

The Bioeconomy Consultants

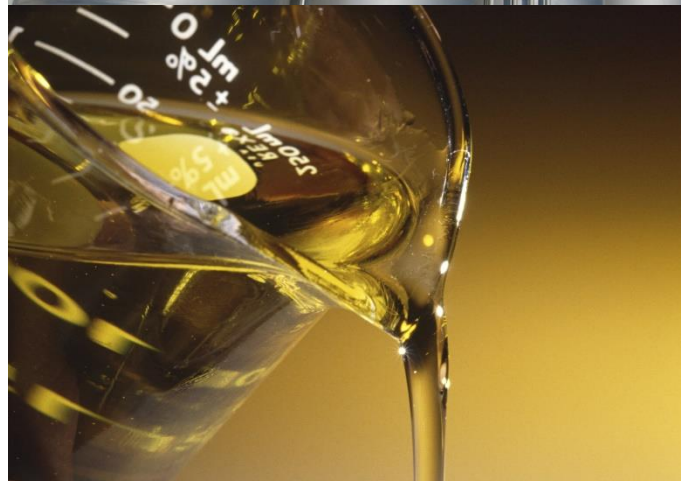


News Review

Issue Sixty-Four

July 2017

Each month we review the latest news and select key announcements and commentary from across the biofuels sector.



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Foreword

A warm welcome to July's issue of NNFCC's Biofuels News Review.

As well as looking ahead to future developments, here at NNFCC we like to celebrate the bioeconomy's history of success, and what better way to do that than to mark an anniversary? July of this year marks five years since E15 biofuel made its market debut in the USA. Since then, it has spread out from one state to twenty-nine, with 80% of the country's new vehicles being able to run on the fuel. According to the Renewable Fuels Association, over 1 billion miles have been driven on E15 over those five years, with "Not a single verified case of misfuelling, engine damage, or inferior performance" reported. This latter statement is likely hyperbole, coming from an NGO, but still represents the high performance it is still possible to achieve with biofuels, and that is only increasing.

However, despite the successes of biofuels over the years, there are still those who oppose their development – most notably petroleum companies. Under the US' Renewable Fuel Standard, transport fuel companies need to produce an ever-increasing amount of biofuel each year, but they have repeatedly insisted that these targets aren't feasible. In an effort to alleviate pressure from said companies, the US' Environmental Protection Agency has proposed a reduction in the volume of advanced biofuels required under the RFS, and has also sought to address concerns that targets are being met by importing biofuels from overseas. This shows that while policy and regulation can be the driving factors behind development and proliferation of biofuels (and elsewhere in the bioeconomy), they mustn't be too stringent, or the markets will fail to support them.

In other news on the policy front, a new report from the Horizon2020-funded ProBIO project has revealed the alarmingly low market success rate of bioeconomy projects funded by the EU's 7th Framework Programme for Research and Innovation. Of the projects that have received funding from the Knowledge-Based Bioeconomy Programme, less than 5% have resulted in anything able to be brought to market. The report highlights that whilst a lot of technological and knowledge progress has been made under the scheme, few results have been ready for commercialisation, which the authors put down to ignorance of market conditions during development, and failure to involve commercially active partners in projects. How this investment to development return compares with the rest of the world is unknown, but this level of return is still very low, and it remains to be seen how EU funding bodies will react to this news.

Read on for the latest news.

Policy

E15 biofuel, five years on

Five years ago, 15% ethanol (E15) blends debuted in the marketplace, offering consumers a new lower-cost, higher-octane fuel option at the pump.

On July 10, 2012, Kansas became the first state in the U.S. to offer E15. Since that time, the growth of E15 availability has expanded, with nearly 900 stations in 29 states currently offering the fuel blend.

In June 2012, the U.S. Environmental Protection Agency (EPA) gave final approval for the sale and use of E15 in light duty vehicles made since 2001, representing nearly 90 percent of today's automotive fleet. Meanwhile, manufacturers of more than 80 percent of the new vehicles sold in 2017 clearly list E15 as an approved fuel.

