

LNG *North America*

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China levies sanctions on US LNG, turns to Qatar instead

As the US-China trade war escalates, Beijing says it has “no chance but to retaliate” new trade tariffs imposed by the Trump administration. Effective September 24, the Chinese President Xi Jinping implemented a 10% tariff on US LNG imports, casting a shadow over new US export terminals. China used to be No.2 buyer of US LNG, but state-owned PetroChina already suspended buying American gas and opted to enter a 22-year purchase agreement with Qatargas.

Spot markets are alarmed by the impact of tariffs on energy trade between the world's two biggest economies. In the twelve months up until June 2018 China has been the second largest buyer of US LNG globally, accounting for about 3 mtpa, mostly purchased through Shell as an intermediary.

Goldman Sachs analysts warned the tariff could “effectively end direct LNG trade” between American exporters and Chinese importer, or at led to a fast drop in purchases of spot LNG cargoes.

Wood Mackenzie research director Giles Farrer, meanwhile, said short-term consequence will be less than previously indicated. “This is partly because the level

of the tariff is lower than initially proposed, 10% now vs. 25% in August, but also because we think China has already completed the majority of its procurement for winter,” he said, explaining: “Possibly because of this, we have recently seen spot and futures prices for winter come down despite strengthening oil prices.”

If China still needs to procure spot cargoes, this will most likely result in a premium of up to 10% on supply from non-American, lean sources like the Australia East Coast projects, Tangguh, Gorgon or the Qatari Mega-trains, Mr Farrer said.

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Germany to build LNG terminal as “gesture to our American friends”

Before the turn of 2018/19, Germany will decide where to locate its first LNG import terminal. The German economy and energy minister Altmaier announced this move as “a gesture to our American friends” that could help ease tensions over the Nord Stream-2 pipeline project, led by Russia's Gazprom.

“Nord Stream-2 is a project that has a long life already and much money has been invested,” Altmaier said but suggested the government approval of a LNG import project would be “unrelated” to Berlin's backing to extend Nord Stream.

The Dutch companies Gasunie and Vopak, together with Germany's Oiltanking, formed

a joint venture last year called German LNG terminal that they plan to build in Brunsbüttel at a cost of €450 million (\$526 million). Once build, the facility could meet about 10% of Germany's gas demand.

RWE signs HoA for Brunsbüttel LNG project

An open season was held on Janu-

ary 17 which led to the signing of a long-term capacity contract between RWE and German LNG Terminal GmbH for a “considerable part” of the terminal's total capacity of 5 billion cubic metres. RWE has signed a Heads of Agreement (HoA) to have guaranteed access to substantial annual capacity.

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He suggested the appetite of Chinese buyers to pay significantly higher prices for LNG from other sources will probably be limited by the price they can sell gas domestically.

Sanctions may hamper 2nd wave of US LNG projects

Consequences will, however, be felt in the long term because the tit-for-tat policy on sanction by Beijing and Washington ultimately restricts the target markets for developers of new US LNG projects trying to sign new long-term contracts. For now, there is still plenty of appetite for second wave US LNG projects from other buyers in Asia and Europe, as evidenced by recent contracting momentum at Freeport, Calcasieu Pass and Sabine Pass Train 6.

"The first wave of US LNG projects was successful, despite not signing contracts with Chinese buyers," Mr. Farrer pointed out.

In consequence, "it could also support development of other projects outside of the US targeting the Chinese market (including Russia pipeline projects), potentially allowing them to push for higher long-term contract prices.

"The recent deal between PetroChina and Qatar is evidence of this," he said. Qatargas, the world's largest LNG producer, in early September struck a 22-year sales and purchase agreement with PetroChina to deliver around 3.4 mtpa of LNG its regasification terminals at Dalian, Jiangsu, Tangshan and Shenzhen.

Pipeline gas competes with LNG on price

In August, China brought two new regas terminals in service which brought the overall number to 19 - in line with the government's policy to replace coal with natural gas in the power sector. The two newly commissioned LNG regas terminals are situated at Zhoushan in the eastern Zhejiang province, and at Dapeng in Guang-

dong. The additionally contracted Qatari LNG supplies to China will come from the Qatargas II project at Ras Laffan, jointly owned by Qatar Petroleum, Exxon Mobil and Total. The emirate of Qatar currently produces 77 mtpa of LNG but an expansion project is underway to bring total output to over 100 mtpa by 2024.

