

LNG *North America*

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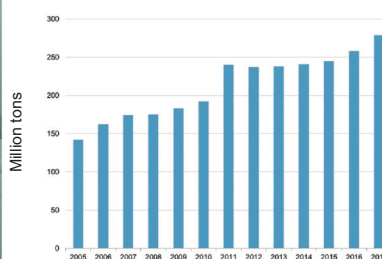
June 2018

Buyers happy to pay above variable cost for US LNG

Against the run of play, LNG buyers are prepared to pay a premium for supply from Australia and the United States – described by Standard & Poor's as “the swing”, meaning states with the highest cost production. Forward prices, notably for shipments to Asia, imply “LNG buyers are willing to pay above the variable cost of U.S. LNG production (delivered ex-ship),” which, according to S&P analysts “is not what you would expect in an oversupplied market.”



Global LNG Demand



In contradiction to the narrative of a supply glut, global natural gas prices rallied strongly in the latter half of last year. February 2018 forward prices reached \$9.90/mmBtu in December, a 80% jump from \$5.50/mmBtu seen during the summer period.

Commenting on this phenomenon, S&P analysts led by Aneesh Prabhu in New York and Simon Redmond in London said “despite the strong growth in LNG supply in 2016 and 2017, global

markets absorbed the available supply.”

China absorbs much of the oversupply

Demand is dominated by Asian markets whereby China along with new markets like India, Bangladesh and Pakistan accounts for 67% of the demand increase seen last year. China's gas demand alone jumped by 12 million tons, or 40%, in 2017 fueled by the country's push to use more gas in

power generation to improve air quality in its major cities.

In 2018, strong demand from China continues but roughly half of the global LNG growth to absorb the excess supply comes from temporary factors like fuel-switching in Europe, given that utilities have sufficient spare regasification capacity and are fully exposed to spot prices of coal and gas. But Europe cannot balance global gas markets alone. Hub prices at the UK's National Balancing Point (NBP) have increased above short-run marginal costs, according to S&P figures, but they are still not consistently above

full-cycle cost of U.S. LNG.

Spot markets conditions are forecast to stay “well-supplied” at least through the next three to four years and it appears LNG seller needs China to balance global gas markets. The country is expected to become the “swing consumer” and one of the largest LNG importers once it seeks to meet the Paris Agreement decarbonisation targets towards the latter part of the 2020s.

Underused capacities during off-peak

On the supply side, analysts see more LNG output coming to the

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Rebound in oil prices widens gap between spot LNG and oil-linked gas contracts

The U.S. decision to leave the Iran nuclear deal and force the Middle East nation to cut its oil exports again keeps pushing up Brent, WTI and oil-linked LNG export contracts – creating a large gap between longterm LNG prices and spot LNG prices in the Northern Hemisphere summer.

“It is not clear whether such price gaps will remain going forward, but depending on how the situation develops, the gaps could lead to a revision of long-

term contract prices and expansion of the spot market,” said Yoshikazu Kobayashi, a Senior Economist at the Institute for Energy Economics in Japan (IEEJ).

Unilaterally, the U.S. President Donald Trump is pushing through the reinstatement of

sanctions against Iran, limiting the country's oil export which creates a shortage on global market and uncertainty on how OPEC might fill that gap in supply. A rebound in global oil prices, and a subsequent rise in oil-indexed gas prices is the consequence while prices LNG linked to the U.S. Henry Hub remain comparatively cheap and attractive to buyers.

Concerns about rising price discrepancy

The spot LNG market of Northeast Asia has fallen to the lower end of \$7/mmBtu while oil prices continue to rise, according to IEEJ figures. Going forward,

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Yoshikazu Kobayashi

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market than is needed globally even though demand is growing at 6% to 7.5% annually through to 2020.

"Given that eastern Australian and U.S. capacities have the highest production costs, we expect to see some of this capacity to be underused during off shoulder (non-peak weather) months when spot prices dipped below their short-run marginal costs of production," Mr Prabhu and Mr Redmond stated in the report.

East Coast Australian projects often underestimated their price sensitivity to the oil price, which together with some resources issues and the implementation of the Austrian Domestic Gas Security

Mechanism in October 2017, has rendered projects "rather expensive."

Built at a cost exceeding \$1,250/ton, the average Australian project is considerably more costly than the \$750-\$800/ton for a U.S. greenfield liquefaction project. Delivered cash costs to Asia is about \$2.25-\$2.50/mmBtu from Qatar and \$5.25-\$5.50/mmBtu from the U.S. Gulf Coast, according to S&P estimates.

Returns on Australian LNG projects overall are unlikely to live up to their pre-FID expectations due to cost overruns and lower

oil prices. Hence S&P analysts say "we should expect Western Australian and Northern territories projects focus on debottleneck-

ing and also efficiency gains and cost reductions, to maximise production and excess wellhead capacities."

