

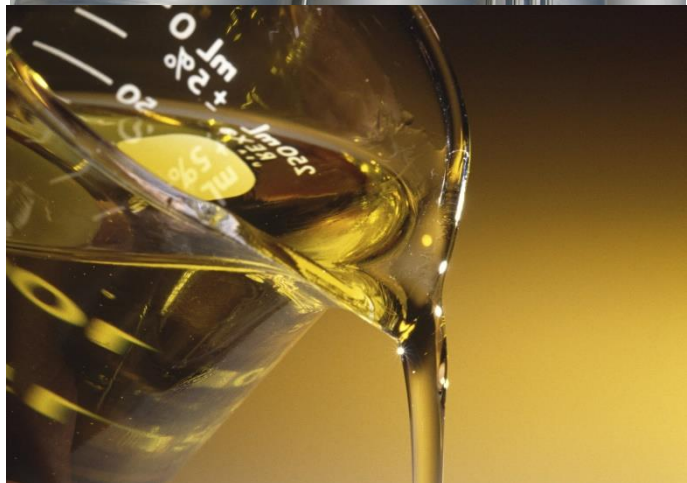


## News Review

Issue Sixty-Two

May 2017

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



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# Foreword

Welcome, subscribers, to May's biofuels News Review.

Here at NNFCC we are well acquainted with Horizon2020 projects, being major participants in the Agrocycle, SuperBIO, and DAFIA projects across Europe. As such, it is always great to hear of new Horizon2020 projects working towards a sustainable bioeconomy in Europe, even if we aren't involved. One such new project is the TO-SYN-FUEL project, whose objective is to deliver production of synthetic biofuels and hydrogen using waste biomass. This comes in the wake of the European Commission's RED II proposal for renewable energy post-2020, which includes a phase-out of conventional biofuels and a commitment to increasing levels of synthetic biofuel use through introducing minimum synthetic-biofuel targets. In theory, synthetic biofuels offer a more sustainable solution than conventional biofuels, as they use wastes as their feedstocks as opposed to crops which otherwise compete with food crops, but it should be noted that the technology is still in its infancy, and hopefully projects like TO-SYN-FUEL will accelerate development in this sector.

On the subject of synthetic biofuels, we have several stories this month about biofuels produced from interesting feedstocks. One such story shows how researchers at Lancaster University (for whom, as a York graduate, I shall set aside the usual rivalry in the interest of reporting biofuels news) have massively increased the efficiency of the process producing biofuels from used coffee grounds. This process has been frowned upon in the past for its lack of real commercial viability, but by removing a step involving hexane, they can reduce processing time by over 90%, and also reduce the amount of glycerol-based waste that stems from the process. Given that over 9 million tonnes of coffee grounds are sent to landfill every year, there is big scope for this process, which the researcher claim could produce over 700,000 tonnes of biofuels per year – a figure not to be sniffed at.

Read on for the latest market news.

# Policy

## Indonesian & Malaysian biodiesel use set to increase

Local palm oil producers in Indonesia predict the domestic use of biodiesel will increase by 30-40 percent in 2017 following the government's decision to impose the 20 percent biodiesel blending (B20) policy to non-subsidized diesel fuel starting late last year.

Indonesia started implementing the B20 policy in early 2016 for the transportation and industry sectors, while power plant sectors were obliged to blend 30 percent of biodiesel (B30) at the same time. In November, the government began stipulating the implementation of the program to all gas stations in the country, including state-owned and private stations.

As a result, Indonesia was able to consume 2.7 million kilolitres of biodiesel domestically throughout the year, 91 percent of which was blended with subsidized diesel fuel and the rest blended with non-subsidized fuel. The figure fell slightly from the original target of 2.9 million kilolitres. This year, the government aims to increase the biodiesel consumption target to 4.6 million kilolitres with 2.5 million kilolitres of which are expected to be blended to make subsidized diesel fuel and 2.1 million kilolitres for the non-subsidized fuel.

