company plans to add a module that converts the methanol into ethanol by the end of 2015. Read more

Brazil - (July) Amyris has partnered with Brazilian airline GOL to begin the first commercial airline route using farnesane at a 10% blend. The first commericial flight on farnesane took place on July 30 from Orlando, Florida to Sao Paulo, Brazil. Read more

United Arab Emirates - (July) Petrixo Oil & Gas plans to build a massive Biorefinery in the United Arab Emirates, with Honeywell UOP technology used to produce 150 million gallons per year of renewable jet fuel and renewable diesel. Read more

China – Sapphire Energy Inc. has announced that its algae-derived renewable crude project with Sinopec, China's state-owned oil and gas conglomerate, was selected for the U.S.-China EcoPartnerships Program. Read more
China - A joint venture between M&G Chemicals and China-based Anhui Guozhen Co Ltd will be building a commercial-scale cellulosic ethanol plant in Fuyang City, Anhui Province, China. Read more
China - Novozymes expects a commercial-scale second-generation plant to be online in China within the next two years and several more in 5 years. Read more
China - Cathay Pacific in Hong Kong announced a strategic investment in Fulcrum Bioenergy as part of the airline's biofuel strategy to achieve a target of carbon-neutral growth from 2020. Read more

Honduras – The country's first ethanol plant, located in eastern Honduras, opened in July. Read more

South Africa – It is reported that at least three sugarcane-based ethanol facilities are being considered by project developers for the KwaZulu Natal province. Read more

Argentina – (August) ICM Inc. announced the successful start-up and commissioning of a dry-mill corn ethanol plant designed for ACA Bio Cooperative Limitada (ACA Bio). Read more

Zambia – Green fuels plans to invest $500 million to develop a sugarcane-based ethanol plant based on their current facility in Zimbabwe. Read more

Funding announcements

US DOE, USDA award $12.6M for feedstock improvement projects

California proposes $46.3 million for 11 biofuels and biomethane projects.

US DOE awards $6 miilion towards 2 projects to develop cost-competitive drop-in biofuels at $3 per gallon by 2017.

US DOE announced a new funding opportunity for "Targeted Algal Biofuels and Bioproducts".

Upcoming Meetings & Conferences

Fourth International Conference on Lignocellulosic Ethanol (4ICLE)

23-25 September 2014, Landshut-Munich, Germany
The Conference will be facilitated by Clariant and the participants will be able to visit its demonstration plant at Straubing.

7th Biofuels International conference 2014

24 – 25 September 2014. Ghent, Belgium.
Focusing on the latest developments in biofuels policy, international biofuels trading, sustainability, solutions for current producers, progress in advanced biofuels and information on feedstock pricing and trends. This conference aims to update delegates on the latest changes to biofuels legislation and policy as well as recent research into sustainability, ILUC and multiple counting strategies.

National Advanced Biofuels Conference & Expo.

13 – 14 October 2014. Minneapolis, Minnesota, USA.
Produced by BBI International, this national event will feature the world of advanced biofuels and biobased chemicals—technology scale-up, project finance, policy, national markets and more—with a core focus on the industrial, petroleum and agribusiness alliances defining the national advanced biofuels industry.

Sustainable Aviation Fuels Forum

20-22 October, Madrid, Spain
This Sustainable Aviation Fuels Forum will focus on recent progress and important steps forward in the field of sustainable fuels for aviation.

World Ethanol and Biofuels 2014

November 4-7 2014. Munich(Germany)

The Advanced Bioeconomy Leadership Conference (ABCL)

November 10-12 2014, San Francisco,

ABLCNext looks at key emerging markets, technologies, geographies, feedstocks, policies and financing strategies in biobased and alternative fuels, chemicals and materials.

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:

- 2014 September 23-25, Landshut-Munich, Germany: Informal meeting at the 4th ICLE conference.
- 2015 March 10-14, Gwangju, Korea: Formal Task 39 business meeting at the 21st ISAF conference.