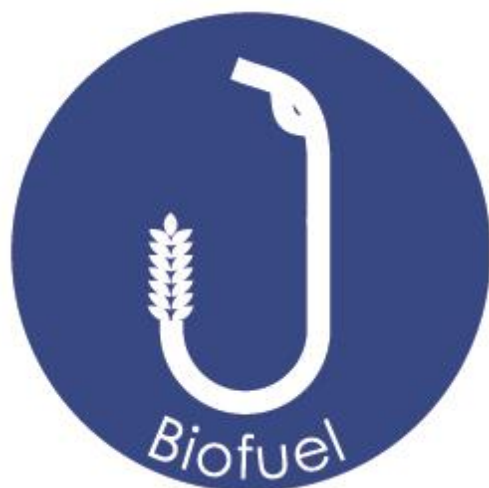


News Review



Issue Eighty
November 2018

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

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Foreword

Welcome to the penultimate Biofuels News Review of 2018.

Normally, within these pages, our focus is on the more common forms of biofuel – namely, bioethanol and biodiesel – and indeed, the latest statistics have shown that biodiesel is the dominant biofuel here in the UK, with 59% of the biofuel accredited under the Renewable Transport Fuels Obligation being biodiesel this past year. However, this month, there are several interesting stories relating to a less-well-known form of biofuel: biomethane.

Unsurprisingly, biomethane can be converted into Compressed (CNG) or Liquefied Natural Gas (LNG) fuel in the same manner as methane from natural gas. This fuel is sometimes used as a fuel for HGVs, as it causes lesser engine degradation, and has lower emissions when compared to diesel and gasoline.

However, a new report by the European Federation for Transport and Environment has questioned biomethane's viability as a transport fuel. Despite acknowledging that biomethane as a fuel represents a significant reduction in carbon emissions when compared to conventional vehicle fuels, the report raises concerns about the amount of available feedstocks, and competition with other available markets for biomethane, such as heat and electricity. The report recommends that biomethane's potential is best utilised in the energy market, allowing other biofuels to bear the brunt of transport decarbonisation.

Despite this view, policy shifts in the UK may mean that the transport and energy markets may not be competing for biomethane at all. Biomethane is also a very viable way of producing renewable heat, and other biofuels are much more prominent in the UK transport mix. However, changes to the UK energy subsidies, including recent degressions in the Renewable Heat Incentive, mean that it could become more profitable for biomethane producers to sell biomethane to the transport sector instead. NNFCC provides a calculator tool that can be used to calculate any potential profits, and this is available on our website.

Read on for the latest news.

Policy

Crop-based biofuels to be phased out of EU targets by 2030



Max Pixel

The European Parliament has confirmed the provisional agreement reached with the Council in June on energy efficiency, renewables and governance of the Energy Union - three important legislative files that are part of the Clean Energy for All Europeans package.

By 2030, energy efficiency in the EU has to have improved by 32.5%, whereas the share of energy from renewables should be at least 32% of the EU's gross final consumption. Both targets are to be reviewed by 2023. These targets can only be raised, not lowered.

By making energy more efficient, Europeans will see their energy bills reduced. In addition, Europe will reduce its reliance on external suppliers of oil and gas, improve local air quality and protect the climate.

Second generation biofuels can play a significant role in reducing the carbon footprint of transport and at least 14% of fuel for transport purposes must come from renewable sources by 2030.

However, first generation biofuels with a high risk of "indirect land use change" (ILUC i.e. when land is converted from non-crop cultivation - such as grasslands and forests- to food production, which increases CO2 emissions) will no longer count

towards the EU's renewable energy goals from 2030. From 2019, the contribution of first-generation biofuels to these goals will gradually be phased out until it reaches zero in 2030.

Each member state must present a ten-year "integrated national energy and climate plan" with national targets, contributions, policies and measures by 31 December 2019, and every ten years thereafter.

Click [here](#) for more information.

US considers reduction in future biofuels targets

The U.S. Environmental Protection Agency will propose new targets for the final three years of the nation's renewable fuel program in January, replacing ambitious decade-old goals set by Congress with volumes closer to the industry's current output, two people familiar with the matter said.

The planned reset of the U.S. Renewable Fuel Standard is likely to set up a fresh battle between two industries, with corn growers wanting the highest possible targets to spur investment, and oil companies eyeing the smallest to reduce costs.

