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CARIBBEAN ENERGY UPDATE

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UPCOMING ENERGY EVENTS



PETROLEUM Energy

New Biofuel Could Work in Regular Diesel Engines

The need for specially designed engines to run biodiesel is holding back the technology.
A new way of refining biodiesel so that it works in standard diesel car engines could help broaden the use of renewable fuels, according to scientists.

Biodiesel made from plant material could present a more eco-friendly alternative to the fossil-fuel-derived diesel, or petro-diesel, that is currently used. In the European Union (EU), commercial diesel already has to contain at least 7 percent biodiesel.

But the molecular makeup of these fuels means they boil at different temperatures from petrodiesel, which means only specially designed engines can run on pure biodiesel or blends that contain considerable amounts of the fuel. Now, Scientists in Germany have found a way to transform chemicals derived from plants into a biodiesel that meets the boiling characteristics required by the EN 590 standard. This is set by the European Committee for Standardization, for commercial diesel sold in the EU.

Lukas Gooßen, a professor of organic chemistry at the Ruhr-Universität Bochum who led the research, said his motivation came during a trip to a biodiesel plant in Rwanda a few years ago. The problem, he said, was that only a single bus had been converted to run on the fuel because of a lack of funds.

"If you're going to use biofuel, you need existing infrastructure you can tap into," he told Live Science. "Anything else will be unaffordable to most countries and societies. This has to be the starting point."

The reason conventional biodiesel doesn't work in standard diesel engines is that

about 95 percent of its constituent molecules are the same length and, therefore, boil at roughly the same temperature. In contrast, petrodiesel is made up of a mixture of hydrocarbons of different lengths and structures that boil at different temperatures, giving petrodiesel a much broader boiling range. Importantly, these are the boiling characteristics for which modern cars have been designed. "All engines were specifically made to fit this fuel," Gooßen said. "Diesel fuel and diesel engines evolved together." There are existing processes that can convert plant oils into biofuel suitable for use in standard diesel engines, but a significant proportion of the fuel is burned to carry out the refining. Gooßen and his colleagues decided to find a way to take advantage of catalysts — substances that accelerate chemical reactions — to do the same thing at low temperatures, using very little energy.

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Source: Gent, Edd, Scientific American

Clever Chemistry Offers New Source of Jet Fuel



Update of century-old chemical reaction could produce kerosene from biomass

Necessity is the mother of invention, and a century ago, nations needed petroleum. They could run ships on coal, but burning solid lumps of fuel was impractical for cars and tanks, and unsuited to aircraft. Unlike other countries, Germany had no access to crude oil, so two chemists there — Franz Fischer and Hans Tropsch — invented a way to make synthetic petroleum from coal in 1925. Their Fischer–Tropsch (FT) process could now help countries and companies that want to phase out fossil fuels: if coal can be turned into liquid fuels, then, theoretically, greener alternatives such as biomass could be as well. But so far, efforts to do this have been inefficient, and certainly not cheap enough to compete with oil.

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Source: Nature.com

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Petroleum Energy Highlights

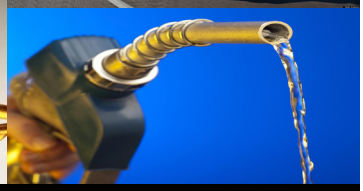
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Regular Unleaded Gasoline Average Retail Price (US$/Litre) Nov/Dec 2019



