



US GAS EXPORTS TO ASIA:

A New Era in Shipping and Global Trade

The global gas landscape is undergoing a seismic change across the supply chain. Alongside conventional, but still demanding gas projects, shale and other unconventional sources have upended traditional energy market models and are reversing assumptions about trade flows.

Nowhere is this more true than in the relationship between Asia and the United States. Energy demand from Asia is set to soar and many countries in the region regard US LNG as a key part of their future energy mix.

The increased use of LNG in new sectors, including transportation and utilities is driven by both environmental compliance and potential fuel cost saving. There is strong focus from Japan on sourcing LNG from the US, as well as growing demand from India and the Southeast Asian region.

By some estimates, Asia could consume as much as two-thirds of global LNG supply by 2015, with cargoes sourced from the US sailing via the expanded Panama Canal. Supply will come from conventional gas fields offshore Australia and East Africa

and increasingly from US shale gas. With its diverse maritime market, increasing gas production and stricter emissions requirements, the US is becoming a catalyst for change in the global gas marketplace.

As a measure of the strength of demand and appetite for new trade opportunities, consider that while there are just three applications to build gas import terminals in the US, there are 13 export terminal proposals currently filed with the Federal Energy Regulatory Commission and another 22 potential projects have been identified.

This potential new US Gulf-Asia LNG trade via the Panama Canal would cover about 5,300 fewer miles, which assuming 19.5 knots sailing speed, would be 12 days fewer sailing time than the current voyage. LNG shipping is changing in response and with new markets come new opportunities. The emergence of floating storage and regasification unit (FSRU) and LNG projects, the development of small scale LNG and LNG bunkering concepts are all exciting opportunities for the industry. ☞



KETC at Forefront of LNG Research

The development of cutting-edge technologies and practices in the LNG field are driving much of the activity of the ABS Korea Energy Technology Center (KETC) in Busan. Working alongside Korean academic institutions and representative of the marine and offshore industries, ABS professionals are focusing on applied research across a broad range of current and future technology challenges.

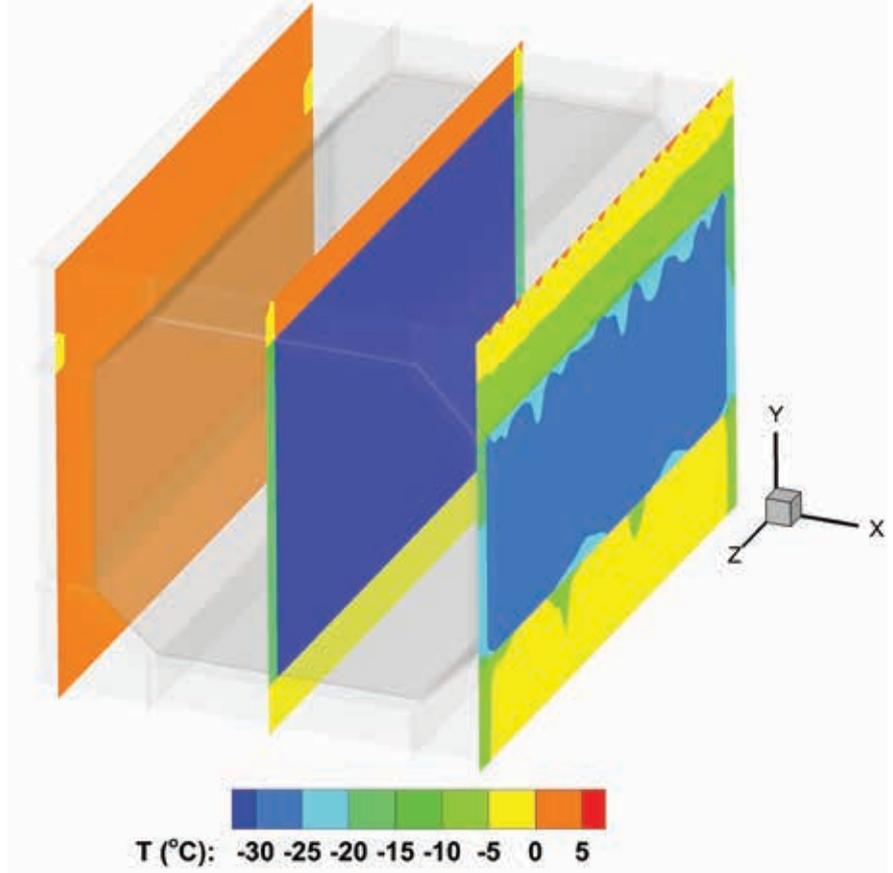
Several current projects at KETC are helping to further industry understanding of LNG-related issues.

