

LNG *North America*

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Analysis: China enters “golden age” for gas, may outpace U.S. demand

Consumption of natural gas in China is anticipated to triple to reach 57 billion cubic feet per day (Bcf/d) by 2040 and bullish analyst houses like Sanford C. Bernstein expect the country's demand to surpass that of the United States, the current No.1 gas consumer, “some-time between 2040 and 2050.” In the first seven month of this year, the worth of US LNG exports exceeded \$139 million, already 2% more than the 2016 total, according to figures by the US-China Economic and Security Review Commission.

With Asian LNG prices at a historic low, the cost premium of purchasing gas instead of coal has eroded to the lowest since 2000. Costs for of transport and shipping keep falling which facilitates increasing gas-on-gas competition around the globe.

Clean energy policies, adopted by Beijing in recent year, further advance the attractiveness of gas compared to coal in the power sector. By 2020, the Chinese government wants to increase the share of natural gas in the energy

mix from 10%, and up to 15% by 2030.

Sinopec ventures in to LNG trade

Emboldened buyers are turning to spot LNG as the cheapest supply option – except for the winter months. “PetroChina and CNOOC are actively purchasing spot in addition to their contracted volumes,” says Wen Wang, senior consultant, Asia gas and power, Wood Mackenzie.

Sinopec has already ventured



in to gas trading, she told *LNG North America*, signaling it out as the only company that are diverting cargoes among the three NOCs. “In 2016 they diverted a lot of their contracted cargoes from Australia Pacific LNG (APLNG), in 2017 they diverted less,” she elaborated on Sinopec's re-selling and trading activity. As one of China's big three national oil companies,

Sinopec has a 7.6mtpa off-take agreement for 20 years in place with the Australia Pacific LNG project led by Origin and US partner ConocoPhillips.

Rampant gas demand in China – spurred by economic growth, Beijing's environmental policies and relative cost competitiveness of natural gas in the industrial and transportation sectors – have been

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LNG exports could add \$73bn to U.S. economy by 2040

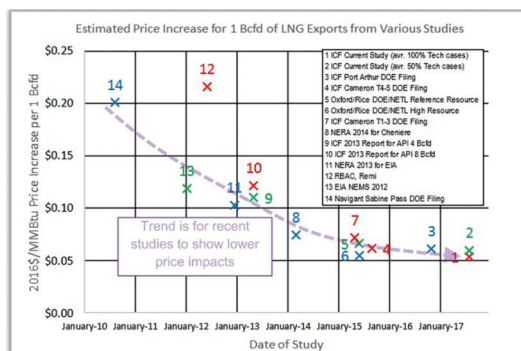
Rising exports of “abundant US natural gas” is estimated to support up to 452,000 new jobs and give a \$73 billion boost to the economy by 2040 – at a “minimal impact on the natural gas prices,” according to a study by the American Petroleum Institute (API). The resource base is now seen as “larger, less expensive and more price responsive,” API Chief Strategy Officer Marty Durbin commented.

Reacting to concerns by some policy makers and industrial groups that LNG exports might result in excessively high natural gas prices and other negative consequences, the American Petroleum Institute had asked ICF International to update its 2013 study – given that the DoE itself has not recently conducted an economic analysis of LNG exports.

Exports have little impact on gas price

Recoverable resources in the U.S. have risen to an estimated 3,700 Tcf, up from 3,550 Tcf in 2013.

continued page 2



Source: ICF compilations of various reports and filings. Price impact is indicated by “X” for the adjacent same-color study number. Name and date of studies are found in the text box. See bibliography for full citations. The colors of the X's and numbers have no meaning and are used only to make it easier to match X's and corresponding numbers.

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strengthening buyers' bargaining power. "They are reluctant to sign into any firm LT contracts right now because there's no sign that spot price will go up any time soon," Ms Wang observed.

"But we think in a few years' time – when demand and supply rebalances again – we will see a reverse trend. There will be a turning point in the next few years when the buyers realise low spot price won't be permanent and LT contracts will again be key for securing supplies."

Differing views on future growth pace

For now, observers expect China to enter "a golden age for natural gas" and some analyst houses like Sanford C. Bernstein have put out bullish forecasts, suggesting that gas demand in China will ultimately overtake the United States, the current largest gas consumer worldwide. According to Bernstein projections, gas demand in China could grow to about 600 billion cubic meters by 2040 and then surpass the U.S. "sometime between 2040 and 2050."

In contrast, the US Energy Information Administration (EIA) is

more cautious about the strength of China's long-term gas demand growth. In the IE02017 Reference case, U.S. gas consumption is projected to grow at a more modest rate, from 75 Bcf/d in 2015 to 88 Bcf/d in 2040, meaning the US would remain the world's largest natural gas consumer.

At any rate, the drive of Chinese buyers for LNG is undisputed amongst market observers. By 2018, China is likely to surpass South Korea in terms of LNG imports in 2018, and by 2040 EIA analysts see Chinese imports surge to 11 Bcf/d, on par with the world's largest LNG importer Japan.

Gazprom seeks closer ties with Petrochina, CNPC

Pricing and policy drivers are widening the supply gap in China. In the first half of 2017, natural gas consumption surged 15% yoy to 115 billion cubic metres (Bcm) while domestic production keeps rising slowly but steadily. CNPC recently revised upward its forecasts for gas consumption up to 2030 to 620 Bcm, up from last year's forecast of 510 Bcm.