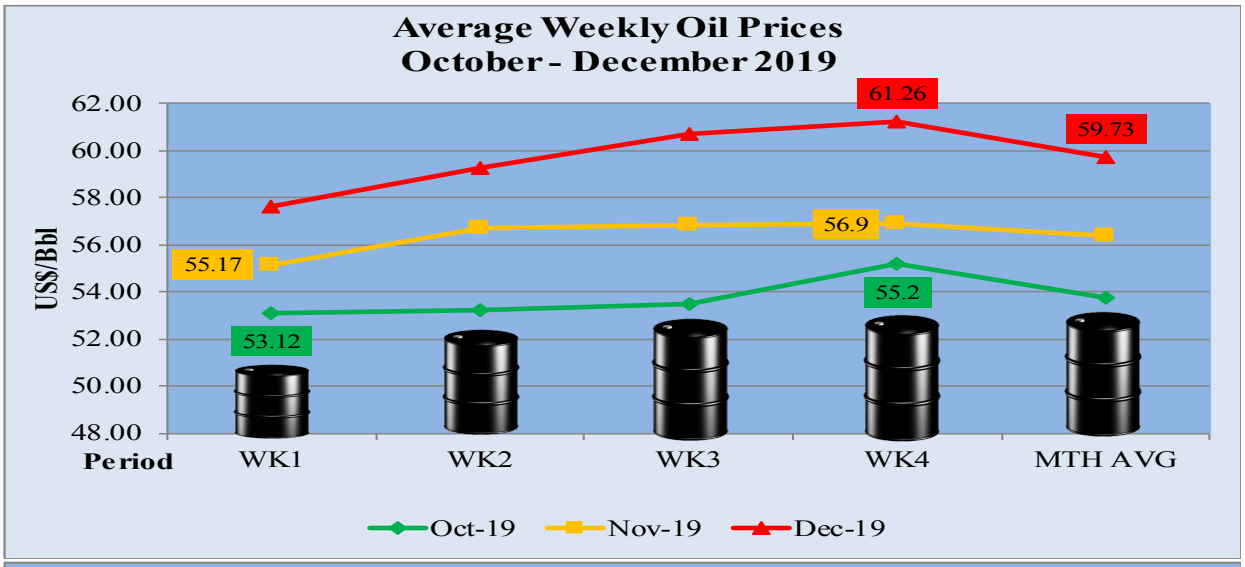


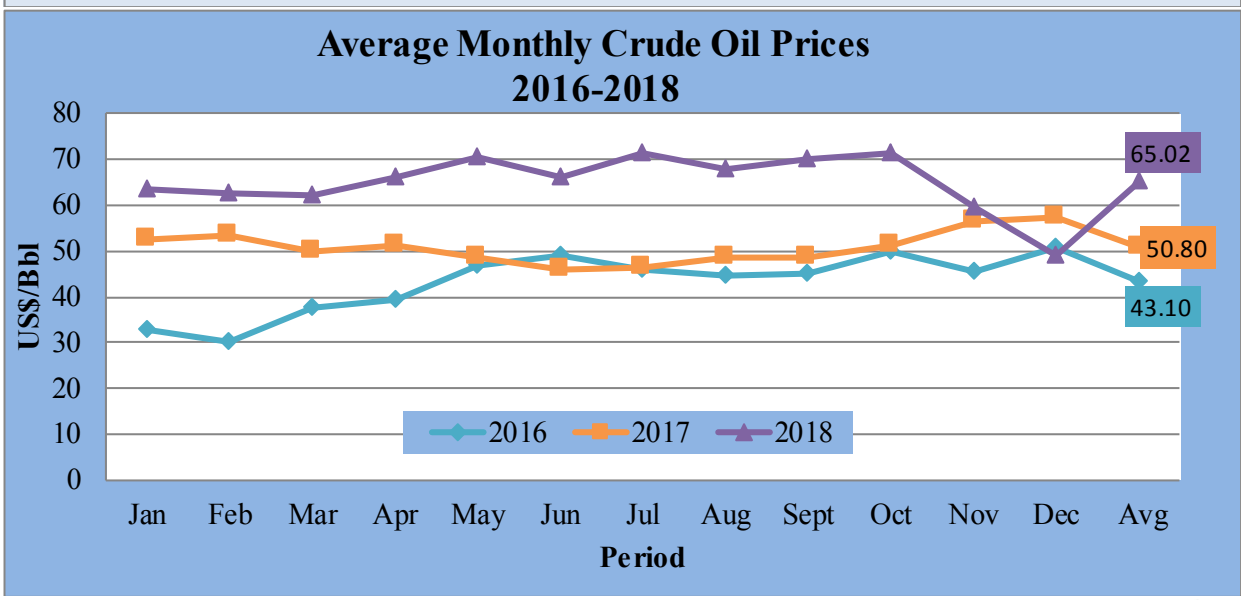
NOV		DEC
$1.82	Barbados	$1.80
$1.32	Belize	$1.32
$1.23	Cayman Islands	$1.23
$1.21	Grenada	$1.20
$1.01	Guyana	$1.01
$1.12	Jamaica	$1.16
$1.09	St. Lucia	$1.09
$0.74	Trinidad & Tobago	$0.74

At the end of December 2019, retail prices for Regular Unleaded Gasoline decreased in Barbados, Belize, Cayman Islands, Grenada and St.Lucia between 0.1% and 1.1% while prices increased in Jamaica by 4%. Prices remained stable in Guyana and Trinidad and Tobago.



International Crude Oil Prices from October to December 2019 increased over the three months period. The average price recorded in December 2019 was US$59.73/bbl. This average price was 11% higher than the average price seen in October 2019 and 7.7% higher than the average price reflected in November 2019. The lowest price recorded for the commodity over the period was US$53.12/bbl-reflected in week one of October 2019. The highest price recorded was US$61.26 /bbl recorded in week four of December 2019.