In addition to LNG, China also imports substantial quantities of pipeline gas from Turkmenistan, Kazakhstan and Uzbekistan, and some smaller volumes through the Myanmar-China pipeline. A further boost will come from the long-awaited start of Russian gas imports through the 'Power of Siberia Project', scheduled for 2019.

Demand for natural gas in China is skyrocketing after the central government implemented clean-air directives that effectively forbid the use of coal for power generation in megacities - Shanghai, Beijing, Chongqing, Guangzhou, Tianjin and Shenzhen.

'Blue sky defense plan' spurs gas demand

Taking bold steps to curb air pollution, China's State Council extended the reach of the three-year 'blue sky defence' action plan in July 2018 to include cities in Shanxi, Shaanxi and Henan provinces. The target area now includes '2+26' cities and prioritizes switching from coal to gas for winter heating and power generation, as well as renewables.

Accelerating air pollution now affects a region with 37% of China's population. Keen to also limit emissions, the government pushes for a shift to cleaner fuels such as LNG in the power and transport sector.

As a quick fix, inefficient coal-fired power units under 300 MW will retire and China's State Council stipulates to replace this capacity with high efficiency, low emission (HELE) units, mostly fuelled by natural gas. Henan and Guangdong provinces, alone, have announced they will close 1 GW of coal power capacity each this year. ■

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"LNG remains a key growth area for RWE: this agreement will enable us to continue growing our portfolio and provide us with additional flexibility to take advantage of new opportunities as they present themselves in the global LNG market," commented Andree Stracke, RWE's Chief Commercial Officer Gas Supply & Origination.

Apart from the Brunsbüttel LNG project, at least two other cities are competing to be the chosen site, Altkmaier noted. Wilhelmshaven is understood to be one of them.

DoE criticizes "advantages of Russian gas supplies"

Altkmaier's surprise announcement comes just days after an US Energy Department (DoE) statement to the Senate highlighted deficiencies in the European Union LNG network that could hamper the free flow at market prices of exports from the U.S. Gulf Coast and other regions in America. Steven E. Winberg, Assistant Secretary for Fossil Energy at the DoE, said that despite the availability of US LNG imports into Europe, there were constraints affecting the amount that could be imported.

"The US is strongly committed to providing Europe with access to strategic, diverse and reliable energy supplies," Winberg said, pointed to the advantages enjoyed by Russian pipelines supplies to the EU compared with LNG volumes from the US.

During Q4-2017, natural gas imports to the EU increased by 6% compared to a year earlier and Russia remained Europe's top gas supplier, accounting for 43% of imports while LNG accounted

for 12% of imports, including US shipments, the Senate was told.

"Particularly as EU member states decrease their reliance on generation from coal to comply with emission goals, European countries are becoming more dependent on gas overall," Mr Winberg sated. "As a consequence, due to lack of supply routes and insufficient pipeline buildout, Europe is also becoming more, not less, dependent on Russian gas." ■

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Start-up of four key pipelines to boost U.S. gas exports to Mexico

Exports of natural gas from the U.S. to Mexico by pipeline exceeded 5 billion cubic feet per day (Bcf/d) for the first time in July 2018, according to Genscape data, after several key interconnectors were commissioned. By the end of 2018, another four of six major strategic pipelines within Mexico will start up, giving further scope for export of constraint Permian production in western Texas.

US pipeline gas and LNG exports help meet the growing demand from Mexico's gas-fired power generation and industrial sectors, offsetting declines in Mexico's domestic production.

Current exports primarily from Eagle Ford

Over three-quarters of U.S. pipeline gas exports to Mexico currently flow from southern Texas. Exports from southern Texas averaged 3.2 Bcf/d in 2017 and 3.3 Bcf/d through the first five months of 2018. These volumes are sourced primarily from the Eagle Ford Basin in Texas and transported on an existing pipeline network to serve industrial and power sector customers in northeastern Mexico.