The standard, which expires in 2022, was established in 2007 to boost the Corn Belt economy and help wean the country off of fossil fuels. Refiners are required to blend increasing amounts of biofuels like corn-based ethanol into U.S. gasoline and diesel each year, or purchase blending credits from companies that do.

Oil companies say the policy costs them a fortune. Yet it has fallen short of original targets because production has proven more costly and inefficient than expected, even with subsidies.

The two sources, who requested anonymity because they are not authorized to speak publicly about the matter, said the EPA was planning to slash the 2022 target to bring it closer to current

market realities, but added that the agency had not settled on a number.

An EPA official confirmed the agency is working with stakeholders on a reset proposal, and aimed to finalize its plan by November 2019.

Congress had hoped biofuel production volumes under the standard would hit 36 billion gallons by 2022. But the industry in 2018 produced only around 20 billion, with advanced biofuels - made from things like corn fibre and algae - posting the biggest shortfalls.

As a result, the EPA has been forced to ignore the statutory targets in its annual rule-making process, setting out instead what it views as more realistic and attainable yearly mandates.

For the first time, the EPA wants to officially rewrite the congressional targets for 2020 through 2022. The Trump administration has tried to reduce compliance costs for refiners, drawing the ire of biofuel producers and their legislative backers.

Biofuel backers say the program should retain loftier targets in its final years to encourage companies to keep investing in new plants and technology.

Click [here](#) for more information.

Markets

Biodiesel dominates UK RTFO



Geograph

The U.K. Department for Transport has published preliminary data on its Renewable Transport Fuel Obligation for a portion of 2018, including data on how much biodiesel met U.K. sustainability requirements.

As of data available Sept. 17, the report indicates 525 million litres (138.7 million gallons) of renewable fuels were supplied during a period beginning April 15. That volume of renewable fuels accounted for 4 percent of total on- and off-road mobile machinery fuel. Approximately 172 million litres, or 33 percent, of this fuel has been demonstrated to meet sustainability requirements so far.

Of the 172 million litres that has met U.K. sustainability requirements, 59 percent was biodiesel, 38 percent was ethanol, 2 percent was biomethane and 1 percent was biomethanol.

During the period, 320 million renewable transport fuel certificates (RTFCs) were awarded to transportation fuel suppliers that meet sustainability criteria, including 296 million RTFCs that were issued to "double counting" feedstocks.

Of the fuel meeting sustainability requirements, 26 percent was made from U.K. feedstocks, primarily used cooking oil. For ethanol, almost half was made from low-grade starch slurry in France.

Click [here](#) for more information.

US biofuel waivers policy prompts price slump



Wikimedia Commons

The US biofuel markets slumped after reports emerged saying the Environmental Protection Agency would not reallocate previously exempted biofuel mandates into its 2019 blending requirements.

The S&P Global Platts benchmark Chicago Argo assessment tumbled 3.9 cents to \$1.1935/gal, the lowest level in 13 1/2 years, since reaching \$1.1750/gal on May 26, 2005.

US Midwest B100 SME biodiesel fell 11.7 cents on the day to be assessed at \$2.5260/gal. D4 biodiesel RINs for 2018 plunged 7.25 cents to 40.75 cents/RIN.

The markets all dropped sharply after a published report said that the EPA was not expected to deviate much from its proposed 2019 blending mandates first published in June. Those proposed levels drew the ire of the biofuels industry, which argued that the mandates should have included volumes that the agency had exempted in previous years.

The subject of the exemptions has become a hot-button issue for the domestic biofuels industry and its supporters on Capitol Hill. Under EPA rules, a refinery with a capacity of less than 75,000 b/d can seek a waiver that would allow it not to comply with blending mandates if it can demonstrate the compliance creates a severe economic hardship. Approximately 10% of US

refining capacity comes under the 75,000 b/d limit.

If the waiver is granted after the mandates are finalized, the agency does not reallocate those volumes. Critics of the exemptions say the exemptions amounts to a back-door way of avoiding the mandates and destroys demand for biofuels. Refining interests contest those arguments.

In its announcement in June, the EPA proposed a modest increase in the 2019 mandates compared with 2018, with the entirety of the increase allocated to non-biodiesel advanced biofuels. The proposal calls for a total renewable mandate of 19.88 billion gallons in 2019, compared with 19.29 billion gallons in 2018.

Click [here](#) for more information.

