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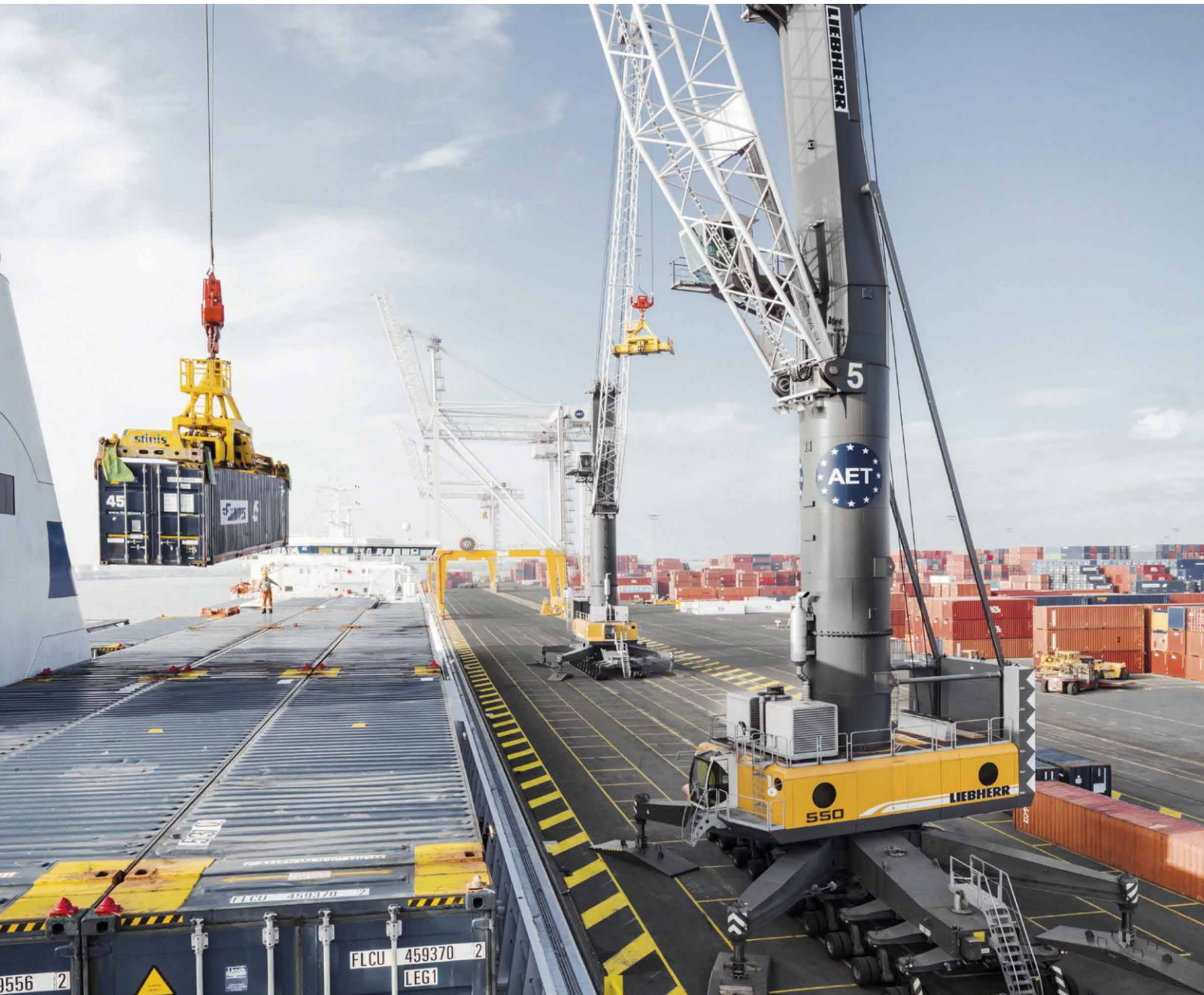
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## red-hot port matters

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### More room in Ystad

The Port of Ystad has put in place two new areas to improve port logistic operations – one 33,000 m<sup>2</sup> and the other 23,000 m<sup>2</sup>. The bigger open sky section is designed for arranging vehicles before they check in. The other comprises two warehouses, each 5,120 m<sup>2</sup>. “The Port of Ystad plays the key role in serving trade between Sweden and Central and Eastern Europe. We’ve been seeing progress here since a long time now, increased prosperity, as well as new job opportunities as well as a world of possibilities for companies,” Roger Jönsson, Chairman of the Harbor Committee Ystad City Council, said. He also added: “in 2018, we’re planning to launch the biggest investments in the municipality’s history – the construction of two new ferry berths in the outer port. These will contribute to further increasing trade by providing shipping companies with new business opportunities. The project demonstrates the potential and the possibilities we see in Ystad for logistics and warehousing companies to base their activities in the port.” “Following the municipality’s investments we have a good base to handle the increased volumes and at the same time support the shipping lines. Both Unity Line and Polferries are experiencing a healthy traffic growth and, in 2020 we’re expecting to see the first out of many newbuilds to start sailing between Ystad and Świnoujście. The facilities we have just launched are a strategically important and simply a necessary step in securing our port’s future in the light of the traffic forecasts,” Björn Boström, Managing Director, the Port of Ystad, commented.

