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## **The LNG Producer - A Generic Design with Great Adaptability**

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### **Abstract**

The LNG Producer is a floating, ship-shaped vessel that can produce LNG, condensate and LPG from stranded and/or associated gas fields offshore. FLEX LNG has four hulls on order and has an EPCIC contract for the topsides of the first vessel. A well-defined set of design principles and criteria have been essential to develop the LNG Producer. In addition the development of the design is strongly supported by market analyses, client feedback and technology evaluations. The final design is neither an evolution from the LNG Shipping industry or the Offshore Oil&Gas industry nor a marinization of a land-based liquefaction plant but a dedicated unit combining the best of these industries. This paper describes the design process and the resulting basic design. Particularly the generic character of the design is described and the adaptability to serve a large range of gas fields, with all kind of project and client specific requirements and conditions. The paper assists both engineers and project developers to consider floating LNG production for a given offshore or onshore gas field.

### **Introduction**

The LNG industry is growing at a rapid pace and medium to long-term forecasts predict a shortage of LNG supply in a few years time. With the huge amount of stranded gas fields and associated gas the introduction of offshore LNG production, or often referred to as Floating LNG (FLNG), can reduce the gap between supply and demand. The key arguments supporting floating LNG production are the competitiveness against land-based plants, the short lead-time, the adaptability for field specifics, the redeployment feature and the use of existing LNG and FPSO construction facilities at shipyards.

FLEX LNG has been pioneering the development of small to medium sized floating LNG production vessels since 2006. The rapid development by FLEX LNG has been supported by a large amount of engineering studies, a close cooperation with customers and an early order at Samsung Heavy Industries (SHI). Currently, FLEX LNG has four LNG Producer hulls on order at SHI. Each hull has a storage capacity of 220,000 m<sup>3</sup> for LNG and condensate or alternatively the inclusion of LPG. These LNG Producer hulls are not just bare steel hulls but comprise a complete LNG Producer vessel except for the topsides. Only for the first hull have the topsides been ordered. In September 2008 FLEX LNG signed a turnkey, lump sum Engineering, Procurement, Construction, Integration and Commissioning (EPCIC) contract with SHI for the topsides and the hull. Consequently, for the first vessel SHI is fully responsible to construct the hull and the topsides, the integration of both and the commissioning of the LNG Producer at the both the shipyard and offshore on site.

### **Design development**

FLEX LNG has gone through a design process which has resulted in the current LNG Producer design. Over time the initial vessel design has increased both in storage size and production capacity. Moreover condensate and LPG extraction, stabilization, storage and handling systems have been designed. All the design and engineering that have been done were essential to develop an optimal generic design. This generic design is the starting point for every project.

The overall design principles that have been used in this development process were:

- *Maximum use of proven and robust technologies*  
In order to enhance the project success a maximum use of proven and robust technologies has been followed.
- *Commitment to safety – implement the industry's best safety practices*  
The LNG industry has a great safety record. When developing FLNG as a new branch to the LNG industry safety shall be on top of the agenda in design, construction and operations.
- *Simplify the design and remove unnecessary complexity*  
Moving offshore the importance of robust, reliable, maintainable and inherently safe systems becomes more important compared to other criteria like for example efficiency.