

Assignment
Introduction to Oil and Gas

Topic: Liquefied Natural Gas (LNG) market: A review of current and future markets

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Introduction

Liquefied Natural Gas (LNG) is a natural gas that is stored and transported in liquid form at a temperature of -162 degrees Celsius and atmospheric pressure (Larson, 2022). To make it easy to store liquefied natural gas, its volume is reduced by 600 times (Robken, 2017). Using purpose-built tanks, LNG is transported by double-hulled ships, which are gasified for use once it reaches its destination. The energy market is designed to sustain periods of uncertainty and volatility. However, the past 24 months have sought to test the elasticity and durability of the energy market. Even though the energy market reacts and evolves to bouts of uncertainty in a given period, the war between Russia and Ukraine has impacted not only the gas market of Europe but also caused a significant impact in the gas markets of Asia and other countries (Bresciani et al., 2020). Indeed, the effect of the war is being felt in major markets around the world as players in the market assess their contractual flexibility and portfolio volumes in an effort of putting up legal and commercial measures that can confront the multiple issues coming from the war. Considering the measures put in place to curb the crisis in the energy market and the benefits that come with them, experts have been able to predict the state of the future market of products like LNG. The current paper presents the current and future markets of the LNG market.

Meaning of Liquefied Natural Gas

Liquefied Natural Gas (LNG) is explained as a natural gas which mainly consists of methane, C_2H_6 , CH_4 and a mixture of ethane that is cooled to a liquid form purposely for safety and ease of non-pressurised storage or transport (US Energy Information Agency, 2022). The gas is

non-toxic, non-corrosive, colourless and odourless. The liquefaction process involves removing certain components that could cause difficulties downstream. These components may include substances such as acid gases, dust, water, helium and heavy hydrocarbons (US Energy Information Agency, 2022). After these components are removed from the natural gas, it is then condensed into a liquid form at close to atmospheric pressure through cooling to approximately 162°C (−260 °F). The transport pressure, which is about one-fourth of the atmospheric pressure of sea level, is set around 25 kPa (4 psi) (gauge pressure) (Fossil Energy and Carbon Management, 2022).

Natural gas extracted from underground contains a mixture of hydrocarbon components, such as methane, which comes along with ethane and butane. Other gases that may be found in natural gas include CO₂. These gases found in natural gas have wide-ranging boiling points with different heating values that allow different routes to commercialisation, and also have different uses. The acidic components from natural gases such as hydrogen sulphide and carbon dioxide as well as mud, water and mercury are removed to ensure that a clean sweetened stream of gas is obtained. The acidic molecules, mercury and other impurities that come with natural gas can result in damage to equipment when there is a failure to remove much or all of them. The gas stream is typically separated into two main fractions which include the liquefied petroleum fractions (butane and propane) and the lighter ethane and methane fractions. The liquefied petroleum fractions (butane and propane) can be stored in liquid form at relatively low pressure (Robken, 2017). However, the lighter fractions of methane and ethane are liquefied to form the bulk of LNG that is shipped.

In the 20th century, natural gas was considered unimportant economically as oil and gas-producing fields were distant from pipelines or in locations where pipelines were not

viable(US Energy Information Agency, 2022). This meant that natural gas flared typically since unlike oil there was no viable method for the storage of natural gas. Also, no transport existed in the past except the compressed gas pipelines to the end users of the same gas. This indicates that the natural gas markets were entirely local in the past and for this reason, any production had to be consumed by the local and regional networks. The introduction of cryogenic storage and the development of production processes as well as transportation effectiveness created the tools that are required to commercialise natural gas into the global market making it possible for natural gas to compete with other fuels. There has also been reliability in networks due to the developments of LNG storage.

The current market of Liquefied Natural Gas

Considering the use of natural gas in large volumes, LNG is more practical than other liquid gases as it has the same chemical composition as natural gas. The benefits that come with the use of LNG gas as well as the high demand for natural gas have influenced the production of LNG in recent times. In areas where natural gas was burned and commercial use, LNG made it possible to use natural gas from very remote areas of the world. With special tankers known as LNG carriers and outfitted with supercooled cryogenic tanks, LNG is transported from countries such as Qatar, Indonesia, and Australia to other international markets such as Europe, China and Japan (Senyagwa, 2022). With the expansion of natural gas pipelines in recent times, areas such as the United States have become the net exporter of LNG while the US was an important importer of the product in past years.

The global LNG market consists of insights on the ongoing and upcoming LNG infrastructure development which covers LNG liquefaction plants, LNG carrier fleet and LNG regasification facilities. In 2021, the global trade in liquefied natural gas (LNG) was indicated to have

increased to 380 million tonnes as a result of many countries being rebounded from the impact of the COVID-19 pandemic. Global trade in liquefied natural gas rebounds strongly during 2021(Larson, 2022). The Russian-Ukraine war has resulted in a seismic shift in the global gas and LNG market (Farrer, 2022). In Asia and Europe spot prices keep rising to record levels as buyers of gas are increasingly searching for an alternative to Russian gas making LNG contracting activities speed up (Ganapathy, 2022). This is a result of the ban on all exportation from Russia to EU countries as a result of the Russian invasion of Ukraine. In the US, the ban on exportation from Russia has been a benefit to LNG players as there has been an increased demand with the majority of recent contracts being signed with US LNG suppliers (Ganapathy, 2022). The over-reliance of Europe on LNG along with the high demand for LNG among countries that have been using LNG all along has resulted in a price war among all other countries in the international market.

