

LNG *North America*

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Analysts expect slower growth in U.S. gas production in 2019

Latest earnings calls from publicly-traded U.S. gas producers show a slowdown in 2019 gas production although the role of private producers increases. Energy Aspects sampled E&P firms with a combined base output of 23.1 billion cubic feet per day (bcf/d), who said they expect 1.3 bcf/d or 6% annual production gains this year, slashing their earlier 9% growth forecast by a third.

Actual 2018 results show that many U.S. traded upstream companies just missed their collective projection, logging 7% year-on-year growth. Part of that decline in growth is due to a marked slowdown in the Appalachian Basin, where some of the largest U.S. producers say they expect “flat growth.”

Appalachian producers said to be ‘well hedged’

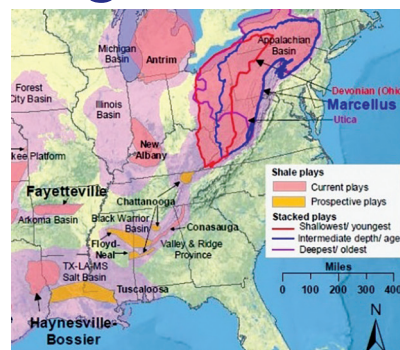
This forecast, however, does not consider the high percentage of hedged volumes, Energy Aspects cautioned: “Our sample of produc-

ers is more hedged for Cal-19 at 60%, an increase of 4% y/y and a weighted average swap price of \$3.00/mmbtu, a decline of \$0.14/mmbtu y/y.

“Cal-20 hedges were reported to cover about 25% of production at a weighted average swap price of \$2.89/mmbtu, but only about half of our sample reported such transactions,” the London-based consultancy said in a market note.

For 2019, Energy Aspect says its own balances point to U.S. production gains of 7.2 bcf/d, with total output rising to 90.6 bcf/d.

“Though Appalachian gains may be



lessening, the region’s major producers are well-hedged, solidifying the likelihood of estimated output gains,” analysts commented.

Antero remains fully hedged for 2019, while CNX, Range Resources, and Southwestern have also locked in deals for 70%

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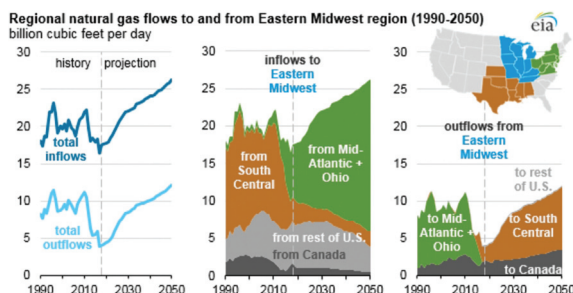
Demand for LNG feed-gas surges in Southern U.S., reverses pipeline flows

Length in natural gas supply the U.S. Mid-Atlantic and Ohio region is building up amid rising production from the Marcellus and Utica Shale. Simultaneously, growing demand in the South Central region for feed-gas for LNG export facilities on the Gulf Coast has caused a reversal in gas flows on key interstate pipelines.

U.S. LNG exports are forecast to grow to an average of 14 Bcf/d by 2030. At the same time, pipeline gas exports to Mexico are growing as well as domestic gas consumption for power generation. These three factors combined will turn the South Central Region into the “fastest-growing demand market in the United States,” according to EIA’s Annual Energy Outlook (AEO2019) Reference case.

This trend towards a surge in

gas demand in the Southeast has caused a reversal in gas flows. Traditionally, gas from the South Central region, which includes Texas and the Gulf Coast, moved into population centers in the Northeast through either the



Eastern Midwest or Southeast regions. Flows into the Northeast averaged 12 Bcf/d in 2018, but by

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of their projected volumes. Private producers are also expected to contribute a sizeable portion of new supply.

Several E&P firms missed 2018 output targets

In Q4-18, production from the consultancy's full sample of 51 U.S. traded gas producers stood at 35.7 bcf/d, marking a growth of 3.9 bcf/d year-on-year and

0.7 bcf/d quarter-on-quarter. Proportionally, these 12% y/y gains match the official EIA figures for U.S. production.

Divestments as well as takeovers also affect upstream activities. CNX in Q3-18 sold its Utica assets to the private player Ascent Resources, which operates five Appalachia rigs. In the Northeast, Tug Hill Operating is running four rigs, seeking to accommodate

its 60 new drilling permits.

The Appalachian Basin is a mature basin with abundant oil and gas reserves. It extends over the states of New York, Pennsylvania, Maryland, Ohio, West Virginia, Virginia, Kentucky, Tennessee and Alabama. According to the U.S. Geological Survey (USGS), the basin holds abundant fossil fuels to support the Nation's economic growth for at least 150 years.

Utica Shale, part of the Appalachian Basin, has seen a 34% surge in gas production in 2017/18 with output rising from 1.8 trillion cubic feet (Tcf) to 2.4 Tcf, according to estimates in Ohio's Utica Shale in the Debrosse Memorial Report. The U.S. upstream major Chesapeake drilled the most Utica wells to date with 688, followed by Ascent with 378, and Gulfport with 304. ■

Argentina admits planned start of LNG exports will be delayed

The Argentine Secretary of Energy Gustavo Lopetegui has said it would take some time before Argentina becomes a globally competitive LNG market participant. "Shale gas production could be increased by 50% over the next four years if we had the markets to supply and we don't have them domestically," he told the CeraWeek energy conference in Houston, Texas.