The country's biodiesel production is expected to have increased from 1.7 million tonnes in 2015 to 3.3 million tonnes in 2016 and is expected to hit six million tonnes this year.

Nearby Malaysia also intends to implement a B10 mandate, delayed by the recent rise on palm oil prices. The Malaysian Biodiesel Association said when CPO prices were at sustainable price levels, the industry could witness a steady increase in biodiesel usage. The B10 policy effectively

mandates the use of palm oil in diesel and is one of the measures the government has initiated to support the palm oil industry. At the moment diesel sold has a 7% palm oil content.

The biodiesel industry in Malaysia has 17 biodiesel plants, with total installed capacity of 2.1 million tonnes. When crude oil prices fell, the export market for biodiesel shrank and a lot of capacity went unutilised.

Most industry players are operating at utilisation capacity of below 25%. Malaysia's biodiesel production is expected to go up about 80% to 900,000 tonnes this year.

Click [here](#) for more information.

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# Markets

## Crop Energies ethanol output surpasses 1million m<sup>3</sup>



*Crop Energies*

CropEnergies increased its ethanol output by 23% to 1,030,000m<sup>3</sup> in the financial year from March 1, 2016 to February 28, 2017, the German-headquartered company said in its annual report Wednesday.

The company attributed most of the increase to the restart of the Ensus plant at Wilton, UK in July 2016. As a result, all plants were running at high capacity utilization rates since the summer of 2016, the report said.

CropEnergies also increased its production of food and animal feed products by 63% to 574,000 mt.

Higher production and sales volumes more than offset lower prices and resulted in an 11% revenue increase to €802 million (\$890 million) for the financial year, a new record result, the company said.

It said it intend to continue utilizing its production capacities flexibly according to market conditions.

CropEnergies expects a slight rise in ethanol demand in Europe due to higher blending mandates, but lower prices than the last quarter of the financial year 2016-17, given the high level of European production capacity.

The company said any future investments will largely depend on the EU framework for biofuels post 2020.

CropEnergies has production facilities in four locations with the following annual ethanol production capacities: Zeitz in Germany (400,000m<sup>3</sup>), Wanze in Belgium (300,000m<sup>3</sup>), Loon-Plage in France (190,000m<sup>3</sup>), and Wilton (400,000m<sup>3</sup>).

Click [here](#) for more information.

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## **POET announces expansion to Marion biorefinery capacity**

POET Biorefining – Marion (Ohio) is undergoing an expansion to more than double its capacity from nearly 70 million gallons per year to 150 million gallons per year, improving the grain market for local farmers and adding new jobs to the community. With the expansion, high-protein animal feed production will also grow from 178,000 tons to approximately 360,000 tons annually.

With the increased production, corn purchases from area farmers will grow from the current 24 million bushels to approximately 50 million bushels annually, improving the grain market for farmers at a time when agriculture is facing challenging commodity prices, farm incomes and land values. POET today spends more than \$330 million on Ohio corn annually.

The project will cost approximately \$120 million and provide more than 225 construction-related jobs and 18-21 new permanent jobs for the area. Site work is planned to begin this summer with a construction start in the fall and completion estimated for Q3 2018.

Click [here](#) for more information.

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# Research & Development

## **New Horizon2020 project aims to promote synthetic biofuels**



*Horizon2020*

TO-SYN-FUEL is a project funded by Horizon 2020 EU's new research and innovation programme, with the aim to build-up, operate and demonstrate the production of Synthetic Fuels and Green Hydrogen from waste biomass.

Twelve SME, industrial, and scientific partners, co-ordinated by Fraunhofer UMSICHT, are participating in a new ambitious research project named TO-SYN-FUEL which will build up, operate and demonstrate the production of Synthetic Fuels and Green Hydrogen from waste biomass. Building and extending from previous framework funding, the project is designed to set the benchmark for future sustainable development and growth within Europe and will provide a real example to the rest of the world of how sustainable energy, economic, social and environmental needs can successfully be addressed.