U.S. LNG Projects Operational By 2020

Project	Start-up	Location	Capacity (mt/year)	Trains	Main owner/operator	Rating
Sabine Pass Liquefaction	2016	U.S. Gulf Coast-Louisiana	22.5	5	Cheniere Energy, Blackstone	BBB-/Stable
Cove Point	2018 Q1	East Coast-Maryland	5.25	N/A	Dominion Energy	NR
Corpus Christi Liquefaction	2019	U.S. Gulf Coast-Texas	9	2	Cheniere Energy, EIG	BB-/Stable
Freeport LNG	2018/2019	U.S. Gulf Coast-Texas	15.3	3	Freeport, IFM Investors	BBB/Stable
Cameron LNG	2019/2020	U.S. Gulf Coast-Louisiana	12.0	3	Sempra, Engie, Mitsui, Mitsubishi, NYK	A-/Stable
Elba Island	2019	U.S. Gulf Coast-Georgia	2.5	N/A	Kinder Morgan, EIG	NR

We do not include the Kenai LNG project, which is owned by ConocoPhillips, because the plant will be 50 years old in 2019, has no contracts, and has only produced limited cargoes since 2015. Engie has announced it will sell its interest in Cameron LNG to Total S.A. N/A—Not applicable. Source: S&P Global and IGU 2017 World LNG Report.

Israel imports 1st US LNG cargo at Hadera FLNG facility

The tanker was carrying a cargo from the Sabine Pass plant in Louisiana owned by Cheniere Energy. According to shipping data, the cargo was lifted on May 3 from the US export plant on the Gulf Coast.

From Haifa FLNG terminal, operated by state-owned Israel Natural Gas Lines, the regasified gas volumes get transmitted to the end-user, Israel Electric Corp. The electric utility has asked for supply of regasified LNG during peak periods until the Tamar natural gas field offshore Israel came on stream in 2016.

Israel uses LNG to top up domestic supplies, largely as a re-

placement for Egyptian gas supplies that were cut off in 2012.



British Diamond, gross tonnage: 102,064

That year, Israel started LNG imports on a temporary basis in November 2012 from a buoy-based facility set up by Excelerate Energy some 10km offshore from the town of Hadera, south of Haifa. The Exel-erate import ter-

minal is able to unload cargoes from FSRUs or other converted vessels.

Self-sufficiency in gas supply will be achieved once Israel's larger Leviathan field will start up in 2019, with some volumes from this field designated for export to Jordan and the Palestinian Authority. The Tamar and Leviathan fields are operated by Noble Energy and Delek Group.

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Japanese importers are vary that their longterm LNG import contracts will cost them more dearly as higher-prices oil is being factored in – just at the time of peak gas demand during the summer season.

Sellers into the spot LNG market, notably from the United States might well see the attractiveness of their cargoes increase amid a growing price disparity between spot, shortterm and longterm offtake.

Portfolio players such as Shell and the likes of Vitol, Trafigura and Guvnor are increasingly trying to position themselves for selling more US LNG into growing markets in Northeast Asia.

The elephant in the room remains China, which took analysts by surprise last year when its LNG imports surged. Far from being a one-off hike, China's demand

now appears to "remain robust", given that it imported around 12.7 million tonnes of LNG in January-March this year, up an astonishing 63% year-on-year.

"Initially, China's LNG imports were expected to be calmer this year than last year. However, as the January-March levels show, the country's demand is robust and increasing," Mr. Kobayashi commented in the latest IEEJ report on global oil and gas pricing.

Although Cheniere's unique business model is doing well exporting limited amounts of LNG to China, overall, the United States has not played a major role in

China's supply chain because U.S. LNG is generally not cost competitive in China.

In 2017, China paid an average \$8.65 per thousand cubic feet for imports from the United States and an average \$6.95 per thousand cubic feet for all other natural gas imports. Based on 2017 pricing, U.S. imports are more expensive than 83.6% of the natural gas China obtained from other suppliers. Within China's seaborne LNG supply chain alone – not including pipeline gas – U.S. imports are more expensive than 73.8% of China's imports from other suppliers.

LNG North America

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Cenagas prepares Mexico's 1st strategic gas storage tender

Mexico, the largest buyer of US pipeline gas and LNG, is preparing a tender for strategic storage at depleted oil and gas reservoirs. Cenagas, the Mexican National Natural Gas Control Centre, has already selected four underground sites – Acuyo, Brasil, Jaf and Saramako – from a list of 15 proposed sites. Registering strong bidding interest from foreign players, the Mexican Energy Secretariat (Sener) will hold the tender in September 2018.

The site selection comes shortly after Sener issued its natural gas storage policy, which sets a minimum capacity target of 10 Bcf for this year's tender and specifies the use of depleted gas fields as storage reservoirs to meet this immediate goal. The tender bidding process is scheduled to start in September with the aim of announcing the winners in mid-December.