"So, if Argentina wants to fully develop its shale resources, it has to find customers abroad to supply," he said. In his view, it would also require additional liquefaction infrastructure than the one floating liquefaction unit (FLNG) that is currently in place.

The Tango FLNG unit arrived in Argentine port of Bahia Blanca in February 2019, based on a 10-year charter agreement between the Belgian shipping company Exmar and Argentine's state oil and gas producer Yacimientos Petroliferos Fiscales (YPF). Originally built for cancelled venture in Colombia called Caribbean FLNG, the floating LNG unit has been revamped and renamed Tango FLNG. YPF said it expects that around eight LNG car-

goes per annum would be produced and exported from the venture.

Argentina's first FLNG unit will use feed-gas sent by pipeline from the Vaca Muerta shale play in the onshore Neuquen Basin of northwest Argentina. However, it has become clear it will take more time than planned to get the entire infrastructure in place and operational.

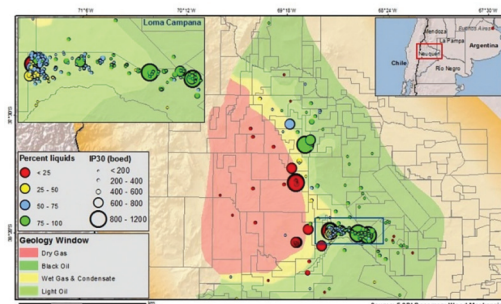
But Energy Secretary Lopetegui cautioned that Argentina's shale-gas production would be first used domestically to reduce the country's need to import LNG in the peak winter season, and second to supply some volumes to neighbouring Chile by pipeline. Gas exports from Argentina to Chile were resumed only recently for the first time in many years, and Lopetegui

noted that the Vaca Muerta's shale-gas production was not yet high enough to guarantee a steady gas flow.

Analysts noted the Argentine shale-gas was delivered to Chile at an average price of around \$6.00/MMBtu, including pipeline transportation costs. This is at least \$2.00/MMBtu lower than the cost of winter gas in Europe.

According to the Argentine Energy Secretary, domestic gas prices had fallen to around \$4.50/MMBtu, though he said this was too high for a country to become a competitive LNG exporter.

"The prices are attractive enough to continue with project developments and it is a matter of time before Argentina cuts production costs in the shale basin. We recently achieved the milestone of operating 1,000 shale wells," he said, stressing; "Once we reach 3,000 wells, we will see an inflection point in the increase in the productivity and efficiency." ■



Geological map of Vaca Muerta shale gas play

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2013, these volumes had dropped to 5 Bcf/d, and today the region is a net natural gas exporter, primarily to the Eastern Midwest.

This reversal of flows was en-

abled by a rise in bi-directional gas transportation capacity on interstate pipelines as well as the opening of new pipelines to cater for rising supplies from Marcellus and Utica Shale. Between 2008 and 2018, pipeline capacity out of the Northeast grew from 5 Bcf/d to 23 Bcf/d, according to EIA estimates.

Looking ahead, the EIA projects that even more gas pipeline capacity beyond what is currently under construction will be built from the Mid-Atlantic and Ohio region, primarily through the Eastern Midwest region.

In the AEO2019 Reference case, an additional 4 Bcf/d of pipeline

capacity out of the Northeast will be constructed through 2050. "This capacity is required to realize the growth in dry gas production in the East, and it contributes to growth in both domestic natural gas consumption and LNG exports from the South Central region," analysts said.

South Central region depends on imports

Though the South Central region itself also contains some shale plays - the Wolfcamp in the Permian Basin and the Haynesville - regional gas consumption outpaces production. To meet rising gas de-

mand for power generation and for liquefaction facilities, the South Central region will have to import more and more gas from neighbouring states in the Eastern part of the United States.

The Appalachian region is likely to supply most of these additional gas needs. Most AEO2019 cases anticipate that total U.S. dry gas production will be driven by continued development of the Marcellus and Utica shale plays in the East.

In the Reference case, dry gas production reaches nearly 120 Bcf/d by 2050, compared with 75 Bcf/d in 2017. ■

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Golar supplies 1st LNG cargo for Brazil's 1.5 GW Sergipe-I Power Project

Norway's Golar LNG in early March started to unload the first commissioning cargo at its Golar Nanook FSRU (floating storage and regas unit) offshore Sergipe, northeastern Brazil. The supply is designated for the Porto de Sergipe-I Power Project, a 1.5 GW combined-cycle gas power plant, developed by Golar in a joint venture with Stonepeak Infrastructure Partners.

Golar confirmed its FSRU Nanook has started to offload the natural gas supplied as Sergipe's first commissioning cargo via FLNG tanker Hilli Episeyo. The shipment is designated for the Porto de Sergipe I Power Project, Golar said when reporting solid financial year 2018 results.

Financial close on Segipe I was reached in April 2018, whereby Golar and Stonepeak determined that CELSE (Centrais Elétricas de Sergipe), the project company 50% controlled by Golar Power, will re-

ceive \$1,340 billion in non-recourse project financing.

The funds are being used to build the 1.5 GW power plant, a 34km 500KV high-voltage transmission line, an associated gas pipeline and mooring infrastructure for the integrated LNG import terminal.

