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Analysis: Cap on Australian gas exports would play in the hands of US LNG

Stakes are high in Australia's energy policy: Faced with spiralling electricity prices and a domestic gas shortage, Prime Minister Malcolm Turnbull is threatening to cap gas exports. Santos's Gorgon LNG project is likely to be hit first, but critics warn that in the absence of a Trans-Australian pipeline any export restrictions will play in the hands of US LNG exporters, notably Cheniere Energy.

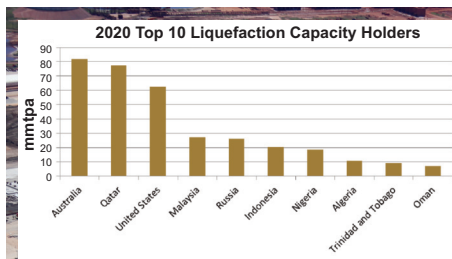
Before imposing drastic measures, the Australian PM has called on Shell, ConocoPhillips and Santos to help plug an estimated shortfall of up to 17% of market demand in 2018. Headquartered in Adelaide, Santos is understood to be the prime candidate for any gas export restrictions.

Profit-driven upstream companies prefer selling spot LNG cargoes on global markets instead of locally in the absence of a Trans-Australian gas pipeline. Alerted by skyrocketing electricity prices in Sydney and Melbourne, the energy

watchdog AEMO on September 25 published a bleak forecast saying the country's gas crisis is three times bigger than initially thought, and expected to "remain tight in eastern and south-eastern Australia in 2018 and 2019."

For 2018, the shortfall risk is estimated between 54 petajoules and 107 PJ which, according to AEMO, is in line with the gap found by the competition commission. "The expected shortfall could be reduced to a significant extent

if the expected sales on international LNG spot markets were instead redirected to the domestic market," competition chairman Rod Sims suggested in a barely disguised call for a cap on gas exports.



Corpus Christi Liquefaction Project 2016



Santos' GLNG project

Urgent action is now required, and AEMO's dire outlook is now being carefully considered in Parliament where PM Turnbull is trying to get a mandate for a unanimous decision by November 1.

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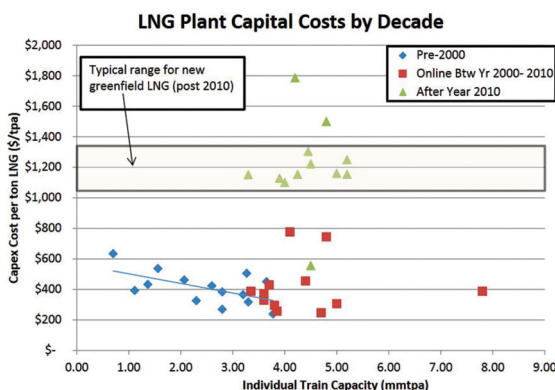
Shift to spot LNG requires fresh take on project finance

As the second wave of U.S. LNG projects is gathering speed, the shift to short-term offtake agreements which already account for 25% of global trade requires a radically different approach on how large-scale liquefaction projects are being financed.

Banks used to underwrite liquefaction and export projects based on long-term supply agreements over 20 years or more with creditworthy buyers, usually some major state-backed gas utilities. However, as the global gas market has become saturated, if not oversupplied, some emboldened buyers push for short-term deals with flexible delivery terms. This alters project risk.

Risks associated with future cash flows increase if a greater proportion of the sendout capacity of an LNG project is backed merely by short-term deals. The debt-ratio of such project decreases, as lenders

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Pipe dream vs. LNG shipments

LNG could be an option, given that much of Australia's gas bounty is already being liquefied for exports to global markets. However, shipping LNG from Western Australia to the centres of demand along the East Coast would tie Australia into international prices and therefore risks to sacrifice a potential gas advantage at home.

A transcontinental gas pipeline, spanning over 3,000 km could help bring gas from the centres of production up north to the urban metropolis along east coast Australia. With about 167 trillion cubic feet (Tcf) of conventional gas resources and a domestic market consuming just 2 Tcf of gas per year, there is easily more than 75 years of gas available, says Colin Barnett former premier of Western Australia.

"The problem is 95% of this conventional gas resource is off the Western Australian and Northern Territory coasts," he admits. Mr Barnett advocates a trans-con-

tinental gas pipeline that connects the resource-rich Northwest to existing infrastructure in central Australia. Though the 3,000km interconnector costs an estimated \$5 billion, he stressed expenses need to be put in context with \$49 billion spent for a national broadband project.

Cheniere – the laughing third?

Threats of LNG exports caps are increasing the risk factor of the Australia's three landmark liquefaction and export projects: Gladstone LNG (7.8 mtpa) in Queensland, as well as Gorgon LNG (15 mtpa) and Wheatstone LNG (8.9 mtpa) off the north coast of Western Australia.

The threat of a cap on gas exports is looming large over the three large LNG schemes - Prelude, Wheatstone and Ichthys - that are currently at various stages of development off the north coast of Western Australia. In total, almost \$80 billion worth of LNG projects are under construction, according to APPEA,

the voice of Australia's oil and gas industry.

Restricting exports, or mandating that developers have to free up a share of their gas upstream output for the Australian domestic market is adding risk to unfinished projects.

The laughing third would be US developers, notably Cheniere Energy. Less spot LNG from Australia to buyers across Asia means there is more room for shipping cargoes from the US Gulf Coast. Any limitations on Australian exports would greatly benefit American LNG developers to get a greater foothold into an oversupplied market. IHS Markit expects the length on global LNG markets will persist until 2022-23.

The Trump administration sees gas exports as almost a panacea in its drive to boost American jobs and curb the country's budget deficit. LNG has become an instrument of Trump's trade policy - a move welcomed by the industry.

Charif Souki, chairman of Telurian and former CEO of Cheniere rebuked the suggestion that the

Obama administration was not supportive of LNG exports, but underlined the new government is more vocal in its support. "Mr Trump is not afraid to brag about the industry," he told the Financial Times, hinting at Trump's recent efforts to court Chinese buyers.

