

LNG North America

LNG Unlimited Data Includes:

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January 2020

Shell prepares to supply Hong Kong with LNG in 2020

Shell Eastern Trading will be the first supplier of LNG cargoes to Hong Kong for use in the 2.5 Gigawatt Black Point and 3.7 GW Lamma Island Power Stations. Under a 10-year supply deal commencing in late 2020, Shell will ship up to 1.2 million tons per annum (mtpa) of LNG to Hong Kong Electric and CAPCO. Supplies are set to come from Shell's global portfolio which includes major LNG export projects in Australia and probably some spot cargoes from the U.S.

The cargoes with super-chilled natural gas, supplied by Shell, will berth at Hong Kong's first floating storage and regas unit (FSRU). Named 'Challenger', the FSRU will be deployed by Mitsui O.S.K. Lines (MOL) and moored at the southern waters of Hong Kong and to the east of the Soko Islands.

'Challenger' has a storage capacity of 263,000 cubic meters and is said to be "the largest FSRU in the world." It is currently deployed as an import facility offshore Turkey but will be shipped to Hong Kong in the next months where it is

due to enter service around the end of 2020, or early 2021.

"The FSRU vessel, together with the jetty and submarine pipelines, will enable us to have access to diverse gas sources for cost-competitive LNG supplies," said HK Electric managing director, Wan Chi-tin.

Preferring LNG over pipeline gas from China

Supply of imported and regasified LNG is meant to commence from mid-2021, replacing pipeline gas supply from southern China.

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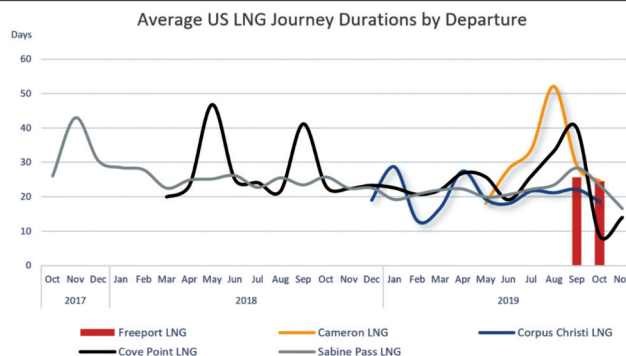
US LNG supply surplus increases risk for portfolio players

Global market are flush with new supply from the latest round of US LNG project build-out, but the prevailing 'tolling' model makes offtaker exposed to a significant downside risk. LNG offtakers from US liquefaction have to pay tolling fees, regardless if they take capacity, which can leave them out of pocket at times of falling demand in high-priced Asian markets.

A spike in journey times highlighted lower demand in the Far East this autumn, leaving several US cargoes lifted circling the oceans in autumn 2019. Journey durations spiked as vessels remained in limbo for several weeks, including the British Sponsor and the Gaslog Hong Kong.

From a trader's perspective, Europe became a convenient sink for what would otherwise have been surplus LNG. At the same time, the additional US volumes also served as a convenient hedge for European utilities

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Turning to flexible LNG import, rather than long-term purchase of pipeline gas, is a relatively new move for state-owned CLP Power which used to rely almost entirely on supply of pipeline gas from China. Back in 2008, CLP scrapped plans for a \$1-billion LNG import plant after China offered an attractive deal to renew a gas supply contract for another 20 years. But things started to change when

LNG prices in Asia started to fall with the growing influx of supply from Australia, Qatar and flexible cargoes from the United States.

Observers note there is much upside for US LNG imports to Hong Kong, both for economic and political reasons. Much of the city's coal-fired power plants are reaching the end of their lifetime before 2030, hence Hong Kong is

embarking on a massive shift to gas-fired power. Utilities start to embrace attractively priced spot LNG, delivered on a flexible basis.

HK Electric and CAPCO, the operators of the massive Black Point and Lamma Power Stations, are keen to fully utilize the FSRU for receiving cost-competitive LNG cargoes as a stable source of gas supply.

CAPCO is jointly owned by China Southern Power Grid and CLP Power, which operates three large power generators - Castle Peak Power Station, Black Point Power Station and Penny's Bay Power Station. Black Point is a 2,500 MW combined-cycle gas power station, while Lamma Island has a nameplate capacity of 3,736 MW consisting of eight coal- and seven gas-fired units. ■

U.S. gas production expected to grow "much less" in 2020

The latest U.S. Government Short-Term Energy Outlook (STEO) anticipates natural gas production will grow much less in 2020 because of the lag between changes in price and changes in future drilling activity. Low prices in Q3-2019 is likely to reduce gas-directed drilling in the first half of next year, with 2020 output seen average 95.1 billion cubic feet per day (Bcf/d).

