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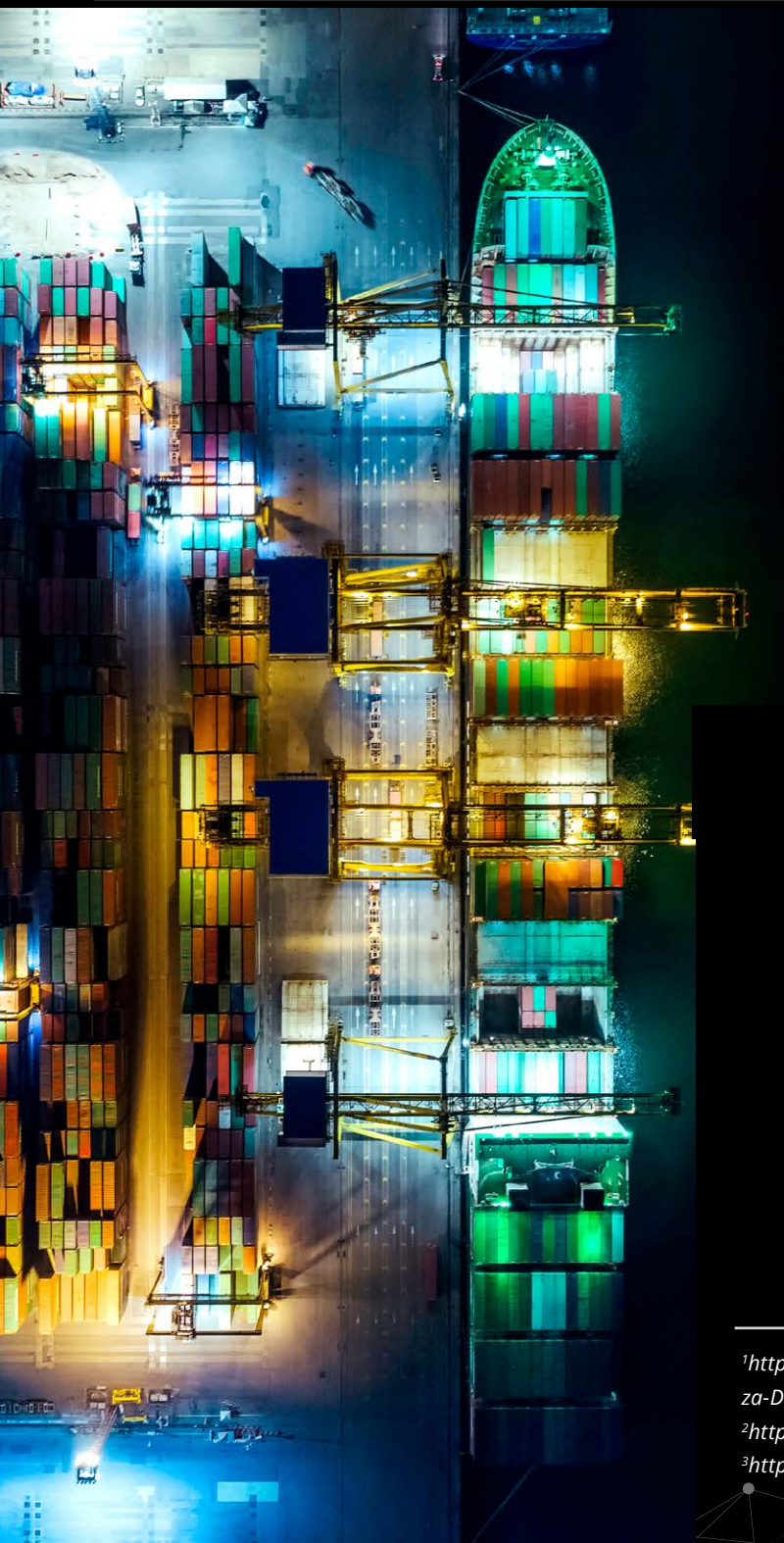
Mozambique Domgas

LNG: powering shipping forward



Natural gas will face a more certain future due to its abundant supply and geographic diversity, with multiple discoveries across the globe reducing the dependence on a specific region

The discovery and development of the gas fields in Mozambique will help to solidify Africa's position as a leading global producer of natural gas[1]. Natural gas will face a more certain future due to its abundant supply and geographic diversity, with multiple discoveries across the globe reducing the dependence on a specific region. The Rovuma Basin discoveries in Mozambique come at a time when there is worldwide pressure to switch to fuels that have a lighter impact on the environment – the shipping industry is viewing LNG as its fuel of the future.

