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Choices for LNG FPSO's

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Abstract

An estimated quarter of the world gas reserves is presently "Stranded" in offshore gas fields. The energy markets and dwindling oil reserves show the necessity to find new ways for offshore gas production. LNG FPSO's will be required to develop the fields that are too far from the market for pipelines or in too deep water. Despite many design studies, technical and economic constraints have prevented LNG FPSO's from being developed as fast as Oil FPSO's.

A guide on the main choices in the development of a LNG FPSO is given based on a decade of development work by CB&I Lummus.

The following questions are crucial in realizing an offshore LNG production development:

-Which gas fields will be the preferred candidates for early development? -What type of storage tank to use? -Which offloading system? -What liquefaction process shall be selected? What is the lay-out philosophy? What are the options for power generation? How should the project be organized?

Eventually it will be possible to develop sour or high-nitrogen gas fields, fields in harsh environments, and very large gas fields, but these fields will initially not be selected.

The process on a FPSO will be determined by the feed gas composition and the sales spec of the LNG. For storage tanks both membrane and self-supporting types have their advantages; but newer types shall also be considered. Selection of offloading system follows from metocean data: in harsher environments tandem offloading with hoses will be the most flexible but requires dedicated carriers. First projects will use side-by-side offloading with conventional carriers. In the future, remote buoy offloading systems will become available. Power generation could be dual fuel diesel engines or gas turbines; larger fields favor combined cycle power plants. Safety considerations should determine the layout of the FPSO. Safety and availability will strongly favor electric motor driven compressors.

Choice of liquefaction process is related to capacity; small and medium size will strongly favor expander processes.

For project approach, the choice is between leased and owned units.

The experience of an integrated design team is crucial for both.