China's gas demand has grown significantly, with consumption in Jan-July up 16% since early 2017, compared to the same period last year



- Alexey Miller, CEO & Chairman, Gazprom

However, there seems to be also some volatility in pipeline gas supplies from Central Asia – "certain countries did not deliver in January-April," indicated Gazprom chairman and CEO Alexey Miller, stating that China's gas procurement – including under spot LNG contracts – have soared 140%.

Combined with China's stated aim for gas industry development up to 2020, and policy drivers to curb air pollution in the energy sector, "creates great potential for deepening cooperation with Gazprom," Miller said. "China's gas demand has grown significantly, with consumption in Jan-July up 16% since early 2017, compared to the same period last year," he noted after a recent meeting with Petrochina president Wang Dongjin, who is also the vice president of CNPC. Imports of Russian gas to China soared 20%, or

9 Bcm, to a total of 51 Bcm in the span of six months.

Novatek, Russia's largest independent gas exporter, is also targeting the growing Chinese gas market. Train 1 of the Yamal liquefaction project, led by Novatek, is scheduled to come on stream around the end of 2017 and Chinese companies have a 30% of the venture through China National Petroleum Corp and the equity firm, Silk Road Fund. Train 2 and 3 will follow suit in the second half of 2018 and the third quarter of 2019, respectively, bringing the total capacity to 16.5 mtpa. CNPC signed an offtake agreement with Novatek in May 2014 over 3 mtpa of LNG over a period of 20 years. The Chinese cargoes, indexed to the price of oil, will be delivered on an ex-ship (DES) basis whereby the Yamal project organizes the shipping. ■

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Efficiency gains and advances in gas production technology allow extracting shale gas at a considerably lower cost than just a few years back. As a consequence, the price impact of LNG exports has dropped over time. Based on ICF's modeling, this trend occurred be-

cause improved technologies for gas production have led to a drop in the forecasted prices for natural gas which made supplies more price-elastic (*see graph on previous page*).

Exporting America's shale gas via pipeline and in the form of LNG is deemed to only have moderate impacts on domestic U.S. natural gas prices. For each one billion cubic feet per day of exports, ICF estimated in 2013 there would be a price increase of about 11 to 12 cents per million British Thermal Units (MMBtu) – now it estimates a price increase of 5 to 6 cents/MMBtu.

"The U.S. is the world's leader in producing clean and abundant natural gas and today's study demonstrates that the U.S. can export additional supplies of U.S.

natural gas without sacrificing our competitive advantage here at home," Mr Durbin commented.

Falling gas price elasticity in the power sector

Within the United States, gas use keeps growing as well predominantly in the power generation sector. Gas-fired power plants gain market share, largely at the expense of nuclear and coal. The acceleration of competitively prices US shale gas exports will lead to greater gas use globally which helps reduce air pollution, just as natural gas in U.S. power generation has helped reduce U.S. greenhouse gas emissions to near 25-year lows.

By 2040, gas will gain the highest market share in the U.S. power sector and compete for

new-build generation capacity with renewables. With fewer coal power plants operational by that time that could adjust their utilization rates up and down in response to changes in natural gas prices, analyst expect a falling price elasticity of gas use in the power sector.

Renewables are equally on the rise, but their utilisation hinges on the availability of wind, solar or water flow. Flexible dispatch of gas peaking plants will remain vital to accommodate a growing share of renewable energy sources which further reduces the price elasticity of gas for power generation. Wind and solar power plants are non-dispatchable and cannot respond with greater generation when natural gas or electricity prices go up. ■

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LNG Journal

Washington seeks help from Tokyo in boosting LNG exports to Asia-Pacific

American government representatives have been reaching out to Japanese officials in the hope to find informal avenues of increasing the volume of US LNG exports to the Asia-Pacific region. The topic dominated the latest US-Japan economic dialogue meeting in Washington, and the deal-making continued at the LNG Producer-Consumer Conference in Tokyo.

Having just met with Japanese government officials in Washington on October 16, key representatives of the US gas industry and energy policy makers flew over to Tokyo for the opening of the LNG Producer-Consumer Conference.



H. Seko Rob Smith, Deputy Assistant Secretary at the Office of Oil and Natural Gas at the US Department of Energy (DoE) represented the government of the United States.

At this year's LNG Producer-Consumer Conference, the government of Japan's trade and industry minister Hiroshige Seko unveiled a \$10 billion plan to build out Asian LNG market. With this financing initiative, the world's No.1 gas importer seeks to play a leading role in the development of infrastructure – notably small-scale regasification plants and power stations – across Southeast Asia.

Asked about details of the public-private funding packages, Mr Seko refused to comment and said it was up to companies and state-backed financial institutions to work out such loan arrangements on a case-by-case basis. Japan Bank for International Cooperation and the Nippon Export and Investment Insurance body have been asked by the government to encourage and support companies to invest in gas infrastructure abroad. Providing project finance is a handle for the government in Tokyo to strengthen its regional influence at a time when of emboldened Chinese pan-Asian aspirations.

By playing the energy policy card, Minister Seko is combining diplomacy with a soft-sales approach for Japanese technology. His move mirrors steps undertaken by Prime Minister Shinzo Abe to encourage domestic engineering companies to venture abroad which is hoped to indirectly strengthen Japan's hand in future gas procurement negotiations.