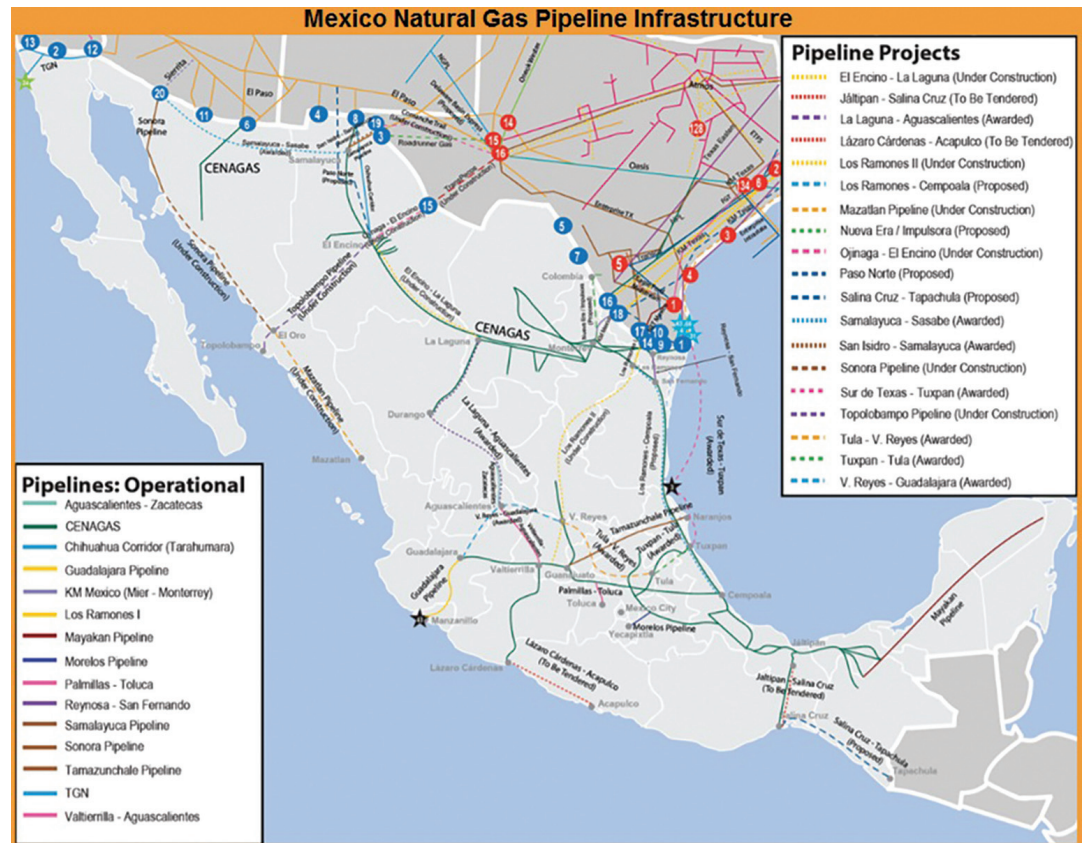
Preparing for the tender, Cenagas has opened a data room and it will be available for consultation until the end of June.

"When the data room is closed, Cenagas will hold the nomination process and companies can submit non-binding proposals that provide technical, economic, legal and social reasons for developing one of the four possible storage sites," it said, adding "The full tender process is expected to start by September and should take up to six months."

The selected Jaf site and the 16 Bcf Brasil reservoirs are both located in Mexico's central state of Veracruz. Acuyo and the 40 Bcf Saramako reservoir, meanwhile, are both situated in southeast Mexico – a region prone to gas shortages as production of associated gas at Pemex-operated offshore oilfields declines.

Gas storage to help boost supply security

Strategic gas storage has become increasingly important for Mexico as gas use in the power sector keeps rising. Pipeline gas imports from the United States do not yet



reach the southeast of the country, though December 2018 will see the start-up of the Sur de Texas-Tuxpan subsea pipeline with 2.6 Bcf per day of capacity and which terminates in Veracruz.

Analysts forecast a 75% increase in gas demand over the next 15 years, considering that the Mexican gas market has grown at a rate of 3.5% over the past decade. Natural gas currently supplies about half of the country's primary energy demand, and 60% of Mexico's current gas supply is imported from its northern neighbour. According to data from the U.S. Energy Information Adminis-

tration (EIA), natural gas exports to Mexico from the United States – either shipments by pipeline or LNG cargoes – were 4.6 billion cubic feet per day (Bcf/d) in 2017.

New gas interconnectors under construction will nearly double the exporting capacity from the U.S. to Mexico by 2018. In February, Paso Norte Pipeline Group (PNP) launched an open season inviting shippers to express interest in delivering natural gas from the Permian Basin in the western part of Texas to under-supplied markets in Central and Western Mexico. In terms of timing, the first pipeline link, stretching from

the Permian to Apache Power Park in Chihuahua, is scheduled to be at an advanced stage by 2019.

In addition to rising pipeline volumes, shippers are also looking to increase LNG imports at the Altamira and Manzanillo terminals on the Gulf of Mexico and the Pacific Coast, respectively. Mexico's buildout of gas infrastructure also includes the Pemex-led Pajaritos floating storage and regasification unit (FSRU) venture. It involves an FSRU tender and the construction of a 14-kilometres pipeline connected to Mexico's national gas network.