Remaining upbeat in the face of a potential supply glut, Anatol Feygin, Cheniere's chief commercial officer, said: "Pundits tend to overstate supply and understate demand, because it's easy to track the supply projects coming on line, but it's hard to know when the projects that drive demand will come on line."

Readying for the 'next round' in LNG projects, Cheniere is considering skipping banks altogether and seeking out other capital sources, CEO Jack Fusco told Bloomberg. A second round of US liquefaction terminals is under development on the assumption that the current slowdown will lead to a post-2020 construction boom that will benefit low-cost producers offering flexible contracts. ■

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are hesitant to take risks in an oversupplied global gas market. There is an explicit link between the capital structure of an LNG project and its off-take.

Short-term agreements provide less visibility into future cashflows and debt service coverage for banks, export credit agencies (ECAs), and international financial institutions to be able to confi-

dently lend money against the assets.

"With the spot price of LNG being volatile and recently hitting its lowest level in a decade, the concept of a merchant LNG facility (e.g. one without a contracted anchor customer) is difficult to conceive and execute to the satisfaction of all stakeholders. This is coming at a time where some buyers are requiring destination restrictions, a common contractual element, to be eliminated, thus providing more options and flexibility to the buyer," says Eric Robken, LNG Proposal Development Engineer at Dresser-Rand.

Faced with a different risk structure, developers of large LNG export project and lenders need to come up with a new commercial solution for financing large LNG export ventures, which provides adequate visibility for the lenders, investors, and customers.

The aim is to minimize capital risk and provide the possibility of a satisfactory return on debt and equity investment.

"This is an area where the portfolio players, companies who purchase LNG to subsequently distribute through their own marketing channels, provide great leverage in making LNG a viable long-term market," Mr. Robken suggests. Portfolio players, often large companies with substantial balance sheets, are in a position to can provide liquidity to the market - and can chose to back a project, irrespective of long-term counterparty contracts.

Cost is of the essence to get large scale infrastructure projects off the ground in times of an uncertain demand outlook and lower LNG prices globally in an oversupplied market. To secure debt financing, it is imperative that project developments are exe-

cuted at a minimal cost. However, the industry is being plagued with cost overruns which have escalated from \$1,000/tpa a decade ago to over \$3,000/tpa like in the Gorgon LNG project.

"It is evident that proposed projects with all-in budget cost estimates, which include the often costly feed gas pipelines, at a range above \$1,000/tpa will be a longer shot to be funded than those that are more cost competitive," Mr Robken comments.

"The most competitive project developments may target a cost of approximately \$500-700/tpa using the advantages of sunk costs in prior asset development, design standardization, and larger individual train capacity. However, even at this ambitious cost target, projects may have difficulty achieving the pro-forma financial returns necessary to be fully funded in today's environment." ■

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South Korea's sudden hunger for LNG surprises analysts

Strikingly, South Korea's year-to-date LNG demand has risen by over 4 million tons – contrary to expectations it would fall. Price sensitive Korean buyers got really interested in US shale gas and have already bought eight cargos from Cheniere Energy's Sabine Pass terminal; now Korea Gas Corp. (KOGAS) is also considering investing in LNG projects in Alaska, Texas and Louisiana.

State-run KOGAS handles most of South Korea's LNG imports and the company just struck a 20-year supply with US exporter Cheniere under which it will receive 2.8 mtpa of LNG. The first cargo was received in July, followed by several others.

Competitively priced US LNG cargoes may well soon play an even bigger role in South Korea – if the new liberal President Moon Jae-in, who won office in May this year, manages to implement his goal to transition away from coal and nuclear in favour of gas-fired power generation.

Spot LNG cargoes bought on spec

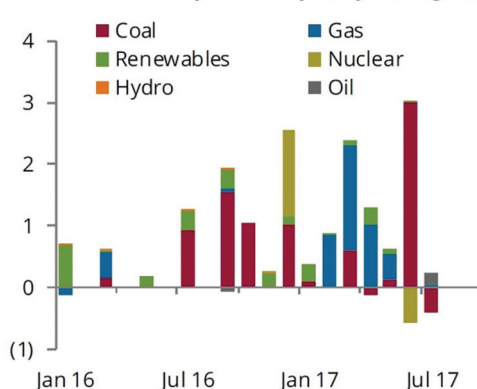
To date, however, very little of the latest strength in gas demand comes from the power sector. According to Energy Aspects, South Korea's LNG appetite this year has been more down to expansion of LNG import facilities, with players having bought cheap spot cargoes on spec and put the gas into storage.

Pricing has been the driver behind Korea's sudden surge in LNG

import. KOGAS and others have been seeking to take the arbitrage between cheap global LNG spot prices and higher domestic prices in South Korea.

The economic rationale behind

South Korean power capacity changes, GW



Source: KEPCO, Energy Aspects

this is the wide gap between the price of spot LNG, which have been less than 7 \$/mmbtu since mid-February, and KOGAS city gate prices, averaging 12.2 \$/mmbtu, according to Energy Aspects. Year-to-date imports into non-KOGAS terminals were up by a combined 1.8 Mt y/y, accounting for around half of Korea's LNG takes this year

Moreover, KOGAS just built three new 270 kcm storage tanks at the Samcheok regas facility.



This additional storage tank capacity has been used, with Korean LNG gas inventories at end-August up by 1.8 million tons y/y at 3.0 Mt. With utilization both independent terminals estimated to come in around 80%, this leave little upside for further growth in LNG imports going forward.

Another 1.2 Mt of y/y growth at best, Energy Aspects estimates, saying "KOGAS may want to may want to carry high stock levels into the peak demand periods to ensure supply security, [but] how much higher is questionable."

Uptick in LNG imports may end in 2018

"We could now be at the end of the road for this unexpected uptick in Korean LNG takes. LNG imports in Q4-2017 look to have far less support, as nuclear outages could be 5 GW lower y/y and gas could be crowded out by coal," analysts suggest.

