

LNG *North America*

A MONTHLY LNG JOURNAL PUBLICATION

May 2017

Analysis: TPA seen as a precondition for an Asian gas trading hub

Third-party access (TPA) to regasification terminals is offered for over 420 mtpa, or 54% of global regas capacity, but in practice such access still rarely happens outside Europe. In Japan, for example, TPA exists on paper notably on the basis of 'bilateral negotiations' – in practice, however, incumbents do often not respond to any query of a third party. Regulators would need to enforce full or partial TPA, analysts argue, to help aspirations of creating an Asian gas trading hub become a reality.



"Access to infrastructure – both pipeline and LNG import capacity – is a key factor for a functioning trading hub. This goes hand-in-hand with initiatives to get rid of final destination clauses," Sammy Six and Anne-Sophie Corbeau write in one of the latest report based on high-level meetings at the King Abdullah Petroleum Studies and Research Center (KAPSARC).

The shift to spot LNG purchase in oversupplied gas markets already helped Asian buyers to push through greater contract flexibility – now those flexible buyers and swing gas suppliers urgently seek a way to gain access regasification slots at short notice.

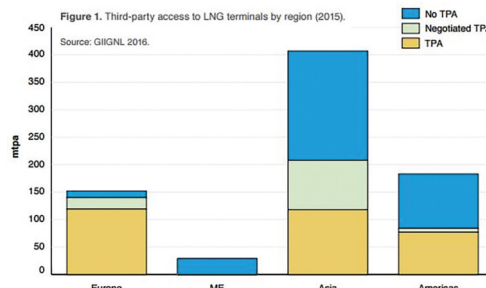
Contractual reconfigurations of gas supply agreements (SPAs), spurred by the glut of supply coming to market, could help emboldened buyers in Northeast Asia – notably Japan, Korea and China – get their way in terms of destination flexibility and a gradual shift from oil-indexed long term supply contracts towards hub-based spot trade. Northeast Asia currently makes up nearly 50% of the world's regasification capacity and 56% of LNG imports.

Race for an Asian trading hub

Singapore, Japan and China (Shanghai) are embroiled in a com-

petition for setting up an Asian trading hub, each of them with their own advantages and difficulties.

Hosting Asia's first multiuser, open-access LNG terminal that also offers re-exports, Singapore has an edge over competing fledgling hubs. However, the city state's LNG business model is primarily that of a tolling model – BG had an initial license to import 3 mtpa but Singapore's energy regulator EMA in October 2016 selected two additional LNG importers, Pavillion Gas and Shell.



Going forward, gas customers will be allowed to import 10% of their demand from the spot market, and the regulator also seeks to set up secondary LNG trading.

nTPA – a toothless tiger?

Japan and South Korea, Asia's two largest LNG importers, are still reluctant to impose regulated

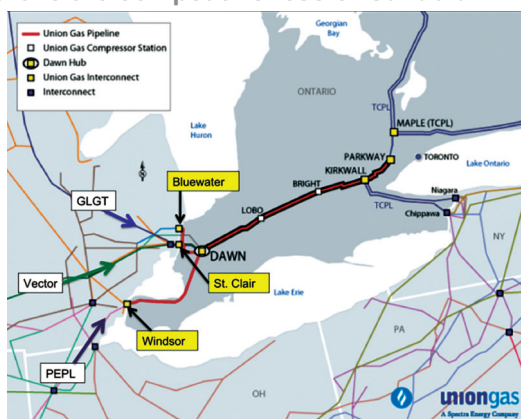
continued on page 2

BC still send pipeline gas to US border instead of LNG to Asia

Aspiring to one day develop an LNG industry, the Canadian province of British Columbia is supporting plans by TransCanada to ship its gas via pipeline to border towns like Toronto to compete in the US market instead of shipping LNG cargoes to Seoul, Tokyo and Shanghai. Conclusion of the tender fills up most of TransCanada's idle pipeline capacity – a move seen to improve the competitiveness of Canadian natural gas which had lost out on price compared to US shale gas.

TransCanada's open season in mid-March resulted in binding long-term, fixed-price contracts for natural gas produced in the Western Canada Sedimentary Basin (WCBS) at a simplified toll of C\$0.77 per gigajoule, the equivalent of US\$0.54/mmBtu.