Though Japan's financing initiative is primarily aimed at LNG import infrastructure build-out, it particularly targets island nations like Thailand, Indonesia and the Philippines where a small-scale regas import project can be complemented by either a land-based decentralized power generator or an LNG-based power ships.

According to IEA projections, Asia's hunger for LNG will surge 40% to make up three-fourth of global imports by 2022. China's gas offtake is likely to double, while Bangladesh and the Philippines will become new importers – requiring an estimated investment in gas import infrastructure of up to \$80 million across East

Asia alone by 2030.

Seizing commercial opportunities

Japanese companies have already positioned themselves to cash in on Asian growth in LNG trading. Tokyo Gas has entered the gas distribution business in Indonesia, and also aims to support the construction of terminals and other LNG infrastructure. On Monday, Tokyo Gas and the government-backed Development Bank of Japan invested roughly 4 billion yen (\$35 million) the gas distributor Panji Raya Alamindo to benefit from growing urban gas demand across the Indonesian archipelago.

"We want to use Japanese funding and technology to advance Southeast Asia's shift toward LNG," said Tokyo Gas President Michiaki Hirose.

India, Asia's second largest gas market, has also signed an accord with Japan on Wednesday aimed at facilitating flexibility in LNG contracts, abolishing destination restriction clauses and establishing reliable LNG spot price indices. ■



LNG tanker berthing next to Tepco's Futtsu gas power plant

NEWS NUDGES

Engie looking to divest LNG units to Total

French energy utility Engie has confirmed that it is in negotiations with Total and other companies relating to a partial sale of its liquefied natural gas (LNG) business, as part of its restructuring strategy. The units up for divestment include liquefaction, transport and global trading of LNG. In contrast, downstream activities like regasification and LNG ex-terminal sales have been excluded from the review process.

Russia keen to step up gas supplies to China

Since early 2017, China's gas imports totalled 51 Bcm, a 20% increase, over the same period, according to Gazprom. The Russian gas export monopoly sees "great potential" for deepening its cooperation with Chinese imports, both in terms of pipeline gas and LNG from its Sakhalin venture.

LNG for China and Korea

The 216,000 cubic metres capacity vessel "Al Huwaila" will deliver a cargo on November 1 to the Chinese Yuedong import terminal, operated by China National Offshore Oil Corp. in the southern province of Guangdong, from the Ras Laffan plant in Qatar, according to shipping data. The 216,000 cubic metres capacity carrier "Al Thumama" is scheduled to unload a Qatargas shipment on November 7 at the Incheon terminal, owned by Korea Gas Corp.

Mitsui's 'Energy Liberty' tanker to deliver Cove Point LNG

Mitsui OSK Lines, the Japanese ship owner with a LNG fleet of 70 vessels, has given the name "Energy Liberty" to a new-build vessel with a rarely used storage tank. The new-build tanker will transport LNG from the Cove Point liquefaction plant in Maryland, U.S., all the way to Tokyo Bay in Japan.

"Energy Liberty" is the eighth LNG tanker managed by Tokyo LNG Tankers, part of the utility Tokyo gas. The ship has been built at the Tsu Shipyard of Japan Marine United Corp and is jointly owned by MOL and Tokyo LNG Tankers.

After delivery, the vessel will transport LNG from the Cove Point liquefaction plant, currently being completed on Chesapeake Bay on

the US East Coast. Dominion Energy has been transforming an existing regasification import terminal at Cove Point, into a liquefaction plant with capacity of 5.25 mtpa. Start commercial operations is slated for early 2018.

The entire capacity of the Cove Point LNG venture has been subscribed for 20 years to Tokyo Gas and Sumitomo Corp; and a second

such offtake agreement has been signed between Dominion and Gas Authority of India (GAIL).

IMO Type B storage tanks

The 165,000 cubic metres capacity "Energy Liberty" has a tri-fuel, diesel-electric propulsion system and self-supporting, prismatic-shape (SPB) IMO Type B storage

tanks that have been designed by IHI Marine.

Until Tokyo Gas chose the SPB tanks for its new tankers, they had only been previously fitted to the 89,900 cubic metres capacity "Arctic Sun" and "Polar Eagle", which IHI built in Japan in 1993, and the 1,500 cubic metres capacity prototype LNG-ethylene carrier "Kayoh Maru", constructed in 1988.

The SPB tanks are subdivided into four spaces by a centreline, liquid-tight bulkhead and a transverse bulkhead. This subdivision, with the stiffened plate structure of both the shell and the internal supporting elements, strengthens the SPB system and is expected to minimize the risk of cargo sloshing.

The SPB system is a comparatively expensive alternative to the established Moss-type spherical tanks and the membrane tanks of GazTransport & Technigaz (GTT).



The 'Energy Liberty' can reach a maximum speed of 19.5 knots

Japan, Indonesia to evaluate 'LNG-fuelled power ships'

Electrifying remote Indonesian islands through ships, or barges, that generated electricity using LNG, is at the centre of a research plan supported by the governments of Indonesia and Japan. Tokyo hopes to export the new technology to other island nations in Asia Pacific.