### DP World Yarimca upgrades two RTGs

DP World’s Yarimca Container Terminal in Turkey is upgrading two of its Konecranes’ Rubber Tired Gantry (RTG) cranes to test the capabilities of remote operations. The new improvement involves the installation of two Remote Operating Stations (ROS). Yarimca’s Konecranes RTG cranes are electrically powered by cable reel systems. They are already equipped with safety-enhancing and operator-assisting features, such as stack collision prevention, trailer lift prevention, auto-truck guiding and auto-positioning, as well as auto-TOS reporting. The upgraded RTGs will be remotely operated from two ROSES and are scheduled to be operational at the beginning of next year. “I am pleased to receive this opportunity to field-test remote operation with two of the Konecranes RTGs in the DP World fleet. Together, we will test the remote operation concept, studying the performance of the remotely operated RTGs versus the manned RTGs in the container yard as they carry out work cycles in everyday operating conditions,” Antoine Bosquet, Sales Director Region EMEA, Port Solutions, Konecranes, said.

### VGT bulks up

Ventspils Grain Terminal has gained a new two-section warehouse and a new cargo handling facility that serve both sea and land transports. The 5,500 m<sup>2</sup> big warehouse can store up to 30,000 tonnes of various agro products. Thanks to the investment, its total storage capacity has been increased to 100,000 tonnes. With 1.5 million tonnes of yearly freight turnover capacity, Ventspils Grain Terminal can handle Panamax ships (up to 280 meters long with a draft of 14.5 meters) at a 1,000 tonnes/hour rate.

### Wagenborg Offshore charters *Blue Queen*

The Ulstein-owned ship has been chartered for six years by Wagenborg Offshore to support Nederlandse Aardolie Maatschappij (NAM) and SHELL UK Exploration & Production with their offshore operations in the North Sea. *Blue Queen* will be converted from Platform Supply Vessel (PSV) to the so-called Walk-to-Work Emergency Response and Rescue Vessel (W2W ERRV). It will be Wagenborg’s standby and support ship for inspection and maintenance of the unmanned platforms in both Dutch and British waters. The conversion to W2W ERRV will include i.a. installation of an additional accommodation module, motion compensated gangway and motion compensated crane – to comply with the requirements of NAM-Shell. The vessel will start operations in Q1 2018.



Photo: Royal Wagenborg

# market sms

Photo: www.pexels.com

## HHLA:

5.5 mln TEU handled in I-IX 2017 (+10.8% yoy)

The company's three sea container terminals operating in the Port of Hamburg made a total of 5.2 million TEU during the first three quarters of this year, an increase of 11.3% year-on-year. The remaining 0.3 million TEU was handled at HHLA's box facility in the Ukrainian Port of Odessa. At the same time, the company's intermodal unit (rail and road) carried a total of 1.1 million TEU, an increase of 6.8% over last year's volumes. "HHLA is currently benefiting from the positive trend in both the global economy and world trade, but also from the targeted sales activities and in-depth discussions with our customers which took place in the spring of this year and by which we secured – and in some cases expanded – our market position. We believe that we will achieve the targets forecast for 2017," commented Angela Titzrath, Chairwoman of HHLA's Executive Board. She also said: "although the results are very pleasing, we continue to operate in a challenging market environment. Uncertainty remains in the form of the volatile trend in international trade, which has prompted a structural slowdown in growth over recent years and in the conditions at the Port of Hamburg. We are still waiting for work to commence on the dredging of the river Elbe."

## ORE RAILWAY:

18,507 thous. tn carried in H1 2017 (-2.5% yoy)

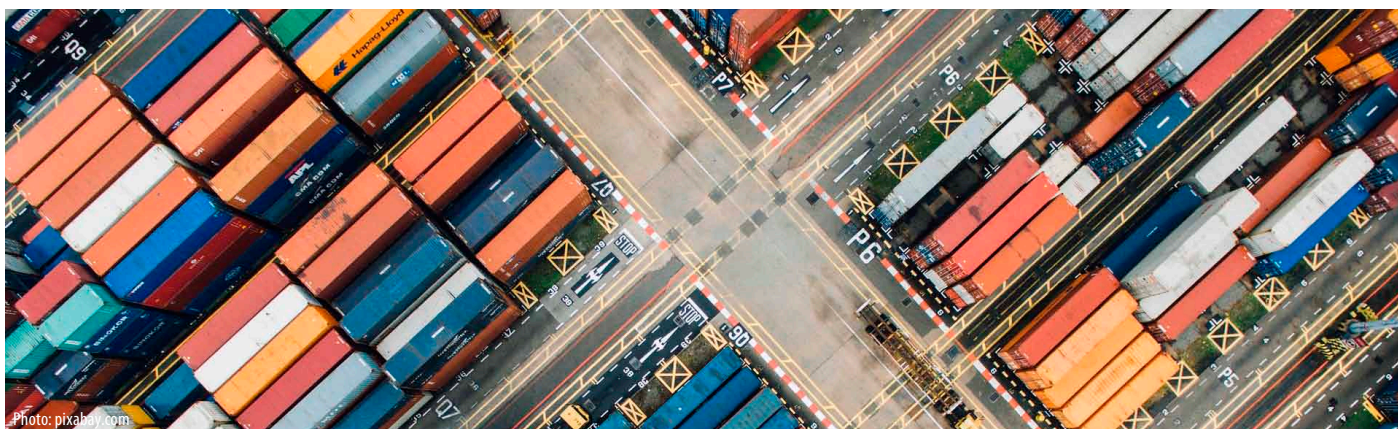
Transport performance across the rail line which serves traffic between mines in the North of Sweden and the Port of Narvik, Norway, totalled 8,194 million tonne-kilometer in the reported period (-0.8% yoy).