Though the gas transportation contract runs for 10 years, upstream companies have the right of an early termination after the pipeline has been operating for five years. In-service date is scheduled for November 1, 2017.



continued page 3

AGENDA

SHIPPING

LNG – fuel of choice for ships, trucks and heavy machinery

3

PROJECTS

China and US closely monitor progress of Alaska LNG

5

REGAS

Excelerate lines up seven FSRUs from Daewoo

6

SUPPLY

'Clearing mechanisms' for global LNG glut

7

LNG trade rises but supply security 'less solid'; IEA

7

DEMAND

Seasonal swings determine Egypt's LNG imports

9

continued from page 1, top story

third party access (rTPA) to give newcomers a real chance of using the regas and pipeline infrastructure of the countries' dominant state-owned gas companies. Korea briefly discussed whether to adopt regulated Third-Party Access (rTPA) or negotiated access (nTPA) to KOGAS' pipeline and LNG infrastructures in 1999 and decided to go for nTPA.

Cumbersome negotiations with incumbent Kogas, especially the requirement to notify the incumbent 12 months in advance about the usage of regas capacity and gas transmission pipelines, in practice has largely meant that foreign players do not even try to enter the market. nTPA is no functioning instrument to open up gas markets to competition and create liquidity for a gas trading hub – facing incumbents, nTPA is rather a toothless tiger.

Criticizing South Korea's ineffective practice of charging one single state company with ensuring security of gas supply, KAPSARC analysts nonetheless see some silver lining at the horizon by suggesting: "It seems that liberalization is envisaged by 2025, when a gap would emerge between forecast demand and contracted LNG supply, leaving KOGAS in a dominant position until then."

Price spreads make China attractive

China has become the object of desire for gas importers. As the world's largest gas consumer despite its small share of gas in its primary energy consumption, China has started to experiment with some sort of TPA, mostly driven by market conditions.

Until quite recently there were no rules that enabled other parties than the country's three state oil companies - CNPC, Sinopec and CNOOC - access Chinese downstream oil and gas infrastructure. New entrants were, however, helped through TPA "guidelines" that were issued by China's powerful National Development and Reform Commission (NDRC) in 2014. A flurry of new entrants is now seeking access to regas capacities. These new players include gas distribution companies and domestic gas suppliers such as ENN, Guanghui and Jovo; citygas companies such as Beijing Gas Group; and power generating companies such as Huadian, Huaneng and Guangdong Development.

ENN Holdings and Jovo have successfully concluded spot LNG purchases using CNPC's Rudong and Dalian terminals - the only two accessible as of 2016. As more and more new entrants endeavor access to LNG terminals of incumbents, the regulator NDRC is encouraging them to build their own regas terminals. Jovo has just done so with Dongguan LNG, while ENN is building another private regas terminal in Zhoushan.

The large spread between low spot prices on the global market and high regulated prices in the Chinese domestic market is highly attractive to third-party gas suppliers and new market entrants. While incumbents have been traditionally buying LNG through long-term contracts (most of which have oil indexation and sometimes high slopes for those negotiated during the 2007-10 period), new entrants are seeking to snap up and land attractively-priced spot LNG cargoes into China.

Price seems to count a great deal for Beijing's energy politics, and the use of cheap spot LNG for power generation is backed by Chinese policy makers as a way to help alleviate chronic air pollution hazard. According to KAPSARC analysts, "this view seems supported by the government as indicated by announcements in November 2016 that it will support import companies that can secure LNG at

cheaper prices, either through their own terminals or by using existing facilities."

Regional differences

Comparing Asia with North America and Europe, there are vast regional differences as for the terms of trade, existing infrastructure and the cost of building new regas terminals and gas pipelines. Global regasification capacity as of end-2015 amounted to around 771 mtpa (1,049 bcm/y), of which more than half (about 410 mtpa) is located in Asia. Based on GIIGNL data, it appears that around 310 mtpa of regas terminals offer TPA while another 110 mtpa provide either negotiated TPA or TPA subject to some conditions; this leaves around 340 mtpa with no easy access for third parties.

LNG import terminals in Asia are generally purpose-built, hence their capacity is reserved for a single or limited number of users. A significant share of Asia's regas capacity with negotiated TPA is in Japan, but no cargo has made use of that possibility so far. Chinese LNG terminals do officially not to give TPA, but in practice ENN Holdings and Jovo have successfully concluded spot LNG purchases using CNPC's Rudong and Dalian terminals - the only two accessible as of 2016.

"Markets heavily dependent on LNG imports may be harder to liberalize - particular where there are no competing pipeline sources," KAPSARC analysts commented. Competition in Asia is "limited," they say, because the gas market in many of these countries is too small, gas infrastructure is not interconnected, gas is often the dominant fuel in the primary energy mix (e.g. Singapore, Taiwan) and import facilities are often absent or limited at best (e.g. Vietnam).