The TCR® technology developed by Fraunhofer UMSICHT could be the solution. The thermo-catalytic reforming TCR® produces renewable liquid fuels from waste biomass, which can replace fossil fuels. These fuels comply with European standards for gasoline and diesel EN228 and EN590, which have already been demonstrated on a pilot scale. The TCR® technology converts all kinds of residual biomass into three main products: H<sub>2</sub>-rich synthesis gas, biochar and liquid bio-oil, which can be upgraded. By high pressure hydro-deoxygenation HDO and conventional refining processes, a diesel or petrol equivalent is created in the distillation and is ready to be used directly in internal combustion engines.

Within the project biogenic residues or organic residues are converted into useful, inexpensive and high-performance synthetic fuels on a demonstration scale. The scale up of one hundred of such plants installed throughout Europe would avoid GHG emissions equivalent to five million people per year and divert millions of tonnes of organic wastes from landfill to sustainable biofuel production. As a result, the TCR® technology opens up long-term opportunities to convert organic waste into renewable fuels and to directly implement these fuels into existing petroleum infrastructure.

Click [here](#) for more information.

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## Biofuels from used coffee-grounds



*Public Domain Pictures*

Purpose-grown feedstocks (used to extract oils) for biodiesels are controversial because of their cost and the demand they place on land and water. Spent coffee grounds, which have a high calorific value, offer a good low-cost alternative feedstock. However, most used coffee grounds are currently just dumped. In 2014 more than nine million tonnes of spent coffee grounds were sent to landfill.

Although a small number of businesses are using spent coffee grounds to make biofuels, researchers at Lancaster University have found a way to significantly improve the efficiency of the process— vastly increasing biofuel from coffee's commercial competitiveness.

The chemical engineers have consolidated the existing multi-stage process into one step (known as in-situ transesterification), which combines extraction of the oils from the spent coffee grounds and the conversion of it into coffee biodiesel.

In the traditional process, manufacturers mix spent coffee grounds with hexane and cook the mixture at 60°C for between 1-2 hours. The hexane is then evaporated to leave behind the oils. Methanol and a catalyst is then added to make biodiesel, and a glycerol by-product – which also needs separating.

Lancaster University researchers, led by Dr Vesna Najdanovic-Visak, found they are able to combine the processes by using just methanol and a catalyst – removing the need for hexane altogether and saving on chemical waste. In addition, they also discovered that the optimal time for the process was 10 minutes to gain the same yield of oils from the spent coffee grounds - a significant reduction in time needed and associated energy costs.

The process has the potential to enable 720,000 tonnes of biodiesel to be produced each year from spent coffee grounds.

Click [here](#) for more information.

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## University of Maine operates pilot-scale biorefinery



*Flickr*

A pilot plant capable of processing up to 1 ton of woody biomass per day into chemicals that can be used to manufacture bioproducts, including biofuels, biochemicals and advanced materials, was demonstrated in 100 hours of continuous operation beginning May 1 at the University of Maine's Technology Research Centre (TRC) in Old Town.

Chemicals made from biomass could one day be an important revenue source for the forest economy. Organic acid platform chemicals, as they are known in the industry, have multiple uses, including the production of plastics and other specialty chemicals.

At UMaine, these "green" chemical intermediates are critical in the university's patented conversion technology to produce diesel and jet fuel from woody biomass, developed by the Forest Bioproducts Research Institute (FBRI).

The Biomass to Bioproducts Pilot Plant, which occupies 10,000 square feet in TRC, is the first step in scaling up UMaine's jet fuel technology, which is still in bench-scale production. FBRI researchers hope to add another pilot plant that would use the platform chemicals to create larger quantities of biofuel — prototyping for commercialization. The two pilot plants would fully demonstrate the potential of creating diesel and jet fuels — and the chemical ingredients — entirely from biomass.

