



LNG

THE FUEL OF THE FUTURE



Angus Campbell, Managing Director,
Bernhard Schulte Shipmanagement UK

Whatever the fluctuations currently seen in the oil market, Liquefied Natural Gas, (LNG), is still widely regarded as the fuel of the future. Natural gas is a plentiful energy resource, found in many parts of the world in significant quantities. This abundance makes it virtually sustainable, with, (according to the IEA), about 200 years supply recoverable. In addition, new discoveries are being added on a regular basis and the advent of hydraulic fracturing, (or fracking), of shale rock is also contributing significantly to global reserves.

The chemical composition of natural gas is also key to its importance. As environmental concerns and emission controls become even more important, the fact that methane has one carbon atom and four hydrogen atoms makes it a versatile, efficient and cleaner burning fuel than other hydrocarbons. As seen during the recent COP21 UN climate conference in Paris, concern about carbon dioxide reduction and mitigation of the global warming impact was shown by 195 countries. The European Commission has already introduced the Monitoring,

Reporting and Verification regulation (MRV) which will enter force on January 1, 2018. This will require all ship owners to monitor and report on CO2 emissions for vessels over 5,000 GT which call at any EU port.

Of course market factors cannot be disregarded. Due to the significant volume and geographical diversity of natural gas, there will be healthy competition in the natural gas market as more LNG is produced, leading to competitive energy pricing for consumers. New pricing structures are developing as LNG becomes a globally traded commodity.

As we move away from more complex hydrocarbon fuels, including coal, the need for natural gas as the so called “bridging fuel” between the hydrocarbon and hydrogen economies becomes clearer and more compelling.

LNG AND THE SHIPPING INDUSTRY

Due to the low energy density of natural gas, the only economic way of transporting large quantities of LNG over long distances is by ship. When chilled

to -162 degrees C, methane turns into a cryogenic liquid and the gas/liquid volume ratio is 600/1. We are seeing the number of LNG carriers in service growing, currently numbering about 440, effectively making this fleet of specialised ships the floating pipeline for global LNG trade. As more LNG producers enter the market, this growing fleet will benefit from the developing global natural gas market.

The earlier LNG business model that relied on point to point long term contracts is also changing. Consumers now prefer shorter contracts, providing the ability to source gas from different producers to ensure cost efficiency. The benefits to the shipping industry are obvious with this new business model generating increasing ton mile demand.

The other benefit we are seeing is, of course, the use of natural gas as a marine fuel. As more ships are built with dual fuel engines, the demand for LNG fuelling in ports around the world is increasing, creating new business opportunities for those involved in the development of this infrastructure. The number of ships



being built or converted to burn gas is also increasing, with momentum growing steadily. New regulations, such as the European Commission MRV regulations mentioned earlier, will, in all likelihood accelerate this transition.

For example, Schulte Group and Babcock Group have developed a unique Gas Supply Vessel, (GSV), to deliver LNG to ships and other off-pipe consumers. The GSV design illustrated above has gas electric propulsion, is extremely manoeuvrable to allow safe independent operation within ports and restricted waters, while retaining good seakeeping capability to allow regional service. The gas system has been developed to ensure zero emissions to the atmosphere during LNG transfer operations, with all boil off, flash gas and nitrogen purge retained on board the GSV to be used as fuel.

The use of natural gas as a marine fuel will allow shipping companies to meet all current regulations in Emission Control Areas, (ECAs). Although current ECA regulations focus on dramatically reducing NO_x, SO_x and particulates, the use of natural gas as a fuel also reduces CO₂ emissions. The benefits also extend to a reduction in machinery maintenance costs as a consequence of burning a cleaner fuel. Competitive pricing due to the abundance of this energy resource will ultimately result in a sustainable reduction in operating costs for ships that can make this new fuel choice.

THE ROLE OF THE PORT

Ports play a pivotal role in the growth of LNG, holding the responsibility for building the infrastructure required to handle cryogenic fuel. Availability of LNG on all major trade routes is essential to encourage shipowners to invest in dual fuel ships. This has already started, with

Rotterdam and Antwerp providing good examples of proactive port authorities.

There are many other ports planning to provide this service, determined to make their facilities as attractive to potential users as possible. In addition to the marine facilities needed to safely berth they need to consider load and discharge, suitable storage tanks, maintaining a safety perimeter and the provision of other equipment which may be needed. LNG fuelling facilities may be linked to an existing LNG terminal, or be a smaller standalone facility.

The number of major LNG facilities on-stream already is large, with others under construction or at the planning stage. While this is a moving target, based on publically available information, at November 2015 there were 36 LNG liquefaction plants in operation, plus 15 under construction. On the discharge side there were 112 regasification terminals in operation, plus 19 under construction around the world. There are many more planned, as different regions develop access to LNG for various reasons, including energy diversification and security.

AN INTEGRATED OPERATION

The LNG sector has an excellent safety record which all stakeholders strive to maintain. To achieve this it is essential that ports, shipping companies and LNG producers work together to manage risk and develop appropriate systems and procedures. There are two excellent industry bodies that already facilitate such collaboration: the Society of Gas Tanker and Terminal Operators (SIGTTO) and the Society for Gas as a Marine Fuel (SGMF). Both societies provide a forum for regulatory authorities, ports, LNG terminals and shipping companies to work together in the interests of safety and protection of the environment. The

membership is truly international, making experience gained over decades available to members.

The traditional LNG value chain is a very pure operation involving a specialised LNG carrier loading gas at a dedicated LNG loading terminal, for discharge at a dedicated LNG receiving terminal. It is relatively simple to build safety into the process at every stage.

However as LNG fuelling develops, the safe transfer of LNG will need to work with other simultaneous operations (simops). This may involve many different scenarios, such as a cargo ship receiving LNG while conducting cargo operations, or a ferry transferring passengers and vehicles. With the introduction of simultaneous operations, new safety systems and procedures need to be agreed between all parties. To make sure that standards are international and uniform, SGMF have already started this work, providing an ideal reference point for ports wishing to look at this sector in more detail.

ABOUT THE AUTHOR

Angus Campbell was appointed Managing Director of BSM United Kingdom in 2013, bringing significant experience with him to the role. He previously held the position of Owner/Principal Consultant at CH4 Marine Advisory, a ship management company dealing with the commercial development and operation of marine transportation related to oil and gas. Angus's operational background led him to a specialism in managing dry/wet and gas carriers. Trained as a ship manager, Angus has been in the shipping industry for over 40 years, holding various senior positions including Head of Gas for Overseas Shipholding Group (OSG).

ABOUT THE ORGANISATION

Bernhard Schulte Shipmanagement (BSM) is an integrated maritime solutions leader, with more than 130 years of experience in the shipping industry. Managing a fleet of 600 vessels, 20,000 employees enable the delivery of safe, reliable and efficient ship management services through a network of nine ship management, 23 crew service and five wholly-owned maritime training centres across the world. Alongside comprehensive ship management services, BSM offers a suite of complementary maritime solutions that are customised to meet individual customer requirements.

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uk-smc-man@bs-shipmanagement.com