Changing terms of trade

Spot and short-term LNG trade reached 68 mtpa, or 28% of global trade or in 2015, up from just 5% in 2000. If and when spot cargoes are bought and sold based on hub-

based spot prices, analysts believe that "TPA to regas terminals can erode the traditional pricing regime in those markets. Provided new entrants would also have access to the gas transportation system, they could offer spot-based gas supplies to the end-users, Ms Corbeau said, suggesting "Such a trading hub can also improve the efficiency of the market by providing incentives to market participants to buy or sell supply imbalances to each other."

On the flip side, TPA can discourage investments in additional LNG import capacity. For example in the UK, most regas terminals were built after obtaining a TPA exemption. More recently, the Dunkirk regas terminal in France, which started operations in July 2016, was also granted a 20-year exemption. However, Ms Corbeau underlined that these exceptions were often completed by additional conditions that gave third parties access to unused capacity, e.g. use it or lose it (UIOLI) rules.

Cost of capital

To build a regas terminal the cost of capital is not quite as expensive, and hence potentially prohibitive, as for liquefaction terminals. Yet, without securing exclusive returns in advance, analysts warn that it could still be difficult for the buy-side to justify the money spent on the new terminal. Generally speaking, supply competition in a liberalized market tends to promote infrastructure investment.

"The much-quoted trade-off between TPA and security of supply is often false, as the former can contribute to the latter through enhancing diversification," researchers Six and Corbeau find.

"The process of putting in place TPA may be painful for incumbents as it will threaten their position and put them in financial difficulty. They are tied to their long-term oil indexed contracts, and will face competition from new entrants importing spot-indexed LNG, especially in the current oversupplied situation." ■

LNG North America

Publisher
Stuart Fryer

Editor
Anja Karl
Tel: +44 7733 684682
anja@lngjournal.com

Layout
Vivian Chee
Tel: +44 (0) 20 8995 5540
chee@btconnect.com

Subscription included with
LNG Journal

LNG – fuel of choice for shipping, transport and heavy machinery

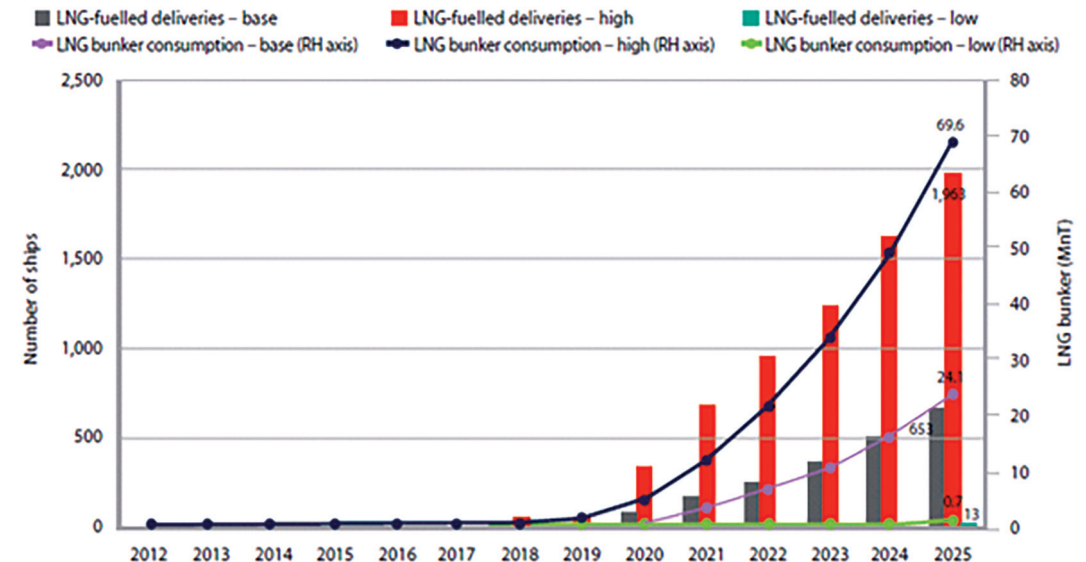
Demand for LNG keeps rising globally, as the super-chilled gas becomes a fuel of choice in new markets such as shipping, transport and heavy-horsepower machinery. In its annual World LNG Report, the International Gas Union (IGU) pointed out the fast rise of LNG-powered tankers, with 31 newbuilds delivered in 2016 from shipyards to the LNG shipping fleet.

Switching to LNG fuel in maritime transport has a monumental impact on emissions, commented David Carroll, the US President of the IGU. “The increased use of natural gas is hugely beneficial to the environment, and subsequently human health, across the globe. Our recent reports on urban air quality, as well as the use of LNG in marine shipping, are testament to this,” he said when presenting their annual World LNG Report.

Several studies illustrate future LNG-fuelled ship fleet development: The DNV study “Shipping 2020” includes a scenario that assumes high economic growth and limited environmental protection – hereby the global LNG-fuelled fleet is seen growing to over 1,000 ships by 2020.