Since the first gallon of E15 was pumped five years ago, more than 1 billion trouble-free miles have been driven on the fuel. Not a single verified case of misfuelling, "engine damage," or inferior performance has been reported.

Even greater E15 expansion will occur once consumers have year-round access to E15. Due to an outdated EPA regulation, retail gas stations are essentially prohibited from selling E15 in more than two-thirds of the nation's gasoline market during the summer ozone control season, from June 1st-Sept. 15th. Whether through legislative or regulatory action, RFA is working to ensure E15 is available year-round, throughout the nation.

Click [here](#) for more information.

US to cut Advanced Biofuel targets



Wikimedia Commons

The U.S. government has proposed to reduce the volume of biofuel required to be used in gasoline and diesel fuel next year as it signalled the first step toward a potential broader overhaul of its biofuels program.

The U.S. Environmental Protection Agency's proposed total volume marked a slight decline from current levels and was more than 20 percent below targets laid out in a 2007 law. The U.S. Renewable Fuel Standard, or RFS, requires increased volumes of renewable fuels each year, but the proposal would keep targets for use of conventional biofuels at current levels.

Environmentalists, who have been critical of ethanol, called for Congress to reform the program.

The RFS has become a battlefield between corn and oil interests. The law has been a boon to agriculture, supporting economies across the Midwest's Corn Belt.

Petroleum companies say the biofuel targets are impossible to meet and add billions of dollars in costs. The plan would require companies to blend a total of 19.24 billion gallons of renewable fuels in the country's fuel supply next year.

The agency would keep the 2018 target for conventional ethanol at 15 billion gallons, unchanged from 2017, and set the requirement for advanced biofuels, including cellulosic ethanol, at 4.24 billion gallons.

The EPA also requested comments related to concerns that the biofuels requirements increasingly are being met by supplies from Brazil, Argentina and Indonesia.

Click [here](#) for more information.

EU's FP7 bioeconomy projects have less than 5% success rate



Seventh Framework Programme

An analysis by the Horizon 2020 ProBIO project has found that less than 5% of bioeconomy projects funded by the EU's 7th Framework Programme for Research and Innovation (FP7) have results with the potential to be introduced to market. ProBIO has screened more than 400 projects funded by FP7's Knowledge-Based Bioeconomy (KBBE) Programme and found that whilst projects have supported the generation of new knowledge, few are close to being ready to cause widespread socio-economic impact through commercialisation.

The common assumption is that the EU has excellent research, but it is not turned into market success only because Europe lacks entrepreneurial capacity and there is a 'knowhow gap' concerning

the needs of commercial exploitation. However, ProBIO found that there are more complex, structural barriers behind the low commercial performance of European research programmes. These have taken a technology-push approach, thus ignoring market conditions, have not included enough commercially active partners, and have not provided full innovation process support.

Click [here](#) for more information.

Report highlights biofuels' potential for UK emissions reduction

Biofuels have a role to play in meeting the UK's commitments to climate change mitigation, especially so-called second-generation biofuels made from wastes and by-products of other sectors, according to a major new review of the sustainability pros and cons of biofuels by the Royal Academy of Engineering. Such fuels can be sustainable and could make a real impact in reducing carbon emissions, although action is needed to manage the risks involved, improve traceability and avoid fraudulent practice.

The report, Sustainability of liquid biofuels, was commissioned by the Department of Transport and the Department of Energy and Climate Change (now the Department for Business, Energy and Industrial Strategy) to provide advice on the UK's future strategy for the development of biofuels. While they have been enthusiastically adopted in some countries, notably Brazil, first generation biofuels manufactured from crops like corn have proved controversial. There have been concerns that increased demand for crops drives the conversion of land to agriculture, with the consequent risks of an increase in deforestation, drainage of peatlands, loss of biodiversity, as well as associated usage of freshwater, fertilisers and pesticides.