In addition, this operational campaign will produce organic acid salts made from old corrugated cardboard waste as precursors for conversion to jet fuel and diesel using UMaine's patented technology. FBRI is well positioned to help Maine communities attract new investments in forest bioeconomy for producing bioproducts — fuels, chemicals and advanced materials — from biomass at scales ranging from 100 to 1,000 tons per day dry feed.

Click [here](#) for more information.

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## Nigerian billionaire to invest in US biofuels plant

Nigerian Oil Billionaire and Non-Executive Chairman/Founder of Taleveras, Igho Sanomi has signed a Joint Venture deal to build a biofuel refinery in the United States of America (USA) with African feedstock.

The Proposed Integrated Biofuel Production Enterprise will be able to establish a capacity to produce several Million Gallons of neat Biofuel per year under its initial pilot program in Claiborne County Mississippi USA. The Biofuel project is expected to include a capability to blend the neat biofuel product with Petroleum-Based equivalent fuels ordered to meet approved certifications and specifications. The project will be in different phases and will involve the establishment of Farming Cooperatives in Africa to grow the feedstock.

The Global Green Energy Joint Venture Project will focus on the increase of advanced biofuels production capacity by establishing a complete value chain capable of producing drop-in replacement biofuels. This includes feedstock production and logistics and Integrated Biorefineries, Fuel blending, transportation and logistics.

Click [here](#) for more information.

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## Biofuels journal runs special on LCA

For biofuels to be a successful replacement for fossil fuels, they must be both economically viable and truly sustainable. The journal *Biotechnology for Biofuels* has published a new Special Issue on Life Cycle Analysis, focusing on all aspects of the supply chain to produce sustainable aviation and vehicle transportation fuel.

Highlights of the series include an analysis of the water footprint of growing different biofuel feedstocks in China. Xiaomin Xie and colleagues also identify provinces where water shortages would mean that growing biofuel crops would not be sustainable, offering insight for Chinese biofuel policy-makers.

Biofuel production from food crops is controversial as it competes with land use for food. One solution is to produce ethanol from waste biomass, however, this is more costly than the production of ethanol directly from food crops such as sugar cane and corn. In a techno-economic analysis, Tassia L. Junqueira and colleagues show that using waste biomass to produce ethanol in Brazil will become more competitive in the long term. The results have implications for climate change, since the suggested scenario of producing biofuel from waste biomass would reduce greenhouse gas (GHG) emissions by more than 80% compared to gasoline.

Three articles in the series address renewable jet fuels, an important factor in reducing the environmental impact of the aviation industry. Sierk de Jong and colleagues compare the GHG emission performance of several renewable jet fuel conversion pathways from well-to-wake (the entire life-cycle of production and end-use). Meanwhile, Jeongwoo Han and colleagues compare well-to-wake pathways and GHG emissions for jet fuel production from corn and corn stover. Finally, Guolin Yao and colleagues carry out a techno-economic analysis of different jet fuel feedstocks, showing that sugar cane is the lowest cost, followed by corn grain and

switchgrass. Taken together, these studies work towards achieving goals set by the International Air Transport Association (IATA) of carbon neutral growth of aviation by 2020 and a 50% reduction of CO<sub>2</sub> emissions by 2050, compared to 2005 levels.

Click [here](#) for more information.

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## Bioethanol

### Record low carbon-intensity for Enerkem



*Enerkem*

Enerkem Inc., a world leading waste-to-biofuels and renewable chemicals producer, has received the lowest carbon intensity value ever issued by the British Columbia Ministry of Energy and Mines for its ethanol product under the Renewable and Low Carbon Fuel Requirements Regulation.