The shipping industry, like many others, is under pressure to reduce its carbon dioxide (CO2) emissions by 2050 to half of what they were in 2008[2]. These targets were agreed by the International Maritime Organisation (IMO). Additionally, from 2020, the IMO will ban the operation of ships that use fuels with a sulphur content above 0.5 percent; the current limit is 3.5 percent[3]. These measures are forcing the maritime industry to operate differently.

[1]https://www2.deloitte.com/content/dam/Deloitte/za/Documents/energy-resources/za-Deloitte-Mozambique-Domgas-intro-Aug2020.pdf

[2]http://www.imo.org/en/MediaCentre/HotTopics/GHG/Pages/default.aspx

[3]http://www.imo.org/en/MediaCentre/HotTopics/Pages/Sulphur-2020.aspx

The other major factor influencing the decision to switch fuels is the cost spent on fuel to run ships around the world. According to the World Shipping Council, fuel costs represent 50-60% of total ship operating costs[4]. The potential to reduce the cost of fuel will enable shipping operators to reduce overall costs in a meaningful way. The cost per gigajoule (GJ) of LNG makes it an attractive fuel for shipping operators, as it is cheaper than both currently used fuels - fuel oil and diesel. Figure 1 highlights the cost per GJ between common fuels used in shipping[5]. There is a massive cost saving opportunity that shipping operators can capitalise on if they switch to LNG.

This is not the first time the maritime industry has transitioned from a fuel source. In the late 19th century, sails were used to propel the fleets of the world. As technology progressed, sails were replaced by steamships that burned coal, making journey times more consistent and independent of weather conditions. Coal was then replaced with oil as competition pushed operators on a pursuit of increased efficiency, ease of handling and cleaner operations. The industry is at another turning point as regulatory requirements, environmental concerns, availability of fuels, costs and energy security are forcing the maritime industry to look at alternate fuels such as LNG.

Figure 1: Cost of shipping fuels

According to DNV GL, a leading technical advisor in the maritime industry, 41% of marine fuel use will be LNG by 2050[6]. The challenges in reaching the forecasted figure are the development of LNG infrastructure internationally, the number of ships that use LNG and the bunkering of LNG fuel.

To meet this forecast, the way marine fuel is bunkered will need to be changed as there are only a handful of LNG bunkering ships in operation as of February 2020 with many more under construction and set for operation later in 2020. Major ports across the world are recognising the shift to the cleaner fuel by investing heavily in LNG infrastructure. The storage of LNG is specialised and requires storage vessels to keep the fuel in a safe liquefied state as it is highly flammable in its gaseous state. These features of the storage conditions mean the infrastructure is more expensive compared to oil, which does not have this challenge. Oil also benefits from decades of infrastructure development and innovation. The requirements of safe bunkering for LNG will benefit from innovation to reduce the associated costs.

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[4]http://www.worldshipping.org/pdf/WSC_fuel_statement_final.pdf

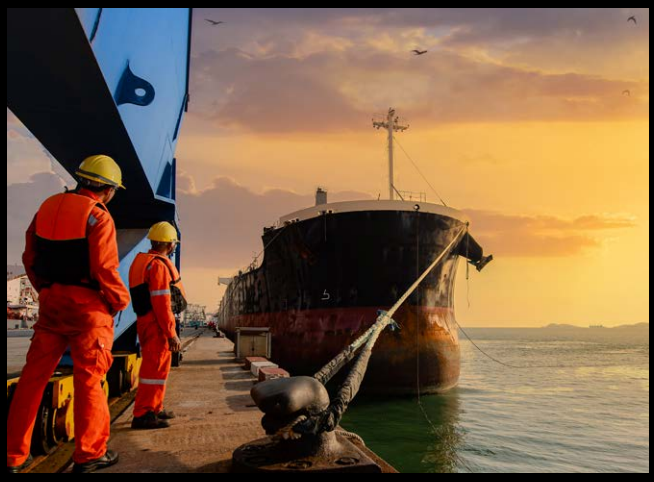
[5]https://www2.deloitte.com/content/dam/Deloitte/za/Documents/energy-resources/za-Deloitte-Mozambique-Domgas-intro-Aug2020.pdf

