



**SASOL GROUP EXECUTIVE,
LEAN STRAUSS**

**INVESTOR STRATEGY DAY
“NORTH AMERICAN VALUE PROPOSITION
TECHNOLOGY & FEEDSTOCK”
AS DELIVERED**

**TUESDAY, 9 APRIL 2013
(NEW YORK)**



Good morning ladies and gentlemen

It is a lovely spring day but I must admit, I have mixed feelings about this day. I am responsible for the GTL and the upstream gas business. I was quite pleased with the cold days we had for the last couple of months because that increased the gas price above \$4 per mmbtu. So I would not mind having a bit more cold weather.

I am going to touch on three topics with you. As David mentioned, I will provide a short overview of how our gas to liquids process works or GTL as we refer to it, where we are executing it, projects we have in the pipeline, and technology advancements we are planning.

Secondly, I will provide an overview on our feedstock situation, specifically how our existing investments enables our integrated project to be more robust. Lastly, I will provide a short overview on the characteristics of the GTL plant we are planning for Louisiana.

Slide 37 – Gas to liquids (GTL) in a nutshell

Here is a simplistic flowchart of how our gas to liquids or GTL works. We use natural gas as feedstock. We can use conventional or unconventional gas, shale gas, or coal bed methane. Once the gas is in the plant, it goes through a reforming process.

Essentially, the gas is broken up into its chemical molecules of carbon monoxides and hydrogen. To that we add oxygen and we form a new chemical value chain. That chemical chain then goes through our GTL synthesis process. This is our proprietary technology. In South Africa we use the word “muti” which means magic medicine. So this is where we use our magic and we react the gas in our reactor with our proprietary catalyst.

Our reactor is very special. Its 60 meters long and 10 meters wide. It weighs 2,000 tons. It is at least three times larger than what our competitors have and that gives us a significant advantage. We then use a cobalt catalyst which we have developed and improved over time.



We need 10 mcf of gas to produce 1 barrel of product. We need 1 bcf of gas a day to produce 100,000 barrels per day for what we are planning in Louisiana.

After we have passed the synthetic gas through our reactor, we produce a waxy substance. We traditionally process this in a simplified refinery. This is off the shelf technology, licensed from Chevron from which we produce fuel products. These are world-class products that meet and exceed Euro 5 specifications.

A typical product mix is 75% diesel, 20% naphtha and 5% LPG. We have some further advances which I will show later for Louisiana. I will also show how that product mix is being advanced.

Slide 38 – ORYX Qatar, Sasol's GTL flagship

So where are we implementing GTL? Our first plant is the ORYX Plant in Qatar, which is a joint venture with Qatar Petroleum. It is a 32,400-barrel a day plant comprising of two trains. Each reactor can produce 16,000 barrels a day of product.

To date we have produced more than 45 million barrels of product at this plant. I am aware that some of you have recollections of teething problems at that plant, but I would like to assure you that the plant today operates extremely efficiently. It is one of the best performers in our organization.

In 2012, ORYX achieved the best safety record in our group by having a zero RCR, or recordable case rate. For six months, production exceeded design capacity. This implies we exceeded 16,000 barrels per day per train. For nine months, we had in excess of 99% on-line availability. This demonstrates that the plant works perfectly.

All glitches in the plant have been resolved, and our technology works extremely well. The feedstock conversion we are achieving today is better than when we started it. For instance, we produce more than 80% diesel from the process in Qatar.

Slide 39 – Other GTL projects in the pipeline

In the pipeline, we have two projects. The first is in Nigeria, which is a partnership between Chevron and NNPC, the Nigerian National Petroleum Company. This plant and ORYX are similar. It is a carbon copy of ORYX. We are already in the process of commissioning this plant with beneficial operation planned by the end of this year.

Christine has also made reference to our plant in Uzbekistan which is a partnership with Uzbekneftegaz and PETRONAS. This is an enhanced ORYX. It is the same reactor and reformers, but we have been able to produce more output from the same equipment, thereby increasing production to 38,000 barrels a day. The trains in Qatar are producing 16 000 bbl/d, whereas Uzbekistan will be producing 19,000 bbl/d.