"Factor in higher gas stocks and forecasts for warmer-than-normal weather and y/y reduc-

tions in LNG imports are much more likely. This extends to 2018."

Policy drivers and green energy regulation might extend Korea's dash for gas a little longer. President Moon Jae-in touted a shift to clean energy sources and pledged a shift away from coal and nuclear. During his election campaign he also pledged to review plans to build nine coal power stations and eight nuclear reactors, including the part-completed Shin Kori No.5 and No.6, citing safety concerns.

But analysts are not impressed: "While new government policies will take some time to have an impact, in the period to 2025, the policies are more likely to stimulate an increase in renewables and only gradually improve utilisation of gas plants."

So far, gas-burn in the power sector remained subdued, despite nuclear outages being almost 3 GW higher in January-September compared with the same period last year, leaving nuclear generation 10% lower y/y. Unsurprisingly, given that the 4.6 GW of new-build gas power capacity is outnumbered by over 8 GW of new coal-fired capacity.

Rather than gas, Korea turned to new coal plants to offset the loss from nuclear. Making great use of the new-build coal power plants, Over 2017, the output of coal generation was up by 15 TWh (12%) with gas only coming in 0.63 TWh (1%) higher. Unsurprisingly, analysts say as "for gas to play a bigger role, the commodity needs to be cheaper."

South Korean gas balances forecast, Mt

	2017	2018	2019	Q4 17	Q1 18	Q2 18	Q3 18	y/y change		
								Q1 18	Q2 18	Q3 18
Power	13.8	12.4	10.9	3.7	3.6	2.4	3.1	(0.4)	(0.2)	(0.4)
Res-com	17.4	17.4	17.6	4.9	6.7	3.1	2.6	(0.1)	(0.1)	0.0
Other terminals	4.9	5.2	5.2	1.3	1.2	1.3	1.4	0.4	0.0	(0.1)
Total demand	36.1	34.9	33.7	9.8	11.6	6.9	7.1	(0.1)	(0.2)	(0.5)
LNG	37.7	34.9	33.8	10.1	11.3	7.0	7.2	(0.1)	(1.3)	(0.8)
Storage	1.7	0.0	0.1	0.3	(0.3)	0.1	0.1	0.0	(1.1)	(0.3)

Source: Kogas, JODI, Energy Aspects

Mexico, South Korea – key destinations for US LNG

Mexico and South Korea each received four cargoes and China took delivery of two as a total of 16 shipments were delivered from the Sabine Pass plant in Louisiana at lower average prices compared with 15 loaded in the previous month, according to the latest data released by the Department of Energy (DoE).

Among the remaining six cargoes lifted, the purchasing nations were Brazil, Chile, Egypt, Kuwait, Spain and Portugal.

Shipping data also showed that the cargoes were delivered by contract holders such as Royal Dutch Shell, Gas Natural Fenosa and the Cheniere marketing unit. Cheniere Energy's plant had sent out 15 cargoes the previous month, including to nations such as India, Italy and Argentina.

Prices were lower than for the previous month, ranging from \$3.53/mmBtu to \$6.02/mmBtu on a loaded basis at Sabine compared with June prices of \$3.72/mmBtu to \$6.61/mmBtu. Among the interesting details in the data for July was that the most expensive cargoes were delivered to Egypt, Spain and

Portugal at \$6.02/mmBtu.

Since Sabine Pass began its shipments in February 2016, the largest recipient of US LNG has been Mexico with 39 cargoes received followed by Chile with 16, South Korea 15 and China with 13. The Sabine Pass plant now has three liquefaction Trains on stream, each with nameplate capacity of 4.5 million tonnes per annum and a fourth being ramped up.

The DoE figures also showed that four cargoes were exported in ISO container tanks from the Hialeah facility near Medley in Florida, via the port of Fort Lauderdale, to the Caribbean island of Barbados. Each of the container shipments to Barbados were priced at \$10 per MMBtu. The exporter was American LNG Market-

ing. Barbados has received 30 ISO containers of LNG from Florida ports during 2017.

Details of Sabine Pass April 2017 shipments in chronological order, including country of destination, cargo type, vessel, volume (given as thousand cubic feet [mcf] of natural gas) and cost at the export point:

- South Korea Long-Term "SM Seahawk" 3,712,758 \$3.53
- Mexico Long-Term "Maran Gas Sparta" 3,444,912 \$3.53
- South Korea Long-Term "Hyundai Peacepia" 3,709,231 \$3.53
- Spain (split cargo) Long-Term "Ribera del Duero Knutsen" 216,626 \$6.02
- Egypt (split cargo) Long-Term "Ribera del Duero Knutsen" 3,464,134 \$6.02

- China Long-Term "Maran Gas Olympias" 3,584,901 \$3.53
- Brazil Short-Term "Creole Spirit" 3,641,640 \$4.07
- South Korea Long-Term "K. Jasmine" 3,112,053 \$3.53
- Mexico Long-Term "Maran Gas Hector" 3,714,141 \$3.53
- Mexico Short-Term "Oak Spirit" 3,591,699 \$4.52
- Kuwait Short-Term "Maran Gas Alexandria" 3,409,793 \$4.33
- Portugal Long-Term "Valencia Knutsen" 3,662,245 \$6.02
- China Long-Term "SCF Melampus" 3,633,585 \$3.53
- Mexico Short-Term "Oak Spirit" 3,681,230 \$4.46
- Chile Long-Term "Provalys" 3,255,587 \$3.53
- South Korea Long-Term "Barcelona Knutsen" 3,704,024 \$3.53