Much of this additionally gas imported from the United States will be used in Mexico's power sector given that the energy ministry plans to substantially expand the country's installed gas-based generating capacity by 2029. ■

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- EIA

Cheniere takes FID at Corpus Christi Train-3

Advancing its capacity buildout, Cheniere Energy has taken a final investment decision (FID) on a third train at Corpus Christi LNG which will take the terminal's liquefaction capacity to a total of 13.5 mtpa. "Moving forward with the construction of Train 3 at Corpus Christi reinforces our position as the leader in U.S. LNG," said Cheniere President and CEO Jack Fusco.

Fusco pointed out the FID is the first on new liquefaction capacity in the U.S. since 2015, when the first two trains on the Corpus

Christi project achieved financial close.

Bechtel has been given full notice to proceed with construction,

which began at the end of last year under limited notice to proceed. Works include the construction of an additional tank and the completion of a second berth. The Cheniere CEO explicitly thanked its EPC partner for its "demonstrated teamwork, commitment and execution" which were critical elements in the commercialization and financing of Train 3.

In terms of financing, Cheniere's subsidiary Corpus Christi Holdings secured amended credit facilities, increasing the total available funding from \$4.5 billion to \$6.1 billion.

The amended credit lines will be used to fund a portion of the costs of developing, constructing, and placing into service Trains 1, 2, and 3 and associated pipelines and infrastructure. The remaining costs of the Corpus Christi project will be funded by Cheniere under its amended Equity Contribution Agreement with Corpus Christi Holdings, and from cash flows generated by Trains 1 and 2. ■



Works proceed at Corpus Christi Train-3

BP agrees feed-gas deal for Alaska LNG project

Alaska LNG has reached an agreement with BP and Alaska Gasline Development Corp (AGDC) on feed-gas supplies, including price and volume. The parties aim to finalize a long-term gas sales agreement before the end of 2018 that will see AGDC purchase BP Alaska's share of 30 trillion cubic feet of gas produced at the Prudhoe Bay and Point Thomson reservoirs.

BP operates the Prudhoe Bay field, the largest oil and gas field in North America and owns a 26% share of Prudhoe Bay as well as a 32% share of the nearby Point Thomson field.

Pointing out BP's long history in Alaska and Prudhoe Bay, CEO Bob Dudley said the company was "pleased to be part of the state's vision to bring Alaskan natural gas to new and expanding markets globally. We think this is good for the state, good for BP and good for the environment."

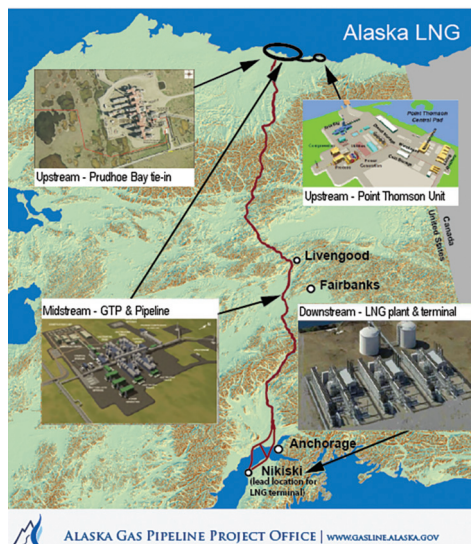
State-owned AGDC called the BP feed-gas deal that will enable a pipeline to deliver the gas from the north to a liquefaction plant in south-central Alaska, a boost for the venture.

The deal comes about six months after President Donald Trump and Chinese President Xi Jinping witnessed the signing in

Beijing of a five-party joint development agreement to monetize Alaska's natural gas with financial backing from China. AGDC and the state signed a joint development agreement in November 2017 with three Chinese companies, China Petroleum & Chemical Corp., also known as Sinopec, as well as the financial institutions, the Bank of China and China Investment Corp.

"This (BP) gas sales agreement is a significant factor in progressing the Alaska LNG project," said AGDC President Keith Meyer. "We have secured the customers, we have progressed on the pipeline build with regulators and the finance community and now we

have a commitment that there will be gas to sell and put through the pipeline. I look forward to continued negotiations to secure supply from other North Slope producers," he stated, in reference to companies such as ExxonMobil Corp. and ConocoPhillips. ■



Sempra Energy resolves issues with Cameron LNG contractors

California-based Sempra Energy has settled a dispute with Chicago Bridge & Iron (CB&I), the contractors working on transforming the Cameron LNG facility at Hackberry in Louisiana from an import to an export plant. After resolving scheduling issues with the contractors, Sempra now expects to have three processing Trains in operation before the end of 2019.

The \$10 billion EPC contract was signed in 2014 between Sempra and CB&I, now merged with McDermott International, and the dispute includes financial claims relating to contract completions in the aftermath of Hurricane Harvey.

