

Pushing the boat out

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Shell's Prelude vessel – some 488 metres long – pulled out of Samsung Heavy Industries' shipyard in South Korea at the end of July.

The length of four football fields back-to-back, this state-of-the art bet on the global gas market headed for the Browse basin off the north-west coast of Australia where it will stay for up to 25 years.

Prelude, the largest floating structure ever built, represents an estimated \$14 billion investment. And despite its monstrous size, its footprint is around a quarter of an equivalent land-based LNG plant. Once it has been commissioned it will pump gas from below the seabed, cooling and liquefying it ready for sale and transport.

Floating LNG is being peddled as a way of reducing capital expenditure costs for offshore field development, making production, liquefaction, storage and offloading available from a single unit without the need for onshore facilities. The technology opens up previously stranded assets to development and the platform can also be towed onward to new fields.

The technology represents a bet on the surging popularity of gas – particularly in Asia. In January this year, Chinese imports of LNG rose by almost 40% against the same time in 2016. The country's increased demand is down to efforts to reduce reliance on coal as it moves to reduce pollution.

China also has its sights on the FLNG market and has been making headway into becoming a major exporter of the complex production and liquefaction units need for the projects.

Other territories looking to lead the way in FLNG vessel construction include Singapore and South Korea.

The industry offers some sizeable investment opportunities, with Chinese lenders having committed almost \$4 billion in financing for three FLNG projects off the coast of Africa; around \$1.75 billion for Coral South; \$1.2 billion for Fortuna; and \$960 million for Golar. Two other FLNG platforms – off the coasts of the Congo and Cameroon – are under development by NewAge and set to be both financed and built by Chinese companies.

China's increased demand for LNG comes as the country seeks to tackle dangerous levels of air pollution in its cities. This switch in Beijing's policy will see the country become an increasingly large source of demand for LNG by 2020.

Around the same time, Australia plans to bring a number of FLNG projects online after already accounting for the majority of growth in LNG exports last year.

The US is also looking to compete with its large gas production levels and growing export market; the DoE has approved exports of 21 billion cubic feet per day (bcf/d) to non-free trade agreement countries as of mid-2017.

Despite production levels projected to rise, the total global demand for LNG has increased in recent years with new importing countries including Colombia, Egypt, Jamaica, Jordan, Pakistan and Poland – bringing the total number of LNG importers worldwide to 35, from 10 at the turn of the century.

What are the benefits?

FLNG has a number of advantages over traditional onshore LNG developments.

Onshore assets include undersea pipelines linking production assets with onshore liquefaction facilities and export ports, whereas FLNG sees these technologies bolted together and floated out to sea.

This makes capital expenditure costs for FLNG lower, and floating facilities have the added advantage of being transportable, with owners able to tow platforms away once fields have been exhausted. These characteristics combine to enhance overall project economics, allowing for quicker returns, making LNG development viable even in a low gas-price environment.

Despite the reduced upfront cost, FLNG is more expensive to operate than equivalent onshore facilities. The technology is also significantly more complicated than the alternative.

“Technologically speaking, people probably feel safer with a pipeline as the technology is better known, whereas there is currently only one LNG FPSO in operation,” according to Conn Fagan, vice-president of business development of offshore gas projects at classification society and technical consultancy DNV GL. “If you could put a pipeline out to a field you probably would.”

But sometimes undersea conditions make the use of pipelines impossible – the distance might be too great. Or as with the Sunrise project off the northern coast of Australia, there’s a 3.3km deep gorge, the Timor Trough, in the way. When pipelines aren’t feasible either because of difficult conditions or cost, an FLNG removes the need to transport the gas onshore for processing.

“This technology opens up these fields which may otherwise go untouched,” Fagan says.

But despite the seemingly sunny uplands of lower costs and less onshore development, the complexity of FLNG projects has in some cases unexpectedly bloated expenditure. Prelude, for instance, had construction challenges that pushed costs up from \$12 billion to around \$14 billion in total, analysis firm Wood Mackenzie estimates.

“We’ve got beyond the question of whether FLNG will work or not. The question is how reliably it will work; will the availability be satisfactory?” Stephen Craen, managing director and head of energy project finance in Société Générale’s natural resources group says. “Under a typical offtake agreement you may have to pay penalties for failing to supply LNG.”

If a seller isn’t able to load a buyer’s ship – for instance if weather conditions don’t allow it – then it may have to wait. Such delays can prove costly for both parties and contracts need to be written such that they’re not unduly onerous when accounting for failure to deliver on time, Craen says.

Offtake agreements for FLNG are comparable to land-based plants and look otherwise vanilla – more sponsors are looking to sell LNG under long-term contracts with the price indexed to a spot index and an ongoing volume obligation on the buyer.

“Mostly we’re seeing 20-year contracts but sometimes 15 years. It could potentially work at 15-years or even less but the likelihood is that the leverage would be lower,” says Craen.

