

LNG marine bunkers' role in the transition to cleaner shipping

By Kevin Keenan, Antonia Panayides and Ella Evagora

Takeaways

- Shipping has a target of net-zero CO₂ emissions by 2050; restrictions will ensue
- Demand for LNG-powered ships has increased greatly
- LNG has clear environmental and commercial benefits for shipping
- In spite of the Ukraine/Russia crisis, LNG bunkering looks poised to grow



The shipping industry is facing increased regulation in a move to a greener shipping emissions profile. Regulations on shipping emissions are increasing, with the International Maritime Organization (IMO) setting a 2030 target for emissions reductions, and signatories to a September 2021 Global Methane Pledge will try to lower [2020 methane emissions](#) levels by 30 percent by 2030.

These goals are aimed at mapping the way to net-zero CO₂ emissions by 2050. With these policy commitments in mind, and with shipping companies on their own seeking to reduce greenhouse gas emissions and reap other clear benefits that LNG bunkering affords, there has been a significant increase in demand for LNG bunkers. This is evidenced by multiple shipbuilders building LNG bunker vessels, multiple shipowners ordering the construction of LNG-fueled vessels and a number of shipping companies exploring options for sources of green fuel production. Some examples of these trends include the following:

- Orders for new LNG-fueled ships reached record highs in 2021. According to data from Det Norske Veritas (DNV), there was a net increase of 240 ships from the previous year, a bigger increase than in the previous four years combined. This trend did not let up in early 2022, with [DNV reporting](#) that another 40 ships powered by LNG were ordered in January 2022 alone.
- Japanese shipbuilder, Mitsubishi Shipbuilding, a part of Mitsubishi Heavy Industries, will build an [LNG bunker vessel](#), the first to operate in the waters off western Japan.
- Maersk and Egyptian authorities have signed a partnership agreement to explore the establishment of green fuel production in Egypt.

This article explores the reasons for the increased demand for LNG-fueled vessels and whether LNG is the way forward for clean shipping.



Reasons for increased demand for LNG fuel

a. Increased regulation – Net-zero 2050 target

IMO rules from 2020 (IMO 2020) [lower the sulfur content of bunker fuel to 0.5 percent](#) (down from 3.5 percent) mass by mass (m/m). To comply with this, vessels must switch to fuels that are low in sulfur content or install a fuel cleaning method to reduce the sulfur content of traditional bunker fuels. The sulfur oxides regulation (MARPOL Annex VI, regulation 14) applies to all ships, whether they are on international voyages or domestic voyages, solely within the waters of a [country that is party to MARPOL Annex VI](#). Enforcement of IMO 2020 is supported by a ban on the carriage of non-compliant fuel which has been in effect since March 1, 2020. The ban prohibits ships from carrying fuel with a sulfur content higher than 0.5 percent in their fuel tanks. It is noteworthy that port state control authorities do not have to prove consumption of a non-compliant fuel; they simply have to find its presence in a ship's tanks to establish a violation. The only exception to this standard is ships equipped with exhaust gas cleaning systems ([scrubbers](#)) that remove sulfur emissions from a ship's exhaust before the gas is released into the atmosphere. In considering the aim for net-zero by 2050, [DNV Germanischer Lloyd confirmed](#) in its 2050 Marine Energy Forecast that "[i]n almost any scenario, LNG will be the single most important fuel in the market." Further, regulations on shipping emissions are set to get stricter. Following the 2021 UN Climate Change Conference (COP26), the IMO 2030 emissions target will now be reviewed in 2022. Also, following COP26, signatories to a [Global Methane Pledge](#) will see countries seek to lower 2020 methane emissions levels by 30 percent by 2030.

Increased regulation greatly increases the potential for a vessel's carbon footprint to be penalized in the new framework. However, with the clear benefits of LNG fuel, vessels will be placed in a good position to comply with the incoming regulations.

The benefits of LNG are discussed below.

b. Clear environmental and commercial benefits

LNG is one of the cleanest marine fuels available and has significantly lower CO₂ emissions than heavy fuel oil, marine diesel oil or marine gas oil. Moreover, LNG provides higher energy content and lower operational and maintenance costs. [LNG is suitable for ferries, passenger ships, tankers, bulk carriers, supply ships and containerships](#). LNG can significantly reduce pollution from nitrogen oxides (NOx) and particulate matter compared with conventional marine fuels

while cutting emissions of sulfur oxides (SOx) by [more than 90 percent](#), helping significantly to meet regulatory requirements. Additionally, LNG can reduce greenhouse gas emissions by up to 23 percent compared with traditional marine fuels, depending on the engine used.

c. Future-proof (cost, reliability and increase in infrastructure)

The reliable long-term supply of natural gas is also a key factor in LNG being more feasible in the long term than current fuels. The safe refueling of LNG-powered ships and the safe evacuation of LNG fuel from ships in an emergency are of paramount importance for the protection of LNG as a commercially viable and [acceptable marine fuel](#). LNG has the potential to be decarbonized further using ["drop in" bio gas-sourced LNG](#) (bioLNG) and, in the future, synthetic sources of methane.

