

Floating LNG Production Attracts Renewed Interest

Offshore liquefaction is staging a strong comeback, attracting interest from a wide range of companies and expanding the net of potential participants beyond the traditional LNG “club.” On September 19, two different groups unveiled plans to develop floating production and storage operations for LNG. The first announcement came from a consortium consisting of ship owner Høegh LNG, Aker Yards and ABB Lummus Global. This was followed on the same day by a similar statement from offshore specialists SBM Offshore and the German engineering and technology company Linde AG. Rumors also abound that Flex LNG may declare an option on a third ship, following the signature of a Memorandum of Understanding with an unidentified energy company for one of its M-Flex LNG Producer vessels (see related story above).

Høegh’s FPSO project is for a ship-shaped structure capable of processing up to 2.5 Bcm/y of feedgas to produce 1.6 MMt/y of LNG and 0.5 MMt/y of liquid petroleum gas. It will have capacity to store 180,000 cubic meters of LNG and 30,000 cubic meters of LPG. Aker is responsible for the hull, storage and utility systems while Lummus will provide the design for the gas processing, liquefaction and LPG facilities. The FPSO will use the proprietary NicheLNGSM turbo expander liquefaction process developed by Lummus, while LNG storage will be in Aker’s proprietary SPB-type Double Barrier Tank containment system. Pre-feasibility studies on the concept are underway and the sponsors say the first unit could be delivered as early as 2011.

The FPSO planned by SBM and Linde is slightly larger. It would use the German firm’s Multi-Stage Mixed Refrigerant process to produce 2.5 MMt/y of LNG plus LPG and condensate byproducts from stranded gas reserves as small as 1 Tcf. The structure will have 230,000 cubic meters of SPB-type containment for LNG and liquid byproduct storage. SBM Offshore has commissioned Japanese ship builder IHI to undertake basic hull design. The long-term agreement also requires IHI to offer capacity at its Aichi works for an early project. SBM has started its global marketing effort and hopes to have a unit onstream by 2012.

Illustration of LNG FPSO unit



Source: SBM

London-based Flex LNG plans to use at least one of its new builds as a production ship for a project based in the Asia-Pacific region. Flex announced the conclusion of its second private placement on September 7, increasing the amount of funds raised to \$220 million. The new financing will be used for down payments on two 90,000 m³ ships being built by Samsung Heavy Industries for delivery in 2010 and 2011 (see **LNGWM**, Jun '07). Other companies considering floating LNG projects include BW Offshore, Exmar and LNG Partners. Although most schemes require new builds or custom barges, some players are considering the use of existing vessels. Such schemes will need to balance the cost benefits associated with accessing fully depreciated ships against potential sloshing issues for vessels with membrane storage tanks and, in the case of spherical Moss-type ships, a shortage of available deck space for processing equipment.

Interest is almost exclusively concentrated on small stranded gas fields, rather than the large-scale projects contemplated by the major oil firms in the past. The proposed facilities all hope to tap structures that are either too small or too isolated to support a baseload project. Other potential advantages include a sharp reduction in upstream development costs and the system’s portability,

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which could allow a single unit to process gas from several fields within its working life. Reduced project size and potential ship-like leasing arrangements for the floaters also promise to increase the list of potential participants and the viable resource base for development. Finally, project costs and timelines may benefit from the application of shipyard construction techniques and established skilled labor forces.

But the concept faces a number of technical and commercial hurdles as well. Stringent feedgas quality requirements, demanding the removal of almost all carbon dioxide, hydrogen sulfide and heavier hydrocarbons, will require installation of extensive pretreatment facilities, particularly if the FPSO exploits several different gas fields. All offshore systems must perform efficiently in pitching seas – a tough requirement for some of the absorption and separation columns required for acid gas and LPG separation units – and are subject to extremely strict design codes. Floating projects will also have to reconcile the production profiles from depleting gas fields with the need for steady feedgas conditions and rates.

Cost signals for offshore development are mixed. While ship building costs have not risen to the same extent as those for liquefaction plants, offshore exploration and development projects are subject to many of the same pressures experienced on this side of the business. It remains to be seen whether these ventures are viable at Henry Hub prices of \$5 to \$6/MMBtu. However, the major challenge facing these projects will continue to be the same one facing many gas monetization technologies: finding upstream partners with sufficient natural gas reserves. With the exception of Flex LNG's recent MOU, no other project has given any indication that it has lined up suitable candidates on the upstream side. No one has secured buyers for the LNG output produced from these FPSOs either, although this should not be a problem once the other elements of the project are in place