As Christine has indicated, we will be completing the front-end engineering design during the second half of this year, which will enable us to make a final investment decision.

Slide 40 – Identified various levers to extract greater value

One of the biggest challenges for GTL, is the capital intensity of these projects.

To address this we have identified ways in which we can advance and enhance the value proposition of our GTL process. We have identified three main levers; namely, improving capital productivity, improving product value, and driving technology improvement.

André will provide more color on improving capital productivity, but essentially our aim is to operate the plant with less capital. Instead of building all the equipment and owning all the utilities ourselves, we can buy this over the fence, thereby reducing our capital spend. Examples include the purchase of oxygen and hydrogen over the fence.

Longer term, we are also considering buying synthetic gas over the fence to reduce our capital spend. Aspects such as modularization whereby the bulk of the plant is manufactured in low cost regions, such as India and Korea, will also be considered. Long-term partnerships and alliances with suppliers are also being investigated to reduce manufacturing costs.

The project also consists of value enhancing and differentiated products which will be dealt with later in the presentation.



We are also looking to improve the technology itself such as reactor intensification. We are planning to introduce a third generation catalyst next year which we are already manufacturing and will be commercially used in Oryx. This will be effective from 2014 and we believe it could drive down the cost of the catalyst by about 30%. In addition to this, improvements will be made to the reforming technology by using waste heat produced in the process more efficiently.

Slide 41 – Scale up and intensification of GTL reactor

This slide gives you some flavor of how we have developed the reactor size of our GTL plant. Back in the 1980s we produced 100 barrels a day from a one-meter diameter plant. In the '90s, we made it five meters and took it to 2,500 barrels a day.

In ORYX, the plant is now 60 meters by 10 meters and we produce 16,000 barrels a day. In Uzbekistan, that same shell goes to 19,000 barrels a day. Now, by just increasing the shell by two meters, we can expect at least 24,000 barrels a day, and that is what we are planning for Louisiana.

Today that reactor can essentially produce 30,000 barrels a day and this distinguishes us significantly from other players in the market. We have made significant advancements to achieve economies of scale from our GTL conversion reactor.

Slide 42 – Feedstock

Moving on to feedstock and specifically shale, we will look at its impact on the US energy landscape and the benefits to our process.

Slide 43 – Not only shale gas, but also shale ethane has changed North American energy and chemical markets

This graph shows the impact of shale gas over the last decade, and potentially the impact it will have on the North American gas market in future.

Ten years ago, shale was less than 2% of the US gas supply. By 2009, it has accounted for 14%. Today, it is more than a third of US gas supply and predictions are that it will go to 40% by the end of this decade. So firstly, it enhanced the availability of dry methane gas for our GTL plants as well as ethane for our chemical processes.



Today, the ethane supply in the US market is about 1.2 million barrels per day. Predictions are by the time we start up the ethane cracker, it will be at 2 million barrels a day of which we need roughly 100,000 barrels a day. We already have expressions of interest to supply ethane to us that exceeds 100,000 barrels a day, and for those of the opinion that the market is limited, I can assure you that it will be very easy to sign contracts for a supply of methane to our GTL plant.

Slide 44 – The US GTL opportunity is advantaged by favourable oil/gas price ratios

Importantly, what does this mean to the economics? Christine has shown you the graph of what the experts believe long term gas prices and long term oil prices would be. When we separately consider the economics of GTL, we should not focus on the cost of gas or the price of oil. It is the combination, the ratio which is relevant. By how much is oil more expensive than gas?

The long-term experts' predictions, on the oil to gas to ratio is around 25. Our world scale GTL plant requires a ratio of about 16 to achieve our hurdle rate. This is competitive.

We believe that market conditions in the US will be quite conducive going forward. Later on, Andre will present a very interesting slide on how the product prices play out in the US despite an oversupply of shale oil and WTI being depressed in certain markets.

Slide 45 – Montney shale gas- a feedstock hedge for US GTL

We do know that we cannot rely on the prediction of experts, so when the opportunity arose to bid for the Montney gas in Canada, we took it. This allowed us to buy between 7.5 and 10 tcf of contingent resources in a joint venture with Talisman.