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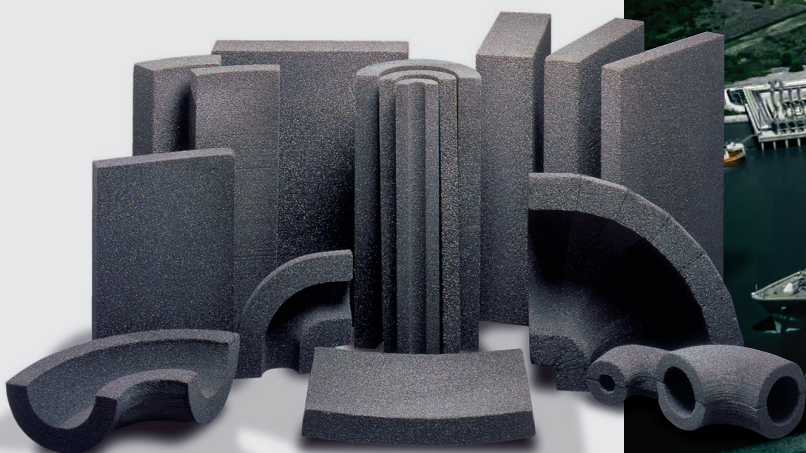
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Tellurian acquires acreage in Haynesville Shale

Tellurian Inc., developer of the Driftwood LNG project on the Gulf Coast of Louisiana, said it had agreed to acquire acreage in Haynesville Shale play in the northwest of the state to add potential gas assets to its portfolio for future export.

Haynesville plays has around 1.3 trillion cubic feet (Tcf) of potential gas resources from 19 producing and operated wells with net current production of 4 million cubic feet per day. The asset purchase also comes with associated natural gas gathering and processing facilities.

Nasdaq-listed Tellurian has now entered into an agreement with a private seller to acquire natural gas producing assets and undeveloped acreage in northern Louisiana for \$85.1 million.

"The assets are 100 percent

held by production and 92 percent operated, allowing Tellurian to control the pace of development for its multi-year drilling inventory," the company stated, adding adding the 9,200 net acres have 138 operated Haynesville and Bossier drilling locations. The transaction is scheduled to close by the end of November 2017.

Future feed-gas at competitive prices

Meg Gentle, Tellurian President and CEO said the acquisition of natural gas producing assets was integral

to its growing business: "We expect our full-cycle cost of production and transport to markets will be approximately \$2.25/mmBtu, which represents a significant savings to natural gas we will pur-

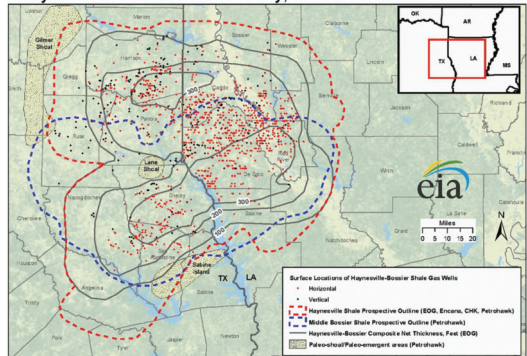
chase at Henry Hub and other regional liquidity points."

Driftwood LNG, a subsidiary of Tellurian LNG, is developing a liquefaction and export plant near Lake Charles that will match the nearby Sabine Pass venture of Cheniere Energy with 27 mpta output. Construction works for Driftwood LNG are scheduled to start in 2018, pending regulatory approval. If all goes to plan, first cargoes could be shipped by 2022.

Analysts pointed out that Tellurian's new gas assets will provide future feed-gas from shale at competitive prices but will also require investment funds for the development of the plays located in Red River, DeSoto and Natchitoches Parishes of Louisiana.

The Haynesville shale covers areas of northeast Texas as well as northwest Louisiana and is one of the most prolific in the US with more than 13 Tcf of historical production an array of active drilling rigs and access to multiple pipelines.

Haynesville-Bossier Shale Play, Texas-Louisiana Salt Basin



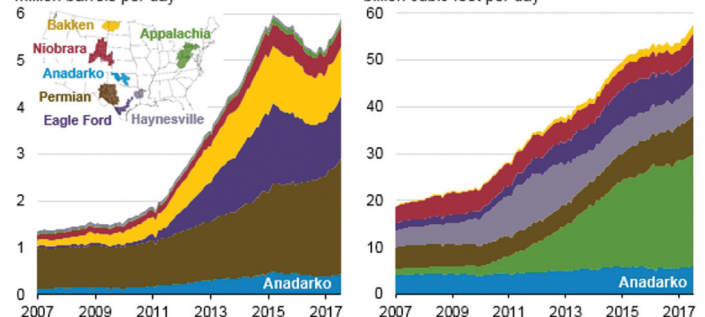
Anadarko output keeps rising

Drilling activity and production of crude oil and natural gas is picking up in Oklahoma's Anadarko Region, notably in two areas commonly known as the STACK (Sooner Trend Anadarko Canadian and Kingfisher) and the SCOOP (South Central Oklahoma Oil Province) plays.

According to EIA's Drilling Productivity Report, the rig count in the region has risen from 84 in January to 129 in July. The rig count is expected to increase further as more operators are flocking to the region. According to EIA data, Anadarko's rate of increase is second only to that in the Permian Region in 2017.

Covering a large portion of western Oklahoma and the northeast corner of the Texas panhandle, the Anadarko Region used to be known for some prolific oil plays. In 2010, however, the U.S. Geological Survey reassessed the entire basin and found technically recoverable undiscovered re-

U.S. crude oil and natural gas production in selected regions (Jan 2007 - Jul 2017)



sources of 495 million barrels of oil, 27.5 Tcf of natural gas, and 410 million bbl of natural gas liquids.

Today's rise in drilling productivity helped the Anadarko Region in July to achieve 437,000 barrels per day (b/d) of oil production

and 4.9 billion cubic feet per day (Bcf/d) of natural gas production, according to the EIA's Drilling Productivity Report. Oil production peaked at 498,000 b/d in March 2015, compared with an average of 112,000 b/d in the period between July 2013 and July 2017.

Hurricanes can't stop rise in US gas production

Despite the havoc caused by recent hurricanes along the Gulf Coast of Texas and Louisiana, US dry gas production is set to rise to an average of 73.7 billion cubic feet per day in 2017. This year's output is a 1.4 Bcf/d increase from the 2016 level, and the EIA says 2018 output is also likely to surge.