For the power plant unit, GE will deliver three 7HA.02 turbines, a generator and a steam turbine. An LNG supply agreement is in place with Qatar Petroleum and ExxonMobil.

Innovative financing structure

Capital expenditure for the Sergipe-I venture, including taxes and financing costs, are estimated to reach \$1,740 billion, developers said, adding the power project will generate a forecasted annual EBITDA of \$323 million at current exchange rates, prior to any dispatch.

A power purchase agreement (PPA) is already in place with a local Brazilian electric utility, with the inflation-indexed payments set to provide for pass-through of fuel costs to the PPA counterparties. "This innovative financing is a key milestone in the development of Golar Power infrastructure projects globally, and sets a precedent for financing in local currency," commented Golar Power CEO, Eduardo Antonello.

Start of full commercial opera-

tions of the 1.5GW power station is scheduled for January 1st, 2020.

IPO of Golar Power on the cards

Looking ahead, Golar LNG stated it is seeking to pursue further FSRU-power opportunities in Brazil. License approvals for projects are making good progress, it said, notably the recent one for the Barcarena site.

"These licenses put Golar Power in a strong position to develop FSRU terminal projects, to win future power auctions, and to distribute LNG locally," it said.

Golar currently reviews the strategic alignment of its Golar Power business. Joint venture partner may use their right to trigger an Initial Public Offering (IPO) of Golar Power given that the company has built up "significant value" over the last four years. ■



Exelon, STEC sign power supply accord for Annova LNG

Electricity, not natural gas, will drive the compressors of the Annova LNG export project at Brownsville Ship Channel, lowering the project's carbon footprint. To that end developers have signed an agreement with the South Texas Electrical Cooperative (STEC) for supplies of 405 MW of electricity to cool and liquefy up to 6 mtpa of LNG.

Annova CEO Omar Khayum pointed out the project has a significantly lower environmental impact on the Rio Grande Valley than other proposed projects because it uses electricity instead of natural gas to power the liquefaction facility.

Magic Valley Electric Cooperative, a member of STEC, will be the sole provider of electric energy to power the facility. "This agreement is yet another example of Annova LNG's momentum," Khayum said.

"The project continues to make significant progress as we

begin 2019," he stated, noting that commercial operations are scheduled to begin in 2024.

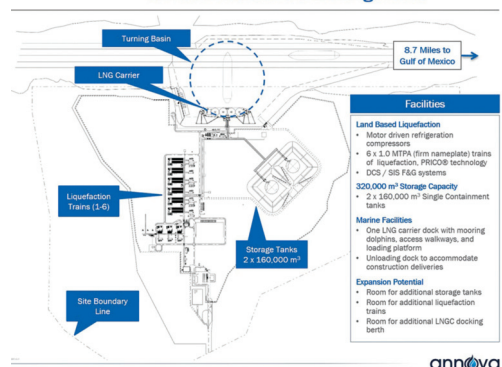
Having received its draft environmental impact statement from FERC, the project company modified its layout to create a 185-acre environmental conservation corridor and avoid impacting over 100 acres of wetlands. Plans claim the tidal exchange would be restored to reinstate habitats lost when the Brownsville Ship Channel was built.

Apart from Exelon, the Annova LNG project company includes

the engineering firm Black & Veatch and the construction company Kiewit. Proposed are six small-scale liquefaction Trains as well as an interconnected pipeline and marine export facilities, with developers saying they hope to receive the final EIS in Q2-2019. ■



Annova LNG General Arrangement



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Williams, CCPIB forge \$3.8bn joint venture in Marcellus and Utica Basins

U.S. gas pipeline operator Williams and the Canada Pension Plan Investment Board (CPPIB) have set up a US\$3.8 billion joint venture that centers around Williams' Ohio Valley Midstream (OVM) and Utica East Ohio (UEO) Midstream systems. CPPIB agreed to invest about \$1.34 billion for a 35% ownership stake in the joint venture, while Williams will retain the majority stake.

At the same time, Williams purchased the remaining 38% stake in UEO from Momentum Midstream and will take over operatorship. Williams said it will use the cash proceeds from CPPIB purchase of 35% in the joint venture to offset the purchase price of the acquisition of the Utica East Ohio Midstream systems, which focuses on fracking and processing natural gas and gas liquids in the Utica Shale.

Williams said combining UEO and OVM will create synergies such as more efficient capital spending, lower operating and maintenance expenses and enhanced capabilities on the production side. The new JV excludes Williams' ownership interests in

Flint Gathering, Cardinal Gathering, Marcellus South Gathering, Laurel Mountain Midstream and Blue Racer Midstream.

