

# Floating Storage Regasification Units

As decarbonization increases, so does the popularity of LNG as fuel. Those already in the market may need to increase capacity quickly, and small or new players in the dynamic gas to power market will also want flexibility with relatively low risk. Floating Storage Regasification Units, or ‘FSRUs’ have been developed to respond to these needs.

In this article, we look at the construction of an FSRU and therefore it’s operations and contractual arrangements as compared with traditional LNG tankers and how that affects P&I cover.

## What is an FSRU?

Natural gas is extracted and transported by pipeline, or liquified by cooling and transported by sea on specially constructed LNG tanker vessels. The liquified gas then needs to be re-gasified for use at destination. This regasification can take place by discharging to an onshore terminal or, alternatively, offshore to a purpose-built vessel or converted LNG tanker referred to as Floating Storage Regasification Units or “FSRUs”.

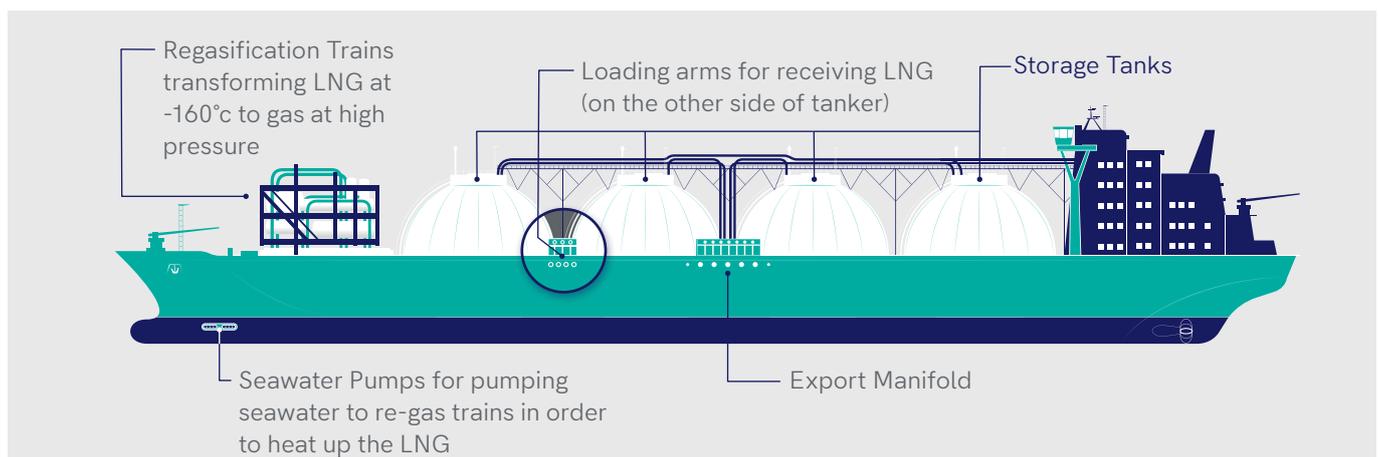
Here is a diagram that illustrates the key equipment on board the FSRU.

## How are FSRUs different from FSU / FPSO and FLNGs ?

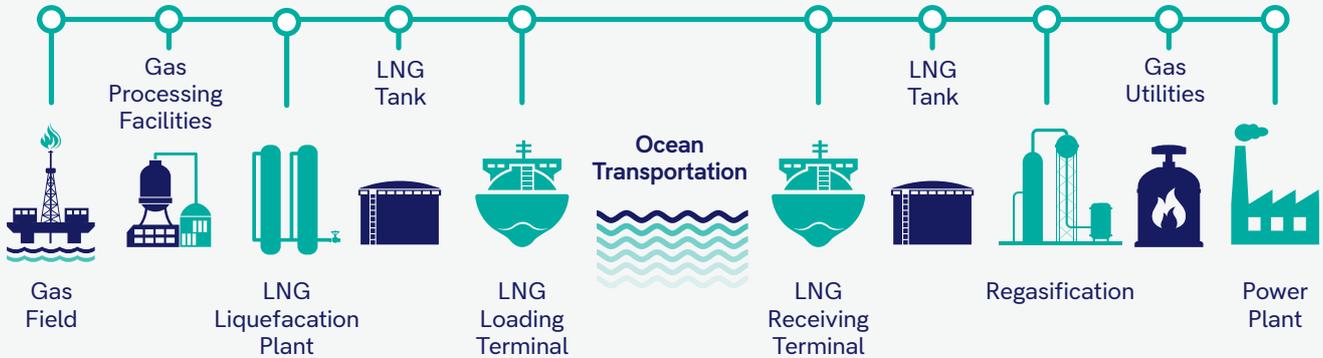
In order to understand how these vessels differ from one another, it is useful to understand how LNG discharge ports or regasification terminals are built.