### Ore Railway's volumes

H1 2017	Cargo carried [thous. tn]	Yoy	Total rail freight traffic in Sweden [thous. tn]	Ore Railway's share of the total
Q1	9,363	-0.2%	17,222	54.4%
Q2	9,144	-4.8%	16,615	55.0%
Total	18,507	-2.5%	33,837	54.7%

H1 2017	Transport performance [mln tn-km]	Yoy	Total rail freight transport performance in Sweden [mln tn-km]	Ore Railway's share of the total
Q1	4,165	+2.6%	5,400	77.1%
Q2	4,029	-4.0%	5,214	77.3%
Total	8,194	-0.8%	10,614	77.2%



## SPSP:

5.1 mln tn handled in I-IX 2017 (-8% yoy)

With 4.8 million tonnes (+/-0% year-on-year), general cargo accounted for the bulk of freight handlings done by the Russian stevedore Sea Port of Saint-Petersburg. Out of the total volume, ferrous metals totalled 2.7 million tonnes (+23% yoy), non-ferrous – 1.1 million tonnes (-7% yoy), and scrap metal – 415 thousand tonnes (-26% yoy). Containerised freight traffic made 191 thousand tonnes/25,551 TEU (+50% yoy). Handlings of ore, which previously accounted for approx. 10% of SPSP's overall turnover, were entirely transferred to another stevedore of the UCL Holding.



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REVISOL



featured article

Photo: ConocoPhillips

# To LNG or not to LNG

by Katarzyna Chmielewska

**Natural gas is a triple-A resource – it is abundant, available, and affordable. Its carbon emissions are about half those of coal, being at the same time cheaper than renewables to boot. The sharp rise in production of gas from shale rock formations in the United States has led to a supply boom, fuelling in turn export capacity investments. However, experts agree that the very same triple-As have led to an LNG supply glut. Producers are already seeing an unfavourable supply-demand relation, and they are likely to face even more challenges in the coming years.**

“  
**In 2002, LNG represented 7% of the total natural gas supply, jumping up to 16% in 2015. According to the International Energy Agency, demand will rise 1.4% per year from 2013 through 2025, as compared to a 0.4% growth for coal and 0.6% for oil.**

**T**he need to bring conventional gas reserves to the global market has driven the demand for LNG. In 2002, LNG represented 7% of the total natural gas supply, jumping up to 16% in 2015. According to the International Energy Agency, demand will rise 1.4% per year from 2013 through 2025, as compared to a 0.4% growth for coal and 0.6% for oil. LNG demand has also proven to grow strong relative to natural gas and other fossil fuels. From 1990-2015, LNG grew in this regard at an annual rate of 6.2%, eclipsing the 2.3% rate for natural gas and 1.4% for oil.

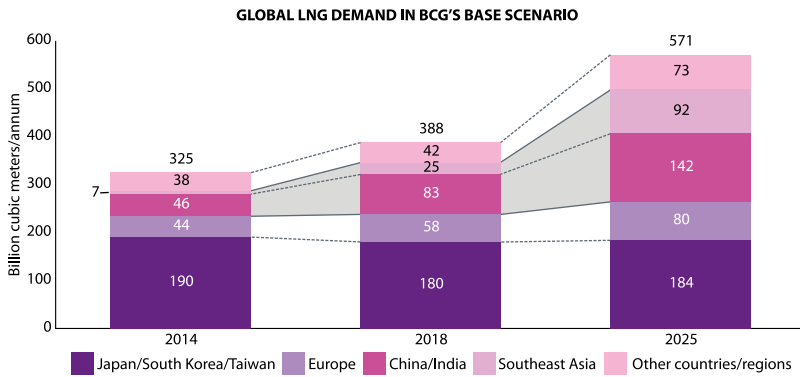
### Uncertain demand

According to the authors of the *Global LNG Market Outlook*, “LNG demand is a function of increasing natural gas consumption, driven by economic growth and fuel switching.” Decline in local production and seasonal gas demand will ensure continued LNG demand, particularly in Western Europe and Latin America. Relative cost-effectiveness is another factor that makes LNG a sought-after resource.