In contrast, exports from western Texas' prolific Permian basin have been limited despite a substantial increase in cross-border pipeline interconnectors over the past two years. But delays



Map of FERC-approved US LNG terminals

in the construction of connecting onward pipelines on hampered gas exports and led to low utilization of cross-border pipeline capacity from western Texas.

"Some pipelines in Mexico have been delayed by more than a year from their original expected in-service dates, in part because of disputes contesting pipeline routes," analysts from the U.S. Energy Information Administration

(EIA) noted. According to EIA data, exports from western Texas averaged only 0.4 Bcf/d in 2017 and 0.5 Bcf/d in January-May 2018.

More intra-Mexican pipelines to start in November

In spring 2018, some key pipelines in Mexico were placed in service. Furthermore, the 1.1 Bcf/d Laguna-Aguascalientes and the

0.9 Bcf/d Reyes-Aguascalientes-Guadalajara are due to commence commercial operation in November 2018, after the interlink at El Encino-La Laguna is completed in October.

This new network of inter-Mexican pipeline is expected to help transport substantial volumes of natural gas from western Texas into central and western Mexico.

Pipeline gas to replace some LNG imports

Additional deliveries of US natural gas via pipeline is likely to displace some LNG imports at the Manzanillo regasification terminal that serves markets in Guadalajara, Mexico's second-largest city.

Start-up of the 0.5 Bcf/d Samalayuca-Sasabe pipeline is slated for November 2018, with delivered volumes set to primarily serve new gas-fired power plants in western Mexico that also cater for the electricity supply of the greater Guadalajara region. ■

Trinidad sources feed-gas for Atlantic LNG from Venezuela

Trinidad and Tobago is increasing sources of feed-gas for the Atlantic LNG plant at Point Fortin on Trinidad. To that end, the government of Trinidad and Tobago has signed an agreement with Venezuela to purchase 0.15 Bcf/d of natural gas from Venezuela's offshore Dragon field.

ALNG project stakeholders also identified several new domestic fields to shore up LNG production. Production and liquefaction activity has declined in recent years due to feed-gas shortages from maturing offshore fields.

Trying to stock up supplies, BP in 2017 started production from the Juniper field, which will supply 0.59 Bcf/d in feed gas and sanctioned the development of the Angelin field for 0.6 Bcf/d, where production is expected to start in 2019.

"BP has also commissioned the

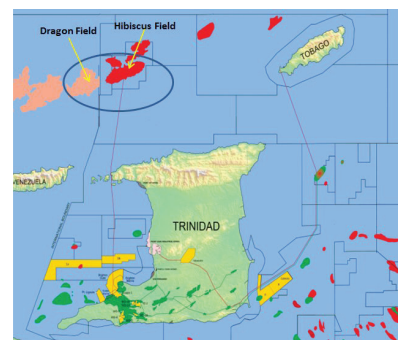
Trinidad onshore compression project (0.2 Bcf/d) to increase feedstock supply to the facility," said the EIA report. "Additional offshore fields that could provide natural gas feedstock for the project were also discovered, including BHP Billiton's LeClerc field containing 4 trillion cubic feet (Tcf) to 5 Tcf of reserves and BP's blocks near Juniper and Cashima fields containing 2 Tcf of reserves.

ALNG has four liquefaction Trains and last year exported 10.19 million tonnes of LNG, down from 10.46 million the previous year,

from combined plant capacity of 2 Bcf/d. It began LNG production in 1999 and was the first LNG facility built in the Atlantic Basin. Project stakeholders had considered adding one new Train, but were unable to identify a sufficiently large natural gas resource base to support the plan.

Most of ALNG's exports are shipped to South America, Europe and the United States, primarily to Everett import terminal near Boston, Mas-

sachusetts, to meet seasonal winter peak demand in New England. ■



Map of the Dragon field located in Venezuela's maritime borders

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Gas trade expands in the absence of LNG glut

Global gas trade expanded last year by 63 billion cubic metres, or 6.2%, with growth in LNG outpacing growth in pipeline trading, according to the latest BP Statistical Review of World Energy. The apparent absence of a glut shows, according to analysts, that any surplus LNG resulted in bouts of unsustainably low prices rather than a build-up of idle capacity.