Chevron becomes biggest refiner to receive US biofuel waiver

The US Environmental Protection Agency granted oil major Chevron Corp a 2017 hardship waiver from U.S. biofuel laws for its Utah refinery earlier this year, according to a source familiar with the company's operations.

Chevron, which reported a net income of \$9.2 billion in 2017, becomes the largest known company to be awarded a hardship waiver from the Renewable Fuel Standard (RFS), which requires refiners to blend biofuels like ethanol into their fuel pool or buy compliance credits from competitors that do.

The waivers, which have grown significantly under the Trump administration, have angered corn-belt farmers who say it hurts demand for ethanol and other biofuels.

California-based Chevron declined to confirm whether it received a small refinery hardship waiver, but did say that seeking them can level the playing field.

Refineries with a capacity less than 75,000 barrels-per-day can receive waivers from the RFS if they prove compliance would cause them disproportionate hardship. Chevron's Salt Lake City, Utah, plant is 54,000 barrels-per-day.

The EPA, under President Donald Trump, expanded the waiver program, awarding 29 exemptions for the 2017 calendar year, up from 19 in 2016 and just seven in 2015, EPA data shows.

The EPA has attributed the program's expansion to a lawsuit brought by two oil refiners who challenged the EPA's denial of their waiver request. A federal judge ruled the EPA was using too narrow of a test to evaluate applications.

Click [here](#) for more information.

Biodiesel prices less tied to oil price



Flickr

Traditionally increases in crude oil prices lent support to biodiesel demand providing an economic incentive to increase discretionary blending. This in turn boosts demand for vegetable oils lending support to both vegetable oil and oilseed prices. However, the recent increase in Brent crude oil prices has not been translated into any significant increase in vegetable oil prices.

Forward Brent crude oil prices are sitting lower than current values. These forward prices could explain the dislocation between crude oil pricing and the veg oil complex. Current pricing may

encourage a slight increase in biodiesel production and blending. Meanwhile, lower forward prices for crude oil are likely to dampen incentives to commit to longer term increases in biodiesel production, meaning that larger increases in vegetable oil demand are less likely to be seen.

Should the longer-term outlook for crude oil prices change in the coming months, then we may see rises in forward crude prices, which could translate into increased support for the vegetable oil markets.

Research and Development

"Mobile units" produce biofuels by pyrolysis of waste wood

A technology to produce biofuel within 'mobile production units' has been developed by scientists from the Fraunhofer Institute for Microengineering and Microsystems (IMM).

12 research groups from the European Union's Biogo project were involved in the development. The technology itself uses ingredients from local forests.

One of the prototype units is located behind Fraunhofer IMM, transforming wood industry waste into 'high-quality' fuel.

The first process stage of the production unit is heating the wood waste into a pyrolysis oil. Then, using reaction chambers developed by scientists at Fraunhofer IMM, the oil is converted into a synthetic gas. Extracting the oxygen from the gas results in a synthetic gasoline.

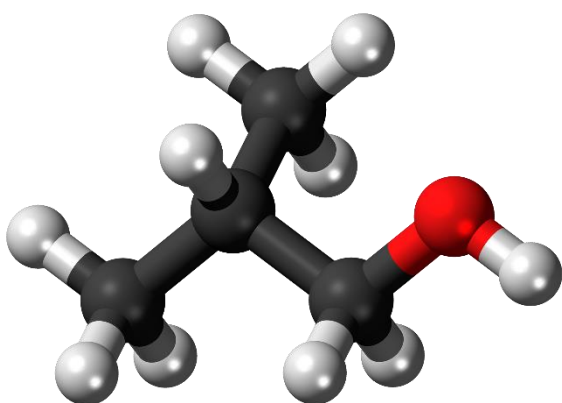
To accelerate the process, scientists from coatings solutions firm Teer Coatings developed a method of applying tiny clusters of catalytically active substances to surfaces. This produces high-

performance nanocatalysts that conserve resources.

In coming years, according to the release, the Biogo teams are planning to further develop the plant, with the goal of producing as much as 1,000 litres of eco-fuel per day.

Click [here](#) for more information.

Genetically engineering yeast to produce isobutanol



Wikimedia Commons

A red pigment called pulcherrimin, naturally produced by several strains of wild yeasts, is synthesized in part through the same biochemical pathway that researchers hope to use to improve production of isobutanol, a promising biofuel alternative to ethanol. In research published in the Proceedings of the National Academy of Sciences, a team based at the University of Wisconsin–Madison and the Great Lakes Bioenergy Research Centre describe the genetic machinery that yeasts use to make pulcherrimin, which binds iron, an essential nutrient. The work is a key step toward harnessing the synthesis pathway for large-scale production of isobutanol as a biofuel.