The confirmed carbon intensity of Enerkem's waste-based ethanol is set at -55 gCO<sub>2</sub>e/MJ. As a comparison, gasoline has an intensity of +88 gCO<sub>2</sub>e/MJ. This approval under the British Columbia Renewable and Low Carbon Fuel Requirements Regulation opens up the door for Enerkem to sell its advanced ethanol in the province, in addition to the local Alberta market where its world's first full-scale facility in operation is located.

The British Columbia Renewable and Low Carbon Fuel Requirements Regulation was introduced to reduce reliance on non-renewable fuels and the environmental impact of transportation fuels. Under this requirement, fuel suppliers must progressively decrease the average carbon intensity of their fuels by 10% by 2020 relative to 2010.



Enerkem's proprietary technology decreases greenhouse gas (GHG) emissions by producing low carbon fuels that displace a portion of the gasoline used to fuel cars. Moreover, by using non-recyclable, non-compostable household waste—otherwise destined to landfills—and converting this waste feedstock into advanced biofuels, it also avoids methane emissions from landfills.

Carbon intensity is the measure of GHG emissions associated with producing and consuming a transportation fuel, measured in grams of carbon dioxide equivalent per megajoule of energy (gCO<sub>2</sub>e/MJ). It accounts for the GHG emissions associated with extracting, producing, transporting, and consuming a unit of energy of transportation fuel. It is a measure of the GHG emissions from the complete life cycle assessment of a fuel.

Click [here](#) for more information.

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## Maabjerg Bioethanol Plant set for large investment

A London-based investment firm Pioneer Point Partners has confirmed in a letter of intent that it is ready to invest up to €160 million in Denmark-based Maabjerg Energy Centre's bioethanol plant.

The plant will be based in Western Jutland, Denmark, and create around 1,000 jobs.

In a statement, Maabjerg said that Pioneer will invest in the plant if it gets a precondition that the political framework and long-term government support is settled first.

In 2014, Maabjerg Energy Centre was awarded €39 million in funding from the NER300 Programme. But in October 2016, the consortium announced that the project would be put on hold as a consequence of not being able to find a political majority that would support the idea of providing public guarantees for the investment. Instead, the consortium was encouraged to find private investors.

According to Maabjerg, the news was received with great enthusiasm among the mayors in Holstebro and Struer – the home towns of the projected 2G bioethanol plant.

The plant is projected to be established right on the boundaries of the municipality of Struer, and the utility companies of both municipalities (Struer Forsyning and Vestforsyning) are both involved in the project.

Before making the decision to invest, the regulatory framework for the revitalised project must be settled. Maabjerg Energy Centre has resumed negotiations with the Danish Government.

Click [here](#) for more information.

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# Biodiesel

## UPM test wood-based biodiesel in Helsinki



*Public Domain Pictures*

UPM's wood-based UPM BioVerno biofuel has been proven to reduce carbon dioxide and particle emissions in both urban and maritime transport.

In laboratory testing, the tailpipe emissions of UPM BioVerno diesel, such as nitrogen oxides and particulate matter, were significantly lower than those of the commercial grade fossil diesel. The tests were carried out on Euro III class buses that are still frequently used in Finland.

In the traffic tests that lasted a year, the buses drove a total of approximately 400,000 kilometres. UPM BioVerno worked just like the best diesel fuels.

In Euro VI class buses, the diesel particulate filter (DPF) and selective catalytic reduction (SCR) catalyst reduce emissions to close to zero, so there were no significant differences between the fuels in tailpipe emissions. However, in a Euro VI engine, the fuel has an indirect effect on emissions. A high-quality fuel, such as UPM BioVerno, ensures that the exhaust cleaning systems operate effectively even after driving significant mileage.

The bus field tests were part of a larger BioPilot project coordinated by VTT Technical Research Centre of Finland Ltd. The goal of this project was to encourage companies to commercialise renewable energy solutions in traffic.