It occupies 1/600 of the volume of natural gas, hence it is more economical to transport it for storing in large quantities. The cost-effectiveness of LNG translates into its price-competitiveness, which has been seen as a solution that could “help meet future economic needs” of the countries importing LNG.

Another report, titled *The Evolving Market: A Challenging Supply-Demand Outlook for LNG Producers* by the Boston Consulting Group (BCG), shows LNG demand increasing from 150 billion cubic meters per annum (bcma) in 2002 to 327 bcma in 2011, which makes for a 9% annual growth rate. However, this pace plateaued in the early 2010s, and “has remained Asia-centric,” this continent being responsible for 80% of the demand growth between 2002 and 2014. As far as the future outlook is concerned, industry analysts project annual growth of 5% to 6% from 2015 through 2025, and the demand reaching 571 bcma. In this scenario, China, India, and South-east Asia are responsible for 75% of total demand (Fig. 1).

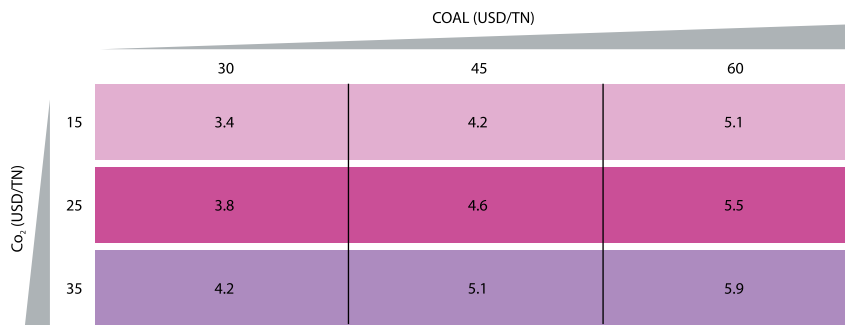
**Fig. 1. LNG demand growth till 2025**



Source for all figures: Boston Consulting Group's *The Evolving Market: A Challenging Supply-Demand Outlook for LNG Producers* (2016)

**Fig. 2. LNG vs. coal prices**

SPOT PRICES AT WHICH LNG COULD COMPETE AGAINST COAL BASED ON MARGINAL COSTS (DES, USD PER MILLION BTU)



Nevertheless, the Asia-centric LNG demand is marked by a “number of uncertainties,” BCG writes, chiefly among them energy policies, economic growth, and competition from alternative fuels or sources of gas supply, such as domestic production or pipeline imports. Japan continues

in its efforts to restart 24 gigawatts of its nuclear capacity, which will cut into the country's LNG demand. Additionally, given the stymied economic growth in Asia in recent years, LNG producers should prepare for lower demand estimates. Writing for the popular energy news site, oilprice.com,

Nick Cunningham cautions that “China's GDP grew at its slowest rate in a quarter century in 2014. The world's largest LNG importer, Japan, has seen modest economic improvements over the past year, but growth is still weak. South Korea actually imported 9% less LNG in 2014 compared to a year earlier.”

**From oversupply to low price to balance?**

While LNG demand is strong in some respects, it may not be robust enough to withstand a pending surge in LNG production capacity. “Thirteen liquefaction plants have secured a final investment decision and are currently under construction,” says *The Evolving Market*. These facilities are scheduled to start operation in three to five years, with their collective production capacity reaching 185 bcma, an amount equivalent to 57% of the world's total production in 2014, and close to the total growth in LNG production that occurred during the last 13 years.

Such an increase in production capacity will lead to what some refer to as a “massive volume of LNG export capacity.” It is expected to surge by 34%. It may jump from 290 million tonnes per annum (mtpa) at the end of 2013 to almost 400 mtpa by 2018. For example, Australia is going through a massive LNG construction phase, following which the country's export capacity is expected to increase more than threefold over the next three years.

BCG's paper shows an upward trend for market LNG market liquidity, too. Spot and short-term volumes of LNG have risen, climbing from 25 bcma in 2005 to about 100 bcma in 2015. This growth is expected to continue, with volume exceeding 200 bcma in 2025. Consequently, LNG spot prices will remain under “considerable pressure for some time,” the report concludes. Some market analyses go as far as to assert that an additional 270 bcma of potential liquefaction capacity is unlikely to be realized because of relatively low LNG spot prices.

How low will the prices go? BCG's market analysis considers a number of factors. “One is the likelihood that suppliers with broad portfolios will actively curtail the amount they produce – even if their production costs are below the level of spot prices – in order to keep spot prices from going so low that they trigger a wave of calls by long-term customers to renegotiate existing contracts.” There are two other factors that can become a spot price floor in cases of oversupply. The first is curtailing production by US production facilities if spot prices reach a level that is “financially disadvantageous to offtakers (i.e.