The KETC team has recently completed a design review for a proposed LNG bunkering vessel. This has included studying LNG tank capacity and structural issues, handling of boil-off gas, bunkering concepts, LNG cargo handling, LNG propulsion and hazards associated with the operation of the vessel.

Building on its work concerning LNG as fuel, the KETC has granted concept design approval for a non-circular pressure type tank constructed from cryogenic temperature steel. The approval included making structural assessments under internal pressure loads, non-linear analysis of damaged condition, system design and analysis of tank operations and heat ingress calculations.

The center is performing 3D thermal analysis of centerline cofferdam bulkheads for

application on floating LNG structures. Using thermal analysis on FLNG tanks can provide better guidance for structural material selection and more accurate boil-off gas calculation, improving safety design under different operating conditions. ☞



ABS Expands Global Gas Solutions Team

To meet the needs of a diverse and growing gas marketplace, ABS recently expanded its Global Gas Solutions team. ABS has built a team of global gas specialists with extensive knowledge of LNG floating structures and systems, gas fuel systems and equipment, and regulatory and statutory requirements.

Sean Bond serves as the Director of Global Gas Development. With more than 25 years at ABS, Bond has worked across the organization in Rule development and engineering review, with a particular specialty in LNG carriers. He most recently served as Director of Environmental Solutions, where he was a leading specialist on the use of LNG as a marine fuel.



Sean Bond



Tor-Ivar Guttulsrod

With more than 25 years of experience, Tor-Ivar Guttulsrod recently joined ABS as Director of Floating LNG. Guttulsrod has extensive management and operational experience from across the energy industry. Most recently he served as Vice President of LNG Sales for Wison Offshore and Marine. He also held several positions with

Teekay and ABB. Guttulsrod's career has focused on LPG and LNG facilities, with extensive involvement in FPSOs and floating LNG and LPG facilities. ☞

ABS Releases NSR Advisory

ABS has released an Advisory for *Navigating the Northern Sea Route* (NSR), to support shipowners and operators intending to transit the increasingly popular commercial shipping routes through the Arctic seas.

The NSR provides access to the growing energy and industrial activity in northern Russia. Projects that already have led to greater tanker traffic in the area and provided the impetus for several recent orders of ice-class LNG carriers for future export trades.

The first LNG carrier transit of the NSR was completed in 2012. That the voyage was completed safely will give encouragement to those who judge the carrying of LNG from western suppliers to eastern consumers as a new trading opportunity.

The Advisory includes reference information on the NSR and its regulations, navigating in ice-covered waters, winterization strategies and data on NSR ports. It was developed with assistance from Russia's Central Marine Research and Design Institute and provides owners with the information they need to apply for permits and to identify the technical and operational risks that could arise when trading in some of the world's most challenging commercial shipping environments. ☞



Study Outlines LNG Bunkering Regulations

ABS is developing a document that LNG stakeholders will be able to use to guide them through the issues associated with LNG bunkering.

