LNG Carriers: Salient Features and Characteristics of LNG Charterparties with respect to Vessel Delivery

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General features

Liquefied Natural Gas (LNG) is the liquid form of natural gas which was made possible through research began more than 70 years ago. Worldwide, natural gas is in plentiful supply and the exploration of new reserves still continues. There are currently 13 exporting LNG countries¹ and 14 importing states².

Historically, one of the difficulties associated with natural gas was how to get this product from one point to another. Although pipelines are an obvious choice they are not, for instance, practical other than across land. The process to liquify natural gas into LNG was developed to transport large quantities of natural gas. Unlike oil, gas is an unstable transportation fuel that requires expensive liquefaction³ and re-gasification equipment to be able to be transported at sea.

LNG has substantially less volume than its equivalent in natural gas. Liquefying natural gas vapour reduces the gas into a practical size for transportation and storage. By volume the reduction is to the order of a factor of 600. To achieve this the gas is cooled to below -160°C or -260 Fahrenheit (boiling point) until it condenses into a liquid form. During the cooling process, the gas is also purified in order to eliminate compounds such as nitrogen, carbon dioxide, hydrogen sulphides, which improves its clean-burning properties. Once it reaches its destination, LNG can be transformed back into liquid natural gas through the so-called re-gasification process, which warms it to a point (through a heat exchangers system) where it become natural gas again and can be distributed through domestic pipelines.

LNG itself does not burn. When it is warmed up and transformed back into natural gas it is flammable within a very limited range. The main component of natural gas is methane. It cannot burn if the mixture of natural gas with air contains less than 5% natural gas (being too lean). Similarly, it cannot burn if the mixture with air contains more than 15% natural gas (being too rich). Therefore, LNG is a clean and safe energy and it is far less dangerous than other commonly used fuels such as petrol, propane or butane. This is combined with the fact that LNG carriers are operated at a high standard compared to other shipping sectors.

However, there are other characteristics unique to LNG. Due to being extremely unstable tankers designed and built to transport LNG require substantial investment. The cost of an LNG tanker is about double the price of a very large crude oil carrier, although the cargo has a lower value. It is estimated that shipping costs typically represent between 25% to 40% of total cost of an LNG scheme (depending on the distance from the reserves to the market), while shipping cost of crude oil is generally around 5 to 10%.

Having said that LNG shipping has been a haven for many investors. This is due to tight (and relatively secure) customer relationships and long term contracts which in turn provide for a steady business environment and stable returns. The investors make sure that the cargo is sold under long term contracts and in large volume. There are also signs of improvements in efficiency, design and utilisation of available capacity. These measures will (and have to some extent) reduce the costs of LNG production and transportation.

The LNG carriers are built to IMO and international regulations and their safety standards are vigorously codified. They are built with a double hull structure and space between bottom and cargo containment system to ensure vital safety features in case of collision or grounding. The most commonly built LNG carriers are the so called Type B tanks (or Moss system or spherical tanks) and membrane type. They run minimal risk of failing post-delivery boil off tests. The LNG cargo tanks are thermally insulated and the cargo is carried at atmospheric pressure. Most ship holds are designed to collect spilled LNG. Other LNG ships are designed with prismatic, membrane-lined cargo tanks. Prismatic tanks are designed to conform to the shape of the ship's hull, thereby occupying much of the internal area of the ship which minimises areas into which LNG from a tank rupture or spill can be diverted.

The LNG shipping industry has had an outstanding safety record in the last 50 years. During that period, a distance of more than 60 million miles covered and almost 40,000 voyages completed with no breach of cargo containment. More than 120 million metric tons of LNG has been transported worldwide each year. There have been few safety incidents only. There have been three serious grounding, two in the late 1970s and a recent grounding off Korea, none of those resulted in cargo loss. It is interesting to note that the groundings were caused by human error (crew and pilot). Given the safe and reliable operations, the economy of LNG transportation has become a topic of increasing attention for the LNG supply chain.

Some legal features of LNG Charters

LNG ship building contracts are in principle similar to conventional ship building contracts. They are built according to certain specifications and to be delivered at an agreed future date. However, in order to finance the substantial build costs the LNG contract is normally tied to a long term time charter. Unlike the conventional time charters, an LNG charter is signed for much longer periods, usually for 10 to 20 years. The preamble specify that the vessel is to be built and delivered at a future date and pursuant to a new building contract which is incorporated in the time charter arrangements.