Maritime transport is looking for new ways to reduce carbon dioxide and sulphur emissions. Since the start of 2015, due to the EU directive, ships in the Baltic Sea have to use a fuel with a sulphur content of 0.1%, use LNG or be equipped with a sulphur dioxide scrubber.

With advanced biofuels, it is possible to eliminate sulphur oxide emissions, cut nitrogen oxide emissions by 10% and reduce particulate matter emissions by 50%.

According to current forecasts, marine biofuels could make up 5-10% of the marine fuel mix by 2030.

Click [here](#) for more information.

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## **Big investment for Renewable Energy Group's biodiesel plant**

Renewable Energy Group, Inc. has announced that it has secured financing of up to \$20 million from First Midwest Bank for the \$24 million capacity-expansion project at the company's Ralston, Iowa biodiesel refinery.

The upgrade project, announced last November, is expected to increase the annual nameplate capacity of the Ralston biorefinery from 12 million to 30 million gallons. This would match the capacity at the company's other Iowa biorefineries in Mason City and Newton.

Iowa Senate File 2309, which was signed into law last year by Gov. Terry Branstad at REG's Newton biorefinery, extends the existing 2 cents per gallon biodiesel production tax credit for seven years beginning January 1, 2018. In that year, the new law also adjusts the current retail incentive for fuel containing a minimum 5 percent biodiesel blend (B5) to 3.5 cents per gallon and creates a new 5.5 cents per gallon incentive for blends of B11 or more.

REG has grown from its beginnings in Ralston 21 years ago into North America's largest biomass-based diesel producer. The company now owns 14 active biorefineries in the United States and Europe with a combined annual nameplate capacity of 502 million gallons.

Click [here](#) for more information.

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# Aviation Fuel

## Singapore Airlines to run 12 biofuel-powered flights from San Francisco



*Wikimedia Commons*

Committed to the global effort to reduce international aviation emissions, Singapore Airlines (SIA), in partnership with the Civil Aviation Authority of Singapore (CAAS), has started operating a series of 12 'green package' flights over a three-month period on its non-stop San Francisco-Singapore route.

Featuring SIA's latest-generation and most fuel-efficient aircraft – the Airbus A350-900 – the 'green package' flights are the first in the world to combine the use of biofuels, fuel-efficient aircraft and optimised flight operations. CAAS is facilitating the use of these optimised flight operations and Air Traffic Management (ATM) best practices which reduce fuel burn and carbon emissions for the flights.

The first of the 12 flights, SQ31, departed San Francisco at 1121hrs (San Francisco Time) on 1 May 2017 and arrived in Singapore at 1910 hrs (Singapore Time) on 2 May with 206 passengers on board.

The initiative supports the efforts under the Sustainable Singapore Blueprint (SSB) 2015 to develop Singapore as a Leading Green Economy, where businesses adopt more efficient and sustainable processes and measures to reduce their resource and environmental impact, and contribute towards a Sustainable Singapore. The flights will also raise awareness of sustainable

biofuels for aviation and provide the industry with valuable insight on the economics, logistical requirements and performance of biofuels.

Over the three-month period, flight SQ31 will be powered by a combination of HEFA (Hydro-processed Esters and Fatty Acids), a sustainable biofuel produced from used cooking oils, and conventional jet fuel. The biofuel, produced by AltAir Fuels, will be supplied and delivered to San Francisco by SkyNRG in collaboration with North American Fuel Corporation (NAFCO), a wholly owned subsidiary of China Aviation Oil (Singapore), and EPIC Fuels.

According to the International Air Transport Association (IATA), sustainable biofuel is a promising technological solution which will reduce the airline industry's carbon emissions. It has been certified safe for use in commercial aviation since 2011, and has been in use by airlines in other parts of the world.

Click [here](#) for more information.

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## Jet Fuel from waste restaurant oils

Plans to mass-produce jet fuel from restaurants' waste kitchen oil will come a step closer in China next year when a major state-owned refiner begins construction of a full-scale production plant.