Trade on record high amid supply-side growth

Global LNG trade last year rose by 5% to reach a record 258 mil-



lion tonnes, amid “dynamic growth on the supply side”, notably the start of new exports from the US Gulf of Mexico as well as from production ventures in Australia. Global liquefaction capacity reached 339.7 mtpa, according to IGU figures building on the 2015 measurement of

301.5 mtpa and showing consistent rate.

Demand also keeps growing; “The most pronounced increase in demand comes from Asian markets, with China’s LNG consumption increasing dramatically by roughly 35 percent to 27 mtpa,” the report reads.

“This year’s World LNG report is extremely promising and LNG maintains an essential role in expanding access to gas across the globe, acting as a key pillar in the future energy mix,” Carroll concluded. Looking ahead, the IGU expects LNG production to grow significantly over the next few years, with 114.6 MTPA of capacity under construction as of January 2017.

The IGU was established in 1931 and brings together natural gas associations and corporations from 91 countries.

LNG-fuelled new-builds worldwide together with bunker consumption estimates for three scenarios

Scenario	Number of ships	Share of global fuel deliveries from 2012 to 2025 (%)
Low	13	0.1%
Base	653	4.2%
High	1963	12.6%

Source: Lloyd’s Register

continued from page 1

“WCSB producers are facing a much more challenging landscape than they have in the past,” said Russ Girling, TransCanada, President and CEO, suggesting the new offering helped Canadian customers compete more effectively by utilizing existing capacity on the Canadian Mainline. TransCanada’s successful tender. In his view, “demonstrates the value of this system to deliver their products to markets in Eastern Canada and the Northeast US (...) and provides benefits for our customers, shareholders, commu-

nities and governments that depend on the economic benefits that are generated by natural gas exploration, production and transportation.”

The Canadian Mainline runs from the Empress receiving point in Alberta to the Dawn Hub in Ontario near the US border. From the Dawn Hub, natural gas produced in Western Canada can move onwards to markets in central Canada, the Great Lakes region and the northeast of the United States. Based in Calgary, TransCanada runs a network of natural

gas pipelines that extends more than 91,500 kilometres, tapping into virtually all major gas supply basins in North America.

Rich Coleman, British Columbia’s minister of Natural Gas Development, said “it was nice to see the level of cooperation between gas producers and TransCanada to establish a competitive toll structure that will ensure BC natural gas can be delivered to Eastern Canada at a competitive cost.”

“This long-term access for natural gas will also mean millions of

dollars of investment in northeast British Columbia [notably in shale gas production],” according to the minister and could create approximately 6,000 jobs in Western Canada.

“We remain committed to reaching potential markets,” Coleman added, specifying this would include retaining and increasing Canada’s traditional markets in North America, developing access to Asia through a LNG exports, and supporting local industries that add value to the country’s abundant natural resources.

Solutions for ALL your Natural Gas needs.



On-site/Factory Built Storage Tanks for LNG, Ethane, etc., Intermodal ISO Tank-Containers, Tank Trailers, Barges, & more.

Corban Energy Group (CEG) has been creating highly engineered products required by the natural gas supply chain, from upstream to downstream. CEG has established natural gas terminals throughout the world, provided quality LNG/CNG equipment for the American market, and built storage tanks as large as 200,000 CM in capacity, with its worldwide network of engineering & manufacturing partners.

Call or e-mail us to find out how your company can benefit from our comprehensive natural gas products and services today.

www.CorbanEnergyGroup.com

CORBAN ENERGY GROUP
Your Solution for LNG/LPG



T. 201.509.8555 info@corbanenergygroup.com
418 Elmwood Park, New Jersey, 07407, U.S.A.

Washington, and also Beijing, monitor progress of Alaska LNG as it files for FERC permits

The Administration of President Donald Trump is taking an interest in the Alaska LNG project with US Vice-President Mike Pence meeting Alaska Governor Bill Walker and officials during a stop-over. The venture itself on April 17 filed for regulatory permits.

Vice-President Pence spoke during the Anchorage stop-over to Keith Meyer, the President of Alaska Gasline Development Corp. (AGDC), as well as Governor Walker.

The AGDC President said that Pence was scheduled to meet with leaders in key Asian LNG purchasing nations who were close allies. "The project will be the United States' largest energy export project and will help fortify the nation's ability to export LNG to the Asia-Pacific region," he said in a statement.

Meyer also pointed out that Pence was the latest of several senior officials to take on interest in the project. The Chinese President Xi Jinping, returning to Beijing after meeting with President

Trump, had visited Anchorage on April 7 where he met with Walker and Meyer.

