All development challenges are unravelled in floating solutions for LNG-to-power projects

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There are currently some 30 floating storage and regasification units (FSRUs) in operation, of which approximately 24 are operating as FSRUs and the other six trading as LNG carriers.

However, of those operating as FSRUs, only between three and four are currently employed in LNG-to-power projects.

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Solution

In this article, we review the role FSRUs have taken in providing regasified LNG as a feedstock for power generation, why there have been relatively few LNG-to-power projects utilising a floating solution, and how these complicated projects may be structured to give them the best chance of success.

Despite the relatively low numbers of FSRUs being utilised in LNG-to-power projects, it is fair to say that in recent years various factors - whether political, commercial or technical – have combined to enhance the conditions for LNG-to-power generation using floating solutions.

Ever growing environmental concerns have meant that economies such as China have changed their domestic policies to favour gas over less environmentally friendly traditional fuels for their power supply.

We are also now witnessing the "glut" in LNG supply that has been widely anticipated for some time resulting in it becoming competitively priced when compared to other fuels.

And with increased levels of technical innovation through the separation of the storage, regasification and even power generation elements, we have seen the development of small and mid-scale floating infrastructure with lower capital costs.

There is also no question that the speed with which an FSRU can be deployed not only assists in a project's flexibility but also its feasibility - as it enables a developer to import LNG in the short term whilst either it or the host state plans for the longer term construction of an onshore based facility to exploit domestic gas supply.

Furthermore, as there are still only a handful of specialist operators of FSRUs, the units themselves tend to be leased by the FSRU provider to the project developer so that it is the former that incurs the initial capital cost rather than the latter.

However, despite these perceived advantages as compared to land based projects, a number of recent LNG-to-gas projects using FSRUs have failed – either before, or in some cases after, the final investment decision (FID) has been made, with the unfortunate legal fall-out that this implies.

And whilst of course there are numerous reasons why any project might fail, we believe there are lessons to be learned from projects to date:

State Policy: We have seen a number of LNG-to-power projects contemplated within particular jurisdictions suggesting a clear governmental policy to import LNG - but due to underlying legislation and regulation, developers have simply not been able to get their proposed projects over the line.

Ghana

An example of this is Ghana, where the government has looked to LNG imports to bridge the gap before the country's domestic gas reserves can be utilised, but the absence of adequate local legislation has been one of the factors why none of the proposed projects have yet been successful.

Conflicting Interests: The flexibility that FSRUs can provide in bridging the gap between imports to domestic production can lead to conflicting interests, with LNG import projects competing with those based on domestic or pipeline gas for power generation. Again, this indicates a lack of policy co-ordination at state level, and leads to FSRU providers (and other contractors) spending additional time and resource attempting to determine which projects have the most realistic chance of success.

Risks

So why have a number of LNG-to-power projects in developing nations been successful while others have failed?

In our experience the successful projects have been those that have been, to the greatest extent possible, "de-risked" from the outset.

Using a floating LNG terminal is a fast-track route to becoming an importer

To facilitate this we have seen international institutions (such as the International Finance Corporation, a World Bank member) providing a level of initial equity to projects, enabling the project developer and the host state to develop the requisite legislation and regulatory framework that has been necessary to support the project.

The legislation has been implemented to determine the technical, commercial and legal parameters under which the developer and state are obliged to operate under - and has enabled the developer to present these parameters to bidding contractors through a robust tender process.

In setting out the required parameters from the outset, it has allowed potential contractors (including the FSRU providers) to assess the project's risks more efficiently and to structure their proposals according to the defined terms on which they are being asked to bid.

Complexity

Arguably this initial "de-risking" has led to less contractual complexity and lower transactional costs – and has ultimately afforded these projects a greater chance of success.

However, not only does the developer need to address the regulatory and legislative regimes, it is also needs to ensure that it structures the project to be both commercially viable and financeable.

This requires a contractual alignment across the LNG value chain - from the LNG sale and purchase contracts to the shipping arrangements, the receiving and transmission structure (including the FSRU) and the offtake arrangements with end-users.

Each element needs to be reviewed by the developer in the context of "project-on-project" risk - and the consequences to the project of a failure in any one or more of these elements needs to analysed and mitigated against to the greatest extent possible.

The provision of the FSRU is an integral part of any LNG-to-power project, and there is always a question as to whether it should be financed separately or as part of the overall project.

Project structures

The majority of FSRUs utilised within LNG-to-power projects are financed on the basis of a "non-integrated" structure, where the FSRU is financed independently of the power plant.

In these cases the FSRU is employed by the developer under a form of lease or services agreement where the provider generally receives a specified daily income linked to the unit's warranted throughput.

On the other hand under an "integrated" project a single group of lenders provides financing for both the FSRU and the power plant, with the interests of the financiers being largely aligned so that as a group they retain the benefit of the security granted over both assets.

An example of this type of structure is the Sergipe project in Brazil, where Golar (as provider) has taken a shareholding in the project developer.

However, integrated projects tend to conflict with an FSRU provider's understandable wish to retain control of its FSRU - because by retaining control the provider is able to remove its asset should there be a problem with the project and redeploy it elsewhere.

As a result we think adopting an integrated approach for a developing nation's first LNG-to-power project may prove challenging if only because the knowledge and skillset required to manage such a project are often being acquired in line with the development of the project itself.

Commercial factors

The commercial factors to be determined are also extensive and flow through the length of the value chain: from the cost of the LNG feedstock at one end, to the price at which the developer can sell electricity to end users at the other - where the creditworthiness of the latter will also be a significant issue.

In addition, careful consideration needs to be given to currency exchange issues as the developer will be required to purchase the LNG in US dollars (or possibly euros) under the sale and purchase contracts, but will almost certainly receive local currency for the sale of electricity in the project's domestic market.

In terms of demand, we mentioned earlier that one of the benefits of a floating solution is that the infrastructure can be scaled down by segregating the storage and regasification elements to match demand. However demand can also be scaled up to match the project.

A newbuilding 170,000 cbm FSRU can send out regasified LNG at a rate of nearly 1,000 mmscf/day.

This equates to approximately 8 million tonnes per annum of LNG - which is significantly more than the amount (say two million tonnes) required to feed one 1,000 MW power station.

But this discrepancy also potentially provides a source of supply for more than one user. Sociedad Portuaria El Cayao (SPEC) has adopted a multi-user model for its project in Cartagena, Colombia where the project developer stands between the FSRU provider (in this case Höegh) and its three foundation customers as off-takers.

This provides the provider with a credit and performance interface, preventing it having to deal with numerous counterparts and separate offtake arrangements.

Without over stressing the point the price at which the electricity is sold to the end user point under any LNG or gas-to-power project is intensely price sensitive.

Costs

Consequently, developers need to exploit any opportunity available to them to develop additional markets that will reduce the overall cost of the project - whether that is the sale of electricity to additional customers as mentioned above, or re-selling the LNG to third parties (i.e. to industrial users or by way of bunker fuel). Affordability (of electricity) is key!

Ultimately for any LNG-to-power project to succeed, all its moving parts must be pulled together in a workable suite of contracts.

There is no doubt that these projects are complicated.

Not only do they require the appropriate level of initial funding, they also need sophisticated planning from the outset.

Each party needs to fully understand the level of risk it is being required to undertake - and this can only really be achieved through extensive due diligence.

But whilst such LNG-to-power projects using floating solutions are complicated, they are also possible.

As we have seen from the projects that have been successful delivered, a developer that is able to develop a workable structure (ideally with the backing of a strong state sponsor) is at least giving itself a fighting chance of achieving FID. ■