Melissa Williams, vice president of Shell Marine, believes that for owners who support decarbonization and are in the market for new build vessels, "the only tangible new product and the best option is LNG." [Williams told Trade Winds](#) that "this is another industrial revolution happening right in front of us and most people don't even realize. [...] We are changing a culture not just within the company but within society. If owners have to make a decision to put something on the water and really believe in decarbonization, then LNG is the lower-carbon option than the alternatives."

Writing in *The Maritime Executive*, Peter Keller, chairman of SEA-LNG, a multi-sector industry coalition established to demonstrate LNG's benefits as a viable marine fuel, commented: "LNG demand, availability and infrastructure are all growing rapidly. LNG can be bunkered at most key ports today, including major marine fuel bunkering hubs such as the [Port of Singapore and Rotterdam](#)." Keller asserts that this will soon apply to bioLNG as well: "Carbon-neutral bioLNG can be bunkered into existing fuel tanks and blended with traditional LNG with no changes required to the vessel or any of its operating systems/procedures. This ability to drop in bioLNG, and in the longer-term renewable synthetic LNG, ensures that LNG-fueled vessels are future-proof assets. Meanwhile, the option to blend bioLNG with traditional LNG allows ship operators to incrementally introduce the lower carbon fuel in line with availability and increasingly stringent emissions requirements."



Obstacles to overcome

a. Price spikes due to supply and demand

Natural gas prices [remained volatile](#) throughout 2021, reaching record highs in Europe in October, owing to rising demand and supply constraints, exacerbated by declining storage volumes. The volatility emphasizes the need for a more strategic approach to achieving a secure, reliable and flexible gas supply in the future to avoid exposure to price spikes. Jerome Leprince-Ringuet, managing director of TotalEnergies Marine Fuels, acknowledged in the latter half of 2021 that the price of LNG was higher than gasoil or VLSFO (very low sulfur fuel oil), but noted that vessels having dual-fuel engines can hedge between the two markets. Also, [Leprince-Ringuet told Trade Winds](#) he is confident that the supply-demand balance will ease in the months to come.

b. Ukraine/Russia crisis: Does it impact where LNG can be sourced from?

In response to the Russian invasion of Ukraine, the [United States is banning all Russian oil and gas imports](#) and the UK will phase out Russian oil imports by the end of 2022. The United States and the EU have announced a deal on LNG in an attempt to reduce Europe's reliance on Russian energy. The deal will see the United States provide the EU with extra gas, [equivalent to around 10 percent of the gas it currently gets from Russia, by the end of 2022](#). A term of the new deal will see the United States and other countries supply an extra 15 billion cubic meters of gas in addition to 2021's 22 billion cubic meters. Reducing reliance on Russian oil and gas will require sourcing imports from non-Russian suppliers. New supplies of gas, will have to come from alternative places. However, there is already [competition for LNG supplies](#) from the world's largest producers, Qatar, Australia, and the United States, as well as other, smaller but nonetheless important producers, and that has been [pushing prices up](#). The biggest producer of LNG in the United States, Cheniere Energy, warns of challenges ahead for European consumers, with limited new supplies scheduled to hit the market. [Plans for Europe to phase out its reliance on Russian natural gas](#) will be complicated by intractable, lengthy construction times for new LNG infrastructure.

Conclusion – LNG bunkering is the way forward for cleaner shipping

While carbon-zero technologies such as hydrogen show some promise for carbon-free shipping at some point in the future, the most readily available solution to decarbonizing the shipping industry in the near to medium term is LNG. LNG is not only greener than traditional bunker fuels, it is also cheaper and more economical, although that doesn't account for the investment that needs to be made to bring LNG bunkering into the mainstream. Some investment has been made, but more will be required in order to see LNG bunkering proliferate to the extent needed to offset traditional bunker fuels. The advent of new and stricter regulations is certainly one driver for some of that investment; the cost savings and lower maintenance costs associated with burning LNG for propulsion are another. Only time will tell whether those two drivers will be enough to bring about a new revolution in marine emissions.





Authors

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Based in our Houston office, with a global practice focused on energy transportation and infrastructure development, Kevin advises clients on transactions across the energy value chain. For more than 25 years, Kevin has helped clients with large-scale capital projects in more than 30 countries, including in the LNG sector where he has taken the lead outside counsel role in dozens of liquefaction, shipping and regasification projects globally. In the LNG shipping space, Kevin has been at the forefront of the development of contract structures for the construction and chartering of multiple floating storage and regasification units (FSRUs), floating storage

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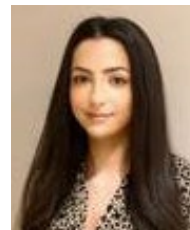
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