FERC permit application

Talks with Pence were followed by it formally applying to obtain all necessary permits from the Federal Energy Regulatory Commission and other agencies for Alaska LNG. "Advancing the project through the federal environmental process will reduce the permitting risk and provide surety to project investors, financiers, and customers," AGDC commented.

"FERC will soon publish a schedule for the NEPA process in the federal register that outlines the time to develop a draft EIS (likely 12 months) and a final EIS (another six months)," the project



Alaska Gasline Development Corp President Keith Meyer discusses the Alaska LNG project with US Vice President Mike Pence

developer stated.

Meyer explained that development of the project "liberates 35 trillion cubic feet of proven natural gas resources stranded on the North Slope", the area in the Prudhoe Bay region where the resources have been discovered, though which have yet to find a way to market.

The Alaska LNG project has three major components: a gas treatment plant located at Prudhoe Bay where the huge feed-gas resources are located, an 800-mile pipeline to south-central Alaska with up to five offtake points for in-state use and a natural gas liquefaction plant in Nikiski to produce and export the LNG. ■

SCHOTT Eternaloc® Terminal Headers

Keeping your cool.

You don't want to take a risk for small, yet important components. More than 30 years of maintenance-free performance in thousands of LNG applications prove that SCHOTT's gas-tight Eternaloc® terminal headers are the safest, most reliable electrical feedthroughs for cryogenic pumps. So let's keep it cool. **What's your next milestone?**

www.schott.com/lng



SCHOTT
glass made of ideas

Excelerate lines up seven FSRUs from Daewoo

Demand and market need will decide whether US LNG developer Excelerate Energy will take delivery of all seven floating storage and regasification units (FSRUs) that it has ordered from Daewoo Shipbuilding and Marine Engineering of South Korea. It has the option to order the first FSRU as early as Q2-2017.

"Excelerate is looking to be able to respond to the market demand for natural gas as its existing fleet of nine FSRUs become committed to long-term projects," the company said in a statement. Under the order, the initial specifications are for 173,400 cubic metres of capacity for the FSRUs with equiv-

alent baseload send-outs.

Target markets for Excelerate's flexible, floating regas solutions are Pakistan, Bangladesh and Puerto Rico.

In Puerto Rico, Excelerate is forging ahead with its Aguirre Offshore GasPort Project - construction started last year following

FERC approval to site, construct, and operate the project together with Puerto Rico Electric Power Authority (PREPA). An in-service date is set for early summer 2017.

Excelerate's agreement for the Bangladesh terminal will see it set up infrastructure at Moheshkali Island in the Bay of Bengal and deliver the FSRU on a

build-own-operate-transfer basis. The International Finance Corporation (IFC), part of the World Bank, is taking an equity stake in that venture in return for financing. First LNG imports at the Bangladesh FSRU are envisaged in 2018. ■



US nat gas inventories end heating season above five-year average

Working gas storage in the United States as of March 31 stood at 2,051 billion cubic feet (Bcf), ending the most recent gas year around 15% above the five-year average. Responding to slightly higher prices, gas consumed in electric power generation fell 2.1 Bcf from the 2015-2016 heating season, but the drop was almost entirely offset by a 2.0 Bcf increase in US gas exports, according to data from PointLogic.

Overall gas consumption in winter 2016/17 flat-lined compared with the previous year, while dry gas production fell by 3% over that same period.

In winter 2015/16, by contrast, US natural gas inventories skyrocketed due to unseasonably mild weather. At the end of the 2016 heating season U.S. gas storage in-

ventories were near the highest on record, totaling 2,470 Bcf, or 54% higher than the previous five-year average (2011-2015). Inventories started the last year's heating season at a record of 4,047 Bcf.

For most of 2016 and continuing into the 2016-2017 heating season, inventories remained above the previous five-year aver-

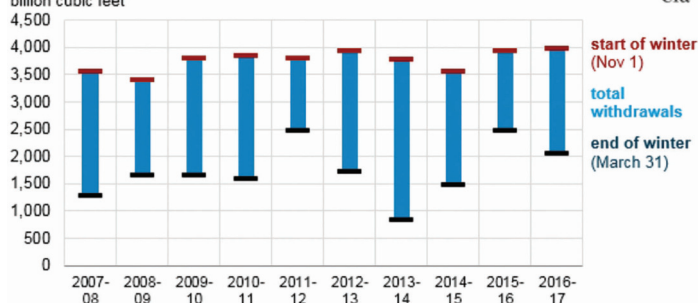
age, the US Energy Information Administration (EIA) Weekly Natural Gas Storage Report.

Analysts at EIA expect an increase in working natural gas inventories of about 1,750 Bcf through this summer's injection season.