"We continue to believe this agreement puts both the contractor and Sempra in a stronger position to meet the current schedule," said Sempra CEO Jeff Martin in a conference call. The new agreement to bring Cameron LNG onstream provides incentive bonus payments related to completion and waives any schedule-related damages from the original contract. ■

Rising U.S. gas production supports storage refill, LNG exports

Dry natural gas production in the United States is forecast to reach a new record of 80.5 billion cubic feet per day (Bcf/d) in 2018, up from 73.6 Bcf/d in the previous year. According to the EIA's latest Short-term Energy Outlook (STEO), the rise in US natural gas production will help replenish storage levels from current lows and support increasing natural gas exports, both via pipeline to Mexico and in the form of LNG.

Marketed natural gas production - gross withdrawals minus gas used for repressuring reservoirs and quantities vented or flared - hit a record high of 78.9 Bcf/d in 2017 and monthly record high of almost 84.0 Bcf/d in December (see graph).

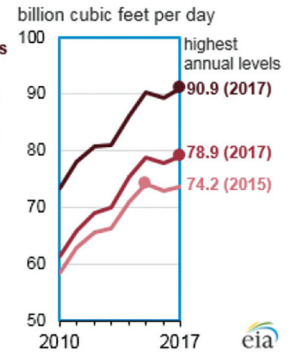
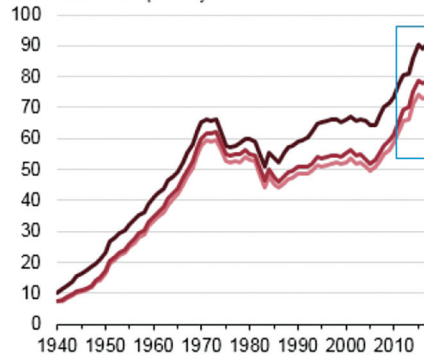
Anticipating U.S. natural gas production to rise again by 2.9 Bcf/d in 2019 to 83.3 Bcf/d, the EIA says it expects exports will keep rising as more liquefaction and export terminal are coming onstream. US gas exports increased from 0.4 Bcf/d in 2017 to an annual average of 2.0 Bcf/d in 2018 and are seen to rise further to 4.6 Bcf/d in 2019.

In terms of gas storage, EIA weekly data shows natural gas inventories increased by 22 billion cubic feet in April, ending the

month 27% below the five-year average for the end of April. "If confirmed, the April 2018 injection would be the smallest April injection since 1983," report reads, explaining preliminary data indicates that April temperatures were the coldest for that month in the past 21 years, which contributed to low injections.

Based on EIA's forecast of rising production, the agency noted "natural gas inventories should increase by more than the five-year average rate of growth during the current injection season (April-October) to reach more than 3.5 trillion cubic feet on October 31, which would be 8% lower than the five-year average for the

U.S. annual natural gas production (1940-2017)
billion cubic feet per day



end of October."

Henry Hub natural gas spot prices are anticipated to average \$3.01 per million British thermal units (MMBtu) in 2018 and \$3.11/MMBtu in 2019. In April, Brent crude oil spot prices averaged \$72/bbl, an increase of \$6/bbl from the March level and the first time monthly Brent prices

were exceeded the \$70/bbl mark since November 2014. In 2018, Brent spot prices are forecast to average \$71/bbl and \$66/bbl in 2019.

The US West Texas Intermediate (WTI) crude oil prices, meanwhile, are forecast to average \$5/bbl lower than Brent prices in both 2018 and 2019.

Rover Pipeline inches closer to full service

U.S. pipeline company Energy Transfer Partners has received approval from the Federal Energy Regulatory Commission (FERC) to place additional Phase-2 facilities into service. The \$4.3 billion pipeline project will allow moving natural gas from the Appalachian, notably the Marcellus and Utica Shale, to domestic and Canadian markets. Construction of the entire pipeline is due for completion in Q2-2018.

Since the phase one completion in December 2017, the Rover Pipeline has been capable of transporting up to 1.7 billion cubic feet per day (Bcf/d) of natural gas. The pipeline will transport natural gas from the Marcellus and

Utica Shale production areas to markets across the United States as well as into the Union Gas Dawn Storage Hub in Ontario, Canada.

"The approval from FERC granted on May 1 allows for the full commercial operation capabil-

ity of the Market Zone North Segment," Energy Transfer said in a statement, adding construction of the entire project will be completed later in the second quarter.