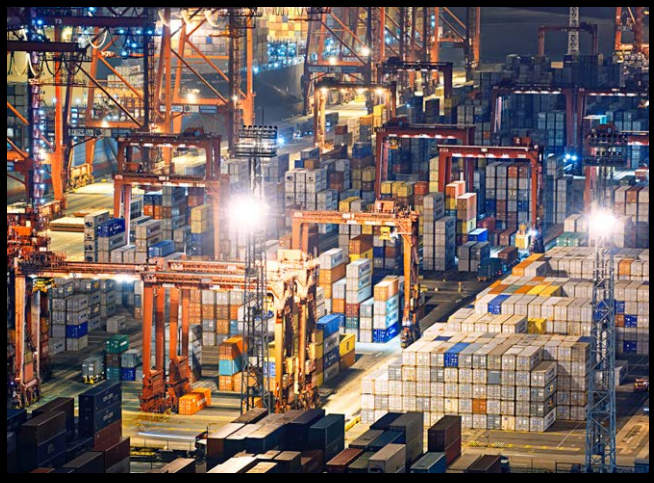
[6]https://sea-lng.org/wp-content/uploads/2020/02/200214_SEALNG2019reviewDIGITAL_compressed.pdf

The conversion of existing ship engines is another challenge. While the conversion itself is technically possible, it is also costly and forces the ships to be out of operation for a period causing ship owners to lose potential revenues. However, a long-term view needs to be considered, and operators need to be encouraged to convert fleets to LNG. With no strong stance being taking by governing bodies, the main driver for the adoption of LNG will be the fuel's ability to save operators money in the long run.

The commercial costs differ between ships that require conversion and newly purpose-built ships that will use LNG as fuel. A key factor impacting the payback period is the price of LNG compared to traditional marine fuels. LNG price fluctuates widely and will have a significant impact on the payback period. Additionally, the size of the vessel influences the price of conversion with the cost of conversion having a direct relationship to the size of the ship due to the size of the storage tanks required as bigger ships require more fuel to operate. A vessel that consumes 5 tonnes of fuel per day would cost $6m to convert while a vessel consuming 80 tonnes of fuel per day would cost $22m to convert[7]. The conversion costs would be for installation of LNG fuel tanks and to retrofit the vessel's engine to run on LNG. Fearnley LNG estimate that the conversion of an existing 8,500 twenty-foot equivalent unit (TEU) capacity container ship to LNG would cost $28m, while the choice of LNG propulsion in a newbuild vessel of the same size would cost $13m[8]. Choosing to run on LNG during the construction phase of a ship is much cheaper than converting an existing vessel to run on LNG.

LNG is seen as the fuel of the future that will aid in reducing the carbon footprint of the shipping industry and meet the targets set by the IMO. Overall, using LNG in the shipping industry could see the reduction of SOX, CO_2, particulate matter and NOX emissions by up to 90%[9]. The environmental benefits and the lower cost per GJ prove this is a compelling argument for the adoption of LNG to fuel marine vessels.





[7] *https://shipandbunker.com/news/features/industry-insight/566977-industry-insight-a-survival-guide-for-evaluating-the-cost-of-converting-a-vessel-to-use-lng-bunkers*

[8] *https://margetis.com/wp-content/uploads/2019/01/Fearnley-LNG.pdf*

[9] *https://www.oxfordenergy.org/wpcms/wp-content/uploads/2019/01/LNG-supply-chains-and-the-development-of-LNG-as-a-shipping-Fuel-in-Northern-Europe-NG-140.pdf*

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