Compared to first-generation biofuels, such as ethanol, isobutanol has a higher energy content, blends better with gasoline, causes less corrosion, and is more compatible with existing engine technology. Nonetheless, considerable barriers

remain to producing this fuel sustainably from dedicated energy crops.

Yeasts typically do not produce much isobutanol under normal conditions. Most commonly studied species produce ethanol during fermentation. But since the early steps of isobutanol synthesis are the same as those used to make pulcherrimin, yeasts that naturally produce the pigment – readily identifiable by their distinctive red hue – caught the researchers' eyes.

With a better understanding of the steps involved in pulcherrimin production, the researchers are now poised to try to tweak the production machinery and turn it to making isobutanol instead.

Click [here](#) for more information.

Report into natural gas-powered vehicles

A new study from the European Federation for Transport and Environment has claimed that biomethane will have a 'limited' role in the EU's bid to lower greenhouse gas emissions from vehicles and shipping.

Titled "CNG and LNG for vehicles and ships – the facts", the study "compiles the latest evidence on the environmental impacts of using gas a transport fuel".

Transport and Environment (T&E) is a European umbrella for NGOs working in the transport and environment fields, aiming to promote sustainable transport in Europe. A key claim of the latest report is that using natural gas for transport is as bad for the climate as using petrol, diesel or conventional marine fuels.

Acknowledging that both biomethane and power-to-methane can have significantly lower GHG emissions than fossil gas, the study questions the potential biomethane has to play in decarbonising transport. Specifically, it says the number of sustainable feedstocks for biomethane in the form

of wastes and residues are limited and cannot be sustainably scaled.

The study suggests what potential exists for renewable methane would be better used to decarbonise sectors that are already dependent on methane, such residential, industry and power, where no new infrastructure or engines are required.

The trade association for Europe's biogas industry, the European Biogas Association (EBA), has responded to the conclusions of T&E's study, arguing that the potential of biomethane estimated is based on a limited set of feedstock.

Click [here](#) for more information.

Bioethanol

Ensus shutdown preceded by record year



CropEnergies

A record-breaking year of production helped the company behind one of Europe's largest bioethanol plants increase turnover beyond the £200m mark.

Ensus UK operates a biorefinery in Teesside which produces bioethanol for the transport fuels market and high-protein animal feed, employing more than 75 staff.

The company has been owned since 2013 by CropEnergies, a German group listed on the Frankfurt stock exchange.

Turnover at Ensus soared to £201.7m for the year ending 28 February 2018, a 72 per cent increase on the previous year.

The company also recorded profit before taxation of £4.2m. In 2017, the company posted a pre-tax profit of £11.5m, its first since it began trading.

The plant remained operational all year except a nine-day maintenance outage in July and August.

Further efficiency improvements allowed the plant to achieve record production levels.

However, more recently, price volatility in the ethanol market has led to greater uncertainty.

CropEnergies, the German parent company of Ensus, announced that the Teesside plant would pause production at the end of November due to difficult market conditions.

Click [here](#) for more information.

Biodiesel

Biodiesel by-product could be used as fuel additive

Crude glycerol of about 10–20% by volume appears as a by-product in biodiesel production. The increasing demand for biodiesel has led to a substantial increase of glycerol supply in the global market and a dramatic fall in the price of glycerol which has warranted alternative uses of glycerol.

One potential way to deal with the crude glycerol overflow is to convert it to glycerol carbonate (GC) and use GC as a fuel or fuel additive. Prior studies have indicated that carbonate esters can significantly reduce particulate emissions during engine combustion.

In this work, the authors have explored possible reaction pathways in the initial stage of glycerol carbonate pyrolysis. Ab initio/RRKM-master equation methods are employed to differentiate various reaction pathways and to obtain the pressure- and temperature-dependence of the major channels. They have found that glycerol carbonate decomposes almost exclusively to

produce CO₂ and 3-hydroxypropanal over 800–2000 K and radical forming channels are unimportant. As 3-hydroxypropanal is one of the main products of GC decomposition, and aldehydes are known to have a very high impact on soot reduction, they conclude that GC has great potential for cleaner combustion as a fuel additive.

Click [here](#) for more information.