The Academy report finds that we now understand much more about what specific crops and regions pose a high risk of land-use change

and how these risks can be managed, and it sees a continued role for biofuels from some agricultural feedstocks. However, it also calls on government to incentivise the development of second generation biofuels in the UK, in the first instance those derived from wastes and agricultural, forest and sawmill residues. These might include converting waste cooking oil, municipal solid waste, the dregs from whisky manufacture or even fatbergs - the bane of sewer management companies - into useful fuel. Growing energy crops is also recommended, particularly where it can be done on marginal land that is unsuitable for food production, housing or has been degraded through deforestation. These sources of biofuel can most effectively avoid the risk of land use change and more generally make use of biomass and land areas that would otherwise have little or no value.

In a bid to meet the EU target of 10% by 2020, fuel suppliers are already blending biofuels into the petrol and diesel we use in our road transport, up to a level of 4.75%. The Academy recommends increasing the level of biofuels required under the Renewable Transport Fuel Obligation (RTFO) in order to help meet climate change mitigation targets. This will also drive the development of the sector and help it develop the fuels needed to decarbonise particularly challenging sectors such as aviation, shipping and haulage, where there are few other low-carbon options.

Click [here](#) for more information.

Research & Development

Novel pyrolysis process for wood-based biofuels developed



Pixabay

This report presents process designs for prospective first-of-their-kind catalytic hydrolysis facilities converting woody biomass residues into “drop-in” transportation fuels, including some designs incorporating CO₂ capture and storage (CCS). The energetic, carbon, and economic performances of these designs were simulated and analysed. Estimated greenhouse gas emissions for the resulting fuels are far below those of conventional petroleum-derived fuels. For plant designs with CCS, the biofuels are characterized by strongly negative emissions. The additional capital costs and energy penalties for CO₂ capture range from modest to high, depending on the extent of capture employed. The fuel production cost at a commercial-scale FOAK plant without CCS corresponds to a break-even crude oil price of 95 \$ per barrel. At a 120 \$ per t CO₂ eq. greenhouse gas (GHG) emission price, the plant design that would capture about half of the CO₂ available for capture would have identical production cost as the design without any CO₂ capture; in both cases the break-even oil price would be 28 \$ per barrel. A design maximizing CO₂ capture would produce fuels with a break-even oil price of 44 \$ per barrel

at this GHG emission price. The prospective economics of drop-in fuels from biomass produced via catalytic hydrolysis appear quite favourable relative to other biofuel production systems, but can only be confirmed via demonstrations at scale.

Click [here](#) for more information.

Empirical study demonstrates particulate reduction from switching to ethanol

Despite ethanol's penetration into urban transportation, observational evidence quantifying the consequence for the atmospheric particulate burden during actual, not hypothetical, fuel-fleet shifts, has been lacking. This paper analyses aerosol, meteorological, traffic, and consumer behaviour data and find, empirically, that ambient number concentrations of 7–100-nm diameter particles rise by one-third during the morning commute when higher ethanol prices induce 2 million drivers in the real-world megacity of São Paulo to substitute to gasoline use). Similarly, concentrations fall when consumers return to ethanol. Changes in larger particle concentrations, including US-regulated PM2.5, are statistically indistinguishable from zero. The prospect of increased biofuel use and mounting evidence on ultrafines' health effects make our result acutely policy relevant, to be weighed against possible ozone increases. The finding motivates further studies in real-world environments. We innovate in using econometrics to quantify a key source of urban ultrafine particles.

Click [here](#) for more information.

Shell partners with SBI to produce biofuels from waste oils



SBI Bioenergy

Royal Dutch Shell plc, through its subsidiary Shell International Exploration and Production B.V., and SBI BioEnergy Inc. have reached an agreement granting Shell exclusive development and licensing rights for SBI's biofuel technology. Edmonton-based SBI has a patented process that can convert a wide range of waste oils, greases and sustainable vegetable oils into lower carbon drop-ins for diesel, jet fuel and gasoline. Under the agreement, Shell and SBI will work together to demonstrate the potential of the technology and, if successful, scale up for commercial application.