Photo: ConocoPhillips



Photo: Cheniere

buyers committed to purchasing certain volumes.” This may result in spot price floors of USD 7.0 per million BTU (delivered ex-ship; DES) in Europe and USD 9.0/mln BTU (DES) in the Far East, slowing down the market’s oversupply. The second factor stems from the demand side; if spot prices reach USD 4.6/mln BTU in Europe, which will make LNG prices competitive against coal prices, there will be a “significant jump in LNG demand as LNG increasingly supplants coal as a generation source.” According to the BCG, this may lead to a growing number of customers to renegotiate their existing long-term LNG contracts.

#### Catching the next wave

A major criticism of the LNG industry is that “high prices and booming demand

for LNG in recent years have allowed industry players to grow lax in managing development costs,” states *The Evolving Market*. They need to realize that gone are the times of “development for development’s sake” that disregards poor infrastructure, scarce key resources, and high construction costs. The time has come, caution BCG’s analysts, to become savvy, prudent, and proactive. In order to weather the uncertain times producers need to adjust their strategies to include all or a combination of the following approaches, namely developing modular and/or standardized approaches to plant construction; fostering competition among suppliers; re-thinking the company’s technology strategy; encouraging cooperation among operators;

“**Spot and short-term volumes of LNG have risen, climbing from 25 bcma in 2005 to about 100 bcma in 2015. This growth is expected to continue, with volume exceeding 200 bcma in 2025. Consequently, LNG spot prices will remain under “considerable pressure for some time.”**

implementing lean approaches across the entire development process; simplifying the company’s approach to the project design; as well as supporting the development and standardization of floating LNG technology.

The LNG industry can expect some difficulties in the coming years. Low prices and oversupply are more than likely to limit investment in capital-intensive liquefaction projects. Yet rising demand, however shaky, justifies continued investment in LNG projects. At this critical time, producers can “take steps that will help them negotiate the challenges and position themselves to thrive once the industry’s supply-demand balance becomes more favourable,” advise *The Evolving Market’s* authors. The LNG industry does have long-term potential. There is enough evidence to suggest that, as countries seek to diversify their energy supply, natural gas will play an increasingly important role in meeting the world’s energy demand. ■



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# Future-fit fuel

by **Steve Esau**, *General Manager, SEA\LNG*



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

**“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 without any major safety incidents in a port or at sea.”**

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

**“**  
**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.**

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. ■



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## Issues behind the Russian LNG industry's development

# Pros and cons

by **Inessa Shahnazarova**, *Head of the Analytical Department*,  
and **Ekaterina Vankova**, *Senior Marketing Manager*,  
*Vostock Capital*

**VOSTOCK** CAPITAL

Vostock Capital is a leading provider of consulting and event management services with a 15-year history, focusing on international conferences for the professionals of oil and gas, agroindustrial, IT and power engineering industries from Russia, CIS, Europe and Asia. Vostock Capital is a qualified multilingual team of 70 people, speaking 10 languages. Our offices are located in Russia, Great Britain, and Spain. For more info please visit [www.vostock-capital.com/en](http://www.vostock-capital.com/en).

**The 5<sup>th</sup> LNG Russia Congress is coming, taking place on 6-8<sup>th</sup> June in Moscow, so let's check how's the Russian LNG sector doing; what are the most promising projects already in place, what is planned across the country, as well as how Iran can change the gas game.**

Our qualitative-and-quantitative study comprised a questionnaire on the one hand, and in-depth interviews with industry experts on the other. In total, we received feedback from 153 respondents (incl. representatives of Gazprom and its subsidiaries, Sakhalin Energy, Saipem, Novatek, Rosneft, BASF, LNG-Gorskaya, Eurotube, Kriomash-BZKM, Technip, and the Moscow-based Institute for Energy and Finance), gaining valuable information – often publicly unavailable – from those who largely shape the future of Russia's LNG industry.

### Specific and common LNG stumbling blocks

The first question, with no predefined answers, went as follows: What are the key challenges affecting your business in the LNG industry? As such, participants had to identify three problems, the elimination of which would promote their business development. And as our respondents consisted of two groups – industrial enterprises (such as oil and gas producers, and project operators) as well

as service providers (engineering companies, design institutes, equipment producers, and technology suppliers), the representatives' opinions have been split to better illustrate specific hurdles they're dealing with. However, there's also a set of challenges common to both groups.

Key challenges facing service providers pertain, first, to the closed nature of the Russian LNG business. This restriction was highlighted by as many as 60% of surveyed service providers, and is characterized by the lack of project access for independent service providers, Russian customers' focus on foreign developers and suppliers, the lack of interest in domestic equipment, as well as a predefined "nomination" of separate companies as contractors of some services. Secondly, finance (25%), i.e. high net value of LNG equipment and potential customers' lack of financial sources, along with clients' requirements in providing substantial technical information at the preliminary stage without payments. Thirdly, technologies (15%), i.e. the lack of experience in LNG facilities