“There’s a conflict at the moment as buyers don’t want to commit to buying for 20 years and feel uncomfortable committing to a fixed volume over that time. And if they’re in an area without a clear, transparent market index they will be uncomfortable committing to, for example, oil indexation of pricing as well. So they’re increasingly looking to flex the volumes and for shorter tenors.”

FLNG offtake contracts are also likely to feature price re-opener elements which have become fairly standard in the industry. “The contracts have a clause that typically allows either side to re-open the

price, say every five years, where if they can demonstrate the price is off-market compared to other similar terms of sale of LNG they can essentially re-open the price and bring it back on-market again,” according to Craen.

That proves beneficial in the existing low oil price environment. Buyers are less willing to commit to long-term contracts where the cost of LNG could change drastically over time.

“In the past you would try to deliver all your gas to a long-term buyer but the current market makes it more difficult to do that,” Anthony Patten, a Shearman & Sterling partner from the company’s project development and finance group based in Singapore, says. The firm is advising sponsors of the Fortuna FLNG project off the coast of Equatorial Guinea.

“But the developers of new projects are not able to rely entirely on the spot market either. So we’ll see a mixture of long-term contracts of 15- or 20-years as well as shorter contracts of five to eight years and then some spot supply.”

O Fortuna

Fortuna FLNG, under development by Ophir Energy and OneLNG (Schlumberger and Golar LNG), looks likely to be the next FLNG project to reach financial close.

Fortuna’s sponsors have said they plan to take an FID in the second half of 2017, though two milestones are yet to be fulfilled; the awarding of offtake agreements and the financial close of the project’s debt facility.

An offtake agreement for Fortuna was signed with Gunvor in August 2017. The agreement will see Gunvor take the project’s full capacity of 2.2 million metric tonnes per annum (mmtpa) purchased on a Brent-linked free on board basis over a 10-year term. The contract also gives the Fortuna partners the potential to sell some of the gas to higher-priced gas markets in Africa or elsewhere whilst retaining a share of the profits from such onward marketing.

Fortuna’s sponsors are also planning to use a lease and operate tolling model, signed in May 2015, which is emerging as an alternative to the integrated model used by Prelude. Under an integrated model, the party with the right to extract the gas is also the owner of the FLNG facility.

Under the tolling model however, debt is lent against a tolling-type revenue scheme payable by the gas user back to the owner of the facility as opposed to a merchant scheme where both the projects and the lenders take commodity risk.

“In the tolling model, an infrastructure provider makes an FLNG facility available to an infrastructure user with the rights to extract natural gas and sell LNG,” Anthony Lepere, also a partner at Shearman & Sterling, says.

“The infrastructure user provides gas to the infrastructure provider and receives LNG, but title to the hydrocarbons never passes from the infrastructure user to the infrastructure provider. In exchange, the user pays a fee – sometimes called charter or dayrate – to the infrastructure provider.”

On Fortuna’s financing side, Ophir and OneLNG are raising \$1.2 billion in debt from a group of three Chinese lenders – one of whom is rumoured to be China State Shipbuilding Corporation (CSSC), which Ophir’s spokespeople would not comment on. The financing will be used for development of the project’s upstream portion – the field itself – as well as conversion of an LNG tanker, the Gandria, into a floating liquefaction vessel; the midstream portion of the project. Singapore’s Keppel Shipyard will convert the Gandria using technology from Black & Veatch.

The conversion deal makes for an interesting aspect of the FLNG industry; although projects such as Prelude can be built from scratch, there is also burgeoning demand for conversions of existing ships.

Successful financing of conversions has already been seen, with Golar LNG signing a \$960 million deal to convert the Hilli Episeyo vessel in mid-2015 for a project in Cameroon. The project, under development by Perenco will use a tolling model similar to Fortuna’s.

Local content balancing act

One other aspect of Fortuna is that Equatorial Guinea's government, via its national oil company EPetrol, has the option to acquire up to 20% of the upstream project and up to 30% of the Gandria. This could reflect a desire for greater state control in protection of national interests and the need to be engaged in various parts of the LNG production chain, Fagan says.

It may also offer a way for the country to ensure it is benefiting as much as it can from the development. With most FLNG assets being built in Chinese or Korean shipyards, for instance, it can be difficult to boost the amount of local content used in the project when compared to the job creation the construction of onshore assets would usually encourage.

Local content rules pose a challenge for FLNG. They become slightly stickier when most of the project cost is spent at a shipyard that can be located on another continent to the field itself.

"It's not always the case that the laws in jurisdictions where these projects will be located currently make provision for projects of these types," Lepere says, adding that there's a need for constructive dialogue between developers and host states.

"Part of that dialogue is about local content and making sure that the host state derives sustainable long-term benefits, such as the up-skilling of the local workforce."

Building the assets offshore can also lessen the sponsor's exposure to risks in the local market, for instance with finding local qualified labour or manufacturing ability.

And one final benefit of FLNG; if the political environment of a given country becomes difficult, sponsors can (theoretically) pull up anchor and sail away.

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