"In natural gas markets, another year of strong expansion of global LNG supplies helped to improve the accessibility of gas around the globe, with clear signs that the major regional gas markets are becoming increasingly integrated," commented BP chief executive Bob Dudley.

"This greater accessibil-

ity and integration should help to underpin the long-term use of natural gas."

The tidal wave of LNG projects that were sanctioned between 2009 and 2014 led many to predict the emergence of surplus LNG as it took time for demand to catch up with the rapid growth in supplies. But many observ-

ers have so far been surprised by the apparent absence of such a glut, BP observed.

"There is certainly little evidence of LNG facilities standing idle due to a lack of demand. This absence partly reflects that, due to a variety of technical issues, actual LNG supplies have come on stream less quickly than originally planned, moving supply more into line with the original demand profiles," analysts explained.

Australia, U.S. and Russia lead the way

The increase in gas exports was driven largely by Australian and American LNG, up by 17 and 13 Bcm respectively, and Russian pipeline exports that increased by 15 Bcm.

"The other central factor supporting the strength of global

gas markets last year was the continued expansion of LNG, which increased by over 10% in 2017, its strongest growth since 2010, aided by the start-up of new LNG trains in Australia and the U.S.," said the BP report.

"China's increased need for LNG accounted for almost half of the global expansion, with China overtaking Korea to be the world's second largest importer of LNG after Japan," it added.

Production of natural gas worldwide increased by 131 Bcm, or 4%, almost double the 10-year average growth rate. Russian growth was the largest at 46 Bcm, followed by Iran at 21 Bcm. Consumption, meanwhile, rose by 96 Bcm, its fastest since 2010 and led by China, the Middle East and Europe, while consumption in the US fell by 1.2%. ■



View of BP Energy's trading room

FLNG Power Vessel market worth over \$930 million by 2023

The global trend towards urbanization will increase business activities within some of the world fast-growing port cities, driving demand for Floating LNG power vessels. MarketsandMarkets analysis sees the FLNG power vessel market to expand from currently \$860 million to nearly \$932 million by 2023.

If estimates prove accurate, the market for FLNG power vessels would be growing at an annual rate of 1.16% over the forecast period.

The power generation system segment is seen holding the largest share of the Floating LNG power vessel market, by component. "Increasing availability of natural gas, coupled with widespread R&D investments and evolution of the combined-cycle gas turbine technology, have led to a steep rise in the application of gas turbines in the power generation system," analysts commented.

Power Ships high in demand

In terms of technology, power ships - special barges modified for power generation - attract the highest demand from utility customers. A power ship is



Karadeniz Powership

generally used in the energy leasing market for short- and mid-term contracts because of its self-propelling property.

Karadeniz Holding of Turkey holds the major share in supplying power ships to the market.

The World Bank provides funds for building floating power plants (FPPs), but the funding is restricted to 129 MW per FPP.

Fastest growth in Asia Pacific Asia Pacific, one of the world's most populated and fast-growing

regions, has been leading the global Floating LNG power vessel market for the past few years. Owing to limited availability of land to build power plants in most of Southeast Asia, these island nations tend to be likely to generate a more and more of their electricity demand through floating LNG power vessels.

Governments of several Southeast Asian island countries plan to increase investments to meet the rising need for electricity supply. For instance, Myanmar Electric Power Generation Enterprise awarded a contract to Karpowership to provide an FPP in Rangoon, Myanmar. Similar factors are likely to keep driving growth for power ships throughout the Asia Pacific region. ■

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Haynesville production falters as costs rise

Higher relative cost to produce natural gas from the Haynesville region has led to a gradual decrease in shale gas production over the past five years. The Haynesville formation lies at a greater depth than Marcellus, so drilling costs are significantly more expensive. This caused a sharp drop in monthly dry gas production from a peak at 7.4 billion cubic feet per day (Bcf/d) in January 2012 to less than half that level by early 2016, according to EIA figures. Output rebounded since then to 6.4 Bcf/d in June 2018.

The Haynesville formation in 2017 was the third-largest producer of shale gas after the Appalachian production region - mainly in Pennsylvania, West Virginia, and Ohio - and the Permian production region in Texas and New Mexico.

