Shale Glut Becomes $2 Diesel Using Gas-to-Liquids Plants: Energy
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By Andrew Herndon and Brian Swint
Oct. 25 (Bloomberg) -- Drivers are next in line to benefit from the U.S. shale boom.
Technologies that create motor fuels from raw materials other than oil, some drawing on techniques first commercialized in Nazi Germany, are poised to turn the glut of U.S. natural gas into energy for cars, trucks and planes.
A Chesapeake Energy Corp.-backed company and Oxford Catalysts Group Plc are planning U.S. factories to make diesel, gasoline and jet fuel from gas, which fell to a decade-low price this year. Their goal is to make motor fuels more cheaply and easily than oil-based products produced at giant refineries, and all within two years.
Gasoline prices in the U.S. have jumped more than 125 percent since the end of 2008 as crude doubled to more than $100 a barrel. At the same time, hydraulic fracturing processes, or fracking, helped gas producers unlock once inaccessible reserves in shale-rock formations. That's boosted output and driven down prices, sparking interest in using the surplus energy to fill fuel tanks.
"It's going to happen in North America," Roy Lipski, chief executive officer of Oxford, England-based Oxford Catalysts, said in an interview. Turning gas into liquid fuels "is the flip-side of the coin to fracking for shale gas, because what are you going to do with all the gas?"

Shell's Pearl

So-called gas-to-liquids technology has been proven on a larger scale, primarily at Royal Dutch Shell Plc's plant in Qatar. Smaller production typically is targeted for areas producing gas that's "stranded," or unserved by pipelines. The economics depend on the feedstock staying relatively cheap. While U.S. natural gas prices are currently about $3.50 per million British thermal units, the futures curve shows prices rising to more than $6 per mmBtu during the next 10 years. Every $1 increase in the price of gas boosts the cost of producing a barrel of diesel by $9, Oxford Catalysts said.
Oxford Catalysts can produce a barrel of premium diesel for $66, or $1.57 a gallon, using gas at $4 per thousand standard cubic feet ($3.89 per mmBtu) at plants with a capacity of just 1,500 barrels a day. The unprofitable technology developer said a plant that size can be built for about $150 million and would last for 20 years.

It costs about $124 a barrel, or $2.95 a gallon, to make premium diesel from oil, the company estimated. The U.S. average price for diesel at the pump is about $4.12 a gallon.

Messerschmitt Fuel

Oxford Catalysts is planning a factory in Pennsylvania, near the Marcellus Shale, that may go into production by the end of 2014, using a process known as Fischer-Tropsch after the German scientists who developed it in the 1920s. Germany commercialized the process in the 1930s to manufacture liquid fuel from domestic coal amid oil shortages before and during World War II.

The fuel accounted for about 95 percent of Germany's aviation gasoline during the Battle of Britain as Hitler's Messerschmitts faced Royal Air Force Spitfires in the early 1940s, Daniel Yergin, the chairman of IHS Cambridge Energy Research Associates, wrote in his Pulitzer Prize-winning 1991 book "The Prize."

Fischer-Tropsch systems break down gas into carbon monoxide and hydrogen and then recombine the two to make synthetic oil. From there, the liquid can be converted into diesel, jet fuel and naphtha. Oxford Catalysts owns hundreds of patents for technologies that make the reaction feasible on a small scale. The company, whose shares have lost almost half their value since a 2006 initial public offering, expects its fuel to be blended with lower-grade diesel.

Biggest Plant

The strategy differs from Shell, which began production at its $19 billion Pearl project last year in Qatar to process gas from offshore fields. Pearl, the world's biggest GTL plant, has the capacity to produce 260,000 barrels of fuel and oil products a day and helped Shell increase its dividend this year for the first time since 2009. Shell CEO Peter Voser said in November he's considering a similar plant in the U.S.

Several smaller companies are pursuing other gas-to-liquid technologies to exploit the oversupply of gas.

Sundrop Fuels Inc., half-owned by Chesapeake, the second-biggest U.S. gas producer, expects to begin construction this year on a plant near Alexandria, Louisiana, that will produce as much as 50 million gallons (189 million liters) of gasoline a year. Its method combines cellulosic biomass, mainly forestry waste, with gas at temperatures of more than 1,300 degrees Celsius (2,372 degrees Fahrenheit) to produce a gas that's processed into fuel.

Pressing Need

“Our nation’s most pressing clean energy need is not electricity generation, for which there are many new technologies, but for transportation fuel,” Sundrop CEO Wayne Simmons said in an e-mail. “Natural gas plays an important role in this.”

Primus Green Energy Inc. developed a technique to make gasoline from gas or plant material, such as wood waste and non-food crops. Gas prices fell to a 10-year low in April, making it an easy decision to push the gas version first, said CEO Robert Johnsen. The Hillsborough, New Jersey-based company is pursuing a deal to sell the fuel to an airline.

“The great thing about the natural gas market is its availability and the predictions for low cost for an extended period of time,” he said in an interview. “Not too many feedstocks have that.”

Commercial Plant

Primus may begin building its first U.S. commercial facility next year, which will produce as much as 20 million gallons of fuel annually through a methanol-to-gasoline process, with backing from Israel Corp., Israel’s biggest holding company.

The company hasn’t received any subsidies and its production costs are “less than $2 a gallon,” Johnsen said. Primus’s “break-even natural gas price” is $11 per mmBtu, he said, assuming the price of crude stays unchanged. “I doubt that in a scenario where you have $11 natural gas you won’t have a higher price for petroleum.”

Coskata Inc., based in Warrenville, Illinois, developed systems to produce cellulosic ethanol from wood, agricultural waste and non-food crops, and is now shifting its focus to using gas as a feedstock. It was offered a $250 million U.S. Department of Agriculture loan guarantee in January 2011 for a cellulosic ethanol refinery, and changing the approach means the company won’t take advantage of the government backing.

Government Mandates

The company’s business model was based on the U.S. Environmental Protection Agency’s renewable fuel standard, which mandates that oil companies blend certain types of fuels made from biomass into their products. The policy would have ensured demand for Coskata’s product, said CEO Bill Roe.

Those mandates have been challenged by the American Petroleum Institute, which sued the EPA in March, saying the

requirements are unachievable, and House Republicans introduced a bill in June calling for the program to be modified. There's also a push to revise the mandate to include fuels made from gas.

That's making wood less appealing as a feedstock, while the business case for gas gets stronger, said Roe. The company expects to produce ethanol for "significantly less than $1.50 per gallon," according to its website. Standard corn-based ethanol costs about $3.40 a gallon to produce, according to Bloomberg New Energy Finance.

"There's real uncertainty around biomass," Roe said. "We're not keen to bet that the mandates are going to remain in place, put capital in the ground around a biomass conversion plant and then find out next year that the whole RFS gets turned upside down."

Stranded Gas

Turning gas into fuel may be more useful as a way to make money from resources far from pipelines, known as stranded gas, said Walter Hart, a director at Houston-based energy research company IHS Inc. Using gas as a feedstock for liquid fuels will only pay off if prices stay low for decades.

"The opportunity's certainly there, but will it be there for the 30 or 40 years of the project? That's the bet you have to make," Hart said in a telephone interview.

GTL technology still may be a smart bet, said Pavel Molchanov, an analyst with Raymond James & Associates Inc. in Houston.

"As far as the eye can see, the price of natural gas in North America is going to be vastly cheaper on an energy equivalent basis than the price of petroleum," he said.

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