The charterer is also drafted so as to provide reasonable leverage for the owners in respect of time of delivery.¹ The charterers have the option either to agree to 'reasonable postponement of the delivery date' or to treat the charter as null and void. As a general rule other charter terms provide charterers with the right to cancel if the vessel is not ready before the stipulated date².

The most distinctive feature specific to LNG charters possibly is the arrangements made (and descriptions agreed) in respect of the vessel's boil off rate (and timing for boil off tests). This is due to the fact that the actual boil off rate can only be determined after the shipowners have taken delivery of the vessel and in fact upon completion of a number of laden voyages.

The significance of the vessel's boil off rate is that it determines the efficiency of the cargo containment system. Once determined in accordance with the mechanism described in the previous paragraph the charter provides for a guaranteed boil off rate (usually no more than 0.15% per day of the vessel's total cargo capacity). In the event of “loss” of cargo during the voyage in excess of the boil off rate the charterparty will normally allow the deduction from the hire of a sum equivalent to the value of the cargo “lost” in excess of the boil off rate. In effect this is the vessel's experience
Moreover, a vessel may experience leakage (or other problems - see by way of example footnote (4)) during the sea (gas) trials, as a result of which the prospective shipowner will be facing unforeseen and, in terms of time, potentially unquantifiable, delays in the delivery of the vessel. As a consequence and dependent on degree the prospective shipowner may even be compelled to terminate the ship building contract. On the face of it the risk of doing is that the shipowner will have a charter and no ship but the notice requirements of the charter that require the shipowner to advise the charterer if there is any trigger of the right to terminate the building contract is designed to avoid this possibility. There is obvious sense to these requirements. Charterers will in all probability have a long term contract of affreightment for the supply of LNG that underpins their obligations under the LNG charter. As a consequence in most cases, presumably absent substantial delay in the delivery of the vessel, charterers will have a significant commercial incentive to agree an extension of the delivery date.

In short, LNG shipping is a complex and expensive venture. The charter is a long term arrangement and very much associated with shipbuilding contract prior to delivery of the vessel. Both owners and charterers assume significant risks of the other's non-performance in the period leading up to the delivery of the vessel, the consequences of which may well be substantial.

1. Algeria, Australia, Brunei, Egypt, Indonesia, Libya, Malaysia, Nigeria, Oman, Qatar, Trinidad and Tobago, UAE and USA.
2. Belgium, Dominican Republic, France, Greece, India, Italy, Japan, Portugal, Puerto Rico, South Korea, Spain, Taiwan, Turkey and USA.
3. Liquefaction dates back to the 19th century when Michael Faraday experimented with liquefying different types of gases, including natural gas. The first commercial liquefaction plant was built in Cleveland, Ohio, in 1941. The world's first LNG tanker was "The Methane Pioneer", a converted World War II liberty freighter (January 1959).
4. There are provisions provided for in the charter under the heading 'permissible delays'. For example, if the right to cancel arises under the building contract as a consequence of delay in the delivery of the vessel the prospective ship owner is required promptly to notify the charterers and requesting either that charterers elect to cancel or specify a revised delivery date. Similarly under the heading 'Sea Trials' if there is any deficiency in speed, cargo tank capacity or excessive fuel consumption or boil off rate, the owners have the option to request that the building contract is novated under the sale and purchase agreement. The owners shall notify the charterers forthwith indicating whether they wish to exercise such option and requesting charterers to elect to cancel this charter or not.
5. For example see Clause 5, Shetland 4. While LNG charterparties generally will provide charterers with the option to cancel the owners are in a better position as opposed to traditional time charters. A typical LNG Charterparty will provide: "If as a consequence of a default by the Builder, delivery under this Charter does not take place on the anticipated delivery date, the owners' sole responsibility to the charterers shall be to pay the charterers an amount equal to 75% of the amount of liquidated damages payable by the Builder to the owners under the building contract."
6. If the delay is such that a charterer will not agree a "reasonable postponement of the delivery date" and elects to cancel - see first paragraph of footnote 4.