CARIBBEAN ENERGY MINISTERS' Bulletin

Renewable Resources



Scientific Developments





BREAKTHROUGH TECHNOLOGY

Solar power from 'the dark side' unlocked by a new formula

Engineers calculate the ultimate potential of next-generation solar panels

Most of today's solar panels capture sunlight and convert it to electricity only from the side facing the sky. If the dark underside of a solar panel could also convert sunlight reflected off the ground, even more electricity might be generated.

Double-sided solar cells are already enabling panels to sit vertically on land or rooftops and even horizontally as the canopy of a gas station, but it hasn't been known exactly how much electricity these panels could ultimately generate or the money they could save.

A new thermodynamic formula reveals that the bifacial cells making up double-sided panels generate on average 15% to 20% more sunlight to electricity than the mono-facial cells of today's one-sided solar panels, taking into consideration different terrain such as grass, sand, concrete and dirt.

The formula, developed by two Purdue University physicists, can be used for calculating in minutes the most electricity that bifacial solar cells could generate in a variety of environments,

as defined by a thermodynamic limit.

"The formula involves just a simple triangle, but distilling the extremely complicated physics problem to this elegantly simple formulation required years of modeling and research. This triangle will help companies make better decisions on investments in next-generation solar cells and figure out how to design them to be more efficient," said Muhammad "Ashraf" Alam, Purdue's Jai N. Gupta Professor of Electrical and Computer Engineering.

In a paper published in the Proceedings of the National Academy of Sciences, Alam and coauthor Ryyan Khan, now an assistant professor at East West University in Bangladesh, also show how the formula can be used to calculate the thermodynamic limits of all solar cells developed in the last 50 years. These results can be generalized to technology likely to be developed over the next 20 to 30 years. The hope is that these calculations would help solar farms to take full advantage of bifacial cells earlier in their use.

Source: Purdue University, Science Daily

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How 'Big Solar' jumped from rooftops to farm fields

The town council of Midland, N.C., was facing what it felt was a bizarre and costly invasion in April 2017. Solar energy companies were planting arrays of solar modules on nearby farmland, and the council was trying to stop it.

One 40-acre project had already been permitted by Cabarrus County, which surrounds Midland (population 3,692). Now a second company had arrived, proposing a 627-acre solar farm. One Midland councilman, Darren Hartsell, described that as a "tremendous footprint." He worried about "safety of the people who live close by and the valuation of their homes."

Another councilman, Rich Wise, agreed with him. "People don't want to build [homes] on property that close to a solar farm."

Midland's complaints fell on deaf ears. Cabarrus County officials were looking at a $130 million project that promised as much as $265,000 in annual tax revenue. They found no safety hazards to neighbors, in part because almost no one lived nearby, and the county issued the permit in June 2017.

Eighteen months later, the solar farm was up and running. The facility, built by Recurrent Energy LLC, was feeding enough electricity to an area utility to supply 12,000 homes. Then, last month, Recurrent Energy sold the farm to an investment firm and went back to work on a backlog of other utility-size solar photovoltaic projects it's developing in the U.S.

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Source: John Fialka, E&E News

Country Happenings

ANGUILLA

Mobile Energy Storage Pilot for Energy Savings, Reliability, and Resilience

The Government of Anguilla and Gridspan Energy have successfully commissioned the first stage of their mobile energy storage pilot project at the Government Headquarters, NBA Building. The project features a 125-kW mobile containerized battery system that can be quickly deployed to numerous locations in order to best accommodate Anguilla's dynamic energy needs. The Gridspan Energy system is uniquely designed for plug-and-play use, with the ability to connect to a site in less than 15-minutes after transport. READ MORE

ST.VINCENT/GRENADINES

Drilling of second well with positive results at St. Vincent geothermal project

As reported locally last week, drilling of the second well for the geothermal power project in St. Vincent & The Grenadines has seen some positive results. Drilling for the well took 83 days and first stimulation work shows a temperature of 215 degrees Celsius, sufficient for a geothermal power plant. Further testing is required to estimate concrete production capability. The initial well reached a depth of 2,800 meters and temperatures likely over 250 degrees Celsius. READ MORE



2020 Events

*International Conference on Contemporary Issues in Science, Technology, Engineering and Management
March 28, 2020
Maracaibo, Guyana

*3rd Puerto Rico Grid Revitalization Forum
July 14-15, 2020
Intercontinental Hotel
San Juan, Puerto Rico

*CARILLEC Renewable Energy and Smart Grid Conference
September 15-19, 2020
Miami, Florida






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PETSTATS - the Caribbean Energy Information System (CEIS) primary report of historical (annual) petroleum energy statistics.
Included are data on petroleum energy production, consumption and trade; overviews of natural gas, electricity as well as financial and environmental indicators.

CEMB - The Caribbean Energy Ministers' Bulletin - Sustainable Energy, Renewable and Breakthrough Technology.

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