According to the Japanese Economy, Trade and Industry Ministry (METI), this would be the first ever instance of full-scale LNG power generation at sea.

Making use of Japan's energy policy experience and accumulated technologies, METI promised to support the private sector by providing advice for constructing LNG receiving terminals and natural gas-fired power plant projects – including LNG power ships.

"Private first" initiative

Dialogues with private sector mar-

ket players – so-called "private first" initiatives – were launched by the ministry last year, are continuing and any issues raised will be "handled immediately."

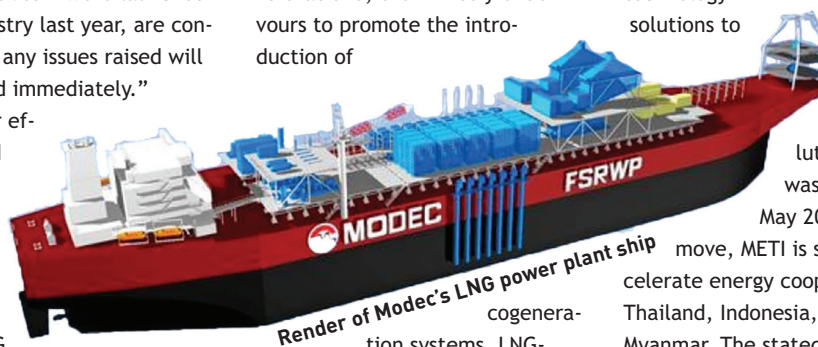
"Further efforts should be made to discover potential demand sources for gas and LNG both inside and outside of Japan to encourage the entry of newcomers," METI stated in its 'Strat-

egy for LNG Market Development'. To that end, the ministry endeavours to promote the introduction of

In a bid to offer comprehensive technology solutions to

emerging countries, the "Enevo-lution" initiative was launched in May 2015. With this

move, METI is seeking to accelerate energy cooperation with Thailand, Indonesia, India and Myanmar. The stated aim is "to offer them support for the development of systems which will facilitate LNG utilization."



Render of Modec's LNG power plant ship cogeneration systems, LNG-fuelled trucks and bunkering as well as barge-based gas power generators.

At the Core of LNG

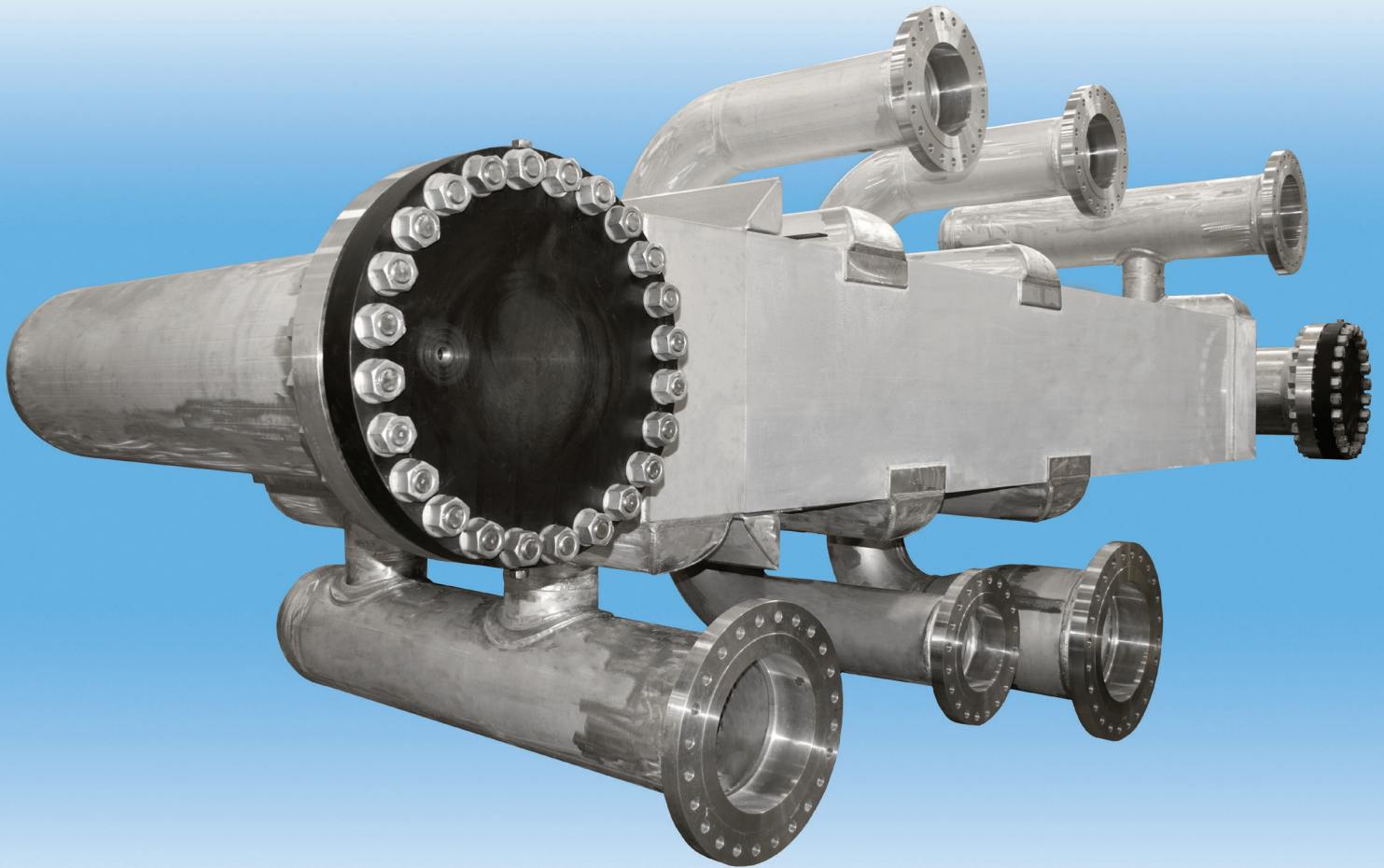


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US LNG imports help plug India's supply gap