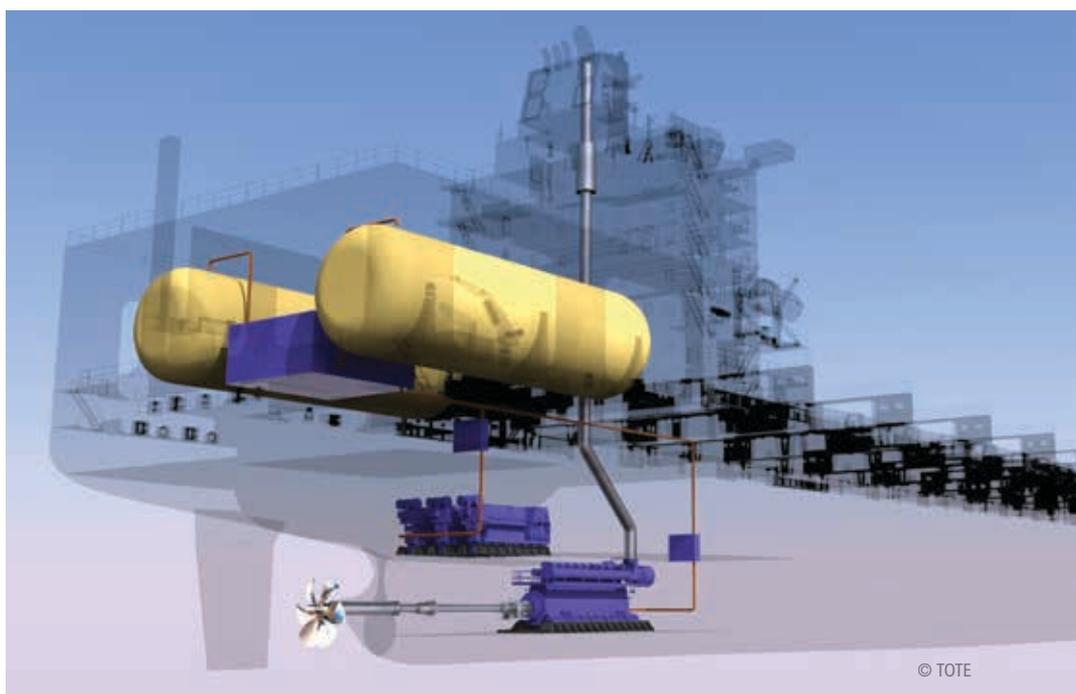
ABS and ABS Group conducted a study to address specific issues associated with LNG bunkering as well as infrastructure at ports and marine accessible terminals. The resulting guidance document will be of particular interest to North American operators and owners of LNG fueled vessels, LNG bunkering vessels and waterfront facilities. The document provides information on US and Canada federal regulations, state/provincial and port requirements, international codes and standards, potential waterway requirements and restrictions as well as regional and local regulations.

“The primary objective of the study is to develop a set of implementation aids, check lists, processes and regulatory information that will support vessel owners and operators at various stages of their decision-making processes,” explains Patrick Janssens, ABS Vice President, Global Gas Solutions.

“While a number of LNG bunkering studies have been conducted, this is

the first that pulls all the pieces together into a process guide and regulatory framework in the form of a resource repository for LNG stakeholders,” adds Chuck Mitchell, ABS Group Vice President, Global Strategic Initiatives.

Taken as a whole, the report lays out a comprehensive overview of LNG bunkering issues and the emerging technological and regulatory implications of using LNG as fuel. ☞



ABS Outlines Lesson Learned During First US Projects for LNG as Fuel

Despite having costly upfront capital expenditure and conversion costs, several owners have concluded that using LNG as a marine fuel offers the best long-term solution to improving environmental stewardship and reducing their fuel costs over the vessel's lifetime.

The first LNG as fuel initiative under US flag calls for innovative design specifications and the evaluation of bunkering infrastructure at a time when regulations surrounding LNG as fuel are still being developed.

This project will see operator Harvey Gulf construct six LNG-powered offshore supply vessels for operation in the US Gulf market. The innovative nature of this construction has seen class, industry and US regulators work together to develop regulations and processes to address technical challenges.



During Gastech 2014, ABS Vice President of Global Marketing William Sember will present a paper discussing the lessons learned while developing the design specifications and the construction of the first class of LNG fueled vessels under regulations applicable in the US. ☞

ABS Endorses Horizon Lines LNG Conversions

As a first step in its 'repowering initiative,' Horizon Lines, Inc. plans to convert the power plants on two of its Jones Act steam turbine cargo vessels serving the Hawaii and Puerto Rico trade lines to modern dual diesel and LNG engines. The 801-ft vessels, *Horizon Reliance* and *Horizon*

Spirit, will receive new notations following verification that the converted vessels have met the requirements laid out in the *Guide for Propulsion and Auxiliary Systems for Gas Fueled Ships*. Conversion work is tentatively scheduled to begin on the first vessel in January 2015, with both ships to be completed late in the year or early 2016.



According to Horizon Lines, the goal of the conversion is to lower emissions, in order to meet the requirements for the North American Emission Control Area, and reduce fuel consumption.

Horizon Lines' conversion project includes removal of the steam propulsion systems and repowering with the dual fuel main engines and supporting components, including the installation of the LNG storage tanks. ABS is assisting the company on compliance with the US Coast Guard (USCG) requirements. ☞