**Tab. 1. The most promising large-scale LNG projects in Russia, according to Vostock Capital's survey respondents**

No.	Project's name	Description
1	Yamal LNG	Yamal LNG executes the project for the construction of an LNG plant with the capacity of 16.5 mln tn of LNG annually on the resource base of the Yuzhno-Tambeysk field. The first train of the plant was commissioned in 2017. The 2 <sup>nd</sup> and the 3 <sup>rd</sup> trains will be commissioned in 2018-2019. Once reaching the full capacity, Russia will move up from rank 9 to rank 5 on the global LNG arena by the volumes of liquefied gas production. The construction involves France's Technip and JGC. The project is estimated at USD 27 bln, 96% of future LNG is contracted. The equipment delivery contracts cost exceeded RUB 600 bln, and the figure will be sharply increased.
2	Sakhalin-2	Russia's largest project developed with the use of private funds. The project is led by Sakhalin Energy Investment company; the stakeholders are Gazprom (50% + 1%), Shell (27.5% - 1%), Mitsui (12.5%), Mitsubishi (10%). The plant has two parallel process trains producing over 9.6 mln tn of LNG annually. The bulk of gas is contracted for the delivery for 20 years ahead with 11 buyers. In 2015 the development of project documentation for the construction of the 3 <sup>rd</sup> production train was initiated. The train is expected to be commissioned in 2021. Shell Global Solutions International and Giprogazcentr are involved in the development.
3	Arctic LNG 2	The project valued at USD 10 bln will be implemented on the Gydan peninsula that juts into the Kara sea. The construction of LNG plant within the framework of Arctic LNG-2 is due to start in 2019, the production is scheduled for 2023. The project will eventually produce around 18 mln tn of liquefied natural gas per year. According to some sources, France's Total expressed interest in participating in Arctic LNG-2 project.
4	Baltic LNG	Baltic LNG is a project for the construction of an LNG facility in Ust-Luga of the Leningrad region. It is planned that LNG will be delivered to customers in Atlantic Ocean regions, Middle East, South Asia. Plant production capacity is estimated at 10 mln tn per annum of LNG. The framework agreements between Gazprom and Shell to establish a joint venture and conduct feasibility study were signed in June 2017. This joint venture will be engaged in design, fund-raising, construction and maintenance activities.
5	Pechora LNG	Pechora LNG is a large-scale project, stipulating for the development of two fields: Kumzhinsky and Korovinsky. Besides, within the project it is planned to develop gas pipeline infrastructure and to build an LNG plant and marine terminal. Projected plant liquefaction capacity, based on APCI technology, will amount to 8-10 mln tn per annum. The operator is evaluating the opportunity to apply floating plant technology. The project aims to export LNG to APR countries with a shipment via the marine terminal located nearby. Project investment is estimated at USD 4 bln.
6	Far East LNG	The cost of a gas liquefaction plant, which is now being built by Rosneft and ExxonMobil, is estimated at USD 15.3 bln. Design capacity of the 1 <sup>st</sup> plant's train will total 6.2 mln tn per annum, with further possible expansion. Rosneft initiated the construction in 2013. According to the latest data, plant commissioning is expected in 2020. Rosneft considers the projects as the main solution for Sakhalin-1 gas monetisation. Pre-FEED activities were carried out within 2017.
7	LNG Gorskaya	LNG Gorskaya provides for the construction of an LNG complex and fleet, ensuring LNG delivery to customers in Europe and vessels bunkering in the Gulf of Finland. Liquefied natural gas will be produced on three non-selfpropelled barges. The overall plant capacity is designed for processing of 1.97 bln m <sup>3</sup> of natural gas, which corresponds to 1.3 mln tn of LNG per annum. The production complex is intended to enter the commissioning in late 2018, selling start point is scheduled for January 2019.
8	LNG terminal in the Port of Vysotsk	Dmitry Medvedev signed an agreement related to the expansion of a marine port of Vysotsk in the Leningrad region, where LNG will be unloaded. Project implementation period is 2023-2024. The capital provider is Gazprombank; project investment is about RUB 50 bln, terminal capacity will amount to 2 mln tn of liquefied gas. General design contractor is Giprokislorod (United Heavy Machinery Plants Group). Key project licensor is French Air Liquide. Within the project, it is planned to erect a vessel mooring line, LNG offloading jetty, a jetty for the acceptance of bulk cargo.

design and construction as compared to foreign companies, LNG tanker equipment selection criteria not stipulating for breakthrough technologies, and adherence to dogmas and old technologies.

Producing enterprises, in turn, have listed the following challenges as their sore LNG points. Firstly, the market (57%), covering such barriers as export restrictions and an absence of export permits, lack of customers' infrastructure, fuel consumers' unavailability to LNG-convert, a poorly developed internal market, demotivation of regional authorities in using LNG due to its final cost in a regasified state, competition with non-efficient projects, field owners unwilling to process the associated petroleum gas, as well as the basic energy sources oversupply on the global market. Secondly, finance (32%), but understood differently than in the case of service providers, i.e. as expensive materials and LNG equipment, insufficient project funding, high prices on LNG transportation due to the

deposit's remoteness, high capital costs, budgeting, finance attraction difficulties, low level of required investments, fixed price on gas regardless of the remoteness from the pipe, high cost of project funding at low LNG prices. Thirdly, personnel (11%) is an issue, too, as a narrow field of LNG specialists is available to hire, weak competence of domestic participants in the design, equipment production, and facilities construction processes, as well as unqualified local engineering, procurement, and construction contractors.