### A discharge port / regasification terminal has:

- LNG storage facility. This could either be tanks built ashore, or LNG vessels used for storage which are permanently moored. Such vessels may be moored alongside a jetty or offshore and connected to the receiving terminal either to supplement existing storage or as permanent storage solutions in the absence of shore tanks. These vessels are called floating storage units (FSU).
- LNG regasification plant. LNG regasification equipment usually consists of high-pressure pumps and vaporizers and is generally installed ashore. LNG stored in the tanks is regasified here to natural gas and pumped through the gas distribution network to be used as feed fuel for power generation, or connected directly to the shore grid for domestic purposes. But where an FSRU is used instead of shore-based equipment, the regasification equipment is installed on board the FSRU itself. The FSRU also provides a storage solution in addition to re-gasifying the stored LNG to natural gas.
- A jetty for mooring the LNG vessel. This LNG vessel may well be the supplying LNG tanker that discharges LNG into the shore tanks or into the FSU / FSRU that permanently sits alongside the jetty, in which case the supplying LNG tanker sits alongside the FSU / FSRU.



## LNG Value Chain



A Floating Liquefaction Natural Gas (FLNG) on the other hand is for use at the other end of the LNG shipment chain and is stationed offshore at a loading port in lieu of a liquefaction plant / loading terminal ashore. It operates in a similar manner to FSRU's with the exception that the FLNG has a production unit installed onboard which treats the raw natural gas to separate methane from other gases and impurities before liquefying the natural gas to LNG.

In the above LNG value chain, the FLNG replaces the need for gas processing, liquefaction, storage and loading terminal at the load port whereas the FSRU negates the need for a receiving tank and regasification facility ashore at the discharge port.

### Onshore terminal or FSRU?

The decision to build an onshore terminal, purchase a new build FSRU or convert an existing LNG carrier to an FSRU will depend on a number of factors including project timeline, capacity requirements, geography and cost.

Though onshore terminals offer a permanent and high capacity solution with relatively low daily operating costs, they are expensive to build and offer far less flexibility than an FSRU which can be relocated should there be a change in demand.

Whilst projects vary considerably, onshore terminals can also take 3 to 5 years to build, whereas converting an existing vessel to an FSRU can take as little as 18 to 24 months. Delivering a new build FSRU can also take up to 3 years and is similar in cost to purchasing and converting an existing vessel, but gives the flexibility to tailor specifications - like capacity for example - to those required for a specific project. Redeployment and chartering-in of an existing FSRU to a new location is obviously the least time-consuming option where capacity is required quickly, when units are available.

It is worth remembering that when converting an existing LNG vessel, the seller does not warrant that it is fit for conversion to an FSRU. The risk is on the buyer to determine that the vessel will be suitable and capable of conversion within their required time frame and whether it will ultimately be accepted by the end user. Further, and unlike a new build project, title and risk remains with the buyer/new owner throughout the duration of the conversion and they cannot simply walk away if the build is substantially delayed.

We always suggest that the Club is consulted when a conversion of an existing LNG vessel to an FSRU is envisaged in order for the Club to assist with identifying new contractual arrangements that may require additional cover. Below are some of the issues that Members operating LNG FSRU's may wish to consider from a P&I perspective.

## P&I Liabilities

As stated previously in this article, FSRU's are similar in their operation to FPSO's / FLNG's, except that FSRU's store and re-gasify the LNG to vapour compared with FLNG's that treat the natural gas and then liquefy it to liquified natural gas. This is an important distinction that has a direct bearing on poolable cover.

Under guidelines contained in the International Group's Pooling Agreement ("PA"), cover is excluded for a unit or vessel constructed or adapted for the purpose of carrying out drilling operations in connection with oil or gas exploration or production to extent that liabilities costs and expenses arise out of or during drilling or production operations.

The pooling guidelines further defines an insured Vessel to be carrying out production operations if it is a storage tanker or other vessel engaged in the storage of oil, and either:

- (a) the oil is transferred directly from a producing well to the storage vessel; or
  - (b) the storage vessel has oil and gas separation equipment on board and gas is being separated from oil whilst on board the storage vessel other than by natural venting; and
- (ii) in respect of any Insured Vessel employed to carry out production operations in connection with oil or gas production.

Essentially FLNGs would fall within this definition and the liabilities arising from their operations are consequently excluded from cover in their entirety. FSRU's on the other hand are not involved in the production operations per se and are therefore eligible for full mutual cover.