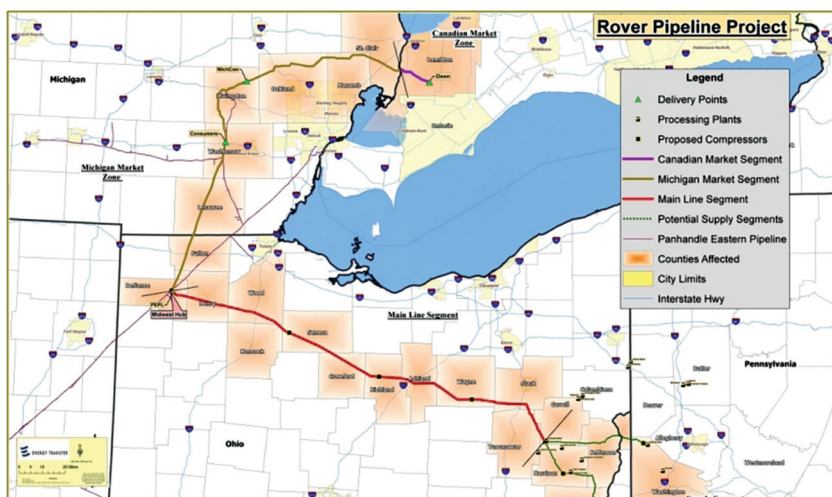
When in full operation Energy Transfer's pipeline of 713 miles in

length will transport 3.25 billion cubic feet per day (Bcf/d) of natural gas from the Marcellus and Utica Shale Basins.

Energy Transfer is also the owner of the Trunkline Gas System, a 2,200-mile pipeline that interconnects with more than a dozen interstate and intrastate pipelines to ship feed-gas to the pro-

posed Lake Charles LNG export plant owned by the company, and to other projects along the Gulf Coast. Lake Charles LNG, an existing LNG import terminal being transformed into an export plant, is backed by firm offtake agreements from Shell and Kogas. Energy transfer recently asked the regulators to extend the deadline for the start of construction to November 2019.

Dallas-based Energy Transfer Partners, is a master limited partnership that owns and operates diversified portfolios of energy assets in the U.S., including natural gas midstream, intrastate and interstate transportation and storage, crude oil, natural gas liquids (NGL) and refined product transportation and terminalling assets.



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NEWS NUDGES

US-Canada trade

The US remains a net energy importer from Canada and latest data from the US Energy Information Administration showed that while energy accounted for \$18 billion of the value of US exports to Canada, oil and gas accounted for \$73Bln of the value of all US imports from its northern neighbour in 2017. Bilateral natural gas trade between Canada and the US is dominated by pipeline shipments. "Natural gas imports from Canada increased to 8.1 billion cubic feet per day in 2017, accounting for 97 percent of all US natural gas imports," said the EIA report. "Most of Canada's natural gas exports to the US originate in Western Canada and are shipped to US West and Midwest markets," it added. "US natural gas exports to Canada, which increased to 2.5 Bcf/d in 2017, mainly go from New York state into the eastern provinces," it added. Canadian LNG export projects in Nova Scotia have previously discussed using pipeline volumes from the US Marcellus shale basin.

South America LNG

Brazilian energy company Petrobras is in the market for delivered LNG cargoes as demand increases in South America where Argentina has also been a recent recipient of US volumes from Sabine Pass in Louisiana. A US cargo will be unloaded at the Argentine Bahia Blanca terminal in the southwest of the province of Buenos Aires on June 1. Brazil is a large user of hydropower generation, though when the dry season starts in April and May water levels fall as does electricity output from the system and gas-fired power is needed as a replacement. A Petrobras tender has sought two cargoes for delivery in June and two more shipments to arrive in July, according to the company. ■

Exelon asks FERC for compensation to keep Everett LNG operational

Chicago-based Exelon has approached the U.S. Federal Energy Regulatory Commission (FERC), suggesting it would keep operating two gas-fired power plants and the LNG import facility in Everett between 2022 and 2024, if it gets permission to collect about \$1 per month from all electricity customers in New England. The Mystic gas-fired power plants are some of the largest generators in New England, but they are not economical in the current market environment.

Agreeing to offset its estimated cost with the revenue generated by running the Mystic plants, Exelon said the actual amount could end up being "considerably less" than a dollar a month if revenue from operating the plants is significant. The revenues will be dependent on weather conditions and energy prices from 2022 to 2024, the company said in a statement. In March, Exelon had announced plans to retire the two power

plants at the end of May 2022 rather than continue to lose money.

Pipeline constraints limit the amount of natural gas that can be transported to New England, hence ISO New England urged the regulator that Exelon needs to keep the Mystic plants running because they rely on LNG brought in via tankers instead of gas brought in by pipeline. Exelon, however, explained in its FERC filing that

"the attribute that makes Mystic 8 & 9 attractive to ISO-NE for fuel security reasons is part of what makes the units uneconomic: their reliance on expensive imported liquefied natural gas."

Estimating the future costs of operating the two power plants and the adjacent LNG import terminal, Exelon said its annual fixed revenue requirement for the two plants totals nearly \$219 million in 2022-2023 and nearly \$187 million

in 2023-2024. This cost estimate is based on an overall rate of return of 8.46%, a cost of debt of 4.76% and a return on equity of 10.26%.

The Mystic Generating Station has the highest nameplate capacity in the state of Massachusetts. The plant currently consists of eight separate generating units; Mystic 8 and 9 are six natural gas units which can produce 1,414 MW total, Mystic 7 is a natural gas or petroleum unit which produces 576 MW, and Mystic Jet is small petroleum fueled unit which produces 8.6 MW in periods of high demand. ■



Bird's eye view of Everett LNG terminal

“

The attribute that makes Mystic 8 & 9 attractive to ISO-NE for fuel security reasons is part of what makes the units uneconomic: their reliance on expensive imported liquefied natural gas.