Zhenhai Refining and Chemical, a Sinopec subsidiary based in Ningbo, Zhejiang province, said the plant would convert 100,000 tonnes of leftover kitchen oil into 30,000 tonnes of aviation-grade biofuel a year.

The fuel would be sold to airlines operating long-haul international flights, especially to countries that charged high emissions taxes, it said.

Sinopec, China's largest oil company, started the project in 2011 as a countermeasure to a carbon tariff on civil aviation proposed by the European Union.

The first sample product was synthesised in a Sinopec laboratory the following year but the biofuel was not used in a commercial flight until March 2015, when a Hainan Airlines Boeing 737 used a 50-50 mix of conventional jet fuel and biofuel to fly 156 passengers from Shanghai to Beijing.

According to Boeing, a major maker of passenger jet planes, more than 1,500 commercial flights had used biofuel since 2011. These were all for demonstration purposes, however. The world's 100,000 daily flights still stick to conventional fossil fuel.

Researchers have developed sophisticated technology to filter out the "junk" that is present in mixed waste oils. They heated the oil to over 350 degrees Celsius to get rid of water molecules, which might damage jet engines, and added hydrogen to extend the fuel's shelf life and combustion efficiency.

That added to the cost of the final product and made it more expensive than fossil fuel. But researchers said the Sinopec's aviation biofuel had met stringent safety standards. For instance, it did not form a gel at temperatures low as minus 47 degrees Celsius, and its manufacturing process should kill off all sorts of bacteria.

Click [here](#) for more information.

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## **Air Canada testing aviation biofuels**

Air Canada is one of the 20 largest airlines in the world transporting 45 million customers in 2016. Now the country's largest domestic and international airline service will start measuring the impact of biofuel on five of their flights. A sustainable biofuel produced by used cooking oil will be used on the aircrafts. Air Canada is teaming up with Civil Aviation Alternate Fuel Contrail and Emissions Research project (CAAF CER), to start this latest research project. It will be led by the National Research Council of Canada (NRC) to test the environmental benefits of biofuel use on contrails. During these flights the NRC will trail the

Air Canada aircraft with a modified T-33 research jet to sample and test the contrail biofuel emissions.

In 2012 Air Canada operated two biofuel flights: one between Toronto and Mexico City as part of a series of commercial biofuel flights that took the secretary general of ICAO to the United Nations conference on Sustainable Development held in Rio de Janeiro; the second flight transported a number of Olympic athletes and officials on their way to the London 2012 Olympic Games. One of Air Canada's most notable recent accomplishment is a 40 percent improvement in average fuel efficiency between 1990 and 2016. Now they are taking further steps to reduce its carbon footprint.

NRC hope that this research project will provide "key information toward biofuel inclusion in all future flights." A reduction in the thickness and coverage of contrails produced by the jet engines of aircraft could reduce aviation's impact on the environment, an important beneficial effect of sustainable biofuel usage in aviation.

Click [here](#) for more information.

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# Other Fuels

## Biogas-fuelled trucks set to create jobs in California



*Pixabay*

A new jobs study reveals that deploying trucks fuelled by renewable natural gas could create up to 130,000 new jobs and add \$14 billion to California's economy. The 'RNG Jobs Report' examines the economic potential of fuelling heavy-duty trucks with renewable natural gas produced in California, instead of being powered by petroleum-based diesel. The study was released jointly by the Coalition for Renewable Natural Gas (RNG Coalition) and the California Natural Gas Vehicle Coalition at the Advanced Clean Transportation Expo, the nation's largest alternative, clean-fleet trade show.