The Energy Information Administration said in its latest short-term outlook (STEO) that natural gas production in 2018 is forecast to be 4.4 Bcf/d higher than the 2017 level. In the aftermath of Hurricane Harvey, Irma and Maria, uncertainty abounds about the timeline for the return to normal operations for a broad range of upstream production, refining, pipeline and terminal and distribution infrastructure.

"The severity and duration of these outages create additional uncertainty about the path of energy prices in the coming weeks and months," the EIA said. The latest STEO consequently does not include any projected effects from Hurricane Irma, which made landfall in Florida on September 10," said the EIA, though Florida brings in most of its energy from surrounding states.

On the price front, the average Henry Hub natural gas spot price was \$2.90 thermal units, down 8 cents per mmBtu from the July level. However, the report expects natural gas prices to rise higher because of the steady increase in LNG exports as the Sabine Pass plant in Louisiana expands and other facilities come on stream such as Cove Point in Maryland, Freeport LNG in Texas and the Cameron plant in Louisiana.

Growth in natural gas exports and domestic consumption in 2018, according to the EIA, will drive up spot prices at Henry Hub from \$3.05/mmBtu on average in 2017 to \$3.29/mmBtu in 2018.

Renewables curtail LNG imports for Europe's power sector

Only after 2030, pipeline gas and LNG is seen regain market share in Europe, displacing nuclear power and lignite coal. Before that time, strong renewable energy expansion is forecast to eradicate the growth of gas use in the power sector, according to the EIA's just-released International Energy Outlook 2017 (IEO2017).

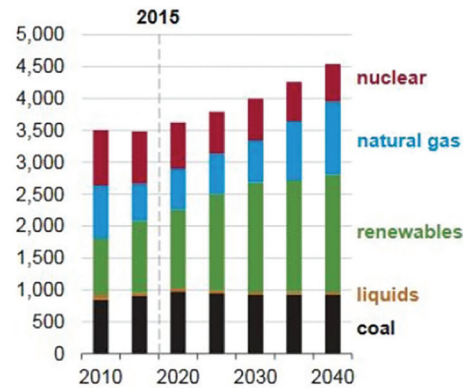
Nuclear generation's share in Europe's power mix is expected to decrease from around 25% in 2015 to less than 15% by 2040 because of stated policies to either cap or phase out nuclear power, including those adopted in France, Germany, and Sweden. Consequently, the overall energy mix in Europe is set to change considerably with renewables gaining market share at a faster speed than any other power source.

Worldwide, renewables are the fastest growing source of energy followed by gas generation, growing at an annual rate of 2.8% and 2.1%, respectively. Coal, along with wind and solar power, will both contribute 31% to world electricity generation by 2040.

On the supply side, net electricity generation in mature regions - notably in Europe - is rising slowly, by an anticipated 1.1% per year from 2015 to 2040, compared to an average annual 1.5% increase worldwide.

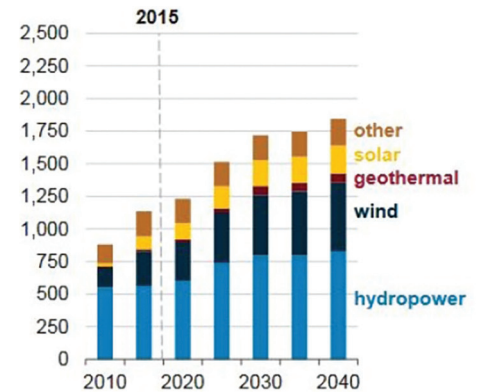
OECD Europe reduces nuclear generation—

Electricity generation in OECD Europe
billion kilowatthours



U.S. Energy Information Administration

Renewable generation in OECD Europe
billion kilowatthours



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World energy use to rise 20% by 2040

Energy consumption around the globe will rise 28% between 2015 and 2040, with non-OECD countries in Asia, including China and India, accounting for over 60% of the growth, the IEO2017 reads. Demand for all fuel sources - except coal - is projected to keep growing through 2040.

Natural gas is the fastest-growing fossil fuel in the outlook. Global natural gas consumption grows by 1.4% per year from 2015 to 2040. Abundant natural gas resources and rising production—including supplies of tight gas, shale gas, and coalbed methane—contribute to the strong competitive position of natural gas.

The industrial sector (including

mining, manufacturing, agriculture, and construction) has the largest share of energy consumption of any end-use sector, accounting for more than 50% over the entire projection period. World industrial sector energy use increases by 18% from 2015 to 2040, reaching 280 quadrillion Btu by 2040.

Coal increasingly replaced by gas, renewables

Although renewables and nuclear are the world's fastest growing forms of energy, fossil fuels will continue to meet much of world's energy demand. Natural gas use is seen rising by 1.4%/year, compared with liquid's 0.7%/year growth and virtually no growth in coal use (0.1%/year).

Coal is increasingly replaced by natural gas, renewables, and nuclear power (in the case of China) in electricity generation. Industrial demand for coal also weakens, according to the IEO2017.

China remains the world's largest consumer of coal, but the country's coal use is projected to drop by 0.6% per year from 2015 to 2040. In OECD countries, coal's expected decline is similar, falling by 0.6% per year.

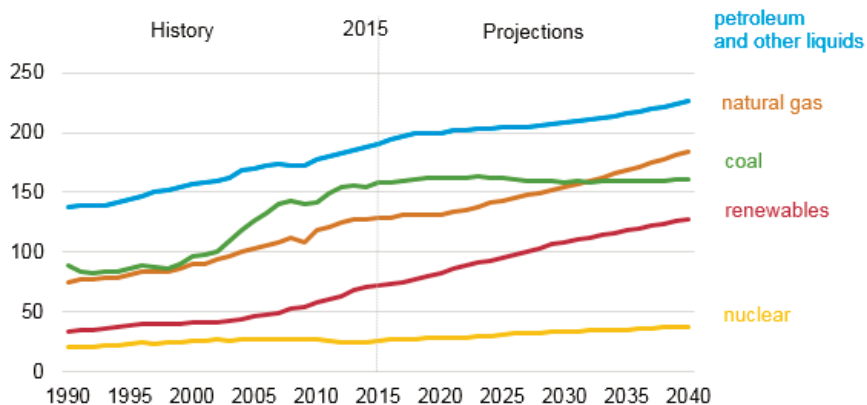
Globally, coal's share of total world energy consumption is seen to fall substantially over the forecast period, down from 27% in 2015, to 22% in 2040.

