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Santos’ GLNG Project
Scope:
GLNG is a pioneering venture which produces natural gas from Queensland’s coal seams and converts it into Liquefied Natural Gas (LNG). It involves gas field development in the Surat and Bowen Basins, a 420-kilometre gas transmission pipeline and a two-train\(^1\) LNG plant on Curtis Island, near Gladstone, Queensland. The plant, when fully operational, will have the capacity to produce 7.8 million tonnes of LNG per year. Project revenue is underpinned by binding long-term LNG sales contracts with PETRONAS and KOGAS covering more than 90% of the plant’s capacity.

Santos is the operator and has a 30% interest in the project. Other coventurers include PETRONAS of Malaysia (27.5%), Total of France (27.5%) and KOGAS of South Korea (15%).

An LNG ‘train’ refers to the infrastructure that purifies and cools natural gas to a liquid state ready for transport.

Rationale:
Prior to the sanctioning of GLNG, development options for Santos’ eastern Australia gas resources were limited. Domestic demand for gas was constrained, margins were low and the future growth outlook was flat. As such, Santos’ resources would have remained in the ground had the company not instigated a strategy that would not only expose our resources to higher pricing, but also the large and growing markets of Asia.

As a result of creating an export pathway through the GLNG project, Santos has, for example, been able to reinvest in Cooper Basin infrastructure and field development and is now well positioned to unlock technically challenging unconventional resources. In fact, had GLNG not been sanctioned, it was expected that the company would have been faced with the prospect of running down the Cooper Basin toward the end of this decade.

Given our relatively small population, Australia has a rich history of exporting primary products to overseas markets and natural gas is the next export frontier.
Why is the sale of LNG linked to the oil price?

The current pricing of Australian LNG exports is based on conventions in the Asian LNG market, which involve long-term contracts linked to the price of oil. The historical reason for this was because when Japan started importing LNG in 1969 to diversify its energy supply, crude oil was the major competing source of fuel for generating power at the time, thereby providing a deep and liquid market as the basis for LNG pricing. As other Asian economies began importing LNG, long-term oil-linked contracts were already well established which provided the basis for the LNG pricing that prevails in the Asia-Pacific region.

LNG prices are denominated in US dollars per million British thermal units (US$/mmBtu), which is a measure of the price per unit of energy content.

Despite recent volatility in oil prices, the underlying fundamentals for long term global energy growth remain robust. Driven by population growth and the rise of urbanisation, Asia’s appetite for cleaner burning natural gas has increased and Santos is well positioned to leverage this demand growth through our infrastructure, abundant gas resources, and LNG know-how.

The GLNG project is robust in a lower oil price environment and will be free cash flow positive at US$40 per barrel of oil price at AUD/USD 80c from 2016 onwards. Free cash flow, defined as operating cash flow less capital expenditure (after tax and after interest), is important, as this can be applied to repay debt, invest for growth and provide greater returns to shareholders.

The start-up of GLNG marks the end of our LNG investment cycle and will deliver a step-change in production and cash flows.

1. When was the GLNG project sanctioned?
   The GLNG project was sanctioned 13 January 2011.

2. What date was first cargo?
   The first cargo of LNG departed Curtis Island, Friday 16 October 2015, bound for South Korea.

3. How many cargoes are expected to be exported per annum?
   When both trains are fully ramped-up, GLNG will be producing approximately 1 cargo per train per week. As such, when both trains are fully ramped-up, GLNG is expected to be exporting more than 100 cargoes per annum.
   Our LNG offtake agreements are deemed FOB (Free on Board) meaning that we sell our LNG at the end of the jetty. Shipping costs are the responsibility of the buyers.
   LNG vessels vary in size but standard volumes are between 120,000 -180,000 m³ per cargo.

4. When do you expect to be operating the first train at full capacity? The second train?
   Train 1 is expected to ramp-up over 3-6 months following the announcement of first LNG on 24 September 2015.
   Train 2 is expected to be ready for start-up by the end of 2015 and ramp-up over 2-3 years.

5. Why is the ramp-up profile for Train 2 longer than Train 1?
   Methane gas trapped in coal is adsorbed onto the coal surface in cleats or micropores and held in place by reservoir and water pressure. To extract the natural gas from the coal seam, it is necessary to reduce the pressure by removing the water. This then allows the gas to flow through the well to the surface.
   The longer ramp-up profile for Train 2 reflects this dewatering phase in our Roma field development program.
   Our Fairview field is more mature and is currently supplying methane gas to Train 1.

6. Do you have binding offtake agreements in place for the LNG produced?
   The LNG is contracted to be sold to PETRONAS and KOGAS, under 20-year binding offtake agreements comprising 7.2 million tonnes per annum (mtpa) of LNG in aggregate. This represents more than 90% of the plant’s capacity.
   Further, PETRONAS and KOGAS are also Santos’ joint venture partners in the GLNG project along with Total.

7. What are the breakeven costs for GLNG?
   GLNG provides positive free cash flow down to US$40 per barrel of oil (AUD/USD $0.80) from 2016 onwards.
How does GLNG produce LNG?

1. Natural gas (almost pure methane) enters plant via 420km pipeline from the Surat and Bowen Basins.
2. The gas is fed into Train 1 and/or Train 2.
3. Small amounts of carbon dioxide and then water are removed.
4. The methane is then progressively cooled in stages, first using a propane refrigerant to cool it to -30°C, then an ethylene refrigerant to cool it to -90°C. Finally, the methane is cooled using changes in pressure to -161°C, at which point it becomes LNG.
5. Six large gas turbine-driven compressors circulate the refrigerant gases.
6. The LNG is pumped into the storage tanks, where it is kept at atmospheric pressure.
7. Small amounts of LNG that boil off in the tanks are returned to the process to be re-liquefied.
8. LNG is pumped through pipes along the 400m jetty to the loading berth.
9. Four loading arms are used to load LNG onto a specially designed LNG ship, which typically carries about 140,000 cubic metres of LNG.

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Santos – an Australian Pioneer

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