SBI uses a continuous catalytic process that converts fat, oil or grease into renewable gasoline, diesel and jet fuel that can be dropped directly into petroleum fuels. SBI's drop-in products do not require blending or any modifications to engines or infrastructure. Biofuels emit less CO₂ than petroleum products so their addition to fuels has the potential to reduce transport emissions and help fuel suppliers to meet lower carbon or renewable fuel standards.

Shell believes biofuels are essential to decarbonize transport fuels because they represent one of the most practical, commercial and cost-efficient solution to reduce CO₂ emissions in the transport fuels sector over the next twenty years. Raízen, a joint venture between Shell and the Brazilian company Cosan, is one of the world's largest producer of sugar-cane ethanol. Shell is also developing advanced biofuels made with non-edible plants and crop waste.

Click [here](#) for more information.

ExxonMobil renews UW-Madison partnership for biofuels research



ExxonMobil

The University of Wisconsin-Madison and ExxonMobil have announced a two-year renewal of an agreement to research the fundamental chemistry of converting biomass into transportation fuels. The research is part of a broad effort to identify scalable and commercially viable solutions to help meet increasing global energy demand with a renewable resource.

UW-Madison has long been known for its expertise in biomass conversion. The project leverages the university's expertise with ExxonMobil's resources and strong technological capabilities. George Huber, the Harvey D. Spangler professor of chemical and biological engineering at UW-Madison, is working closely with ExxonMobil's scientists to build a stronger understanding of the basic chemical transformations that occur during biomass conversion into diesel and jet fuels.

Over the past two years, research has focused on a multistep approach for converting cellulosic biomass to transportation fuels. A new approach with the potential to reduce the number of processing steps will be explored in this collaboration. This approach using solvents could potentially dissolve the entire biomass, which might make it possible to convert the whole biomass into fuel-sized molecules in a single reactor.

Another potential process that will be studied in this collaboration involves the catalytic transformation of bio-derived ethanol into bio-derived diesel and jet fuel. Ethanol is currently produced from a range of sources and is widely used as an additive to gasoline. This technology could potentially allow larger diesel and jet fuel molecules to be produced from renewable

sources. Our research continues to focus on non-food sources like corn stover and other cellulosic feedstocks.

ExxonMobil's work with UW-Madison is a recent addition in a series of partnerships the company has established with leading universities around the world as part of its ongoing research into early-stage innovative projects. This area of biofuels research adds to ExxonMobil's broader advanced biofuels research portfolio, which includes joint research collaborations focused on algae-based biofuels with Synthetic Genomics, Inc., Colorado School of Mines and Michigan State. ExxonMobil is also exploring a variety of biomass-to-fuels conversion processes, which could be used with non-food based feedstocks such as cellulose-derived sugars, in collaboration with REG Life Sciences, a wholly-owned subsidiary of Renewable Energy Group (REG).

Click [here](#) for more information.

Bioethanol

Alliance Bio-Products receives approval to purchase ethanol plant

Alliance Bio-Products, Inc., a subsidiary of Alliance BioEnergy Plus, Inc., has announced it has received approval from the United States Department of Agriculture (USDA) Office of Rural Development for the collateral purchase of the closed ethanol facility in Indian River County, Florida. The approved purchase includes the fully functional plant, 143+ acres that the plant resides on, and all related equipment and vehicles.

The Company made an offer to purchase the eight Million Gallon Per Year (8MMGY) ethanol facility with the intention of converting the current process into its patented Cellulose to Sugar (CTS) process under an agreement with Alliance BioEnergy. By renovating the plant and utilizing a state-of-the-art fermentation and distillation

system already in place, and with an abundance of free feedstock available, Bio-Products believes it can increase production capacity and profitability of its sustainable, environmentally friendly alternative to petroleum-based fuels and other products. The plant also sits on a large parcel of land that would allow Bio-Products to expand as demand increases.