Nuclear power net growth led by China

Worldwide electricity generation from nuclear power increases from 2.5 trillion kWh in 2012 to 3.7 trillion kWh in 2040, as concerns about energy security and greenhouse gas emissions support the development of new nuclear generating capacity, but reactor retirements and opposition from local populations keep nuclear from expanding in many parts of the world.

Virtually all of the projected net growth in the world's installed nuclear capacity occurs in non-OECD countries, led by China's addition of 111 gigawatts of nuclear capacity from 2015 to 2040.

Figure 2. World energy consumption by energy source
quadrillion Btu



In contrast to the strong growth in coal use in the early 2000s, worldwide coal use is projected to remain flat. Declines in OECD regions and China are offsetting growth in India and the other non-OECD Asian nations.

Brexit seen widen NBP-TTF spread, attract LNG imports

As Brexit unfolds, the premium on Britain's National Balancing Point (NBP) and the price volatility in relation with the Dutch Title Transfer Facility (TTF) is likely to play into the hands of LNG sellers and trading houses who are seeking to take advantage of the widening NBP-TTF spread.

According to Thierry Bros, OIES research fellow, the NBP-TTF spread, is bound to increase for EU gas to move to and from the UK, argues the NBP-TTF spread

will have to increase for EU gas to move to and from the UK. On the other hand, some countries in Europe could be tempted to impose severe and costly regulation on EU-UK pipelines to push up energy prices in the UK allowing de facto the EU to be slightly more competitive.

LNG imports are always an option to alleviate supply bottlenecks, and various an-

alysts have argued that Britain may become the 'market of last resort' for US LNG exports.

"In a world awash with LNG the issue of security of supply is not the primary issue in Brexit negotiations," Bros said, but cautioned that the LNG supply and demand balance is forecast to tighten during the 2020s.

The untangling of Britain's economic ties with the European Union will force the UK to "re-shape its energy diplomacy" as it will have to negotiate gas supplies with both the EU and Norway. If relations with Brussels turn sour, the construction of three planned EU-UK gas interconnection pipelines may be at risk.

Post-Brexit, the UK will make up its gas shortfall by importing Norwegian gas but also EU-26 gas.

"As soon as Brexit is formally completed, the UK will still have its own domestic gas supply but will also need to access foreign gas Norwegian and/or EU to meet demand," he explained. By applying this definition, in 2015, 42% of UK demand was 'foreign' gas," Bros warned.

"In the future, UK gas production is bound to decline," he suggested, "and domestic shale gas production does not look promising enough to alter the trend." A rise in LNG imports volumes, including US cargoes, could be on the cards.



Mexico publishes first monthly natural gas price index

Having moved to a competitive market, Mexico's Energy Regulatory Commission (CRE) released its first monthly price report in late August which shows that Mexican marketers sold gas at \$4.10/mmBtu on average in July. CENAGAS, Mexico's pipeline system operator also launched its natural gas capacity reservation system with electronic bulletin boards for posting natural gas flows.

"Price reports and greater transparency will be instrumental in establishing regional price indices at market hubs," analysts from the U.S. Energy Information Administration (EIA) commented.

CRE's price index system captures data on day-ahead spot sales and for each transaction, marketers are required to report the volume, price per gigajoule, storage and transportation costs. For now, the regulator will compile the information submitted for each day and publish non-proprietary information in a monthly public report on its website within 15 business days after the end of each month.

Four pricing hubs identified

Mexico's national energy ministry (SENER) has identified four potential pricing hubs located at the convergence of natural gas pipelines where most trading is likely to occur:

- Los Ramones (near the industry-intensive city of Monterrey),
- Encino (in the northern state of Chihuahua),
- Bajío (near Mexico City), and
- Cactus (in the southern state of Chiapas).

Transparent price reporting at those four hubs not only enables traders to take the arbitrage, but also initiates physical gas flows to balance supply and demand.

CRE initiated a competitive gas market on June 16, 2017, when it removed the price cap that PEMEX could charge for natural gas. This price cap used to be based on a combination of the U.S. Henry Hub natural gas futures prices, published distribution plant prices at Reynosa (near the U.S. border and the Gulf of Mexico), and transportation costs.

"Eliminating the price cap allows economic agents other than PEMEX to offer supply options and for natural gas to be sold in Mexico on a competitive-market basis.

This shift has also led to increasing Mexican production of natural gas," EIA analysts said.

Two more auctions in early 2018

Since the price cap was removed, Mexico has held three rounds of upstream auctions for oil and natural gas exploration in June and July 2017, selling 79% of available auction blocks. Mexico plans to hold two more auctions in early 2018.

According to Natural Gas Intelligence, the last capped prices published in June were

\$2.95/mmBtu at Reynosa and \$3.21/mmBtu at Ciudad PEMEX. These prices were \$1.15/mmBtu and \$0.89/mmBtu lower, respectively, than the average July competitive-market price.

However, CRE said in a statement that the IPGN is neither a regulated price nor a mandatory reference. In the long term, CRE may stop publishing the natural gas price indices once enough market information—such as independently developed price indices at market hubs—is available for participants to make informed decisions.

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Delfin LNG approved as 1st FLNG project in Gulf of Mexico

The US Federal Energy Regulatory Commission (FERC) has granted a permit to Delfin LNG – the most advanced US floating export development – that will allow developers to transport gas to its proposed deepwater port terminal to be located 30 miles offshore Louisiana in the Gulf of Mexico.