”

- Exelon

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Chart regasification station helps power a diamond mine in Canada

Where no pipeline or electrical grid exists, Chart offers solutions enabling clients to access natural gas, through LNG for on-site power generation. For a Canadian client, the operator of a diamond mine, six of Chart's horizontal regas tanks provide almost half a million of LNG storage for seven 2.1 MW gas-fuelled power generator sets and despite the extreme climatic conditions, the project in Canada was completed on schedule.



Regasification stations, also referred to as LNG Satellite Stations, are complete systems that incorporate LNG storage, vaporization, pressure regulation and control systems to deliver natural gas at the point of use. Chart has provided solutions for enterprises of all size, since - regardless of capacity - model is essentially the same and mimics the familiar supply solution of diesel, propane and other LPGs. With single or multiple storage tanks, regas stations can be vertically or horizontally oriented. All Chart stations are modularized around shop-built and tested for reduced cost and schedule, easier

installation and allow for capacity expansions as required.

Liquid fuel is delivered, typically by road, to the site where it is off-loaded and stored, via a so-called virtual LNG. Chart also manufactures the cryogenic distribution containers for road, water and rail distribution for a completely integrated, intermodal solution.

A particularly compact regas station has been installed in Mexico, around 45 minutes away from Queretaro, enabling a local agricultural business to use natural gas in their greenhouse operations. It was supplied as a skid mounted, fac-

tory-assembled package for single truck transport, and is fully automated with cellular monitoring and control. Chart engineers completed site installation and commissioning within two days.

Drilling sites are fast-paced and electricity demand can change in minutes, which is why, when helping a client convert fuelling of their drill rigs to natural gas, Chart focussed on handling flow and pressure variations quickly and effectively. The system provides a continuous gas supply to power generator sets used on the drill rigs and comprises a 15,000 gallon LNG storage tanker trailer, with in-

tegrated vaporization, system controls and an offloading pump.

Designed to operate in all weathers and totally uninterrupted, even during refilling, the system accepts deliveries of full tanker loads, which saves on transportation and fuel supply costs. ■

Flesan Energia to supply power gensets for Peru's first LNG export plant

Orka Energy, through its Peruvian subsidiary Lantera Energy, has entered a power purchase agreement (PPA) with Flesan Enregia of Chile that will see the provision of gas generator sets for Peru's first small-scale gas liquefaction facility. The LNG export facility is under construction in the northern town of Pirua, slated to start up by July 1.

The terms of the PPA stipulate Flesan Energy, a specialist for independent power production (IPP) end-user gas power solutions, to install and operate gas gensets with a combined capacity of 2.8 MW.

Flesan was chosen from among more than 30 contenders throughout Chile, Peru, and the US. "By selecting Flesan Energia, we're able to provide a higher level of energy security to our clients due to Flesan's 24/7 supervision, maintenance and servicing of this critical component of an LNG facility," said Okra Energy CEO, Louis Ravenet.

Small-scale LNG facilitates the scalable delivery of natural gas in remote areas without pipeline in-

frastructure. Construction of the Piru LNG plant is in the process of being finalised by Orka Energy's Peruvian subsidiary Lantera.

Small-scale LNG enables decentralized power gen

South America, but also Southeast Asia, are key markets where small-scale liquefaction and regasification facilities allow the set-up of a 'virtual pipeline' to underpin decentralized power generation projects.

To meet versatile requirements, the Philippines-based Atlantic Gulf

& Pacific Co. (AG&P) has designed a small-scale LNG carrier. This LNCG, scalable from 4,000 cubic metres to 8,000 cbm, is often used as a workhorse to meet delivery challenges posed by shallow rivers and restricted harbours.

AG&P says it "builds the infrastructure in Lego-like pieces." ■



Orka Energy render of the proposed liquefaction plant

Air Products buys Shell's gasification tech

Air Products, the US maker of equipment for LNG production and for industrial gas plants, said it had completed the acquisition of the Coal Gasification Technology licensing business from Shell Global Solutions. The US company said it also formed a strategic alliance with Shell for residue gasification technology to refinery complexes.

In its business model, Air Products finances, builds, owns, operates and maintains the gas production plant, enabling customers to focus their attention and capital on their primary business. Seifi Ghasemi Chairman, CEO of Air Products explained that gasification technologies offer a way to take varied lower-value feedstocks and convert them in a lower-emission manner into syngas.