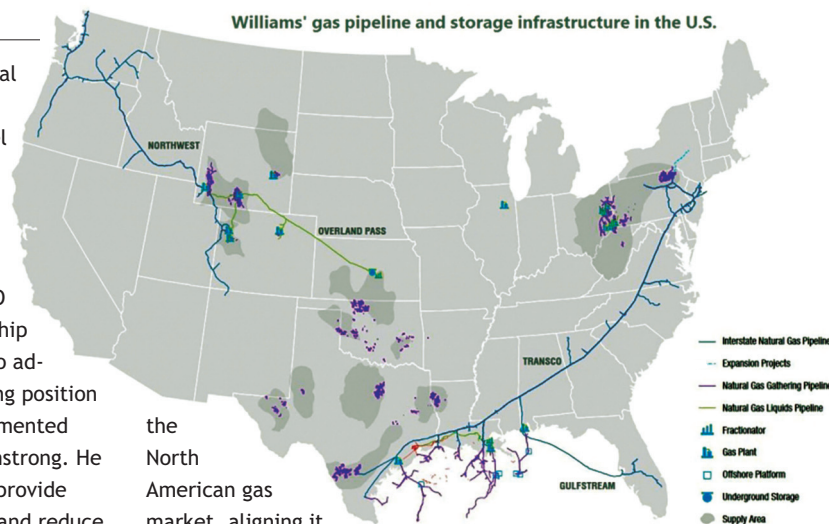
"Acquiring the remaining interest in UEO and forming a partnership with CPPIB continues to advance our already strong position in the Northeast," commented Williams CEO, Alan Armstrong. He said the transactions "provide room for deleveraging and reduce capital spending on processing and fractionation capacity."

For CPPIB, the joint venture will provide the Canadian pension fund with additional exposure to

the North American gas market, aligning it the fund's growing focus on energy transition, said Avik Dey, head of energy & resources at CPPIB.

The transactions are expected to close in the second or third

quarter of 2019, subject to regulatory approvals. Morgan Stanley and CIBC Capital Markets acted as financial advisors to Williams on the deal.



Enagás buys stake in Tallgrass, operator of Rockies Express Pipeline

Spain's gas network operator Enagás has agreed to pay \$590 million for a 10.93% ownership interest in Tallgrass Energy (TGE), the operator of several U.S. interstate pipelines. To finance the deal, Enagás partnered with the private equity firm Blackstone and Singapore's sovereign wealth fund GIC.

Tallgrass Energy (TGE) is a U.S. midstream energy infrastructure company, operating across 11 states, whose transportation, storage and processing facilities serve some of the United States' most prolific crude oil and natural gas basins. The Rockies Express

Pipeline, one of Tallgrass' key assets, is currently being transformed into the nation's northernmost bi-directional natural gas gathering system.

Under the deal, Blackstone will retain a majority share in the holding company that owns 100%

of Tallgrass Energy, as well as 43.91% of the economic interest in the company. GIC will retain a minority stake, while Enagás will hold 24.9% of the holding company after the transaction is completed.

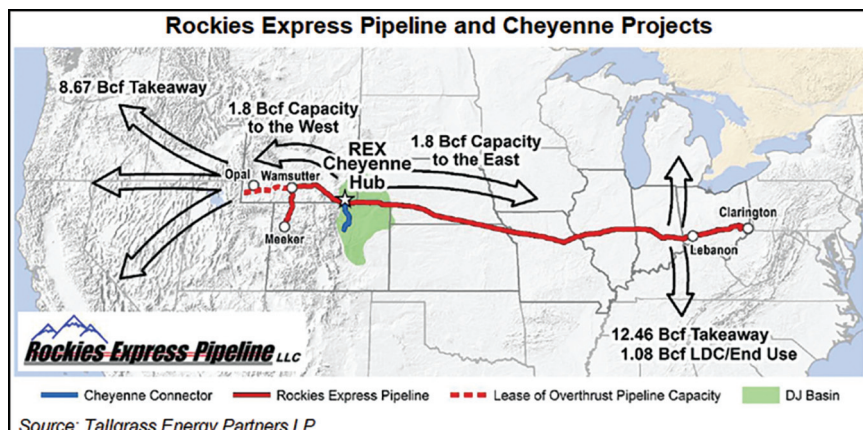
Enagás also agreed to buy an additional 3.5% of the holding company for approximately \$83 million after closing of the initial deal, the company said.

"As an industrial partner, Enagás will have a seat on the company's Board of Directors, contributing its know-

how in operating and developing energy infrastructure," Enagás said in a statement.

Enagás has investments in LNG import terminals on the American continent, at Altamira in Mexico and Quintero in Chile. In Spain, it operates four LNG import terminals: at Barcelona in the northeast, Cartagena in the southeast, Huelva in the southwest and Gijón in the northwest. It also owns a 50% stake in the facility serving the northwest city of Bilbao.

In addition, Enagás holds a stake in the Trans Adriatic Pipeline (TAP), part of Europe's Southern Gas Corridor and is part a European group that took control of the Greek natural gas transmission operator DESFA.