Owned by the US-Asian joint venture Fairwood Peninsula Energy, the Delfin FLNG project is envisaged as a floating liquefaction facility with four moored production and storage vessels to produce up to 13 mtpa.

Developers have already been awarded deepwater port licence by the US Maritime Administration and the venture has been approved by the US Coast Guard. Delfin purchased the UTOS pipeline and submitted its deepwater port license application in 2015.

Fairwood Peninsula Energy, made up of the India and Singapore-based Fairwood Group and

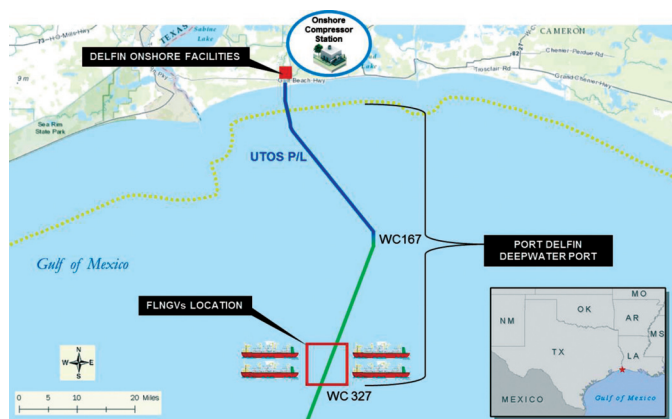
the US-based Peninsula, has proposed that the Delfin project will activate the formerly abandoned offshore system pipeline for the FLNG project and construct new connecting pipelines, a compressor station and associated facilities. Front-end engineering design for the venture has previously been awarded to Bechtel.

FID penciled in for 2018

Delfin CEO Jones said in August 2017 that Golar's floating model increases flexibility for the project and will allow Delfin to offer "inno-

vative commercial solutions," such as reduced credit requirements and medium-term offtake agreements of roughly 10 years.

Financing of the project is underpinned by a \$1.5 billion loan with the Korean Development Bank which ensures that the three project vessels will be built in South Korea. A final investment decision (FID) is expected in 2018.



Delfin FLNG project overview

Venture Global to supply US LNG to Italy

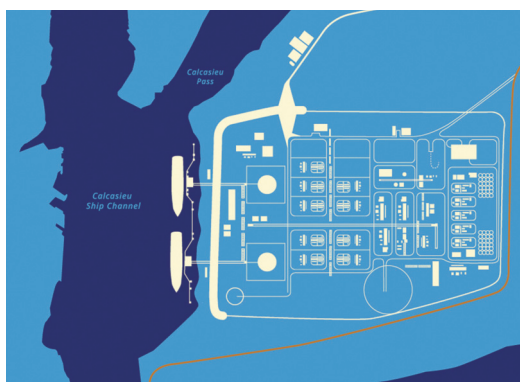
Edison, capacity holder in the Adriatic LNG import terminal, has signed an agreement to receive 1 mtpa of shipments from Calcasieu Pass liquefaction and export plant, developed Venture Global.

Under the Sales and Purchase Agreement, Edison will purchase the LNG shipments on a free-on-board (FOB) basis for a 20-year term whereby the Italian utility provides its own shipping. Edison, owned by EDF, currently provides about 20% of Italy's gas imports mostly through long-term agreements for pipeline gas from Algeria, Libya and Russia and LNG volumes from Qatar.

Washington-based Venture Global has filed to the US regulators, seeking permission to build two liquefaction plants with a combined capacity of 30 mtpa. The first – the 10 mtpa Calcasieu Pass venture – will be located on a 1,000-acre site at the intersection of the Calcasieu Ship Channel and the waters of the Gulf of Mexico. The second facility is the 20 mtpa Plaquemines

project on the Mississippi River.

Eager to advance the Calcasieu Pass project, Venture Global in July appointed the US engineering firm CB&I to build two LNG storage tanks at the Calcasieu Pass site.



Calcasieu Pass plot plan

NEWS NUDGES

Veresen pushes ahead with Jordan Cove LNG

The Canadian energy company Veresen, purchased by Pembina Pipeline in an agreed US\$7.5 billion takeover, has re-applied to develop an LNG export plant across the border in the American state of Oregon. The new Jordan Cove venture includes a liquefaction plant in Coos Bay and a 370-km pipeline that will bring feed gas from British Columbia.

Veresen CEO Don Althoff pointed out the new proposal submitted to FERC had addressed the regulator's earlier objections, notably that demand for the project had not been adequately demonstrated. The new project plan makes over 50 pipeline route adjustments and drops the construction of an affiliated 420 MW power plant.

If approved, Jordan Cove would be the first LNG export terminal on the US West Coast.

Eagle Maxville LNG gets permit for exports to the Caribbean

The US Eagle Maxville small-scale LNG plant near the port of Jacksonville, Florida, has been permitted to export the equivalent of 2.8 Bcf/y of LNG in ISO containers to the Caribbean market and Puerto Rico.

Eagle Maxville LNG will also supply fuel to Crowley Maritime Corp. LNG-powered Commitment Class ships for mainland trade with the US territory of Puerto Rico.

"Eagle Maxville is in the final stages of completing the facility, with commissioning activities underway," the Department of Energy (DoE) stated when granting the permit. Commercial operations are expected to commence in the first week of October 2017.

Fourchon LNG seeks FTA permit

Fourchon LNG, developed by Hong Kong-based Energy World, and planned for Belle Pass in Louisiana, has applied to regulators for multi-year export permits.

Developers seek to ship cargoes for 30 years to countries with a Free Trade Agreement (FTA) with the US and for 20 years to any countries without an FTA. The application with the Department of Energy (DoE) for multi-contract authorization to export up to 260 Bcf/y of natural gas follows the Fourchon project's recent receipt of a letter from FERC giving permission to start its pre-filing environmental review process.