Geographically speaking, the Haynesville formation lies at depths of 10,500 feet to 13,500 feet, much deeper than the Marcellus, which is 4,000 to 8,500 feet deep. Drilling in the Haynesville shale generally more expensive than in other shale plays which makes production more dependent on the price of natural gas.

Rig count follows Henry Hub price

Higher gas prices at the U.S. benchmark Henry Hub makes it more economical for produc-

ers to spend the additional cost associated with drilling deeper to extract gas from the Haynesville formation. In 2010, when the Henry Hub price averaged \$4.50 per million British thermal units (MMBtu), 223 rigs were operating in the Haynesville.

As the Henry Hub price dropped, the rig count followed, ultimately reaching a low of 20 rigs in operation in mid-2016. Since then, the Henry Hub price has increased, recently surpassing \$2.00/MMBtu, and the Haynesville rig count has steadily increased to average at least 50 rigs operating in each month so far in 2018.

Well productivity keeps rising

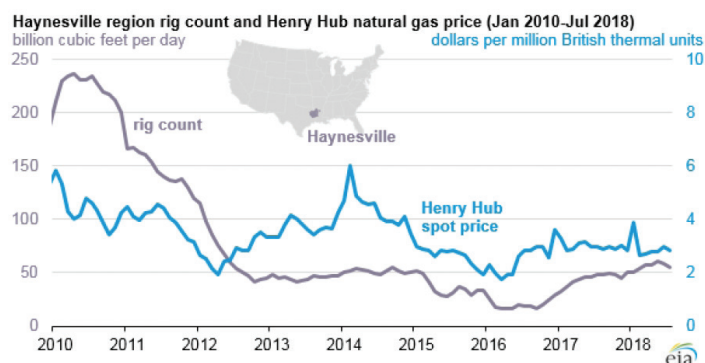
A higher well productivity is another factor that contributed to the rise in production as the lat-

eral length and initial production rate of each well have increased. Average lateral lengths per well have increased from 4,269 feet to 6,421 feet in the years between 2010 and 2017, according to EIA calculations, based on DrillingInfo data.

Consequently, the initial productivity rate in the Haynesville region - calculated

as the initial three-month cumulative production per well - has nearly doubled from 2010 to 2017, increasing from 589 million cubic feet (MMcf) per well to 1,176 MMcf/well.

Analysts expect productivity gains will gather pace as producers optimize the gas recovery rate from the Haynesville formation.



Appalachia, Permian drive growth in U.S. gas production

Gross natural gas production across the United States has risen by more than 10% in recent month, spurred by new drilling and completion techniques that propelled up output from Appalachian Basin in the Northeast, the Permian Basin in western Texas and New Mexico, and the Haynesville Shale in Texas and Louisiana. The contribution of these three regions has increased from 15% to nearly 50% of total gas production.

Enhancing drilling techniques, U.S. upstream companies are making use of longer well laterals that have increased well productivity. By contrast, the Gulf of Mexico's share of total production has fallen from 12% in 2007 to just 3% in recent months, and the share of conventional produc-

tion in the rest of the U.S. has dropped from 60% to 28%.

Shale gas drilling spurs growth with gains in production having come mainly from the Marcellus and Utica shale plays in the Appalachian basin, which collectively accounted for about 29% of total production in July 2018. Recent

infrastructure build-out in the region has allowed natural gas to move out of the region and has reduced the prevailing discount to the national benchmark price at Henry Hub and to regional prices.

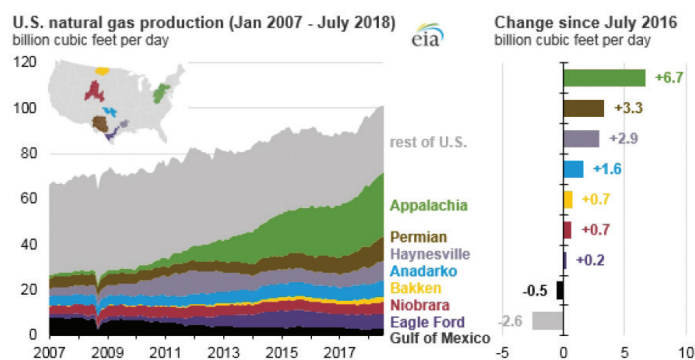
Output from the Permian Basin is also on the up, arguably sourced in the form of associated gas accompanying the region's rising crude oil production. EIA projects that July 2018 production in the Permian Basin will account for about 11% of total U.S. gross production.