The Company's patented CTS process allows it to produce biofuels for less than \$1 per gallon that are 100% CO₂ neutral, because of the process, and have 85-95% less greenhouse gases than petroleum-based products. Bio-Products expects it will be able to begin production at the plant by summer of 2018, potentially generating \$25 million in EBITDA and then will look to double capacity to 16 MMGY, potentially generating \$54 million in EBITDA in 2020 before maximizing capacity of 34 MMGY, generating \$112 million in 2023.

The plant purchase will create approximately 100 permanent jobs in the short term, with additional employment opportunities created as production expands. The community will also benefit from an infusion of tax base revenue, as well as support revenue through an increase of usage of trucking, housing, restaurants, suppliers and more. The plant would also help to dispose of green waste that would otherwise fill up the landfill and release millions of tons of carbon dioxide.

Click [here](#) for more information.

Strong first quarter for CropEnergies



CropEnergies

CropEnergies AG, was able to significantly increase revenues and results in the 1st quarter of the current financial year 2017/18. As already announced on 19 June 2017, revenues increased by 38 percent to EUR 231 (previous year: EUR 168) million. The main reasons for the growth were the significantly increased sales volumes of bioethanol as well as food and animal feed products. In the first three months of the financial year 2017/18, a total of 280,000 (previous year: 203,000) cubic meters of bioethanol were produced. This also led to an increase of the production of food and animal feed products. The increase of the production volumes is mainly due to the restart of the bioethanol plant in Wilton, UK, in July 2016.

EBITDA improved by 18 percent to EUR 33.1 (previous year: EUR 28.0) million. Accordingly, CropEnergies also generated a significantly higher operating profit. It improved by 21 percent to EUR 23.5 (previous year EUR 19.4) million. This leads to an operating margin of 10.2 (previous year: 11.6) percent. Income from operations, as the sum of operating profit, earnings from entities consolidated at equity and special items, grew distinctly by 48 percent to EUR 23.2 (previous year: EUR 15.7) million.

Against the background of the good start in the 1st quarter 2017/18, CropEnergies had already raised the forecast for the financial year 2017/18 on 19 June 2017 and now expects revenues in a range of EUR 850 to EUR 900 million for the whole financial year 2017/18. Operating profit is

expected in a range of EUR 50 to EUR 90 million. This corresponds to an EBITDA between EUR 90 and EUR 130 million which will lead to another improvement of the financial position. In the previous year, revenues reached EUR 802 million and the operating profit EUR 98 million.

Click [here](#) for more information.

Biodiesel

Arriva wins Netherlands trains bid with biodiesel focus



Arriva

Arriva has been named as the winner of the next contract to operate regional passenger rail services in Groningen and Friesland, the Netherlands. The move will see 18 new biodiesel trains added to the busy rail network in the area, a precursor to eventually transitioning to an emissions free electrical network.

The new contract will run for 15 years from 13 December 2020, and is worth €1.6billion. Arriva is the incumbent operator in Groningen and Friesland.

Arriva's bid placed significant emphasis on delivering a more sustainable, more environmentally friendly transport network.

The current fleet of 51 Stadler GTW 2/8 and GTW 2/6 diesel multiple-units is to be refurbished. The trainsets will be fitted with batteries to enable braking energy to be recovered for reuse, 'reducing emissions and cutting noise when accelerating away from stations', according to the Railway Gazette.

18 new train sets added to the Leeuwarden – Groningen Europapark route will all be fuelled by

biodiesel, increasing capacity and enabling the provision of more frequent weekend and evening services on key sections of the network. In the long term, a complete conversion to emission-free electrical operation is planned for the fleet of trains.

Click [here](#) for more information.

Tesoro plans 5% biodiesel co-processing

Biomass magazine reports that Tesoro oil refinery in Dickinson, North Dakota, has plans to co-process renewable feedstock along with regionally sourced Bakken crude oil to produce a 5 percent renewable diesel blend. Construction is planned to begin in October with start-up expected in December.

