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# Future-fit fuel

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To drive the change needed across the entire marine transportation system, SEA\LNG unites key players from across the marine value chain. Launched in July 2016, the multi-sector industry coalition brings together LNG suppliers, bunkering companies, shipping lines, shipyards, original equipment manufacturers, classification societies, and port authorities. For more information please visit [www.sea-lng.org](http://www.sea-lng.org)

**As a clean and competitively-priced fuel, Liquefied Natural Gas (LNG) remains one of the most promising solutions for reducing emissions from shipping. However, despite all its advantages, a number of barriers are stifling the widespread uptake of LNG as a marine bunker. Then again, the 2020 global 0.5% sulphur cap may as well be a breakthrough moment in this regard.**

**W**ith more than 90% of global trade carried by sea, shipping is a lynchpin of the global economy, and it is widely agreed that this form of transportation remains the most efficient mode of moving freight on a tonne per kilometre basis. Maritime transportation, however, and particularly ocean-going vessels, has the potential to emit levels of sulphur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), and particulate matter (PM) that can negatively impact populations living near ports and coastlines, as well as those living further inland. This is why ship-owners and operators are under increasing pressure to adhere to existing and future environmental regulation.

## Regulatory advances

Existing Emission Control Areas (ECAs) in the Baltic and North Seas, North America, and the US Caribbean Sea have recently been supplemented by China's three domestic ECAs, as well as the European Union's Shipping MRV Regulation (2015/757), which came into force in July 2015. Moreover, the International Maritime Organization's (IMO) 0.5% global sulphur cap on marine fuels is going to become effective from January 2020, and the designation of more ECAs

can be expected. These existing and incoming regulations have the clear objective of dramatically reducing emissions produced by vessels using heavy marine fuel oils.

LNG emits zero SO<sub>x</sub> and virtually no PM. Moreover, depending on the technology used, it has the ability to emit approx. 90% fewer NO<sub>x</sub> emissions. Compared to existing heavy marine fuel oils, LNG's greenhouse gas (GHG) performance represents a major step forward. By utilising best practices and appropriate technologies to minimise methane leakage, realistic reductions of GHG by 10-20% are achievable, with a potential for up to 25% compared with conventional maritime fuels.

As of December 2016, there were 97 LNG-fuelled ships in operation – mostly smaller vessels such as ferries – sailing extensively in the ECAs of Northern Europe and North America. There are currently at least 91 LNG-fuelled vessels on order, and more or less another 70 LNG-ready ships either in service or in shipyards' books (the latter is designed for a streamlined conversion from conventional fuels to LNG when the time is deemed appropriate by the ships' owners). The existing order book – while depressed due to over-tonnage – is showing a growing

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number of deep-sea vessels, including cruise ships, container vessels, and bulk carriers being built to LNG dual-fuel standards.

Safety is of paramount importance. The industry has always worked diligently to ensure that LNG is used and transported safely and reliably. In the bulk LNG transportation industry, where LNG is commonly used as a fuel for the transporting vessel, LNG has an exceptional safety record. Over the past 50 years, more than 77,000 commercial LNG cargoes have been safely delivered, and global LNG shipments have covered more than 100 million miles (about 4,000 times around the Earth) without any major safety incidents in a port or at sea.

The use of LNG as a marine fuel outside the LNG carrier business is a relatively new development, as are gas-only and dual-fuelled engines. But, since its introduction as a marine bunker at the turn of the century, LNG-fuelled vessels and associated bunkering operations have had an exemplary safety record. For example, the *Viking Grace* cruise ferry has bunkered without incident more than 1,000 times in Stockholm since its entry into service in 2012. This is a testament to the LNG industry's rigorous design guidelines for both ships and shore facilities, as well as high standards of safety training and operational procedures. The world's first dual-fuelled container vessels entered service in late 2015 for TOTE Maritime in the trade between the U.S. and Puerto Rico. Since their introduction they have been running on LNG for the vast majority of

their operating hours. These vessels again prove that the technology works safely and effectively. And quite recently, the dry bulk segment witnessed its first LNG-powered ship, the dual-fuel *Greenland*.

A key concern for ship-owners and operators is the associated cost of compliance with various environmental regulations. At present, LNG-fuelled propulsion is already proving to be a cost-effective solution to meeting emissions limits in certain US and European ECAs. It also has the capability to be an economically viable solution for deep-sea shipping trades where vessels spend an estimated 50% or more of their time in ECAs. And although the current LNG bunkering infrastructure is concentrated in Northern Europe, the US Gulf and East coast, more such facilities are being built to reflect the growing demand. This is most evident in the infrastructure being developed by the world's busiest bunker port, Singapore, and in the activities in major ports in eastern China, e.g. Shanghai and Ningbo-Zhoushan.

#### Addressing the core issue

While the economics are currently more challenging in the deep-sea container and bulk commodity shipping sector, implementation of the IMO's 0.5% global sulphur cap will likely drive up the demand, and consequently prices for Marine Gas Oil (MGO) and Low Sulphur Fuel Oil (LSFO), thereby improving the economic case for the marine fuel use of LNG. Scrubbers, which are exhaust gas cleaning systems

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enabling continued use of high sulphur bunkers, require significant additional capital expenditure, are operationally complex, as well as have waste management issues. Of the several compliant solutions available for the deep-sea shipping industry, LNG provides an essential solution for the long-term, as it is the only currently available solution that addresses the core issue: The fuel itself.

SEA\LNG believes that a collaborative approach to understanding and then tackling the barriers to LNG use is crucial to encouraging investment and continuing to stimulate innovative solutions, thereby accelerating the adoption of this viable, clean, and cost-effective alternative to traditional bunker fuels. Creating the infrastructure to enable quick, safe, and cost-effective LNG bunkering in key global ports, diminishing the price premium for LNG-fuelled vessels, and establishing the consistency of international and national regulations globally, are all essential if LNG is to reach a tipping point and fulfil its potential as a future-fit solution for the shipping industry as a whole. ■