Malaysia to mandate 10% biodiesel blend



Wikimedia Commons

On the 26th of November Malaysia announced that it intends to start phasing in a higher biodiesel mandate starting from next month. The new rule will be officially put into place from February 2019 as the country hopes that this will bolster palm oil prices.

The provisionally named B10 biodiesel programme intends to raise the minimum bio-content that local producers are meant to put into their biodiesel. The biodiesel that is used to fuel transportation is to be raised from 7% to 10% which will potentially boost demand for palm oil as a feedstock.

According to Reuters, Malaysia's Primary industries minister, Teresa Kok said that the B10 programme would be implemented for the transportation sector in phases starting from the

1st of December. And that the mandatory implementation will begin on the 1st of February.

As the world's second biggest producer of palm oil after Indonesia, Malaysia has been affected by the recent 'slump' in the price of vegetable oil. Reuters state that benchmark palm oil prices fell to a near three-year low last week because of high inventories, rising production and inactive demand.

The B10 programme will increase local consumption of crude palm oil and should help to reduce stock Kok says. "At the current low price of palm oil, now is the right time to implement the expanded biodiesel programme" the minister concluded.

Click [here](#) for more information.

Other Biofuels

Transport fuel biomethane opens up for farm producers

Farmers operating AD plants can now viably maximise biomethane production, benefitting from the highest Renewable Heat Incentive (RHI) tariff and "top up" with additional Renewable Transport Fuel Obligation (RTFO) payments, as part of a government incentivised policy for decarbonising the transport sector.

"Up until recently, biomethane producers have generally either injected gas into the grid to receive RHI payments or they supply the transport sector and claim Renewable Transport Fuel Certificates (RTFCs). Combining the two historically hasn't been done," says Lucy Hopwood from NNFCC.

This is because before now and again since tariff levels were reinstated in May this year, the RHI alone has been lucrative enough. However, with a depression likely at the start of January, and the budget for RHI tariff guarantees becoming tight,

it's likely to be more financially viable to claim both.

According to Lucy, farmers not pushing to maximise biomethane production beyond the Tier one tariff break (40,000MWh per year) may benefit significantly from this new development. "Farmers could in theory double production, claiming RHI for half of their output and RTFCs for the other half."

"There is also an opportunity to double the number of certificates awarded for each unit of gas if biomethane is generated from agricultural waste," she says.

"It's also useful to underline that feedstock restrictions were introduced in May 2018 to new plants claiming RHI and FITs, and support can only be received where greater than 50% of biogas outputs are from waste or residues," adds Lucy.

Click [here](#) for more information.

Biogas to be used for shipping fuel



Libreshot

Powering vehicles with fossil fuels or electricity might soon become old news now, as a new cruise line plans to power its cruise from dead fish, hence reducing negative impact on the environment.

A Norwegian cruise line Hurtigruten have found a way to power their cruise by creating a biogas out of leftover parts after factories process fish for food. By transitioning this biogas, the firm thinks it can also decrease its ships' negative impact on the environment.

As explained by Futurism, when organic matter breaks down in the absence of oxygen, it generates a mix of gasses that together form a biogas. Hurtigruten plans to create its own biogas from a mix of fish leftovers and other organic waste. Then, it will liquefy the gas and use the fuel to power its ships.

By the year 2021, the firm aims to have at least six of its 17 ships converted to run on a combination of this biogas and large battery back that will store energy produced by the renewable sources.

Click [here](#) for more information.

Nottingham's biogas-powered buses receive national award

Roadgas was proud to stand alongside triple gold winners Nottingham City Transport (NCT) at UK Bus Awards 2018.

NCT and Roadgas partnered up in 2016 to supply and maintain a refuelling station to support the transformation of its 53 double decker buses to biogas, the largest biogas fleet currently in operation.

In partnership with Roadgas, NCT is working towards having a third of its fleet operating on biogas, and already has an almost carbon neutral 'well-to-wheel' footprint for the fleet as a whole. Through using biogas produced from waste through anaerobic digestion, NCT currently operates some of the greenest buses on today's roads.

As a result of its pledge to deliver significant improvements to air quality, NCT received the top accolade of Gold in the 'Environment Award' category at this year's UK Bus Awards ceremony.

The move has seen the transport network emit over 3,500 tonnes less carbon dioxide (CO₂), 35 tonnes less nitrogen oxide (NO_x) and ¾ tonne less particulate matter each year.

Click [here](#) for more information.