Demand for natural gas is forecast to outpace the increase in domestic supply. India's gas market is expected to grow at compounded annual growth rate of 7% by 2020, driven by new gas infrastructure and increasing domestic production, according to Wood Mackenzie figures.

To plug the gap between supply and demand, India has to import more natural gas. "We expect a glut in LNG supplies will allow surplus volumes to flow to India," said Terence Ang, senior analyst for Asia gas and power. This includes spot cargoes from the United States.

LNG imports have increased from 14.4 mtpa in 2014 to an expected 19.6 mt by the end of 2017, driven by India's economic growth and rising energy demand of the country's fast-growing population.

Domestic gas struggles to compete with fuel oil on price

The competitiveness of gas is, however, being eroded by cheaper fuel oil and petroleum coke prices, given that newly instated regulations require for domestically produced gas to be sold at market prices.

"The government has allowed pricing freedom for domestic gas produced from the HELP blocks. This, together with the revised domestic gas allocation order, will

force industrial, commercial and power users to pay market prices for gas going forward, regardless whether it is from LNG or domestic production," Ang said.

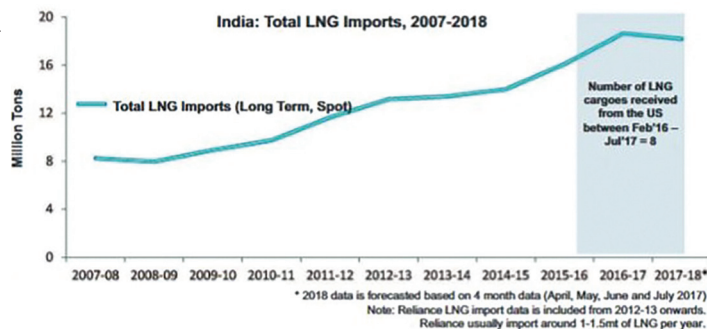
"If the price of Brent [crude] rises beyond \$66/bbl, we expect gas (LNG) to be more competitive as competing fuels such as pet-coke and fuel oil will become more expensive".

"Pricing freedom" needed to accelerated domestic E&P

The Indian government in Delhi needs to give hydrocarbon developers more freedom on gas pricing in order to incentivise production



ONGC's Mumbai High field



in less explored basins, Wood Mackenzie's Asia office recommends. The removal of multiple pricing regimes that are currently in place across India will also help drive greater use of gas in the industrial and power sector.

"Allowing marketing and pricing freedom for all gas production, regardless of shore status and contract vintage, would incentivise companies to develop gas in the less explored basins," said Alay Patel, Wood Mackenzie's senior analyst for Asia upstream.

The Indian government recently introduced a new Hydrocarbon Exploration and Licensing Policy (HELP) as a simplified regime which together with other policy initiatives on gas pricing and clear-cut rules on how to extend contracts are meant to help boost domestic supply. But more is needed, according to Mr. Patel:

"Production enhancement contracts allowing private and foreign operators a stake in NOC-held nomination acreage would help diversify the company mix, which is currently dominated by a handful of players," he said, suggesting "this would also bring more focused and nimble operators to India."

Cheap US shale gas, not regulation puts an end to coal power

Integrating North America's abundant shale gas resources into global markets keeps prices subdued: NBP averaged at \$10/mmBtu in 2011-14 and by 2016 lost more than half of its value, hovering around \$4.63/mmBtu. According to Societe Generale analysis, natural gas is now in a unique position to help regions transition away from coal- and oil-fuelled power generation.

Following the 2014 plunge in oil prices and oil-indexed gas prices, global gas prices started to converge. This trend was accelerated by the reduction in oil-indexation in the Atlantic basin which ultimately helped close the gap between NBP and Asian gas prices. Rising US LNG exports add to the length in global gas markets and help narrow the price gap further.

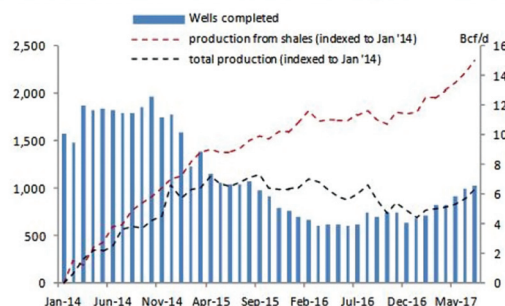
Gauging supply risk factors as the winter season approaches, SocGen says "tightened fundamentals" in terms US gas production have been camouflaged by comparatively mild weather in the first quarter of this year. "With limited certainty around scale of

growth over next seven months," SocGen analyst Breanne Dougherty says "the market remains vulnerable to upside price pressure."