At the Core of LNG

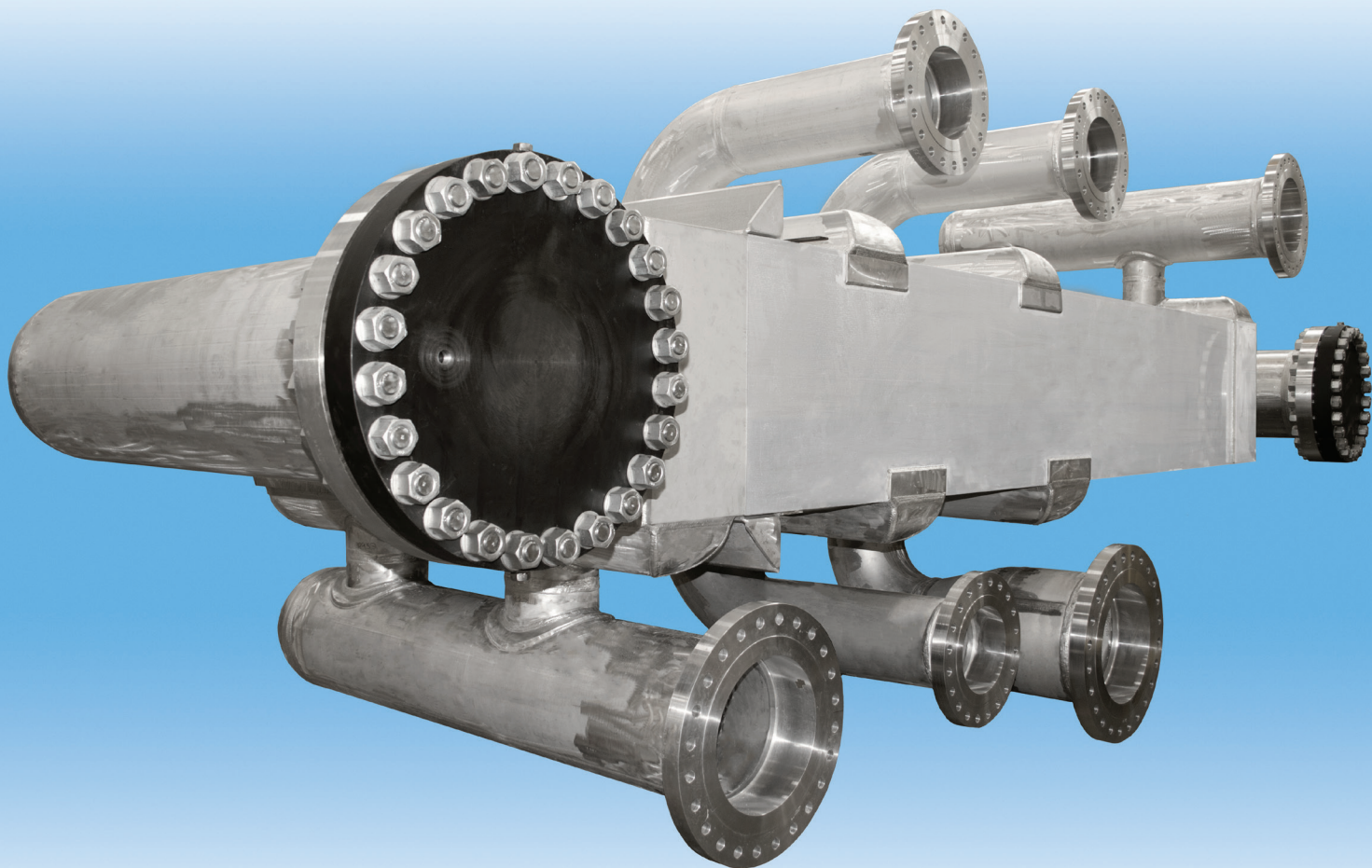


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Chart and Indian Oil Corp. explore opportunities for modular LNG technologies

US-listed LNG equipment manufacturer Chart Industries and Indian Oil Corp, owner of India's first East Coast LNG import terminal at Kamarajar Port, Ennore, have entered a cooperation to promote LNG developments in India. In focus are modular liquefaction and regas technologies, which could spur new decentralized LNG-to-Power projects and alleviate gas shortage for some of India's stranded power plants.

More than half of India's installed 25 GW of gas-fired power generation lies idle, with the Central Electricity Authority (CEA) identifying about 14 GW capacity as 'stranded,' of unutilized. These plants had been built based on government assurances of regasified LNG supply, which did not materialize.

In January, the Indian government announced stranded gas power plants may get LNG at subsidized rates, financed by the government-run Power System Development Fund. The aim is to revive approximately 25,000 MW of stranded capacity through an e-bid RLNG scheme.

In March, Indian Oil Corp (IOC)

commissioned its 5 mtpa Ennore LNG import terminal at Kamarajar Port, the twelfth-largest port in India's southern state of Tamil Nadu, situated some 24 km north of Chennai. The LNG regas terminal was the terminal was developed by an IOC joint venture company, with private equity funding from IDFC Alternatives and ICICI Bank.

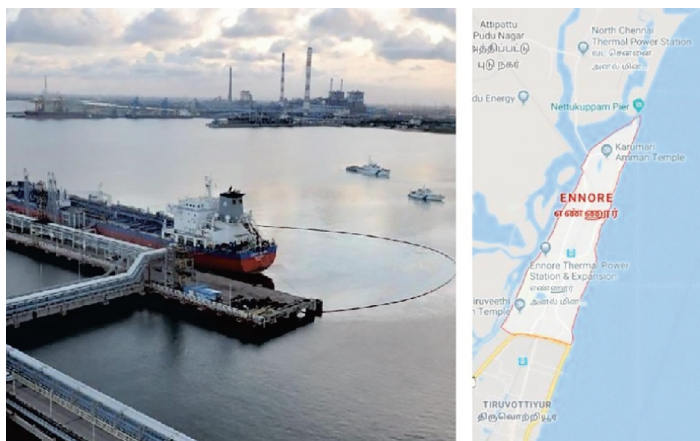
Anticipating double-digit demand growth

Chart and Indian Oil (IOCL), the state-backed refining and fuel marketing company, said they had signed their agreement based on complementary synergies and mutually beneficial business objectives arising from the demand growth of natural gas in India. "The LNG opportunity in India is significant, as evidenced by the government's commitment for

clean fuel, and the double-digit LNG growth forecasts," said Jill Evanko, Chart's President and Chief Executive.