Apart from these specific problems, the Russian LNG industry also raises problems familiar to all market players. Above all, there are administrative barriers (85% of respondents pointed to this issue), ranging from bureaucracy and corruption in the authorities, uncertainty in government regulation prospects, lack of forecasts on potential LNG demand and the sector's development in Russia, inefficient state regulation of the industry,

excessive requirements from the authorities' side, lack of legal framework documents in health and safety executive and fire safety, immaturity of the legal framework associated with LNG usage for land vehicles, absence of Russian GOST standards and requirements (a set of technical standards maintained by the Euro-Asian Council for Standardization, Metrology and Certification), an outdated legal framework on design, monopoly in the gas sector, as well as information security issues. Secondly, again finance (10%) – tight credits, ambivalence in price regulation, project freeze. Last but not least (5%), macroeconomics, i.e. an unstable economic environment, Western sanctions, and high macroeconomic risks.

Additionally, our respondents were asked to name both Russian and foreign companies, leading the way in developing technologies as well as equipment-supplying Russia's LNG market. Concerning the latter, Cryogenmash, Cryogas, Geliymash, and Kriomash-BZKM were

mentioned in the first place, while in the case of the latter, Siemens, Shell, Linde, Technip, Kvaerner, Cryostar, Air liquid, and JGC Corp were the most popular picks.

### Most promising small- and large-scale projects

Next, we asked our respondents about their views on the most promising LNG projects across Russia, both small- and large-scale, marking them on a 1-6 scale, the higher the score, the more a given project shows potential. According to our study's results, the list of Top Russian mega-LNG projects includes Yamal LNG (44% of respondents valued this project the highest), followed by Sakhalin 2 (and especially the construction of the third train line; 39%), Arctic-LNG 2 (15%), Baltic LNG (13%), Pechora LNG (11%), and Far East LNG (10%). For projects' details see Tab. 1.

The small-scale LNG question was in turn open, and had no predefined answer options. Here respondents were supposed to outline three projects of their highest concern, pointing in the first place to two Baltic-located investments – LNG-Gorskaya (70%), and Vysotsk-LNG (56%) – accompanied by Pskov-LNG (24%). Table 2 covers these projects' main features.

A couple of other investments are

worth mentioning here as well. First, back in 2014, Gazprom commissioned an LNG complex in Kanyusyata (Karagay area), and three LNG reception, storage, and regasification units – in Ilyinsky, Nerdva, and Severniy Kommunar. Gazprom also plans to implement an autonomous gasification project in the Tomsk region, stipulating for the construction of a mini-plant, as well as LNG reception, storage, and regasification units in four settlements. Moreover, similar projects are being reviewed for implementation in the Vologda and Kirov regions. Moreover, one of Gazprom's subsidiaries, Gas Engine Fuels, is carrying out a project developing the infrastructure for LNG/CNG production and trade in Tatarstan, one of Russia's republics. To distribute the produced LNG, a network of cryogenic filling stations is being built.

### Making sense of Iran's LNG potential

At the end we also asked our experts what they make of Iranian LNG prospects and, as such, to what extent are Iran's projects relevant to their companies' business perspectives. Following the sanctions lift, Iran today targets resurfacing its scalable projects for LNG production (e.g. in the not-so-distant past, Iran tried to negotiate with Royal Dutch Shell, Repsol, and Total the construction

of three LNG facilities, but was eventually refused in 2010 under pressure from the EU and US).

Currently, the National Iranian Oil Company is developing a project feasibility study, which will become the basis for future tender procedures. As such, Russian parties' interest in getting involved in Iranian LNG projects is high on the agenda these days (e.g. in late July, 2016, Gazprom officially applied for participation in Iran's LNG projects). According to the results of our study, therefore, as many as nine out of 10 respondents highly assess the prospects of Iranian LNG projects, consider them realistic, and take note that they are absolutely in their business interest. On the other hand, however, financing problems as well as it seems unique work features bother almost half of the respondents concerned.

There is no doubt that the Russian LNG market has a lot of constrained potential in it, some of the hurdles blocking it, like sanctions or entrenched red tape, lying beyond the power of market players, while others, e.g. well-trained staff or lobbying in favour of proper standards, being within their reach. Played right, LNG expertise gained across the Russian LNG industry can prove invaluable in entering emerging markets, like Iran, with their own challenges of various sorts. ■

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## Emil Arolski

*Chairman of the Board, Polish LNG Platform*

I'm very optimistic to see all TEN-T core ports having LNG ship bunkering infrastructures in place by 2025. In turn, we'll most likely experience a significant growth in LNG demand as marine fuel, not only in the Baltic, but also Europe-wide. There were, however, very optimistic estimations done by DNV GL in the past of more or less 1,000 ships running on gas by 2020, undermined nowadays to some extent by falling prices of traditional bunkers. Nonetheless, this forecasted downtrend in my mind is only temporary as we'll most likely experience a more positive development in years to come. What's very interesting as well, is the potential upswing in LNG demand on the landside. LNG is discussed more and more as a viable and cost-saving alternative fuel, be it for heavy-duty industries like power stations and refineries (Preem's LNG terminal in Lysekil is a good example here), for overland transports (LNG-driven trucks), as part of container terminals' vehicle fleet (LNG-powered reach stackers, tractors and dual-fuel gantry cranes) or in the overall oil-to-gas transition. Therefore, most likely the future will bring even more LNG projects and promotional campaigns supported by the European Commission as well as win-win synergies among various stakeholders.