Similar to the Appalachian Basin, Permian gas trades at lower prices relative to Henry Hub due to regional infrastructure constraints. A number of new pipelines are planned or under

construction that will help move gas out of the region, helping to expand LNG export capability.

Apart from the continued shale gas boom, the Gulf of Mexico accounts for a much smaller portion of national production. Older wells in the Gulf tend to be more gas-rich, and newer wells tend to be more oil-rich which contributes to the decline in conventional gas output.

Moreover, technology and expertise required to produce oil and gas from the seabed is more expensive and specialized. Drilling platforms sometimes cost a billion dollars or more and take several years to construct; hence offshore projects generally carry higher risk than onshore projects.



Safety Instrumented System Migration: Protect Intellectual Property While Extending Asset Life

At today's Liquefied Natural Gas (LNG) facilities, including processing trains, terminals, and storage/transport ships, the need for safe and environmentally sound operations, is a concern and responsibility shared by operators.

Global market conditions place greater emphasis on optimizing operational performance. At the same time, it is imperative to focus on safety due to increasing government regulations and strict industry standards.

History of Technology Evolution

Honeywell introduced one of the first and most successful Safety Instrumented System (SIS) solutions with its Fail Safe Controller (FSC), helping customers reduce the risk of safety incidents, maximize production uptime, and lower the cost of regulatory compliance.

Honeywell subsequently introduced the Safety Manager system, a technology advancement designed to integrate process safety data, applications, system diagnostics and critical control strategies, and execute Safety Integrity Level (SIL)-defined safety applications in a fully redundant architecture.

By providing customers with a migration path from FSC to the Safety Manager system, customers can protect their intellectual property while extending asset life and implementing the latest process safety technology.

Seamless Path to the Future

With Honeywell's evolutionary approach to SIS upgrades, it is possible to exchange the FSC controller for the Safety Manager controller and maintain the FSC I/O and all related field devices and wiring. Hardware migration kits make the transition an easy operation.

In addition to a smooth hardware migration,

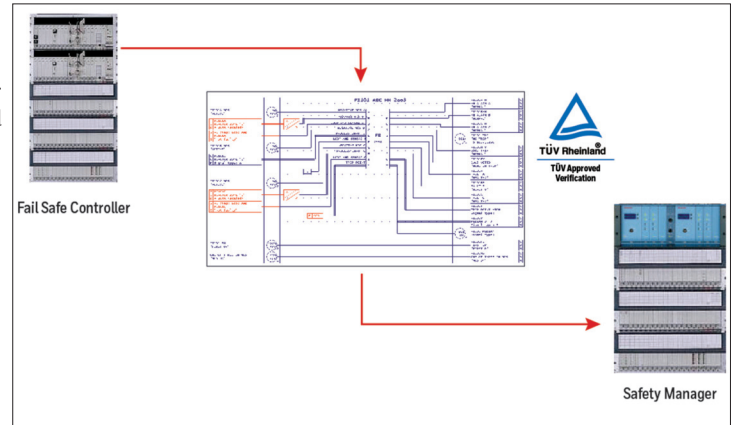
Honeywell's solution includes the option to convert the FSC application in an automated way to a Safety Manager application. A TÜV-certified software migration tool enables a one-to-one conversion of the FSC application.

The migration of an installed base of FSC systems can be planned in a phased manner, aligning it with the turn-around schedule of the plant. A SIL3 fail-safe communication link between the FSC system and Safety Manager is key to enabling incremental migration.

The Honeywell approach also includes modernization of the Universal Control Network (UCN) to Ethernet technology by introducing the Fault Tolerant Ethernet (FTE)-based Enhanced Universal Control Network (EUCN) and related Ethernet-based control devices like the Enhanced High Performance Process Manager (EHPM). Safety Manager can connect to the EUCN, thus allowing peer-to-peer communication to the EHPM. This unified control environment provides a logical path for migration of coax-based devices to Honeywell's Experion® Distributed Control System (DCS) at minimal investment cost, process disruption and changes to intellectual property. The UCN to EUCN upgrade does not require any changes in controller configuration, application software or process displays.