Together, both parties want to explore opportunities in natural gas and LNG developments in various industrial and commercial sectors. LNG use for bunkering and vehicle fueling in India will be explored, as well as LNG micro bulk systems or transport of regasified natural gas in ISO containers.

The cooperation with IOCL expands Chart's reach into the LNG market in India, and provides IOCL with speed to market as well as expanded service access. "This opportunity originated from the recent acquisition of the VRV businesses now within our portfolio of offerings," the Chart CEO said with reference to the Italian company that agreed to be acquired by Chart in September 2018. ■



India's first East Coast LNG import terminal at Kamarajar Port, Ennore

Venture Global aims to expand U.S. Gulf Coast projects

The developer of Calcasieu Pass LNG in Louisiana, Venture Global has announced plans to expand the scope of its LNG development business on the US Gulf Coast to 60 mtpa of production based on customer demand, almost doubling current plans for 32 mtpa of output.

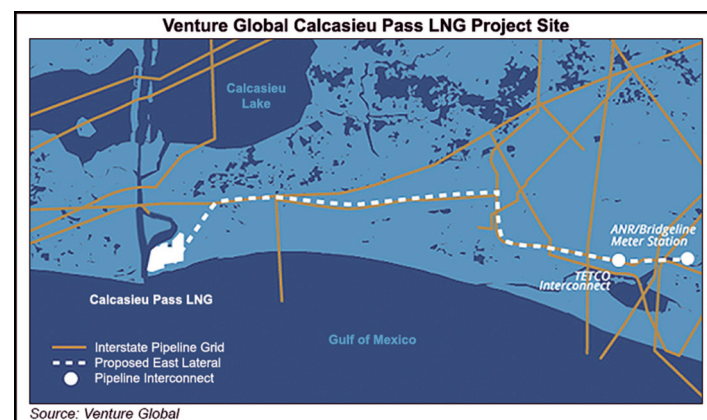
The proposed Calcasieu Pass LNG currently has a nameplate export volume of 12 mtpa and is expected to come on stream in 2022, along with associated facilities, including the TransCameron Pipeline.

Venture Global, owned by former investment banker Michael Sabel and lawyer Robert Pender who act as joint CEOs, is also constructing a second LNG export plant at Plaquemines on the west side of the Mississippi River, 30 miles south of New Orleans. The Mississippi River project has current output targets of 20 mtpa of LNG and was set to include small-scale liquefaction Trains, four LNG storage tanks and three marine

loading berths. But now Venture Global said it will increase the size of its 2016 process equipment supply agreement for its two liquefaction plant projects with Baker Hughes-GE to 60 mtpa in order to meet rising demand from international customers.

"Having fully contracted Calcasieu Pass and anticipating completion of Plaquemines LNG, we are pleased to announce this expansion to meet additional customer demand," said Co-CEOs Pender and Sabel. "We believe our model of mid-scale modular liquefaction is the future of low-cost LNG production," they added.

The 10 mtpa Calcasieu Pass



project has already received all federal authorizations, and the project's EPC contractor Kiewit Energy has started to mobilize its workforce for the start of site preparation and construction. The Calcasieu Pass plant has signed binding 20-year sale and purchase

agreements with Royal Dutch Shell, BP, Edison, PG&E, Enbridge, Repsol and Poland's national oil and gas company PGNiG.

The Plaquemines project is expected to receive its final regulatory authorization in August and start construction later in 2019. ■



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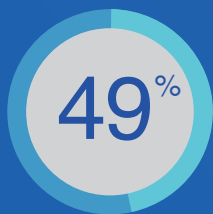
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Train-1 of Elba Island LNG targeted to come onstream in April

Kinder Morgan said it would start-up its Elba Island LNG export plant in Georgia in late April after receiving regulatory permission in early March to introduce feed-gas, back-up fuel and boil-off gas into its systems comprising 10 small-scale liquefaction Trains. Initially Train-1 was meant to start by the end of 2018, but the timeline slipped over construction delays.

Kinder Morgan said it had expected the first train to come on line by the end of March and the remaining Trains following during the year. The company admitted it had to revise its initial in-service date expectations for the Elba Island LNG Project due to “delays during construction.” The first

unit of the project is now expected to be in commercial service in late April.

Elba Island is an existing import terminal that has been transformed into an export plant to produce an initial 2.5 mtpa of LNG. Kinder Morgan, based in Houston, has developed the plant

at a cost of just \$2 billion and will have feed-gas needs equivalent to around 350 million cubic feet per day.

The Georgia terminal is among three US liquefaction facilities that are expected to begin service in

2019, adding to the country's growing energy export industry. Start-ups for Elba Island, Sempra Energy's Cameron LNG in Louisiana and the Freeport plant in Texas would double the number of US LNG export terminals in operation. The Cameron and Freeport projects have also been delayed by holds ups and problems in construction.

According to the Federal Energy Regulatory Commission (FERC), the liquefaction Trains 1-6 at Elba Island are expected to start entering service at one-month intervals. Elba Island's Trains 7-10 are then scheduled to come on stream in the third quarter of 2019. The Georgia project is supported by a 20-year supply contract with Royal Dutch Shell. ■



Rendering of the Elba Island LNG terminal

FERC approves start of feeder pipeline for Freeport LNG venture

The Federal Energy Regulatory Commission (FERC) has granted approval for the Stratton Ridge pipeline additions to help provide the 700 million cubic feet per day that will be needed provide feed-gas to three LNG Trains at the Freeport LNG export plant in Texas.

