



POTEN LNG OPINION

Golar Pushes Forward With First Ever FLNG Conversion

Norway's Golar LNG has continued with its aspirations of branching out into the floating LNG market. The company announced in its second quarter earnings call at the end of August that contracts to convert the 1975 built 125,000 m³ Hilli to an FLNG carrier had been fully executed. Although other companies are pursuing FLNG projects, with four currently under construction, GLNG's work represents the first time an owner has attempted to convert a vessel for this technically-demanding use. GLNG has been toying with the idea of FLNG conversions for a while and has had past success converting several of its older vessels into floating storage and regasification vessels. If GLNG is successful in its FLNG effort, the company will have found a way to diversify its business beyond conventional and FSRU chartering.

On September 7 the Hilli arrived at the Keppel Shipyard in Singapore where the conversion will take place. GLNG is planning to convert the Hilli into a four-train vessel with a modularized design that would give the converted vessel a total capacity of between 2.3 MMt/y and 2.8 MMt/y with onboard storage of 125,000 cubic meters. Keppel has entered into a topside sub-contract with engineering, construction and procurement company Black & Veatch, which will employ its PRICO liquefaction technology. Conversion of the vessel is expected to take 31 months, meaning the Hilli will be scheduled for delivery in early 2017. GLNG will use the proceeds from a June share offer to raise some of the initial capital for the conversion of the Hilli. The company offered 12.65 million shares at \$54 per share to raise a total of \$683 million (see LNG Finance in World Markets, Q2 '14). Keppel will take a 10% stake in the company that owns the Hilli, which will put the shipyard on the hook for any future cash calls if more capital is needed for the conversion which will cost around \$1.2 billion.

The contract with Keppel also includes the option for two more conversions. If successful with the Hilli, GLNG would like to also convert the first generation 125,000 m³ Gimi and 126,000 m³ Gandria, both of which were also built in the 1970s. Keppel has said that a fully executed contract for the conversion of the Gimi could come as soon as October with construction starting no later than November 2015. GLNG has been under pressure to create value out of these older vessels, which have struggled to gain employment given their small size and relatively high fuel consumption and boil off rates. Scrapping these ships would only attract around \$16 million at current rates, and FLNG represents an attractive alternative for GLNG.

Golar is now understood to be making the rounds trying to drum up further investment. Debt funding could prove difficult however. Although banks have been big providers of funds to LNG vessels, they have been skeptical when it comes to older ships converted into FLNG units. Those that are being converted speculatively without employment are not as bankable as classic LNG ships with long term charters, points out one banker specializing in shipping finance. Converted floaters have an added drawback even compared to speculatively ordered LNG ships because they are

seen as risky by banks because FLNG is new technology without an operating track record. Banks will likely need extensive technical surveys carried out to ensure seaworthiness before they would provide funding to older ships. Furthermore, the remaining life of an older vessel post conversion could be too short to achieve positive cash flow by the end of the project, warns one banker.

Before an operating track record is established, bankers expect FLNG conversions will be funded either by industry players with high credit ratings that can raise money on a corporate basis by leveraging the strength of their balance sheet. Or they could potentially attract capital from sources that will tolerate high risk for the possibility of high return, such as certain types of equity investors or mezzanine debt providers. Of course, perceived higher risk will mean that the vessel owner will be charged at a higher rate for any third party investment.

Experts say there will be considerable technical challenges in converting these 1970s built Moss vessels into FLNG carriers. Given the design of the Moss vessels, which have the easy to identify spherical storage tanks, ships with this type of containment system are not clear candidates for FLNG conversions. This is because the tanks do not leave much room for topside equipment. Any conversion will require a flat area on the deck to locate this topside equipment, which can only be achieved by removing one or more of the six-storage tanks. This could make achieving correct spacing difficult, particularly making sure there is enough separation between the trains and the drivers and personnel accommodation. The Moss ship's center of gravity will increase considerably once the cryogenic equipment is installed, a reason why some people targeting FLNG conversions have shown a preference for dockside applications. Space will also be needed for the utilities as liquefaction requires a lot of power. Taking electricity directly from the shore could be one solution. However, in most remote locations where FLNG is being promoted this could be difficult to achieve.

Regardless of the possible technical issues GLNG has said that eventually it has aspirations of launching as many as 10 floaters in the next five years, highlighting regions such as West and East Africa, the Americas and Southeast Asia. Before that type of expansion happens, however, GLNG will need to lock down its first offtake contract with a buyer. Vice Chairman Tor Olov Troim said that the first FLNG contract would likely be firmed up in October. In Golar's second quarter earnings call the company did say that the first FLNG conversion unit will operate at reduced capacity upon completion. This means that only two to three of the trains will be contracted for initially. GLNG has said that the tariff payments for the FLNG conversion would be in line with current US projects, which recent deals would place in the \$3.00-\$3.50/MMBtu range.

Although not confirmed market consensus is pointing to the Hilli conversion being stationed in Cameroon. GLNG is thought to be negotiating with independent oil and gas company Perenco. The company has operations in the Rio del Rey and Douala basins, where it says gas resources are more than 3 Tcf, although these fields are spread over a 6,000 km area. Any GLNG hook up with Perenco could run into some issues with the established potential



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export project in Cameroon. For years state run Societe National des Hydrocarbures and France's GDF Suez have been promoting an onshore export scheme that would be located at Kribi. However, they have not disclosed the local gas reserves to feed the 2.5-3.5 MMt/y project. The French firm is assisting SNH under an exclusive Memorandum of Understanding that could limit other export projects from moving forward.

Conversion units have also been mooted for Western Canada along with Mexico. Cedar LNG Export in Canada, a liquefaction venture of Kitimat's aboriginal Haisla Nation in the Canada province of British Columbia, filed applications at the end of August for three 25-year licenses to export LNG. In an August 28 export application request to the National Energy Board, Haisla pointed to Golar's FLNG conversion plans with Keppel (see LNGWM, Aug '14). Cedar's first filing with NEB was for 2.9 MMt/y, while the second and third were both for 5.8 MMt/y. Assuming the upper end of Golar's proposed conversion capacity of 2.8 MMt/y this could mean Cedar LNG employs as many as five FLNG units. Mexico is considered another area of interest for GLNG where it could possibly tie up with the country's state owned energy company Pemex. The Lakach field has been the site of at least one planned liquefaction scheme, where production could start by the end of this year. By June 2015 Pemex is estimated to be producing 200 MMcf/d from four wells and raising it to 400 MMcf/d by October 2015 from Lakach, which is estimated to hold 850 Bcf of total reserves (see LNGWM, Aug '14)