Shale gas growth is vulnerable to "untenable tightening" of Capex spending. Though guidance for 2017 spend by the top 10 US gas producers under SocGen coverage shows an uplift relative to 2016, actual spend is expected to remain far below 2014/2015 levels.

Concerned about the sustainability of shale gas supply, she cautioned that "Shale growth must continue at good pace; but it isn't drilling that will ultimately deliver volumes, it is completions." As critical regional for shale gas growth,

Shale growth since 2014 has offset underlying decline. Recent acceleration in wells drilled means nothing without completions



Source: SG Commodities Research, EIA Drilling Productivity Report September 2017

SocGen singled out the Northeast, Permian and Haynesville when assessing risk to base-case expectation of 75-bcf/d by February 2018.

The upstream LNG growth cycle is here, and there will be enough regas capacity to absorb

it; but in Ms Dougherty's view "it will be demand growth that is key. The analyst expects liquefaction and export capacity to grow by 10% on average between 2015 and 2020, compared to just 2% in the five year prior to 2015."

Portfolio players needed to enhance LNG market flexibility; IEA says

In the face of oversupplied global gas markets and rising LNG trade, the International Energy Agency (IEA) has voiced concerns that the transformation from regional to more flexible, interdependent gas markets is creating new security challenges. In the short-term, global portfolio players are expected to provide the needed additional flexibility from their currently open selling positions.

Portfolio players – notably the likes of Shell, BP, Petronas, Trafigura, Glencore and Vitol – are seen playing an increasing role in global LNG trade, as flexible supply from Australia and the US is ramping up.

“Looking forward, the pool of legacy export contracts with fixed

destination and long duration can be expected to shrink as these expire, and be replaced by more flexible contracts,” commented the IEA’s executive director, Dr Fatih Birol.

In its second Global Gas Security Review, the IEA analyses balancing issues and risks with

related policy developments – such as the tight situation in southern Europe’s gas and power markets in winter 2016-17; the diplomatic tensions between Qatar and some of its

neighbours; and supply risks posed by recent hurricanes on the U.S. energy system.

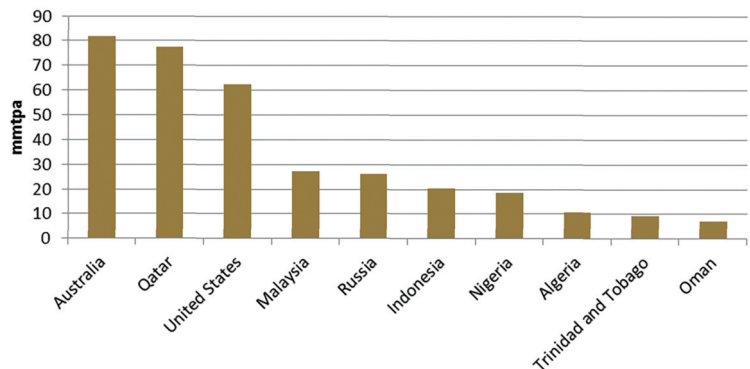
“As recent events demonstrated, the security of natural gas supplies cannot be taken for granted even with the current low price environment and over-supplied market,” said Dr. Birol. Even in the current low-price environment, suppliers are still exposed to low-probability but high-impact events that could have serious consequences for global gas supplies.

Updating metrics of the Review, the IEA noted a continuing improvement in supply availability and contractual flexibility, which are expected to grow in the near future, along with diversification of market participants.

To improve the risk assessment of importing countries, the report also introduces a new typology of LNG buyers as a tool to measure market exposure, and related security of supply issues. This typology also suggests a way to measure future LNG market evolution. ■



2020 Top 10 Liquefaction Capacity Holders



Australia's East Coast LNG producers pledge “affordable” domestic gas supply

CEOs of the three gas liquefaction and export facilities near Gladstone in Queensland, Australia, have struck a deal with Prime Minister Malcolm Turnbull, promising to fill the expected shortfall and address any additional needs by offering gas on “secure and affordable” to domestic customers.

“The east coast LNG exporters will offer sufficient gas to meet the expected shortfall, and any emerging additional shortfall, through the good faith offering of gas to the domestic market on reasonable terms,” the agreement reads.

With this open-ended commitment, the LNG exporters have found an agreement with the Turnbull government that puts an end to the threat that regulators may have to impose a cap on Australian gas exports. The Prime Minister signed the deal at the start of this week with Gladstone LNG’s Rod Duke, Australia Pacific LNG’s Warwick King and Shell Australia’s Zoe Yujnovich on behalf of Queensland Curtis LNG.