Events

ADBA National Conference London, 11th December 2018

The ADBA National Conference returns this December at a time of major shifts in the UK and abroad. Climate change, Brexit, the end of the Common Agricultural Policy in the UK and other economic and environmental changes present the UK anaerobic industry (AD) with both opportunities and threats for the future.

The conference will discuss how we can build a strong, resilient and adaptable AD sector that will operate to the highest standards and thrive in the face of domestic and global challenges.

Click [here](#) for more information.

Lignofuels 2019 Oslo, 13th-14th December 2018

Now on its 11th edition, this two day conference will once again bring together key lignofuels stakeholders to join our forum discussions and networking, including leaders from advanced generation biofuels companies from across the globe represented by Technical, Strategic and Business Development Executives from First and Advanced Generation Biofuels Producers, Oil Refiners, Process Technology Providers, Enzyme Developers, Engineering Firms and Agribusiness as well as Financiers, Investors, Policy & Regulators, Automotive & Aviation Industries, Consultants, Traders & Brokers and Chemical Companies.

Click [here](#) for more information.

Gasification 2019 Brussels, 13th-14th December 2018

The conference will showcase the latest developments in the sector and provide key insights from senior executives in the industry to discuss the latest commercial and technical developments, challenges and research breakthroughs throughout the entire gasification market.

Click [here](#) for more information.

World Bio Markets 2019 Amsterdam, 1st-3rd April 2019

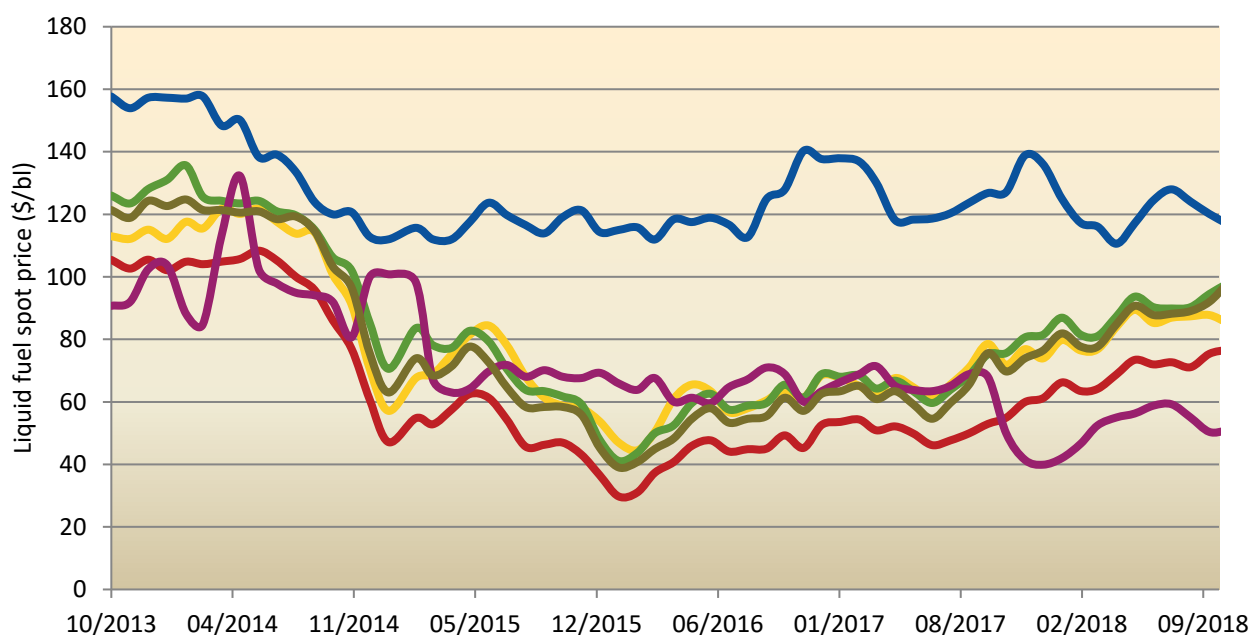
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Price Information

Historical spot prices of liquid fossil fuels and liquid biofuels. Five years prices and up to October 2018 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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NNFCC

Biocentre, York Science Park

Innovation Way

Heslington, York

YO10 5DG

Phone: +44 (0)1904 435182

Fax: +44 (0)1904 435345

Email: enquiries@nnfcc.co.uk

Web: www.nnfcc.co.uk

Twitter: @NNFCC