The resulting forecast of U.S. natural gas inventories at the end of October 2017 suggests that they will not match the record high end-of-injection-period levels set at the end of October 2016, they said in the EIA's latest Short-Term Energy Outlook (STEO).

Electric power sector consumption of natural gas are seen to decline slightly on an annual average basis and gross natural gas exports—especially liquefied natural gas exports—continue to increase. ■

U.S. natural gas winter season working inventories, 2007-2017
billion cubic feet



LNG Ltd remains on standby to ship US cargoes to India and the UK

LNG Ltd. has substantially reduced its net losses as it is waiting in the wings to start building two fully-approved liquefaction plants amid preliminary agreements to ship cargoes to the UK and India.

The Australian developer of two North American LNG export projects has fully approved plans to build the Magnolia LNG plant at Lake Charles in the US state of Louisiana and at Point Tupper in Richmond County in the Canadian Atlantic Coast province of Nova Scotia.

The company recently posted a consolidated half-year net loss of \$13.6 million, down substantially compared with \$80.2 million in H1-2015. CEO Roger Whelan pointed out that "Project development expenditure decreased from \$68.4M (2015) to just under \$7M in the 2016 period, reflecting the company's liquidity management plan and sole focus on completing the marketing of Magnolia LNG's off-take capacity."

British Columbia courts utilities to invest into LNG fuel use

The Canadian province of British Columbia is calling for investments by Canadian utilities and others to build liquefied natural gas fuel infrastructure to help establish BC as a marine bunkering centre on the Pacific Coast capable of providing LNG to an increasing number of vessels.

"Amendments to the Clean Energy Act will enable utilities to increase incentives provided to shipping companies for the conversion of vessels to run on LNG, invest in LNG bunkering infrastructure and increase the supply and use of renewable natural gas (RNG)," Energy and Mines Minister Bill Bennett said referring to bio-methane and made from waste." ■

OIES looks at 'clearing mechanisms' for global LNG glut

As an array of LNG export projects is coming onstream; the Oxford Institute of Energy Studies (OIES) has been evaluating 'clearing mechanisms' to reduce the oversupply in global gas markets. Coal-to-gas switching in Europe is being seen as an option, as is US LNG curtailment.

A 'low Asian LNG demand' scenario would leave significant volumes of LNG from existing and newly completed liquefaction and export facilities competing with Russian pipeline gas in Europe.

"It is assumed that Russia would 'defend' a minimum of 150 bcm of pipeline gas exports to the European region" corresponding to 85% of aggregate annual contract quantities. This was not an issue in 2016 when colder weather and coal to gas switching in the power sector led to higher demand that only Russia and Algeria were able to meet," argued Howard Roger, chairman of the OIES natural gas research programme.

Assuming a 'low Asian LNG demand' scenario, there would be a 'surplus' of LNG supply from 2018 to 2021. This supply overhead could be cleared through three main mechanisms:

- Coal to gas switching in Europe, depending on the prevailing level of coal and

CO2 prices;

- Low-price 'induced' LNG demand in Asia from industrial customers which can access LNG cargoes at spot prices and
- US LNG export curtailment when the spread between Henry Hub and European Hub Prices and Asian spot LNG prices) is less than the variable cost of shipping and regasifica-

tion for players with the highest costs.

On the other hand, in a 'high Asia demand' scenario - triggered by coal-to-gas switching in China and India, higher electricity demand growth and a faster decline rates of domestic gas production in Pakistan, Thailand, Bangladesh, Malaysia, Indonesia and Vietnam - there would be less LNG available

to Europe. Less LNG cargoes setting sail for Europe would almost automatically lead to higher levels of pipeline imports of Russian gas.

Adding a word of caution, Mr Rogers said that a slippage in implementation of some natural gas liquefaction and export projects might well limit the anticipated global glut of supply. ■

Table 3: Global LNG Balance in a low Asian LNG demand scenario Bcm

	2014	2015	2016	2017	2018	2019	2020	2021
Global LNG Supply	329	331	350	387	438	493	513	511
Asian Demand	245	236	253	259	271	284	295	303
South America Demand	17	17	12	19	19	19	19	20
Middle East Demand	5	14	24	20	17	17	15	16
Other Demand	13	13	12	11	12	13	14	19
LNG Available for Europe	49	51	50	78	118	160	169	153
Europe Gas Demand	476	496	517	508	508	508	508	508
Production	255	248	246	242	234	226	217	208
Storage Inventory Change	-	7	6	1	5	-	2	2
Russian Pipeline Imports	148	160	172	157	150	150	150	150
Other Pipeline Imports	32	30	49	36	31	29	32	35
LNG Required	49	51	50	78	98	103	111	116
LNG Surplus	0	0	0	0	20	57	58	37

Source: IEA, EIA, Platts LNG Service, BP Statistical Review of World Energy, Author's analysis

Supply security 'less solid', despite rise in market liquidity

The International Energy Agency (IEA) has warned of risks to global gas security, even if the liquidity of spot and near-term markets has increased substantially in recent years. "LNG markets are less flexible than is commonly believed" and consequently security of gas supply at a global level is now seen as "less solid" than earlier perceived.