Benefits for LNG Operators

LNG organizations deploying the Safety



Manager system can improve safety, simplify operations and reduce costs by providing a single, robust safety system architecture across their plant enterprise.

By migrating from FSC to Safety Manager, operating companies can:

- Modernize their SIS platform by introducing the latest safety technology such as Universal Safety I/O, Universal Logic Solvers, ISA Secure cyber security and advanced DCS integration.
- Prevent a costly rip-and-replace by exchanging the FSC controller with the Safety Manager controller while maintaining existing field infrastructure.
- Extend a reliable process safety solution by easily converting the FSC application to a Safety Manager application.
- Reduce engineering, maintenance and training cost due to the similarity between legacy and new safety platforms

Leveraging Expert Support

Honeywell have a proven commitment to life-cycle support and helping industrial organizations meet their business needs for automation planning. Its high-value service and support capabilities have more worldwide reach and presence than any other supplier.

With Honeywell's approach, linearity of capital investments, together with efficiency improvements, is fully supportable using incremental modernization and upgrades. The company's local service technicians, technical consultants, TÜV certified engineers and Global Technical Assistance Center (GTAC) experts use collective expertise to support customers in countries across the globe.

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Cheniere signs 15-yr supply deal over 0.7 mtpa with Vitol

Cheniere Energy, the leading US LNG exporter, has signed its latest supply agreement with Switzerland-based independent commodities trader Vitol. Cheniere said its marketing unit will provide 700,000 tonnes per annum for 15 years to Vitol on a free-on-board basis whereby the buyer provides the shipping.

The purchase price for the LNG is indexed to the monthly Henry Hub price, plus a fee, Cheniere disclosed. The Houston-based company currently produces 18 mtpa from the Sabine Pass plant in Louisiana and output will increase to 27 mtpa when two more Trains come on stream. Cheniere is also constructing a second liquefaction and export plant at the port of Corpus Christi in Texas.

"We are pleased to announce this long-term SPA with Vitol, one of the fastest growing players in the global LNG market," said Jack Fusco, Cheniere's President and Chief Executive. "This agreement continues Cheniere's commercial momentum and supports our growth plans, while demonstrating the value LNG buyers place on Cheniere's unique ability to offer flexible solutions tailored to the needs of LNG customers worldwide," stated Fusco.

Vitol, a private company founded in Rotterdam in 1966, has been active as an independent LNG trader since 2005 and delivered 7.4 million tons worldwide in



2017. Spot, short or longer-term arrangement are on offer and Vitol said it strives to build partnerships through co-investment in gas infrastructure and bespoke pre-financing solutions. The partly employee-owned company has 40 offices worldwide, with largest operations based in Geneva, Houston, London and Singapore

"We are delighted to be working with Cheniere, a pioneer in US liquefaction," said CEO Russel Hardy. "Vitol is committed to the long-term development of the LNG market. We believe

that LNG has an important role to play in the future energy mix and that its evolution will require a more flexible and tradeable LNG market," added Hardy.

Cheniere's previous supply accord was signed in July 2018 with Taiwanese energy company CPC Corp. for 2 MTPA of LNG for 25 years. Taiwan is the fifth-largest Asian importer of LNG and last year received 16.6 million tonnes. It previously imported more LNG than mainland China until 2011 when it was overtaken for the first time. ■



Vitol-chartered LNG tanker MV-Sohar

NEWS NUDGES

Former KBR CEO joins Teekay LNG

Bill Utt, the former President and CEO of US energy and LNG engineering company KBR, has been appointed as a new member of the Teekay LNG Partners board. The New York-listed affiliate of the shipping company has a global fleet of 207 ships and its LNG carriers are operated with ownership portions ranging from 30% to 100%.

KinderMorgan seeks to advance with Gulf LNG

Kinder Morgan, one of the main US pipeline operators, said it could now move forward with modifying its Gulf LNG import facility in Mississippi to handle exports as it is already doing with its Elba Island plant near Savannah, Georgia. The existing Gulf terminal at the port of Pascagoula in Mississippi could be taken forward by other parties, supported by Kinder, CEO Steve Kean told investors in New York.