One of the characteristics of shale gas is that you can increase and decrease production according to market conditions. When we bought the assets, gas prices were more favorable and we immediately ramped- up our production by using 11 drilling rigs. When prices declined, we scaled back our production activity and currently only have three drilling rigs in operation.

We continue to de-risk the assets to enable us to be in a position to produce more gas when the market ramps up. Our objective is to understand the geology very well, so we know exactly which wells we can produce commercially at \$3, \$4, \$4.50 or \$5, etc.



Christine has mentioned that we are very happy with our investment. Talisman is a good operator. The drilling and completion cost has come down quite significantly and we are approaching the investment assumptions that were made at the time of making the investment. Last year, we produced 129 mcf/day (gross) on average. This will come down this year because of the reduction in the number of rigs that we deploy.

Slide 46 – Integrated gas and GTL economics in North America

But most importantly, this investment provides a price hedge for our feedstock for GTL. We roughly have a two-thirds price cover on the gas, as that is the volume that we can link directly to the feedstock required for the GTL. At this stage we think it is sufficient as we have modeled the economics on an integrated basis.

The graph on the left-hand side depicts the shale gas and GTL economics on a standalone basis. As gas prices increase, the value of GTL decreases due to the feedstock being more expensive. However, the economic value of the Montney gas production increases as it benefits from higher gas prices.

The graph on the right hand side depicts the economics on an integrated basis. This clearly shows you a robust situation for Sasol. Gas prices can rise as high as \$9 per mmbtu and we will still exceed our hurdle rate. Our investment in Montney has made our integrated investment for the GTL plant extremely robust.

Slide 47 – GTL a compelling value proposition in Lake Charles

Moving on to the GTL investment we are planning for Lake Charles. As David has already mentioned, this project is phased after the ethane cracker. On announcement of the project progressing to FEED, we signaled to the market a nameplate capacity of 96,000 barrels a day. I have some good news for you.

You can add at least another 5% because we are very confident that this plant will produce between 5% and 10% more than the nameplate capacity. Also the gas requirement is less than the normal rule of thumb economics we have previously provided. The gas requirement will be between 9 mmbtu and 9.5 mmbtu to produce a barrel of product.

The capital range is \$11 billion to \$14 billion, but very importantly, this includes the chemical value-adds on the project. Therefore the standalone GTL plant is not \$14 billion. It is less. That \$11 billion to \$14



billion range includes the chemical value-adds such as extraction of paraffin, production of wax and production of synthetic base oils. I am going to give you some color on the margin you can expect on this.

Operating cost we believe will be below \$20/barrel. Importantly, we also have significant incentives from the Louisiana government which you should also include in your modeling. Please visit their website regarding the value of these incentives.

For noting, our GTL plant exceeds hurdle rates on a standalone basis. We do not require the chemical value-adds or the incentives. On a fuel production basis, it meets our hurdle rate. We will also ensure that there is sufficient capacity to operate the plant at 100% capacity in a fuels mode only.

In the past, our product mix was only fuels. Now, we intend to use about 30% of our fuel mix and produce chemical value-adds in Louisiana. We will produce paraffin, wax, and synthetic base oils, which gives us a significantly higher margin than our fuel mix. It is significantly higher than diesel.

Diesel is between 15% to 20% on average and I can share with you that the margin of our chemical value adds is significantly higher. This is quite value enhancing for our GTL investments in Louisiana.

Slide 48 – In summary

In conclusion, our GTL value proposition gives us the unique opportunity to arbitrage between oil and gas prices. We have seen that ratio to be as high as 40% in the past and who knows what it will be in the future.

We have made significant technology enhancements to make the cost of producing our GTL products cheaper. We make world-class products. The products we make at ORYX attract premiums against standard products produced from refined oil. We have the ability to add chemical value adds which is quite economically enhancing.

In addition, we have the integrated value chain that protects us against the impact of high gas prices. With Lake Charles we have world-class infrastructure, a supportive government, a competitive labour and contractor market, access to multiple markets and abundant feedstock.

Ladies and gentlemen, if that does not make a good compelling investment case, I don't know what does. With that I would like to call André to tell you about the market and the capabilities he's going to create to build these plants. Thank you very much.