"The core value of this acquisition is the ability to build on more than 40 years of Air Products' gasification experience and the opportunity to fully explore sale-of-gas outsourcing options to produce and supply syngas for customers planning to use gasification," he said. ■

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Fossil fuel use falls in the Americas, but rises in Europe, IEA says

Use of combustible, or fossil fuels, for power generation has fallen by 1% in OECD countries over the course of 2017, according to a monthly assessment compiled by the International Energy Agency (IEA). In the Americas, the contribution of fossil fuelled power plants decreased 144TWh amid greater renewables deployment. In Europe, by contrast, the use of fossil fuels grew by 80TWh, as natural gas and coal-fired power plants had to compensate for a low-hydro-year and falling nuclear power supply.

On a global scale, the Americas was the only OECD region to post a decrease of electricity production of 0.4%. Use of combustible Fuels in the Americas dropped by 4.6%, while nuclear decreased only marginally by 0.1%. Hydro rose by 7.9% and geothermal, wind, solar and other renewables increased significantly by 18.2%.

Gas use up in Europe, down in the U.S.

Decarbonisation and fuel switching from coal to gas continued throughout most of Europe, as the rising use in fossil fuels was mostly met by natural gas-fired generation.

In contrast, the falling fossil fuel-burn in the Americas translated into a greater decline for

natural gas compared to that for coal, with gas losing share in the fuel mix due to its higher prices.

Electricity exports up globally

Looking at global electricity trade, exports increased slightly this year in the Americas by 0.6% with imports falling by 2.6%. In Europe, exported electricity in 2017 increased 4.8% to 406.4 TWh and electricity imports went up 0.9% to 399 TWh.

Certain patterns from 2016 continued in 2017, IEA analysts pointed out: Germany was once more the top electricity exporter in Europe again surpassing France by more than 10 TWh.

France remained a net exporter,



Gauging “how far we’ve come” on the road to clean energy

with exports over 39 TWh, however, due to low nuclear production, this is less than two-thirds of 2015 French export figures. Additionally, France’s electricity trading was accompanied by higher volatility as for two months during 2017 France was a net importer affecting production and trade in much of Western Europe.

Portugal and Ireland maintained

their net exporter status, achieved in 2016 whilst Spain, Switzerland and Poland relied even more on imports. Swedish exports bounced back supported by an ongoing Hydro and Nuclear recovery.

Turkey had a positive trade balance in 2017 for the first time since 2010 despite a fall in Hydro, which traditionally accounts for over one-fifth of its production. ■

Gas to make up majority of U.S. electric capacity additions in 2018

About 21 GW of natural gas-fired generators are scheduled to come online in the United States this year out of a total 32 GW of new-built electric capacity. “If these gas generators come online based on their reported timelines, 2018 will be the first year since 2013 in which renewables did not make up a majority of added capacity,” the U.S. Energy Information Administration (EIA) commented.

More than half of the new gas-fired generators scheduled to start up before the end of this year are combined-cycle units to be added to the PJM Regional Transmission Organization, which spans parts of

several Mid-Atlantic and Midwestern states. In the PJM region, Pennsylvania plans to add 5.2 GW; Maryland will add 1.9 GW, and Virginia will add 1.9 GW. Most new gas power capacity is being added

in the eastern part of the PJM region along the Transcontinental, the Dominion Transmission, and the Texas Eastern Transmission pipelines.

Renewables dominated new-builds for four years

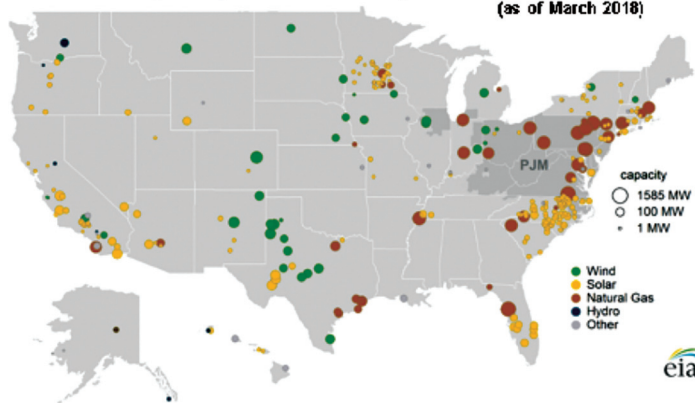
2017 was the fourth consecutive year in which renewables made up more than half U.S. capacity additions, accounting for 55% of the 21 GW of new-built capacity. As of February 2018, renewables accounted for 22% of total currently operating generating capacity, according to data in the EIA’s Preliminary Monthly Electric Generator Inventory.

Wind power addition, totalling 1,196 MW in January and February

this year, were mostly added in Texas, Oklahoma and Iowa. The EIA said it expects 5 GW of capacity to come online by the end of this year of which 2 GW will be in Texas, the state with the highest installed wind power capacity.

Much of the U.S. solar power installations are situated in Florida, and in January 2018, Florida Power & Light (FPL) completed four solar photovoltaic projects totalling 300 MW and the utility is currently working on another four projects, totalling 300 MW. An impressive 4 GW of solar PV is meant to come online in the United States this year, with more than half of the 2018 solar PV additions situated in California, North Carolina, and Texas. ■

Distribution of power plants additions expected in March-December 2018 (as of March 2018)



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