

BACKGROUND

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Natural Gas-to-Liquids Coming to the U.S.

By Ian Madsen, CFA

Attentive investors may have noted an announcement last week by the large South Africa-based energy and chemicals company Sasol. The firm said it was commencing an eighteen-month feasibility study to determine the commercial viability of one of two options: either a two million tons per annum or four million tons per annum Gas-to-Liquids, or 'GTL,' production facility in southwestern Louisiana.

This would be the first GTL facility in the United States, indeed in the Western hemisphere. The liquids produced are expected to be generally kerosene and allied products, for diesel or jet fuel.

This could be the start of a major movement to, effectively, substitute abundant, cheap natural gas produced within North America, for expensive, imported crude oil. The economic, balance of payments, financial and investment implications are enormous.

Heretofore, this potential substitution has been stymied by a 'chicken and egg' problem. Advocates of greater use of natural gas as a transportation fuel—people like T. Boone Pickens, and the largest developer of shale gas, Chesapeake Energy—have run into the practical obstacle of natural gas not being a convenient choice for consumers, businesses or institutions.

Vehicles have to be fitted with adaptation devices and hardware, plus a large tank to hold compressed natural gas, or 'CNG,' squeezing out useful luggage space in passenger vehicles and potential cargo space in trucks and vans.

Furthermore, finding stations able to sell CNG at high volumes, dispersed conveniently in cities, towns and along highways, is nearly impossible and would be costly to deploy on a large scale, even if such equipment could be put in place at existing service stations. These stations are owned by integrated oil companies who are not entirely positively disposed to cannibalizing their existing conventional gasoline sales, nor cluttering up and complicating their current operations with a new one of uncertain demand level.

So, this new development is extremely positive from a standpoint of encouraging the demand for and consumption of natural gas in a different and much more user-friendly form. Truckers, bus lines, delivery companies, railroads and airlines do not have to change anything about how they operate. In fact, the diesel and aviation fuel from GTL plants, as demonstrated by the ones already built, separately, by Sasol and Royal Dutch Shell in Qatar, have less contaminants than 'natural' kerosene fuels refined from crude oil, and burn cleaner, too.

The United States currently consumes over 18-million barrels of crude oil per day, of which about 12-million barrels of it is imported—at a cost, today, of about \$1.08-billion, or about \$400-billion per annum,

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at today's price of about \$90 per barrel.

That is money that leaves the United States economy and contributes to its chronic trade and balance of payments deficit. The revenue, aside from Mexico and Canada, generally goes to unstable, unfriendly, despotic and/or corrupt regimes in the Middle East, Africa or Latin America, fuelling war, repression, terrorism or misery of one kind or another.

Should that money stay at home, it would be spent in communities across the U.S., benefiting consumers and businesses, generating jobs, and improving state and federal finances, lowering deficits. It would also encourage the growth of a new industry that would revitalize many sectors, in construction of facilities, manufacture of sensors, controls, and other tools and devices, and specialized equipment used in GTL and related plant and infrastructure.

In general, GTL projects have not been major revenue generators for any of these companies, as there have been few of them, and they are constructed over protracted time periods. However, it is quite possible that could change in the near future.

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Converting to volumes, the indicated proposed capacity would be about 2.4-million cubic meters per annum for the smaller option, or 4.8-million cubic metres for the larger one. Converting from metric, that would be an output of 22-million barrels per annum for the small facility, 44-million for the large one.

Other sources indicate that, owing to the nature of the process, approximately 11 thousand cubic feet of natural gas are required to produce one barrel of the liquids in these types of facilities. So, annual consumption of gas for the smaller facility is about 240-billion cubic feet; approximately 480-billion cubic feet for the larger option.

This is significant but not substantial; the U.S. produced about 22-trillion cubic feet of natural gas from all sources in 2009, so the smaller plant would consume about 1 per cent of total U.S. supply by the time it is built and started; the larger one, 2 per cent. That is not enough to drive up natural gas prices, especially with the current, and likely continuing, surplus of shale gas.

Indeed, some natural gas drillers are running into some unexpected cash flow issues, and have curtailed their drilling plans, or are shifting their emphasis to more 'liquids-rich' shale prospects, as light oil and other liquids are also produced in conjunction with much of the shale gas.

Economics of GTL

Using the crude numbers available: if diesel fuel persists at its recent wholesale price of about US\$2.10 per gallon, or US\$88.20 per barrel, and natural gas hovers in the range of \$4 per thousand cubic feet, then Sasol's gross margin would be in the neighborhood of \$44 per barrel, which, on the surface, looks very lucrative, and compares very well to many unconventional sources of oil such as the Athabasca oil sands in northern Alberta, Canada.