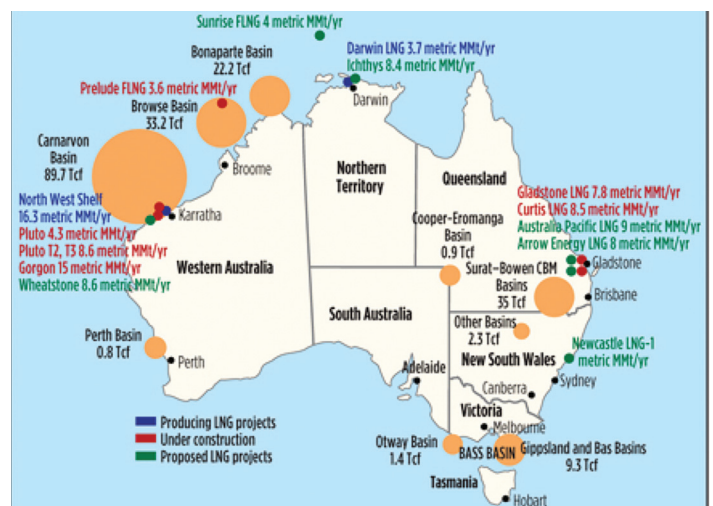
Power stations and other big

gas customers have now the possibility to complain to the Australian Competition & Consumer Commission (ACCC) if they are not getting sufficient gas supply or feel they are being overcharged.

In a bleak report, the ACCC had warned of a gas shortfall in 2018 that is expected to range from 55 petajoules to 108 petajoules next year while gas developers planned to sell 63 petajoules on the global spot market. The watchdog also found that commercial gas customers were asked to pay between \$10 and \$16 a gigajoule this year, when in fact the “benchmark” price should be \$5.87 a gigajoule in Queensland and \$7.77 in the southern states, if Australian prices stayed in line with levels seen across Asia.

Putting a positive face on it, energy minister Josh Frydenberg said he expects the agreement will “put downward pressure on prices” over time. However, the

signed accord does not set a preferred price level and only requires the gas exporters to offer domestic offtakers “reasonable prices.” ■



Overview of Australian LNG projects

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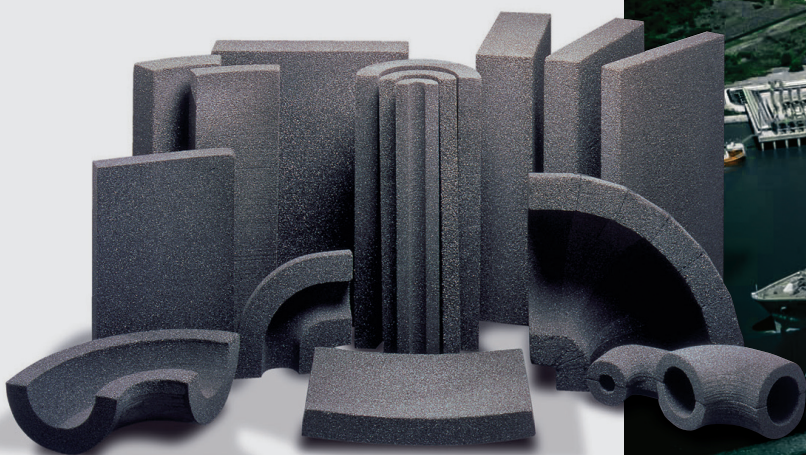
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Argentina to auction offshore gas licenses in 2018

Encouraged by a seismic survey of Atlantic coast acreage, Argentina has announced it will auction offshore oil and gas exploration rights near its northeastern sea border next year. The energy ministry hopes the subsalt basin off Brazil continues south which could lead to discovery of attractive conventional fields that help reverse Argentina's energy deficit.

President Mauricio Macri's government, since taking to power in late 2015, has supported investment in the energy sector in an attempt to reduce cost for energy imports. Argentina has started buying LNG since 2008 to plug a widening gap between falling domestic production and rising demand in the industrial and power generation sector.

LNG imports, together with pipeline gas from Bolivia and Chile, currently cover a third of the country's gas needs of 130-180 million cu m/d. However, President Macri has vowed to end LNG imports in five to six years time, dependent on the success of domestic gas production.

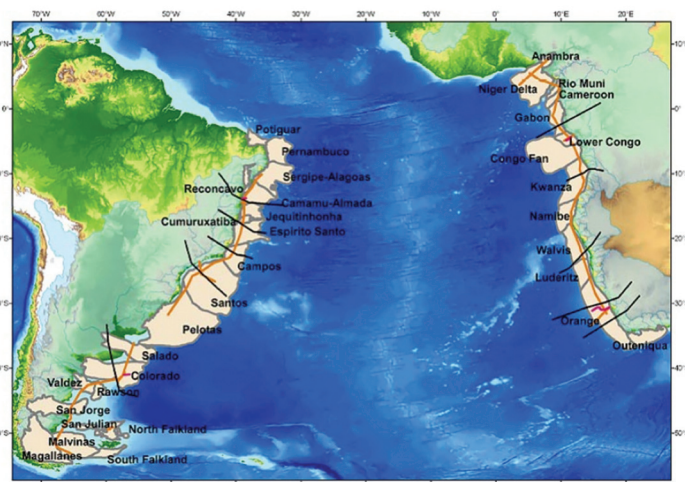
To date, Argentina has just 2.4 billion barrels in proved conventional oil reserves but the latest seismic survey along its northern coastline could alter that. The area had been unexplored and is now being surveyed by Spectrum of Norway which has been hired to help YPF, Argentina's state energy com-

pany. In addition, an Australian company is also surveying the area, Searcher Seismic.

Focus shifts from shale to offshore reserves

Upstream efforts so far mostly centred on Argentina's Vaca Muerta shale fields, rather than offshore exploration. But attention has now shifted, after Brazil attracted a record \$1.19 billion last week in its 14th round of bidding for oil exploration and production rights. Keen to follow Brazil's lead, Argentina's energy ministry wants to explore acreage off its northern coastline.