A switch to renewable natural gas trucks could quickly help California achieve its air quality,

greenhouse gas emissions, and climate change-related goals, the two coalitions say. More than 95 percent of the trucks on California roads currently use petroleum-based diesel fuel and are a major source of particulate, nitrogen oxide (NOx) and GHG emissions. In Southern California, the heavy-duty trucking sector is the single largest source of NOx emissions, which combine with other pollutants to form both ground-level ozone and fine particulates, also known as PM2.5. Those pollutants are responsible for a wide range of health impacts from exacerbating asthma to premature deaths. In fact, the ports and related goods-movement activity emit more than 35 percent of all smog-forming pollutants in the region.

For every job created through direct investment in the trucking and goods movement sector powered by California-produced renewable natural gas, two more jobs will be created. The study estimates that these are high-paying jobs, with estimated labour income more than double California's current median income. The jobs and economic activity from investments in a natural gas trucks powered by in-state renewable natural gas support California's diverse economy, supporting various levels of skilled workers in sectors including construction, fabrication, vehicle manufacturing, engineering services, waste management, and service industries.

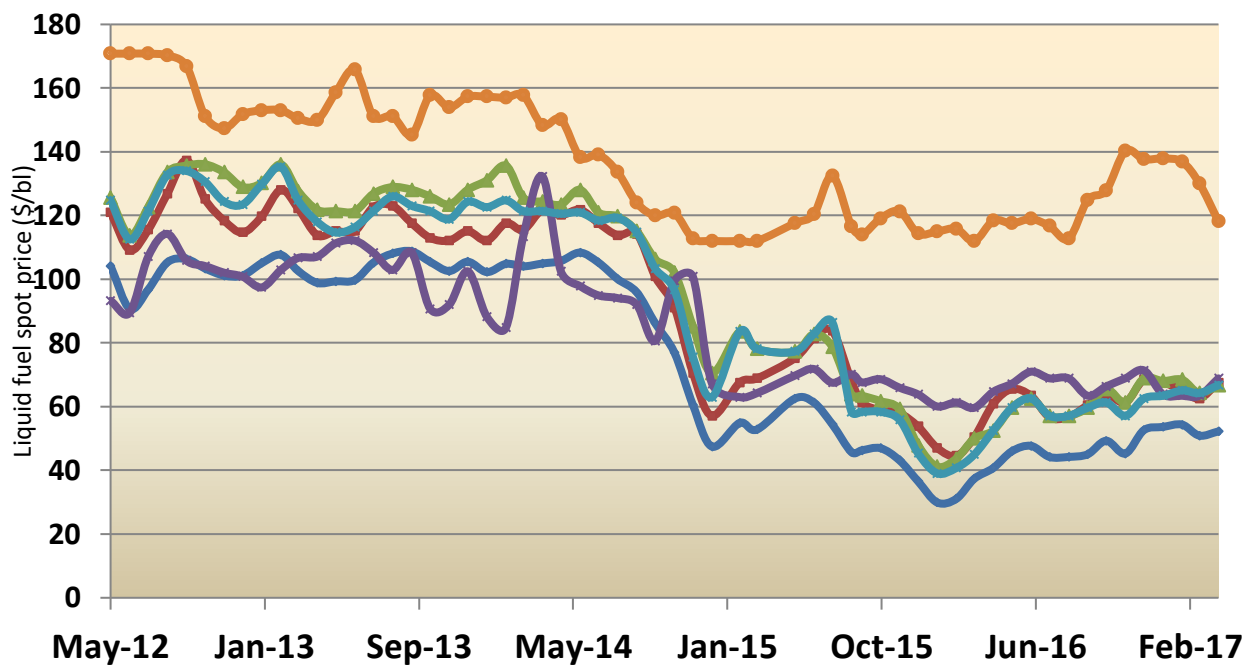
Click [here](#) for more information.

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# Price Information

**Historical spot prices of liquid fossil fuels and liquid biofuels. Five years prices and up to April 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](http://www.indexmundi.com); Price of ethanol from [www.neo.ne.gov](http://www.neo.ne.gov); Biodiesel spot prices from <http://www.kingsman.com>*

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