LNG Technology: The Holy Grail of Gas Investments

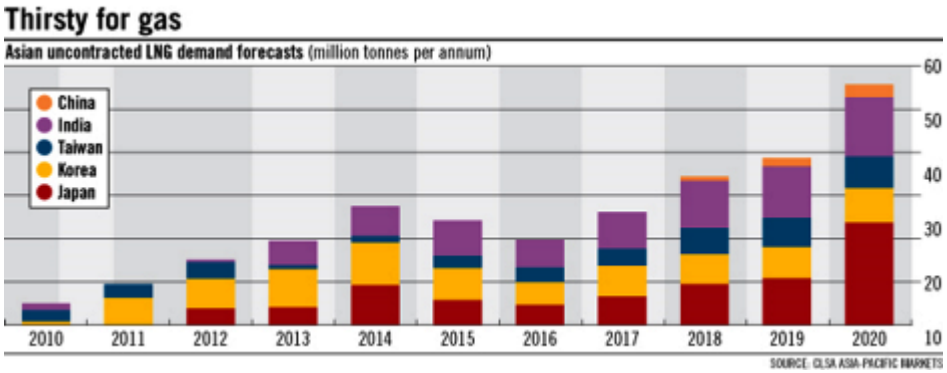
Liquefied natural gas (LNG) technology—from LNG seaborne tankers and LNG trains to floating LNG facilities have quickly gone from concept to commercialization, opening up new possibilities in new frontiers and rendering the remote—well, much less remote.

Analysts say FLNG terminals will become a major growth market within the next couple of years, as they offer more flexibility than stationary terminals.

Liquefaction of natural gas is the process of super-cooling natural gas to minus 260 degrees Fahrenheit (minus 162 degrees Celsius) at which point it becomes much safer and easier to transport. After its been shipped to its destination, regasification plants at importing or receiving terminals return the fuel to a gaseous state.

A lot of money is being dumped into LNG technology right now. It's a major bet on the LNG market, but here's why it's solid:

- LNG demand is set to double over the next decade to 408 million tons a year
- Major markets for LNG are opening up and some of them can't be reached by overland pipelines
- The Asian market is particularly hot for LNG and they are paying top dollar
- Prices and rising global demand make it worth shipping LNG by seaborne tankers
- The US may become a major LNG exporter, and customers are already lining up
- Russia is now in the global LNG market and it's determined to become a major player in this field
- Britain's natural gas imports from outside the North Sea will surpass domestic production by 2015 and add more than $11 billion to import costs as domestic supplies dwindle and Norway struggles to fill the gap (Qatar is only sending it leftovers right now—the bulk goes to higher paying Asian customers)



As natural gas gains favor over oil and coal because it's cheaper and cleaner, non-OECD countries are expected to account for 80% of natural gas demand growth by 2035. The largest share of global gas demand comes from the power sector.

China is set to double its LNG imports to 25-30 MTPA by 2015 as Beijing views gas as the foundation of its energy future over the next decade. Australia and Qatar will be the biggest suppliers on the current scene.

India is also set to double its regasification capacity by the end of 2015, as gas supplants liquid fuel demand. By 2015, LNG imports to India are expected to reach 17-20 MT (up from 9 MT in 2011).

Global Liquefaction capacity is set to increase by 4.4% by 2015 and another 7.5% by 2020, when it is expected to reach 470 MTPA. Australia will be the biggest contributor to this number, adding 80 MTPA of LNG supply by 2020. The US could have the capacity to add 70 MTPA to supplies.

The real game-changer will be if the US moves to export its LNG with its 70 MTPA capacity. In the meantime, companies in Canada are winning permits to export LNG. A Shell-led consortium in February became the latest permit holder for an LNG export facility in British Columbia. Shell joins the permit-holding ranks that already include Apache Corp., which has an interest in Kitimat along with Chevron, where the first LNG shipment is scheduled for 2015. The third license went to privately-owned BC LNG Export Cooperative.

The Future is Floating

Floating LNG production, storage and offloading concepts are revolutionary because they have the ability to station a vessel directly over distant fields, removing the need for offshore pipelines and adding the advantage of mobility—these floating facilities can be moved to a new location once existing fields are depleted.

Floating liquefaction technology can bring additional LNG supply by accessing stranded gas reserves that were previously thought to be too remote, small or otherwise challenging for conventional land-based LNG development. More specifically, the advantages include:

- fast-track regasification for new LNG importers
- lower upfront capital investment compared to onshore facilities
- rising expense of onshore projects improves the cost differential in favor of FLNG
- mobility/relocation to new fields
- overcoming restrictions due to limited land availability

There are 10 existing Floating Storage and Regasification projects, and an additional 8 under construction, and at least 30 other potential projects on the drawing board.

There are both small- and large-scale floating LNG projects. Small-scale floating LNG projects target 1-3 trillion cubic feet stranded gas reserves, while large-scale floating LNG projects are primarily focused on avoiding long distance submerged pipelines to shore and enhancing the prospects of fields for which traditional LNG development would be difficult.