It looks even better when considering that, in effect, the Sasol GTL does not require a refinery; it is, in essence, already refining the input resource into finished, high value products. So, the 'spread' from the substitute for crude oil to the finished, 'refined' liquid is very high.

The only real risks or concerns, other than environmental, cost overruns, terrorist vulnerability, political or other 'black swan' events, are the normal ones of fluctuations in commodity prices—specifically, a drastic spike in natural gas prices, or a prolonged slump in the price of oil, and, consequently, oil-based liquid product prices. Neither of these appears to be likely, and could also be partly or wholly hedged against, if judged appropriate and cost-effective to do so.

As these sorts of plants are very capital-intensive, and have a small labor component, the operating cash flow will be very high, and the free cash flow not much lower, depending on the quality and durability of the initial construction. Depreciation would be significant, as they are multi-billion dollar plants. Actual physical depreciation should be much lower, hence the high free cash flow.

Sasol, and even more so Shell, experienced significant cost overruns in their Qatar GTL plant construction. However, both of them appear to have learned from the experience, and, indeed, their timing was unfortunate, as those plants were built in the late 2000's, in a period that saw a frenzy of energy-related investment and demand for labour, materials and equipment just prior to the recession of 2008. These drove up prices and prolonged the construction periods.

It seems that both companies are still quite positive on GTL, and encouraged to invest in it in the near and extended future. Depending on what happens in Louisiana in the next two years, other energy companies could decide to imitate them, and take advantage of low feedstock costs. ExxonMobil, and Chevron, also have large shale gas divisions, from recent acquisitions. They are undoubtedly reviewing what to do with their burgeoning gas output.

A much longer-term concern that seems too remote to call a 'danger,' perhaps ever, is that the GTL trend becomes so popular that demand for natural gas drives prices for it up, and production of the liquids output increases to such an extent that their prices fall.

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That is a ‘problem’ that long suffering companies like Chesapeake, EnCana, Cabot, Forest Oil and Devon would love to have. Given the capital commitments, very long construction periods, and sheer abundance of natural gas in the United States, Canada, and elsewhere, this potential issue would seem to be a fantasy at this point, and certainly not a ‘nightmare’ that needs to be taken seriously; not for many years to come.

Politics and Environment

Politically, it would seem to be the proverbial ‘no-brainer’ to support the development of GTL and associated energy infrastructure. Indeed, Bobby Jindal, the Republican governor of Louisiana, was present at Sasol’s press conference announcing the feasibility study. GTL, as such, has not entered the U.S. presidential election rhetoric as yet, but shale gas and energy policy in general already have, and, should either the Senate or White House change control to a more business and energy-development-friendly orientation late in 2012, it could be very positive for the whole industry, and perhaps GTL in particular.

Substituting domestic natural gas for imported crude oil accomplishes many things: cleaner energy use, helping local industry and employment, reducing balance of payments problems, improving public finances, decreasing energy dependence on unfriendly or unreliable foreign sources, and reducing the money flowing to erratic or violent regimes.

Shale gas development has been one of the few bright spots in the U.S. economy in the past three years. GTL can amplify and broaden the benefits beyond places like North Dakota, Texas, West Virginia and rural Pennsylvania.

The shale gas industry is addressing groundwater and other environmental concerns brought about by fracturing practices (aka “fracking”), and—in Canada, at least—is making progress in getting rational, tight, explicit regulation enacted. The drillers are also doing a far better, and more proactive job of public education and awareness.

It is not essential for politicians to embrace shale gas and GTL development for both to be successful industries, although it would be helpful. They already have a bright future now, regardless of the current sad natural gas price. Investors should look closely at the sector; this could be one of those rare opportunities to get in on the ground-floor of a brand new industry at a relatively bargain price.

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FURTHER READING

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Faxt Check on Greenhouse Gas Emissions

By Ben Eisen

<http://www.fcpp.org/publication.php/2933>



About the author

Ian Madsen is an investment and financial analyst based in Surrey, BC. He earned a BA in Economics from the University of Alberta and an MBA in Finance from the University of Toronto. He has managed institutional investment portfolios, lectured at colleges, managed investment research operations, and developed financial valuation models. For several years Ian was vice president at a U.S. investment research firm with extensive operations in India, where he worked and managed staff. He also ran his own investment counseling firm and advisory newsletter. He holds the Chartered Financial Analyst (CFA) designation and is a former president of the Saskatchewan and Edmonton CFA Societies.

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