"A growing share of LNG capacity is offline, mostly because of a lack of enough gas to feed into the system but also because of security and technical problems, meaning the market has less extra capacity than assumed" the IEA warned in its recently published *Global Gas Security Review*.

Between 2011 and 2016, the level of unusable export capacity has doubled, "disabling about 65 bcm of gas, which is equal to the combined exports of Malaysia and Indonesia, the world's third- and fifth-largest exporters" it pointed out, adding that "a period of low oil and gas prices could further

worsen the situation."

However, the Global Gas Security Review found that one positive development happened in recent years in gas markets, is that LNG contract structures are becoming less rigid, increasing market liquidity. In 2015, about 40% of LNG contracts had fixed destination terms, down from 60% for contracts signed up to the year 2014.

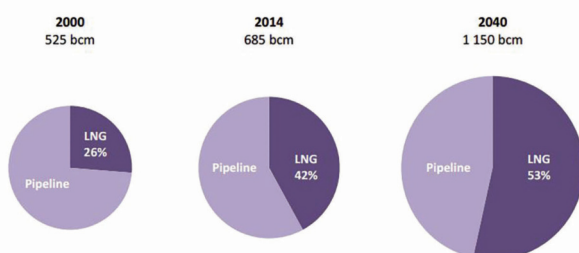
"While shorter term contracts are gradually becoming more common, buyers are also accepting longer contracts in exchange for increased flexibility in the final destination in order to better respond to market conditions" IEA said, noting that flexible contractual structures are important for

gas security as they enable to aggregate gas volumes at a lower cost from various regions.

Overall, LNG's share of the global gas market is set to increase in the coming years, and LNG supplies have grown at a faster pace than total gas consumption.

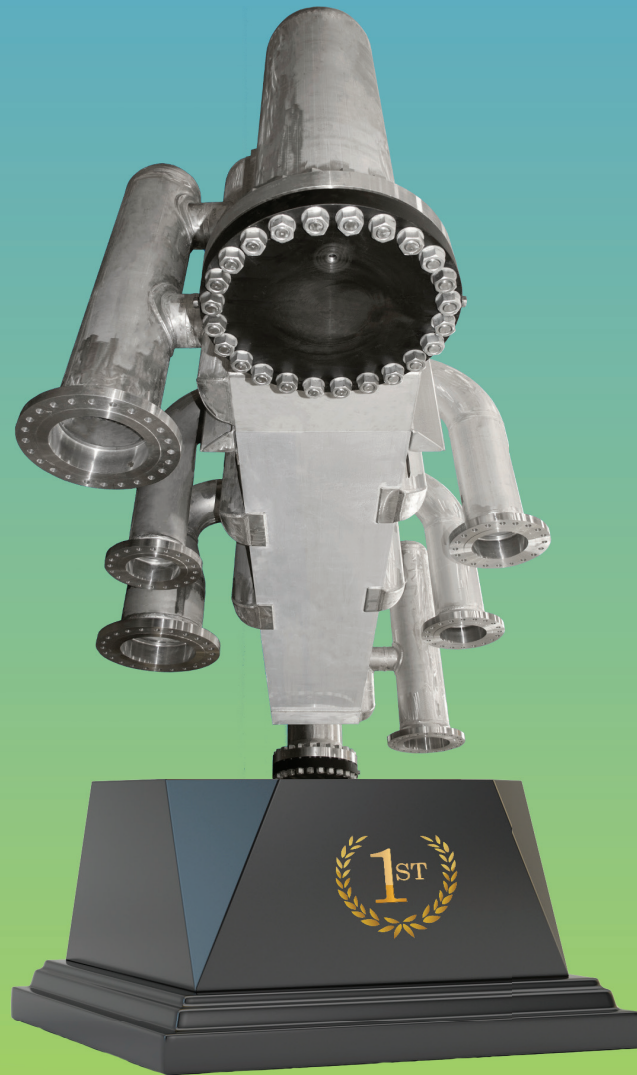
"The growth in the global gas trade, along with the diversification of supply sources, is improving the security of supply," said Fatih Birol, executive director of the International Energy Agency. "But there is still a need to be vigilant on gas security as the changing nature of the market means that regional demand and supply shocks may now be felt in more distant places than ever before." ■