Shell, Mobil and Statoil are all developing large-scale FLNG projects in Australia, Nigeria and Namibia.

Shell's most prized LNG project is its Prelude Floating Liquefied Natural Gas (FLNG) Project in Australia, which is moored some 200 kilometers out to sea and will produce gas from offshore fields and liquefy it onboard. The LNG, LPG and condensate produced will be stored in tanks in the hull of the facility. LNG and LPG carriers will moor alongside to offload the products. This vessel will be six times bigger than the biggest aircraft carrier and will cost between $10.8 and $12.6 billion to build—but it also means that Shell won't have to pay rising prices in Australia's onshore LNG plants. The facility will produce about 3.6 million metric tons of LNG and 1.3 million tons of gas condensate a year.

The Ichthy's Floating Production Storage and Offloading Facility (FPSO) venture in Australia, led by Inpex Corp. (1605), will cost an estimated $34 billion and have a capacity of 8.4 million tons annually—of both liquefied petroleum gas and condensate.

Petronas has its own plans to build its first FLNG project, which is set to start in 2015 in Malaysia. The facility will have a 1.2 million ton per annum capacity and will operate at the Kanowit gas field, 180 kilometers offshore Bintulu.

ConocoPhillips (COP) also plans to build an FLNG facility off Australia, and smaller companies like GDF Suez (GSZ) and PTT Exploration & Production Pcl (PTTEP) also plan floating LNG projects.

BHP and Exxon Mobil Corp. (XOM) are also considering FLNG for their offshore Western Australia Scarborough field because it would eliminate the costs of building pipelines and jetties.

Russia's Gazprom also plans to build an FLNG vessel to store and export LNG from Israel's Tamar gas field, about 90 kilometers off the Israeli coast on the eastern Mediterranean. Tamar has estimated reserves of 9.7 trillion cubic feet of natural gas. According to a deal still being worked out with Israel, Gazprom would export roughly one-third of Tamar's reserves over a 20-year period, starting in 2017.

Onshore LNG Plants: Second Thoughts?

While there is already some hesitancy about building new onshore LNG plants in Australia and some indications of second thoughts due to the advantages of floating facilities, Italy's Eni and Anadarko (Texas) are planning an onshore LNG plant in Mozambique, in the Cabo Delgado province. The plant would have an eventual capacity of about 50 million tons a year. The plant would be the second largest in the world outside of Qatar. So far, though, Mozambique seems to have a limited capacity for the plant which is hindering plans for exports to begin in 2018.

Increasingly, though floating LNG is being bandied about as a better answer to tapping into Mozambique's massive offshore natural gas potential. In 2012, a total of 100 trillion cubic feet of natural gas was discovered in the country's north. New LNG technology, like FLNG facilities, combined with Mozambique's proximity to gas-hungry Asia, could propel the country into the major leagues.

Indeed, there are rumors afoot that BP might be having second thoughts about building its own $40 billion Browse gas project onshore in Western Australia. The project is a joint venture with Woodside Petroleum as well as BHP Billiton Ltd, Shell, Mitsubishi and Mitsui. This summer should see a decision on this.

LNG Transport: Seaborne Full Speed Ahead

Demand for seaborne LNG is expected to increase this year by 5.6%, as some 15 million metric tons a year of liquefaction capacity is set to come on line by 2014—enough to fill 20 average vessels, or 80% of the vessels ordered for 2013. Demand growth for oil-product tankers will exceed fleet growth between 2013 and 2015 (expanding 4.8%), with supply growth expanding 1.8%.

Then there's this: the cost to book an LNG tanker more than doubled from 2010 to 2011.
As of today, we count a total of 373 LNG vessels in operation, with orders for over 60 having been placed. Contracts are also being placed by new market entrants like Awilco, Dynagas, Thenamaris, Cardiff Marine and Alpha Tankers.

Shell is the clear leader in the global LNG market because it has its own fleet of vessels so doesn't incur the same processing and shipping costs, and when its FLNG project in Australia goes on line we expect much better things. Shell is also gearing up for LNG exports from its North American terminal in Kitimat (British Columbia). Shell is also toying with an LNG terminal in India (the country's first ever), which would handle LNG imports coming from Australia.

But here's a smaller company that is looking strong: Golar LNG (GNLG). The company had a stellar year in 2011, up 188% year-on-year. The company is one of the largest independent owners and operators of LNG carriers and has 8 LNG-specific vessels. Its focus in 2011 on LNG instead of crude was a winning bet.

Golar's 4th quarter 2012 results were also impressive, with an increase in net income of $22.83 million compared to $17.18 million in 2011. Comprehensive net income was $32.89 million, up from $26.80 million in the previous year. Revenue for the quarter was $111.84 million--up from $80.62 million in 2011. Last year also saw Golar complete a third follow-on equity offering with a net proceed of $130 million.

Also … Keep an Eye on LNG Technology Companies

Floating LNG has required the development of some very specific technological components that are key to its performance. Specifically, more stringent environmental concerns require specific tandem

offloading systems and dedicated LNG tankers. There are also ongoing technological developments that deal with onboard LNG storage to avoid sloshing.