Tesoro acquired the Dakota Prairie Refinery in Dickinson last year. The facility can refine up to 20,000 barrels per day (BPD).

To co-process renewable feedstock, such as regionally sourced soybean oil and distillers corn oil from ethanol plants, Tesoro plans to retrofit an existing 8,000 BPD diesel hydroheater and associated equipment. The retrofit would allow co-processing of up to 16,800 gallons per day of renewable feedstock. The company plans to market the renewable diesel blend locally in North Dakota.

Tesoro has applied for a \$500,000 grant through the state industrial commission's renewable energy program. The total cost of the project, according to Tesoro, is \$3.5 million.

Haldor Topsoe has been chosen as the project's technology provider based on its "extensive hydrotreating catalyst experience and proven success in commercialization of facilities to convert vegetable oils and/or animal fats into on-spec renewable diesel," Tesoro stated.

Haldor Topsoe will also provide technical expertise in determining the catalyst formulation to achieve the desired process yields and an

acceptable catalyst life, while maintaining desulfurization of the existing conventional diesel product stream, according to Tesoro.

Click [here](#) for more information.

Aviation Fuel

US researchers look to produce jet fuel from sorghum



Max Pixel

As members of a new federally funded bioenergy research centre, two Nebraska plant scientists plan to spend the next five years working to expand the oil-producing capability of the sorghum plant.

The University of Nebraska-Lincoln is one of 15 institutions partnering with the University of Illinois in the \$104-million Centre for Advanced Bioenergy and Bioproducts Innovation. Energy Secretary Rick Perry announced the new Department of Energy-funded research centre on July 17th. The centre expects to receive slightly more than \$4 million for the research during the next five years. The goal is to genetically enhance certain sorghum species so that the stems and leaves contain more oil and less starch. If achieved, sorghum could rival soybeans in terms of oil production per acre.

One advantage of oil-producing sorghum, is that sorghum is a sturdy, drought-tolerant crop that can be grown on more marginal lands than other farm crops.

Part of the feedstocks priority, Nebraska's research is to focus on sweet sorghum and biomass sorghum, tall plants whose leaves and stems now are used to make ethanol. Clemente and Cahoon are among researchers nationally who are investigating whether sorghum's novel chemistry and lignin content could produce high-value molecules that could replace petroleum in lubricants and plastics – even jet fuel.

Other researchers have been able to produce oil in tobacco, which has a broad leaf, but more work is needed to transfer the trait to a grassy plant like sorghum.

Among other centre partners, the Brookhaven National Laboratory in New York, Iowa State University, the University of Illinois and the HudsonAlpha Institute for Biotechnology in Huntsville, Alabama, also will be exploring whether sorghum can be modified to produce more oil.

Click [here](#) for more information.

Other Fuels

SerEnergy develops long-range methanol power for cars

With the aim to develop a cost efficient and environmentally friendly vehicle, the Danish methanol fuel cell manufacturer SerEnergy is now launching a commercial reformed methanol fuel cell vehicle with a driving range up to 800 km on a tank of methanol.

The engineers and mechanics at SerEnergy's mobility development centre, located in Aalborg, Denmark, have developed a reformed methanol fuel cell (RMFC) vehicle based on the Nissan e-NV200 electric car platform, a car that is being sold in large numbers worldwide. The car is equipped with an urban range extender which enables up to 800 km before the car needs refuelling, and is therefore ideal for an urban

driving pattern covering many kilometres, such as taxis, delivery vans and other commercial vehicles.

Besides being environmentally friendly, with zero harmful emissions and an exhaust that is as clean as the air surrounding us, the system also benefits on the overall driving economy with a significant reduction in fuel price as well as being more than double as energy-efficient compared to petrol and diesel. As participants in a methanol infrastructure project, SerEnergy have taken part in the development of a filling station for methanol with a refuelling process that is not much different than what we know from traditional fuelling with petrol or diesel.