The Stratton Ridge Project was developed by Enbridge and the network expansion has cost \$100 million. It enables additional bi-directional flow on the Texas Eastern Transmission system to a delivery point near Stratton Ridge, south of Houston.

Freeport LNG, developed by the US energy entrepreneur Michael Smith and partners, is currently building three 15.3 mtpa Trains at Quintana Island, Texas. Developers also entered the permit process with the FERC to build a fourth Train.

Train-1 is scheduled to start operating around mid-July. The start-up comes after more than a



Construction of Freeport LNG Train1 at Quintana Island, Texas.

year of delays as contractors missed schedules and some damage caused by the two previous hurricane seasons. Another potential cause of delay might be caused by Freeport LNG not having yet requested delivery of feed-gas into the plant's systems to begin commissioning.

About 13.4 mtpy of that Freeport production capacity from the first three Trains has been contracted under use-or-pay liquefaction tolling agreements with European and Japanese contract holders, BP of the UK, Germany's Uniper and Japan's Jera Co. Inc. and Osaka Gas. ■

Kinder Morgan notifies FERC on progress of Gulf LNG project

Gulf LNG, co-owned by Kinder Morgan and several US equity funds, has just notified the FERC about the progress of the project and the issue of the final environmental impact statement. The Gulf LNG terminal was originally owned by US pipeline company El Paso and later acquired by Kinder, which has sold 50% of the project to US equity funds.

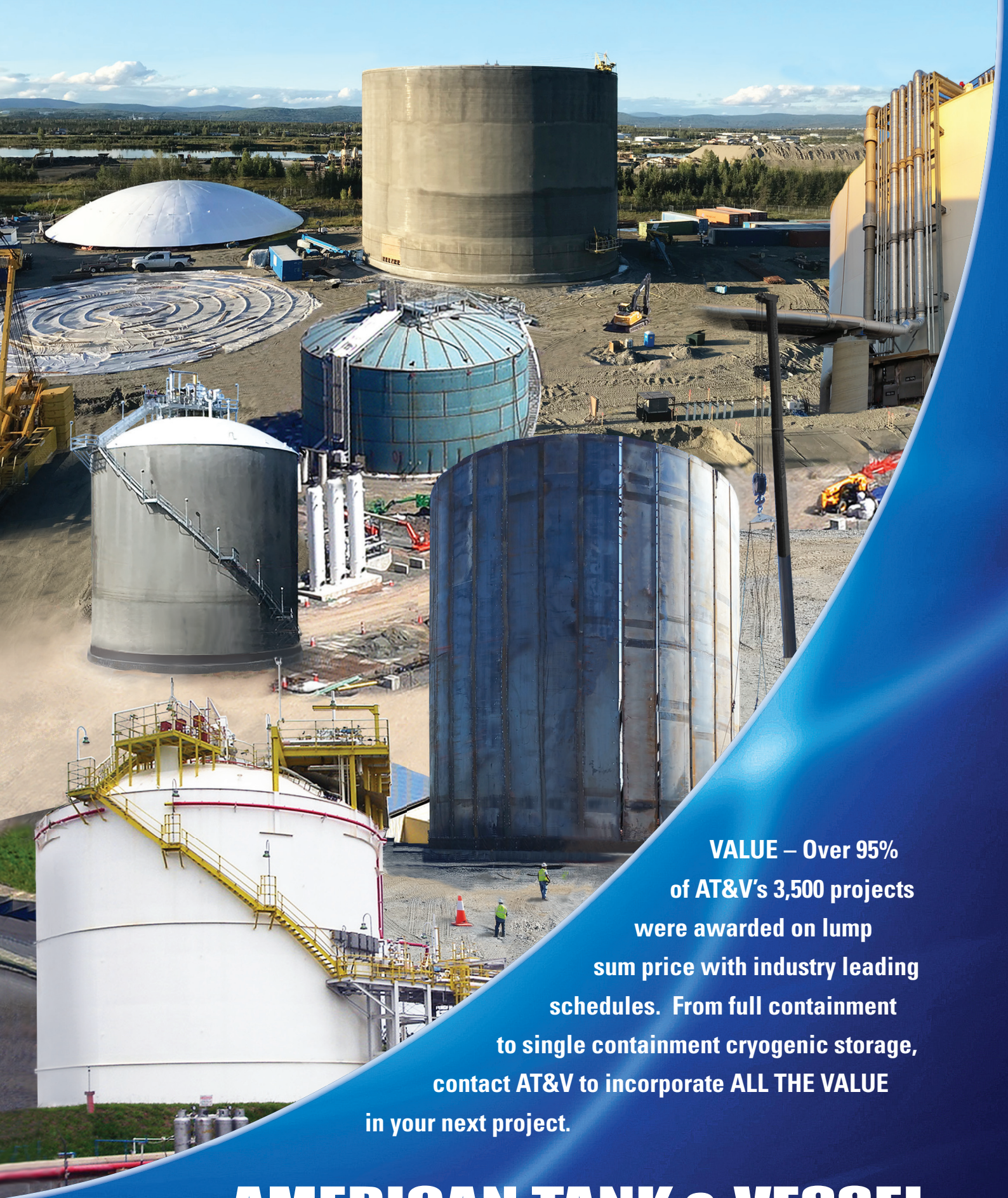
The Gulf LNG terminal is being integrated with an existing import terminal at the site in Pascagoula. Building on existing infrastructure, the brownfield project already includes a five-mile send-out pipeline and two LNG storage tanks, each with a capacity of 160,000 cubic metres.