Though many other P&I risks arising onboard an FSRU are similar to those on any other LNG vessel, there are some interesting differences.

## Crew and property

For example, as part of their employment and normal cargo operations it may be necessary for the highly trained crew onboard an FSRU to operate certain parts of onshore infrastructure. Injuries arising from crew's necessary work ashore would fall within Club cover. It is not unusual for FSRU contracts to have knock for knock clauses for damage to property and injury to crew, so even if a crew injury or death or any damage on board the FSRU were caused by shore side equipment or infrastructure the liability would rest with the FSRU operator. But likewise, any damage caused to a shore side facility arising out of the crew negligence should rest with the shore operators.

## Contractual arrangements.

The owner of an FSRU may have liabilities arising from Terminal Use Agreements, Operation and Maintenance Agreements, Offtake Agreements and other contracts. It is important to understand who the various parties involved in the ownership and operation of the FSRU are and the role played by each party. It may well be that the FSRU is jointly owned by the terminal interests and the ship owner under a joint venture (JV).

The FSRU may be chartered out under a long term charter to the terminal owner. If the owner of the FSRU is a JV there would usually also be a separate operation and maintenance agreement with a ship operator which may also be the part owner of the FSRU-owning JV . A separate gas delivery contract may exist between the terminal owner and the end customer.

From a Club cover perspective, it is important that parties and their roles are clearly identified and understood to establish their respective insurable interest in the FSRU. This is particularly relevant when naming parties on the policy as assureds.





## Flexible charter terms

It is not unusual for FSRU charter parties to contain bespoke contractual terms, where liability allocations and performance requirements are drafted such that they meet the needs of the project.

In traditional LNG charters, the risk of loss and title to the cargo are clearly identified and generally rests with the shipowner when the cargo is in the custody of the ship. In the case of an FSRU that is regularly loading on top cargo received from incoming LNG tankers while simultaneously pumping natural gas to shore, inventory management becomes particularly relevant. It is important that detailed records of any loss are recorded and the charter party provides for protocols to measure that loss. It is particularly important that owners preserve the right to defend any claim for loss of cargo and limit their liability for any incurred loss by incorporating the Club's recommended Hague Visby Rules provisions in the charter party.

If the charter party incorporates any liquidated damages provision for loss of cargo, those provisions must not conflict with the Hague Visby Rules in order for Club cover to be preserved.

## Port and Marine Services / Conditions of use (COU )

The terminal owner will usually also own the port and marine services such as tugs, pilotage etc. The owner and or operator of the FSRU is likely to enter into an agreement for the use of tugs and pilotage services to inbound LNG tankers. As is

customary in the LNG trade, most LNG terminals issue a condition of use agreement to the LNG vessel alongside which aims to pass on most liabilities to the inbound LNG vessel. It is foreseeable that FSRU operators will also request the inbound LNG tanker to agree the terms of a COU. This is a sensible way of passing any risk incurred under the COU with the terminal to the inbound LNG tanker, similar to a back to back charter party arrangement. The IG has certain conditions for liabilities under a COU to be poolable and the Club has issued guidance on this subject in a circular which can be accessed using the link: [www.westpandi.com/Publications/News/Port-Agreements-LNG-Conditions-of-Use](http://www.westpandi.com/Publications/News/Port-Agreements-LNG-Conditions-of-Use)

## Other Insurance Arrangements

Like most other types of ships FSRUs will also have Hull and Machinery insurance and often further policies like War Risks, Defence and Loss of Hire insurance in place.

For newbuild FSRU projects, Defence cover may also be taken out at commencement of the build contract to cover disputes with contractors. It is vital that cover incepts on the date the newbuild contract is signed rather than, say, on delivery of the unit in order for cover to be able to respond to any dispute that arises during the building process.

## Conclusion

The floating storage and regasification unit market is one of the fastest growing segments in the LNG industry. One of the primary reasons for the increase in FSRUs are the policies adopted by various governments to reduce green-house gas emissions and adopt cleaner fuels with a view to reducing the impact of climate change. FSRUs can be built and made operational relatively quickly as compared to land-based terminals that takes years to build, commission and operate, thereby assisting governments to reduce green-house gas emissions sooner whilst the construction of traditional land based infrastructure is being considered.

FSRUs also offer commercial flexibility and scheduling as well as lower costs, resulting in many viewing them as a perfect solution due to their regasification capabilities and the fact that they can be deployed anywhere.

Inventory management on board the FSRU is important. Responsibility for risk of loss of cargo and title to the cargo are important considerations as the cargo passes through from the LNG tanker to the FSRU and from the FSRU to the shore facility.

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