

Pioneering LNG as fuel in North America

Patrick Janssens and Roy Bleiberg, ABS,
demonstrate how LNG projects in the US are setting
the bar for vessel safety.

New regulations require vessels operating within the North American Emission Control Area (ECA) of 200 nautical miles of the US, Canada, Puerto Rico, and the Virgin Islands to meet a 1% sulfur content limit in fuels. While the current limits pose a challenge, the drop of this limit to 0.1% in 2015 will change the operating landscape even more, requiring ship owners and operators to identify and employ cleaner fuel options.

There are several viable options at present for meeting this requirement, such as burning ECA-compliant blends of marine distillates, using ultra-low sulfur fuels, and using exhaust gas scrubber systems to remove pollutants from the emission stream. These solutions, while effective to some degree, may be relatively costly. When seeking to identify long-term solutions, especially for new construction, there is a more effective option owners and operators should consider.

Class perspective

Vessel owners, operators and designers are showing increased interest in maturing the application of natural gas to fuel ships. A number of companies are looking to LNG as a more sustainable and economical fuel source

for the marine and offshore industries to comply with North American ECA standards, which are stricter than global standards.

Working closely with industry and regulatory bodies such as the US Coast Guard (USCG), class societies are committed to verifying that LNG ship designs are based on sound engineering practices, from the initial planning stage to the final delivery of the vessels.

Toward that end, the ABS 'Guide for Propulsion and Auxiliary Systems for Gas Fueled Ships, 2011' was released to provide technical standards for the arrangement, construction, installation, and operation of machinery



Image courtesy of Harvey Gulf International Marine LLC.

components and systems for gas fuelled vessels. Providing a basis for gas fuelled ship designs, the guide incorporates more than 50 years of experience with LNG handling and storage on board ships, many with dual fuel diesel propulsion plants. Industry standards considered in this guide include International Maritime Organisation (IMO) Resolution MSC.285 (86) Interim Guidelines on Safety for Natural Gas-Fuelled Engine Installations in Ships, the International Gas Carrier Code and the IMO International Code of Safety for Gas-Fuelled Ships.

When determining the appropriate requirements for gas fuelled ships and LNG fuel propulsion systems, the USCG has primarily relied on IMO Resolution MSC.285 (86) to provide a baseline for developing its design criteria. Furthermore, the USCG has drafted a policy for vessels and waterfront facilities conducting LNG marine fuel transfer (bunkering) operations, which was scheduled for publication in late Q3 2013.

The first wave of LNG developments, involving new-build and conversion gas fuelled ship designs under way in the US, must meet the appropriate regulatory requirements to receive safety notations certifying that the vessels are in full compliance with all applicable ABS rules, guides, and statutory guidelines and regulations.

First US application

Harvey Gulf International Marine, based in New Orleans, has taken the first step to introducing LNG propulsion technology

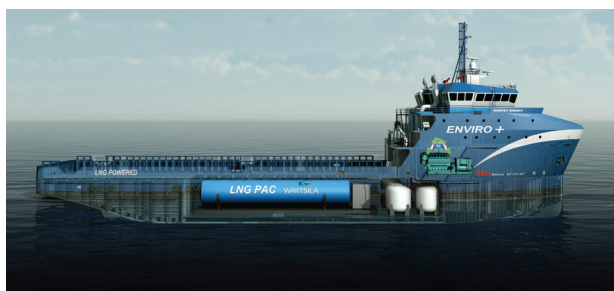


Figure 1. A new generation of LNG fuelled OSVs, classed by ABS, will use dual fuel engines for optimal fuel and cost savings (image courtesy of Harvey Gulf International Marine LLC).

Global Gas Solutions

Organising resources to focus on specific disciplines is one of the first steps in meeting technology challenges. The recently formed Global Gas Solutions Team was created at ABS to align internal resources with external needs. The new team brings together industry-focused professionals, whose objective is to work alongside owners, shipyards, and equipment manufacturers to promote LNG and other gas-related projects as a way to meet more demanding exhaust gas emissions requirements.

A dedicated group within the Global Gas Solutions Team will oversee programmes in North America, focusing on advancing LNG as a marine fuel and developing export capabilities to move growing North American gas supplies into the global marketplace.

Combining extensive LNG and LPG experience with a track record of working with the USCG, Federal Energy Regulatory Commission, and Maritime Administration, ABS will help stakeholders in the global gas industry navigate the sector's unique challenges.

to the US Gulf of Mexico (GOM) as part of the company's 'Going Green' initiative that includes the goal of having a fleet of gas fuelled supply vessels for offshore support. Although this technology is not novel – having been developed by Wärtsilä and implemented 10 years ago on the first platform supply vessel (PSV) to run on natural gas for Statoil in the North Sea – Harvey Gulf's LNG powered offshore supply vessels (OSVs) will be the first built in a US shipyard under USCG requirements and classed by ABS.

The new-build programme includes six dual fuel (LNG and diesel) DP-2 PSVs powered by Wärtsilä's integrated propulsion system with dual fuel machinery. Data gathered and analysed by Harvey Gulf indicate this new generation of OSVs will be the cleanest burning vessels operating in the GOM.

In addition to ABS requirements, the LNG OSV design was developed in accordance with the IMO requirements for gas fuelled ships and the USCG policy on gas fuelled ships. These vessels will receive ABS Enviro+ and GP (Green Passport) notations, outlining additional steps to take in designing, constructing, operating, and recycling vessels in an environmentally responsible way. Harvey Gulf anticipates the use of LNG will save as much as US\$ 2.5 million per ship in operating costs.

ABS and USCG have worked closely together to promote safety and consistency to the application of the new requirements for gas fuelled vessels.

Technical challenges

While ongoing research and development of LNG technology and the developments being undertaken in the US support the technical feasibility of using LNG as fuel, several near-term challenges tied to regulatory requirements and support infrastructure must be overcome for its wide-scale adoption.

As class, industry, and the USCG are shaping concept and design specifications for LNG fuelled vessels under the US flag, applying the insight garnered from combined experience in areas such as vessel operation and bunkering logistics is critical. While the concepts for supporting complex vessels build on existing technology and practices, the lessons learned from working in tandem to resolve these issues and in identifying technical solutions are directly impacting new policies, procedures, and design acceptance criteria for gas fuelled ships.

Lessons learned, to list a few, include recommendations to address hazardous areas, best practices for LNG tank venting arrangements, and clarification of required surveys after construction.

Continued collaborative efforts will provide a better understanding of appropriate operational requirements and restrictions, design loads, applicable class society rules, industry standards, and flag state statutory requirements.

Charting the course

Early adopters of LNG as fuel stand to gain on three significant fronts: they will be well prepared to meet strict exhaust emissions requirements, will have the added benefit of achieving improved environmental stewardship, and will benefit from reducing fuel costs over the vessel's operational life.

Green initiatives aimed at building dual fuel fleets and using LNG propulsion technology are providing the framework and best practices for gas fuelled ship design and are the foundation for longer-term solutions for meeting increasingly stringent emissions standards in North America. **LNG**