"There is a high probability that the subsalt basin that exists on the coast of Brazil continues south and so we see the discovery of any formation of oil and conventional gas in the area as very attractive. It could be very profitable for the country," Minister Juan Jose Aranguren told reporters at a press conference in Buenos Aires when announcing the 2018 auction round.



South Atlantic margin basins. Source: Getech

To boost domestic production Macri's right-of-center government introduced an incentive price of \$7.50/MMBtu for output from new developments back in 2013 and doubled average wellhead gas prices to \$5.20/MMBtu on average for existing fields. The incentive price helped advance production which rose by 6.6% last year – much of the new growth came from shale and tight plays like Vaca Muerta and Mulichinco.

The Neuquen Basin's Vaca

Muerta shale formation, located in west-central Argentina, is estimated to hold 22.8 barrels of oil equivalent which makes it one of the largest shale rock formations in the world. YPF has been fracking there together with three international joint ventures: one with Chevron at the Loma Campana field, a second one with Dow Chemical at the El Orejano field, and a third joint venture with Petronas at La Amarga Chica field.

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Elba Island LNG advances works on storage tanks

Kinder Morgan, the US pipeline company, has received permission from US regulators to advance with further work on storage for its export project at Elba Island near Savannah in the state of Georgia. Elba Island is an existing LNG import terminal being transformed into an export plant to produce an initial 2.5 mtpa.

Under the current schedule, the Georgia liquefaction plant could be producing LNG by the end of 2018 or early 2019. Works to transform the terminal into a liquefaction

plant began in November 2016, and involves the installation of 10 small-scale liquefaction units and modifications to the terminal infrastructure.

The venture is underpinned by a 20-year LNG supply contract with Shell.

The Federal Energy Regulatory Commission (FERC) has just given permission to Kinder's subsidiary Elba Liquefaction Co. to construct the LNG tanks D-4 and D-5 impoundment areas. "This approval is based on review of the information filed on September 28, 2017," the regulator said.

Kinder recently signed up investment fund firm EIG Global Energy (EIG) as its partner in the Elba Island venture. EIG purchased a 49% joint venture participation in Elba Liquefaction Co. for an upfront cash payment of around \$385 million and agreed to fund its share of future

capital expenditures.

Engineering work at Elba Island is being carried out by the US subsidiary of Japan's IHI Engineering & Construction, based in Houston, Texas.



Elba Island LNG in Savannah, Georgia

Tax incentives for \$15bn spend on Rio Grande LNG

NextDecade, developer of the Rio Grande liquefaction plant in Texas, has received tax incentives for its project planned for the Port of Brownsville because of its jobs and investment potential.

Rio Grande LNG is one of the largest proposed private investments in Texas: the liquefaction plant and associated Rio Bravo Pipeline cost more than \$15 billion to be spent in Cameron County, where its site is located. Once completed, Rio Grande's six liquefaction Trains will produce a total 27 mtpa, making the venture one of leading projects in the second wave of the US Gulf Coast export build-out.

Expected to receive FERC approval by mid-2018, Rio Grande project partners aim for a final investment decision later that year and first LNG to be shipped in 2022.

"The proposed facility and pipelines are expected to create approximately 6,000 direct jobs during construction, more than 250 permanent jobs at the facility during operations, and more than 3,000 indirect permanent jobs in the county," NextDecade explained. "Additionally, exports

from Rio Grande LNG could significantly improve the US balance of trade while supporting key allies with access to cleaner-burning natural gas."

"The tax abatement agreements are aligned with distinct phases of the project and provide for the full abatement of County property taxes for each phase's first 10 years of operations.

"Subject to a positive final investment decision, Rio Grande LNG agrees to pay \$2.7 million in payments-in-lieu-of-taxes during each year of tax abatement for all

phases," the company said. Rio Grande LNG has also agreed to provide up to \$10 million to fund community projects and to maximize the hiring of residents of the county during construction and operations.

"This marks the start of our company's formal partnership with Cameron County," said NextDecade Chief Financial Officer Ben Atkins. "These tax incentives are essential to the project's competitiveness, and we are grateful to have received broad political support."



Site of proposed Rio Grande LNG at the Port of Brownsville

Dominion gets regulatory nod on Cove Point commissioning

FERC has granted permission to Dominion to begin the next phase of commissioning at the Cove Point liquefaction project. The authorization, however, does not grant approval for commencement of service.

Before placing the project into service, Dominion must receive written authorization which normally only gets granted once the regulator determined that all facilities have been built to standard and can be expected to operate safely as designed.

Once operational, Cove Point LNG will have the capacity to produce 5.25 mtpa. The entire production capacity has been fully subscribed with Pacific Summit Energy, a U.S. unit of Sumitomo Corporation, as well as with GAIL Global LNG under 20-year terminal service agreements.

According to the latest FERC filing, the commission has permitted commissioning activities including the introduction of hazardous fluids and activities related to mixed refrigerants propane refrigeration systems, LNG piping to the existing LNG tanks, and permanent fuel gas piping as well as all supporting systems.

Dominion was ordered to file weekly reports on the ongoing commissioning activities once LNG is produced until it authorizes the commencement of the service.

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