The vehicles are developed as a hybrid which combines a reformed methanol fuel cell system with a battery pack. The combination of batteries and methanol is an ideal combination where methanol fuels the vehicle on the range and batteries kicks in during start-up and acceleration peaks. When the two technologies are supplementing each other, both technologies can perform as they do best thereby reducing the size of the battery pack and the capacity of the fuel cell significantly, resulting in a vehicle that is both cost and energy efficient.

The first commercial cars are going to be part of the German "greenfuel" project where innogy, one of the leading energy companies in Europe, is demonstrating the entire value chain of methanol as an alternative liquid fuel over traditional fossil fuels. The RMFC-system has been undergoing thorough testing and has been tested on the roads for more than a year with great results.

Click [here](#) for more information.

Clearfleau report highlights potential for transport biogas from AD



Pixabay

New research shows that biomethane generated from food and drinks process residues has growing potential as a low-carbon alternative to diesel used in commercial vehicles. The study was carried out by Aker Associates Ltd for Clearfleau Ltd, the leading provider of on-site bioenergy plants for food and beverage processors. The results were presented at the UK AD & Biogas Expo 2017 in Birmingham.

Diesel is currently the dominant fuel for commercial vehicles but companies are under social, political and environmental pressure to find low-carbon renewable alternatives. And with diesel prices forecast to rise further, the economic argument will become more compelling. Since electric vehicle technology is not viable for large HGVs, gas-powered vehicles are becoming more popular with their efficiency and performance also improving.

BfT technology is particularly appropriate for the dairy sector, as creameries use vehicles to collect raw milk from local farms and bring it to their sites for processing. Clearfleau's unique approach provides a circular economy solution, enabling collection and delivery trucks to be powered by biomethane generated on site from the by-products of making cheese.

The research indicates that more should be done by Government working with industry to stimulate investment and promote the use of cleaner

biofuels in the commercial transport sector, including the classification of biomethane as a development fuel in the revised RTFO.

Currently the return on investment could be circa 14%, varying according to whether the gas is supplied as Compressed or Liquid Biomethane, the level of incentives and other site-specific factors. With ongoing improvements in engine technology and greater interest in the supply of low-carbon fuels from residues, returns in the vehicle fuel sector should compare even more favourably to the on-site generation of electricity in the more widely used CHP engine.

Click [here](#) for more information.

ETI invests in demo plant for clean syngas

Gasification with integrated syngas clean-up to remove undesirable components can be used to produce an “ultra-clean” syngas suitable for use in demanding and efficient applications including reciprocating engines, gas turbines, chemical synthesis processes (for example, to produce hydrogen, fuels or chemicals) and/or biological synthesis processes. It offers a number of benefits including flexibility in feedstock and outputs (heat, power, liquid and gaseous fuels, and chemicals), high efficiencies, being scalable to suit applications in typical UK towns and small cities - in particular at the sub 10 MWe scale -, and the ability to be combined with CCS to create “negative emissions” which ETI anticipates will be needed to deliver a cost-effective 2050 low carbon energy system.

Currently, however, the technology and commercial risks are too high for typical investors and developers. To accelerate the technology to the point where these risks are more acceptable, the ETI has recently announced that it is investing in the construction of a 1.5 MWe waste gasification demonstration project incorporating an engine fuelled by “ultra-clean”, tar-free syngas. This paper seeks to present why the ETI thinks this

technology is important and how its research has mitigated many of the risks associated in driving this sector forward.

Click [here](#) for more information.

Events

Chemistry and Industrial Biotechnology Showcase 2017

York, 20th-21st September 2017

Showcasing how UK chemistry and industrial biotechnology sectors are helping to enable growth in key UK supply chains through innovation.

This two-day conference and exhibition hosted by the Knowledge Transfer Network is a major event to bring together industry, researchers, investors and government agencies to showcase how the UK chemistry and industrial biotechnology sectors are helping to enable growth in key UK supply chains through innovation.