On national level, LNG infrastructure deployment and promotion in Poland is still at its infant stage. We have a long road ahead to change the current perception and introduce it in Poland. Nonetheless, LNG and natural gas are part of the solution in this important challenge and vital segment of the future energy mix in Poland assisting the Europe's valuable climate goals.

Fundamentally, I would like to highlight the importance of introducing LNG in Poland while considering the synergies among the different sectors – Energy, Transport, Maritime and Industry.



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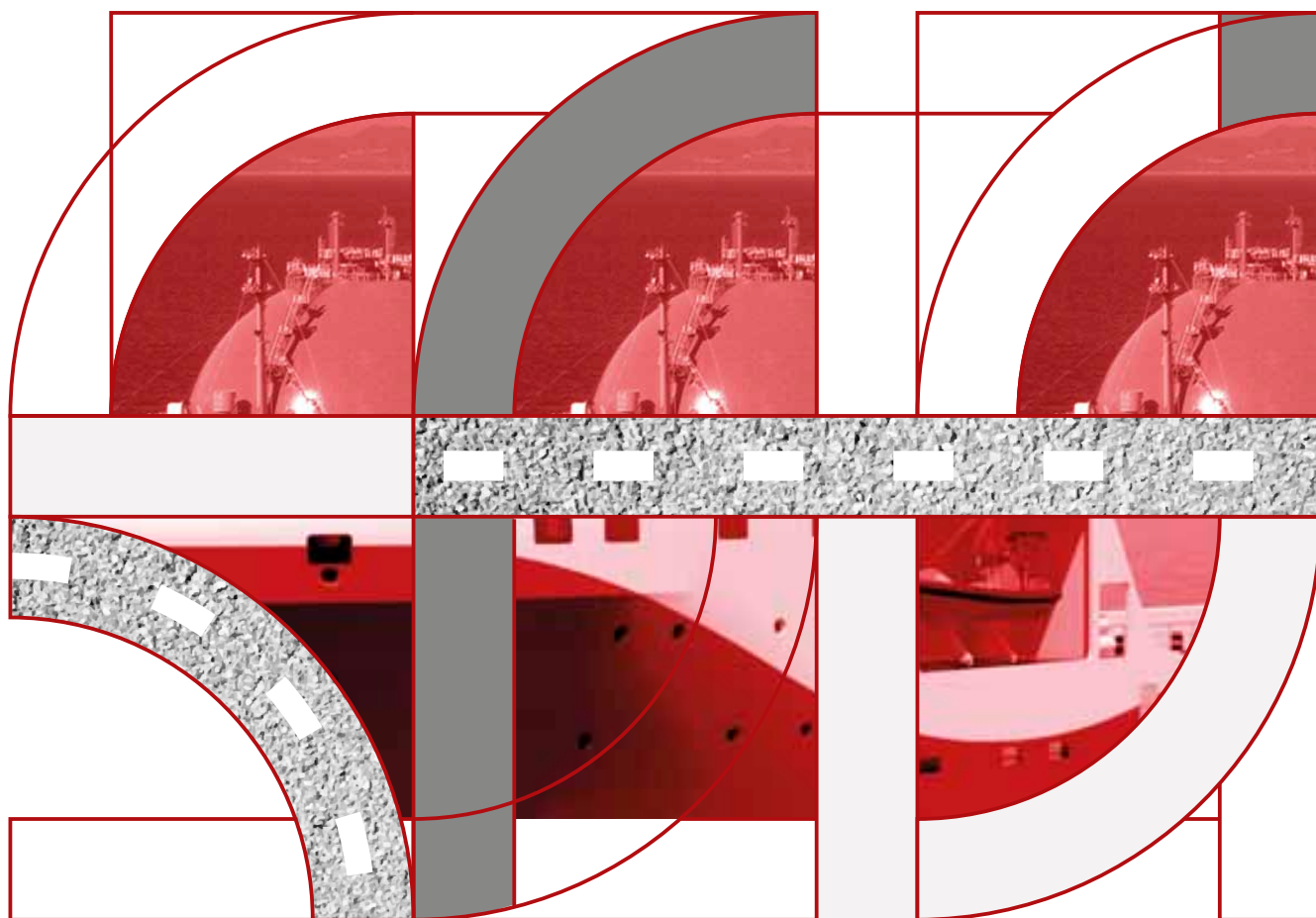
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