Kinder Morgan said that on March 15, 2019, the Pipeline and Hazardous Materials Safety Administration, now playing a more active part of the FERC process, issued its letter of determination. This stated that it had reviewed the company's application and determined that it had demonstrated that the siting of the project complies with Federal Pipeline Safety Standards.

In addition, Kinder Morgan had submitted three replies through March 4, 2019, to data requests from FERC staff on the Draft Environmental Impact Statement (DEIS). “The comment period on the DEIS closed on February 25, 2019 and FERC is presently engaged in drafting the Final Environmental Impact Statement,” the developer said. ■



Kinder Morgan is converting the Gulf LNG regas terminal into a liquefaction and export project



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Shell, Energy Transfer move towards FID on Lake Charles LNG project

Energy Transfer and Shell plan to move towards a potential final investment decision on the 50-50 joint venture and have started seeking engineering, procurement and construction (EPC) companies, while intending to issue an invitation for tenders in the weeks ahead.

The Federal Energy Regulatory Commission (FERC) previously issued a draft environmental impact statement in September 2015 for the Lake Charles export venture to produce 16.5 mtpa of LNG.

Lake Charles' LNG 440-acre



Proposed site for Lake Charles LNG

site, located close to the Henry Hub, has access to many of the largest gas production areas in the US through Energy Transfer's pipeline network such as the Trunkline Gas System, a 2,200-mile network with more than a dozen inter-state and intra-state pipelines to ship feed-gas to Lake Charles LNG and other projects along the Gulf Coast.

"We are pleased to be moving forward with Shell in progressing this major LNG export project," said Tom

Mason, President of Lake Charles LNG, an Energy Transfer subsidiary. "We believe the combination of our assets and Shell's LNG experience will create a platform for exporting natural gas from the US Gulf Coast to the global marketplace that is unmatched."

Shell gained its stake in the Lake Charles facility's reserved capacity from its takeover in 2015 of BG Group. The export project will include the construction of three liquefaction Trains and will use the existing LNG storage and marine berthing facilities owned by Equity Transfer since its takeover of Southern Union Co. in 2013 for

more than \$5 billion.

The proposed Lake Charles liquefaction plant was first awarded a permit by the Department of Energy in August 2013 to ship cargoes to countries without a US Free Trade Agreement. Now the volumes for that permit have been increased.

Before the shale-gas boom Lake Charles was one of the centres of US LNG imports, with BG bringing in cargoes from nations such as Trinidad and Equatorial Guinea. BG and Energy Transfer had previously scheduled a commercial start-up for the plant as an export venture in 2019. ■

Texas LNG project makes progress with permitting

The U.S. Federal Energy Regulatory Commission (FERC) has delivered a final environmental impact statement for the Texas LNG export project, giving the green light for proposed project in the Port of Brownsville.

"We determined that the impacts on the environment from the proposed project would be reduced to less than significant levels with the implementation of Texas LNG's proposed impact avoidance and minimization," said the FERC.

The Texas LNG terminal - one of several ventures planned for the Brownsville area - would be constructed in an area currently zoned for industrial use along the existing Brownsville Ship Channel and is designed to produce up to 4 mtpa of LNG. The project involves building two liquefaction Trains and support facilities as well as two LNG storage tanks, each of around 210,000 cubic metres capacity.

Developers await final FERC approval in the next few months to be able to start construction as they aim for LNG production to commence by 2024. A final investment decision (FID) for Texas LNG is scheduled to be taken in the months ahead, provided comple-

tion of all commercial agreements and financing.

Samsung Engineering will provide all technical and engineering services for the project and is expected to take a minority stake in the venture. The develop-

ment will involve Samsung ordering liquefaction modules to be fabricated elsewhere and transported to the site.

Three projects in the making at Brownsville Ship Channel

In addition to Texas LNG, at least two other firms also want to build export facilities at Brownsville, Exelon Corp's Annova Brownsville

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TEXAS LNG



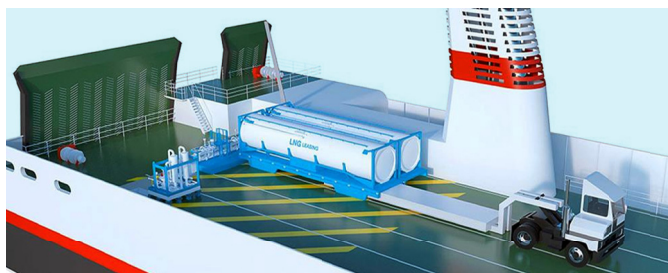
project and NextDecade Corp's Rio Grande project. In this context, the US Coast Guard also issued a letter of recommendation indicating that the Ship Channel would be considered suitable for the projected LNG marine traffic associated with the project. The US Department of Transportation noted there could be some cumulative environmental impacts from several LNG export projects oper-

ating in the area.

"The Texas LNG Project, combined with other projects in the geographic scope, including the Rio Grande LNG and Annova LNG projects, would result in significant cumulative impacts from sediment-turbidity and shoreline erosions within the Brownsville Ship Channel during operations from vessel transits," regulator said. ■

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