In Africa, the war between Russia and Ukraine has resulted in extreme price shocks and a supply chain disruption of various commodities across the continent. This is because Africa heavily relies on the import of LNG from the warring parties. However, the war is good news for Africa as Europe has increased its demand for African oil and gas. The thirst of Europe for oil and gas to replace sanctions on the supply of oil and gas from Russia is reviving interest in African energy projects that have been shunned due to costs and climate change concerns. Algeria and Egypt are major suppliers of oil and gas in Africa and they accounted for a total of 60% of the natural gas production in Africa in 2020 (Senyagwa, 2022). However, the supply of natural gas from these two countries can not offset Russian gas to Europe in the current times. In recent times, energy firms in Africa are considering projects worth a total of \$100 billion on the continent (Larson, 2022). In terms of investment, African energy is yet to recover from the

plunge in the prices of oil and gas since 2014 as the continent has the potential to ease the supply crunch (Senyagwa, 2022). Considering the current global economic crisis on the price of LNG, companies in Africa eyeing oil and gas investments are aware they must be faster with their initiatives to profit from untapped reserves before the transition to low-carbon technology renders many fossil fuel projects unviable.

Future market of Liquefied Natural Gas

The future of LNG is predicted to take a different turn in the world market as various alternatives to the supply of LNG have been identified in various areas around the world. It is predicted that the projects of liquefied natural gas in the US are likely to account for 70% of the new production capacity of the global market to satisfy the high demand for LNG by 2030 (Robken, 2017). Thus, the global LNG demand is forecasted to reach 575MT/y in 2030 which is an estimated 55% increase from current levels. This indicates that a requirement of 115Mt/y of capacity is needed by the year 2025 and more if projects in Russia falter (Robken, 2017).

For many Asia-Pacific countries, LNG as a fuel source has been an energy staple for decades (Harrison et al., 2021). As countries look to diversify their energy mix to lower carbon emissions, LNG is increasingly becoming important in other areas of the world. LNG as a growing industry is associated with significant challenges to continue development despite the recent success in its growth. In the long term, the outlook of LNG is brighter than that of other relevant fossil fuels mainly as a result of its comparatively lower cost as well as its lower emissions from production and combustion. However, to obtain a true competitive advantage amid the volatile market of the oil and gas sector, the LNG industry must move beyond the past winning strategies which involve the control of gas resources and the reliability of supply (Bresciani et al., 2020). Therefore the focus of LNG players must be focused on areas such as

supply chain optimisation, capital efficiency, decarbonisation, downstream market development and digital and advanced analytics (Robken, 2017). For future success, with the effective handling of measures in these areas, LNG could ride out an unpredictable market and as well identify opportunities for faster growth.

The issue of the Russian-Ukraine war that resulted in the ban on the exportation of Russia to the EU has created several benefits for African-producing oil and gas companies (Larson, 2022). Based on an estimate by the International Energy Agency (IEA) Africa as a whole could replace about one-fifth of Russian gas exports to Europe by 2030 (Senyagwa, 2022). Thus, countries in Africa that had little or no gas output could see high levels of investments in coming years among countries such as South Africa, Uganda, Namibia, Tanzania, Mozambique and Kenya. In recent times, there are a lot of activities have been put in place to force forward these measures. This indicates a clear sense of opportunity to reinforce them in these trying times. The renewed thirst for oil and gas by Europe is set to push Africa's output to the peak of nearly 500 billion cubic metres by late 2030 from 260 bcm in 2022 (Senyagwa, 2022).

Conclusion

The global LNG market consists of insights on the ongoing and upcoming LNG infrastructure development which covers LNG liquefaction plants, LNG carrier fleet and LNG regasification facilities. Considering the use of natural gas in large volumes, LNG is more practical than other liquid gases as it has the same chemical composition as natural gas. The benefits that come with the use of LNG gas as well as the high demand for natural gas have influenced the production of LNG in recent times. The global trade in liquefied natural gas (LNG) was indicated to have increased as a result of many countries being rebounded from the impact of the COVID-19

pandemic. Also, spot prices keep rising to record levels as buyers of gas are increasingly searching for an alternative to Russian gas, making LNG contracting activities speed up. The future of LNG is predicted to take a different turn in the world market as various alternatives to the supply of LNG have been identified in various areas around the world. It is predicted that the projects of liquefied natural gas in the US are likely to account for 70% of the new production capacity of the global market to satisfy the high demand for LNG by 2030.

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