NextDecade starts FERC process for Galveston LNG

Houston-based NextDecade, developer of the Galestone LNG project, has requested the start of its authorization process through FERC to produce an initial 16.5 mtpa from a proposed liquefaction facility near Texas City. The Galveston Bay venture has already received a Department of Energy permit to ship cargoes for 20 years to nations with a Free Trade Agreement with the US and a non-FTA permit was pending.

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Driftwood LNG on track for start-up in 2023

Tellurian, developer of the proposed 27 mtpa Driftwood LNG export plant and three affiliated pipelines, has received a draft environmental impact statement from US regulators allowing it to stay on track for a start-up in 2023.

The US Federal Energy Regulatory Commission (FERC) prepared the draft EIS following an extensive evaluation process. Tellurian proposed developing six liquefaction Trains and associated facilities at Driftwood, on Lake Charles in Louisiana.

Tellurian CEO Meg Gentle called the draft EIS a "significant milestone" saying its issuance ensures "the Driftwood Project can produce LNG safely and efficiently beginning in 2023."

Final environmental impact statement is now meant to be completed by January 2019

with a view of starting construction shortly thereafter. Gentle said the Driftwood LNG is estimated to cost approximately \$30 billion of infrastructure investment and create nearly 50,000 direct and indirect jobs.

Houston-based Tellurian Inc. is listed on the Nasdaq global exchange. The company also plans to develop its own pipeline network, including the previously announced Driftwood Pipeline and two additional pipelines to expand supply alternatives for liquefaction and domestic distribution in Louisiana. The three pipelines are

anticipated to be in-service between mid-2021 and the end of 2022, subject to commercial agreements.

As for feed-gas supply, Tellurian agreed in 2017 to purchase gas producing assets and undeveloped acreage in the Haynesville Shale of northern Louisiana from Rockcliff Energy. This includes around 4 million cubic feet per day (mmcf/d) of gas production, about 1.3 trillion cubic feet (tcf) of gas resource and about 138 drilling locations.



Freeport LNG gets short-term DoE export permit

The US Department of Energy (DoE) has issued a short-term order to Freeport LNG, under development at Quintana Island in Texas, to export up to 2.14 billion cubic feet per day (bcf/d) of natural gas as LNG over a two-year period to both free-trade and non-free trade agreement countries.

"This order authorizes Freeport's initial commissioning volumes and other exports pursuant to short-term contracts. During this two-year authorization period, Freeport will be able to export LNG to any country not prohibited by US law or policy," the DoE said, adding: "The two-year export term will become effective on the date of the commencement of the Freeport facility's first export of LNG, currently projected to be in the third quarter of 2019."

Start of commissioning of Freeport Train-1 received FERC approval in August. Freeport LNG is currently building three liquefaction Trains and has entered the permit process with the FERC to build a fourth Train.

The first three Trains will be brought on stream in 2019 and will have a combined



15.3 million tonnes per annum (mtpa) of output. About 13.4 mtpa of that capacity has been contracted under use-or-pay liquefaction tolling agreements with BP, Uniper as well as JERA and Osaka Gas.

NEWS NUDGES

US LNG and gas prices

US LNG decreased by one shipment on the week ending September 21 to five cargoes, four from the Sabine Pass plant in Louisiana and one from Cove Point in Maryland. Three more carriers were lifting cargoes, two at Sabine and one at Cove Point. "Cove Point LNG facility received an LNG vessel on September 16, two days after the landfall of Hurricane Florence in North Carolina," noted the weekly report from the Energy Information Administration (EIA).

US domestic natural gas prices rose with the benchmark Henry Hub spot price increasing 13 cents to \$3.06 per million British thermal units, its highest since the end of January 2018 when prices averaged \$3.21 per MMBtu. Other price increases were logged at the Chicago Citygate at \$3.00 per MMBtu and at the Algonquin Citygate serving the Boston area where prices were 16 cents higher at \$2.91 per MMBtu.

Appalachian prices in shale-gas basins also rose, with the Tennessee Zone 4 Marcellus spot price up 36 cents to \$2.55 per MMBtu.

Pieridae Energy names new CFO

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