Click [here](#) for more information.

EFIB 2017

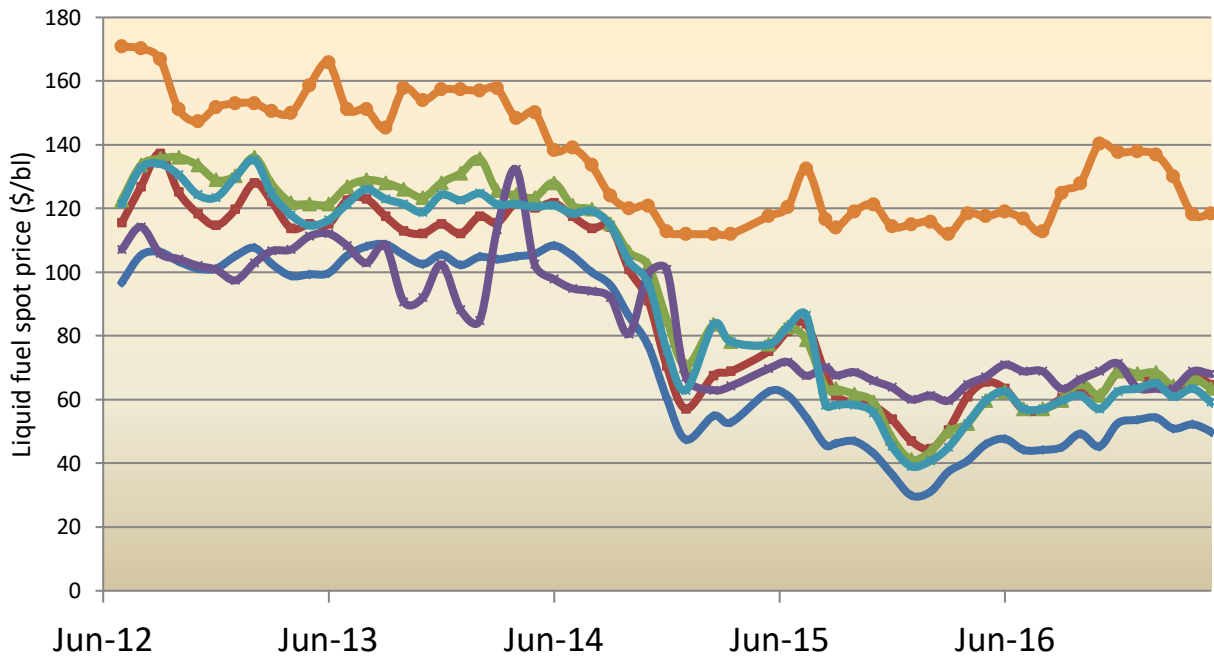
Brussels, 9th-11th October 2017

The 10th European Forum for Industrial Biotechnology and the Bioeconomy (EFIB) returns to Brussels October 2017 and will attract industry executives committed to a shift towards renewable, biologically-based manufacturing. EFIB is organised by EuropaBio, Europe’s largest and most influential biotechnology industry group and Smithers Rapra, global leader in rubber, plastics, polymer and composites information products.

Click [here](#) for more information.

Price Information

Historical spot prices of liquid fossil fuels and liquid biofuels. Five years prices and up to June 2017 are given in \$ per barrel.



- Crude Oil (petroleum), simple average of three spot price
- Gulf Coast Gasoline
- Diesel - New York Harbor Ultra-Low Sulfur No 2 Diesel Spot Price
- Ethanol Average Rack Prices F.O.B. Omaha, Nebraska
- Jet Fuel Spot Price FOB - U.S. Gulf Coast Kerosene
- FAME 0° FOB ARA

Prices of Crude oil, diesel, gasoline, and jet fuel are recorded from www.indexmundi.com; Price of ethanol from www.neo.ne.gov; Biodiesel spot prices from <http://www.kingsman.com>

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