Share of LNG in global long-distance gas trade



Contractual terms and pricing arrangements are all being tested as new LNG from Australia, the US & others collides into an already well-supplied market

Chart Brazed Aluminum Heat Exchangers



First to Produce LNG On-board a Floating Facility

Custom designed, highly efficient, compact heat exchangers with superior heat transfer performance and operational flexibility. Providing substantially lower weight, scalability, modular construction and proven performance, Chart Brazed Aluminum Heat Exchangers are uniquely suited to the rigors of floating vessels, where space is at a premium and reliability is paramount.

www.chart-ec.com



Innovation. Experience. Performance.®

Seasonality takes centre stage in Egyptian gas market

Egypt is positioning itself as a prominent gas importer during the northern hemisphere summer while becoming a winter exporter. Wood Mackenzie points out that “a pragmatic approach to pricing” by the Petroleum Ministry has secured over US\$28 billion in new gas field investment since 2015, so “this could be just the start of Egypt's second gas boom.”

Eager to seize opportunities, BP and Eni already increased their already sizeable positions in Egyptian domestic gas projects.

As a number of major offshore gas developments come on stream in the next few years, including BP's West Nile Delta and Atoll fields and Eni's massive Zohr find, the North African country will add a cumulative 41 Bcm/y of gas production by 2022.

Wild supply/demand fluctuations

This surplus will, however, be seasonal, analysts caution and suggest that “better gas availability will boost domestic consumption in the power sector, peaking in the summer months, while utilisation rates at gas-intensive industries

will recover. “Overall, this will exacerbate Egypt's domestic gas demand seasonality.

“In the medium-term, LNG imports may still be critical to balance the market in the summer, while Egypt could export surplus volumes during the winter, taking

advantage of northern hemisphere winter LNG prices.”

Wild fluctuations in gas supply and demand have been characteristic for Egypt in recent years. The country's market position shifted from being the world's eighth largest LNG exporter in 2009 to the world's

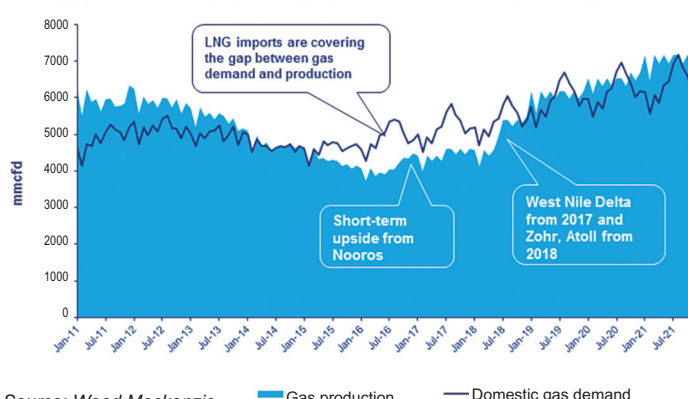
eighth largest LNG importer in 2016.

Inward investment in upstream

The latest upstream expansion, at a time when other regions saw inward investment fall, together with the impending liberalisation of Egypt's gas sector, is closely monitored by international trading houses and portfolio players.

Looking at the number of high-impact wells planned this year, coupled with Egypt's large untapped potential, WoodMackenzie says “a second gas boom could be on its way”. “Additional exploration success would further strengthen Egypt's ambition to become a regional gas hub, importing and exporting gas and LNG simultaneously.”

Egyptian monthly gas supply-demand balance (mmcf/d)



Source: Wood Mackenzie

Gas production

Domestic gas demand

More solutions for greater productivity.

You supply the energy that keeps the world in motion. We help you meet every challenge along the way.

Liquid Natural Gas (LNG) is gaining traction across the globe as a clean and efficient source of energy.

Atlas Copco Gas and Process Division offers the cutting-edge equipment and quality service this dynamic market requires and helps you boost your performance and reliability on land and at sea.

www.atlascopco-gap.com

Atlas Copco

FOAMGLAS®

Pittsburgh Corning

FOAMGLAS® INSULATION

FOAMGLAS® INSULATION ATTRIBUTES

- 100% Moisture Impermeable
- Resistant to Fire – Will Not Burn
- Superior Compressive Strength
- Constant Thermal Efficiency
- Non-absorbent/Non-corrosive

PITTSBURGH CORNING SERVICES

- Education & Training
- Energy & Thermal Imaging Surveys
- Insulation Thickness Calculations
- Insulation Guide Specifications
- Jobsite & Start-up Support

Contact us to learn more
www.foamglas.com
1-724-327-6100 | 800-545-5001

FOR INDUSTRIAL APPLICATIONS ENGINEERED TO LAST