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FUELING THE FUTURE

Atlantic LNG evacuated after fire at power unit

The Atlantic LNG production plant at Point Fortin, Trinidad, has been shut and evacuated after a fire flared up at one of its power generating units. The company said it contained and extinguished the fire, with no injuries reported.

"At around 2:15 pm today (September 12) there was a fire at one of the power generation units on Atlantic's Point Fortin plant. The company's response and safety systems immediately activated," the operator of Atlantic LNG said.

The four gas processing Trains at Atlantic LNG are running below capacity, as the operator is impacted by natural gas curtailment in Trinidad & Tobago which made it lose money and has cost the government hundreds of millions of dollars in taxes. In 2016, the liquefaction plant produced 10.46 million tons of LNG compared with 11.81 mt in the previous year.

Shell, BP and the National Gas Company of Trinidad & Tobago are the main shareholders of Atlantic LNG, while the China Investment Corp holds a minority stake,

acquired from Engie.

As the shale gas in the United States gathered speed, the Trinidad liquefaction plant has been losing importance for gas supply to North America. Over the past 10 years, it has gone from biggest supply of LNG to the U.S. to now having to look for markets in South America, and the Middle East. Atlantic's largest LNG off-taker was Chile with 2.38 mt, followed by 1.19 mt shipped to Jordan and Egypt.

Fire hits BP's Juniper project

The latest fire and temporary shutdown are impacting, and may delay the implementation of plans to expand feed-gas supplies for Atlantic LNG and to upgrade facilities. BP, formerly British Petroleum, is currently completing



Delfin FLNG project overview

the construction of the Juniper project to supply more feed-gas to the LNG plant from 50 miles off the southeast coast of Trinidad.

Other work under way is on the Angelin venture, a dry gas development in the northern Columbus Basin of the Caribbean in over 210 feet (65 metres) of water. With a

design throughput of 600 million standard cubic feet of gas per day, production will be sent to the Casasia platform for processing. The feed-gas from the venture will be transported by pipeline to the Atlantic LNG plant and the liquids produced will go to Galeota terminal via a new 13-mile pipeline. ■

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At the Core of LNG

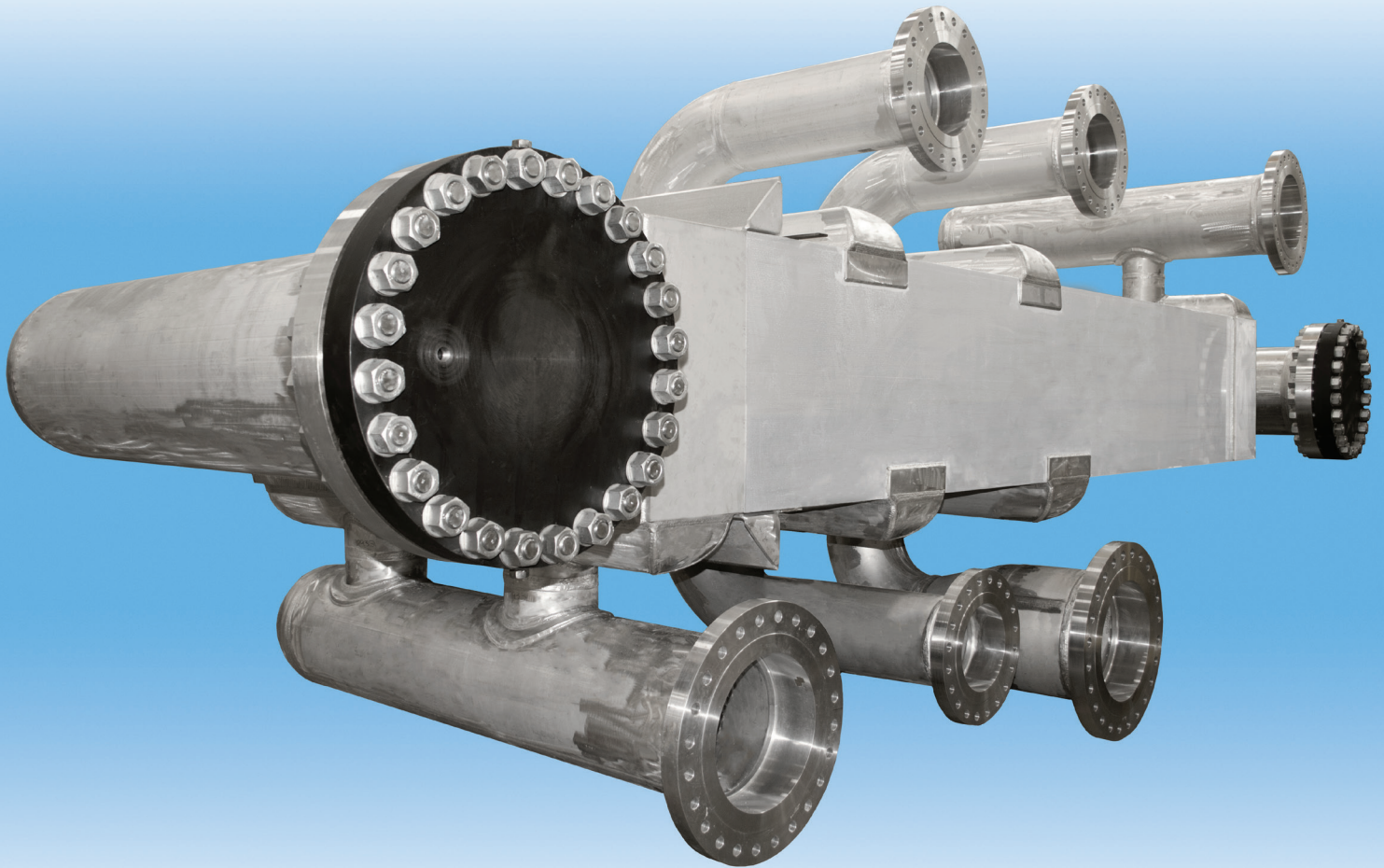


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