At Henry Hub, gas futures contract for January delivery settled at \$2.43 per million British thermal units (MMBtu) on December 5, down 29 cents/MMBtu from November 1. Forecasts for colder weather in early November – seen

in Figure 9 as the sharp, green peak in the difference between normal and current heating degree days (HDD) in November 2019 – had supported a sharp increase in futures prices from \$2.24/MMBtu on October 21 to a peak of

\$2.86/MMBtu on November 5.

For the rest of the month, prices declined in tandem with generally milder weather forecasts. However, front-month natural gas futures price gained 6 cents/MMBtu with the change from December to January delivery on November 27.

Despite lower gas production growth, the share of utility-scale power generation from natural gas will continue to rise. Gas-fired power plants, mainly combined-cycle units, have increased their market share from 34% in 2018 to currently 37% and are forecast to rise to 39% in 2020.

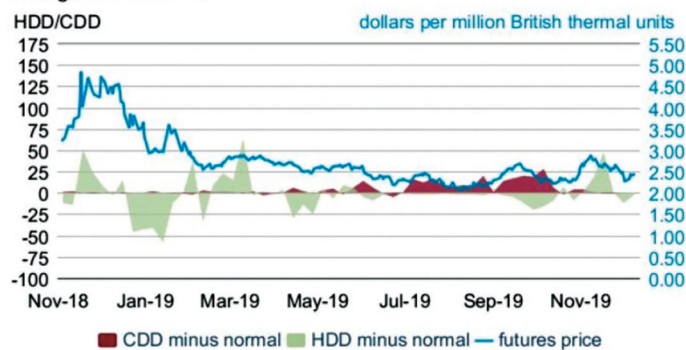
Coal's contribution to the U.S. power mix, meanwhile, is expected to fall from 25% this year 22% in 2020, while nuclear power stays at

20% and hydropower at a 7% market share this year and next. Wind, solar, and other nonhydropower renewables provided 9% of total utility-scale generation in 2018, and the Energy Information Administration (EIA) expects they will provide 10% this year and 12% in 2020.

Wind and solar power keeps rising in Texas

Non-hydro renewables - principally wind and solar - will grow from 411 billion kilowatthours (kWh) in 2019 to 471 billion kWh in 2020. Texas accounted for a fifth of U.S. non-hydropower renewables this year, rising to 22% in 2020. In contrast, California's forecast share of non-hydro renewables is expected to decline from 15% in 2019 to 14% in 2020. ■

Figure 9. Natural gas front-month futures prices and actual minus historical average HDD and CDD



Note: HDD stands for heating degree days, CDD stands for cooling degree days
CME Group and National Oceanic and Atmospheric Administration, as compiled by Bloomberg L.P.

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against the looming delay of Gazprom's Nord Stream 2 pipeline

into Germany, our LNG Unlimited editor Alex Wilk noted.

With the opening of Nord Stream-2 – the second Russian gas interconnector through the Baltic Sea – facing delays, LNG traders are looking at redirecting a number of cargoes to Northwestern Europe this winter. Meanwhile, strong trading focus remains on destinations in the Pacific and the Far East.

Analysis by LNG Unlimited Data expects up to 40% of US cargoes currently at sea will arrive in the Far East by January 9, 2020. In line

with the run up to this winter, Far Eastern LNG demand has begun to rise again since November, with our initial outlook pegging this month's regional demand to be roughly in line with that of December 2018.

Risk lies with PF players, not capacity owners

US liquefaction plants typically sell their LNG at 115% of US gas futures plus a fixed gas liquefaction fee of \$3-4 /mmBtu in what is known as the 'take-or-pay' or 'tolling' model. Hereby the plant operator effec-

tively leases out liquefaction capacity to portfolio players, regardless of whether this capacity is used or not.

For the plant operators such as Cheniere this model means revenue are secure.

For LNG portfolio players, in contrast, this imparts a downside risk of tens of millions of US\$/month, incentivised by relatively low US gas prices following the US shale gas boom in the Marcellus and Utica plays and associated gas from the Eagle Ford play and other Texan sources. ■

LNG North America

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Gas demand in Asia-Pacific to grow 4% per year through 2024

Asia's hunger for natural gas and electricity is likely to increase over the coming five years, the International Energy Agency (IEA) says, forecasting annual growth rates of over 4% in Asia and 1.6% worldwide until 2024. China's policy drive to switch from coal-to-gas in the power sector plays a major role in driving demand in Asia-Pacific.

China's gas demand is expected to account for nearly 40% of global demand growth for years to come, commented Keisuke Sadamori, IEA Director for Energy Markets & Security. But China's energy hunger is abating as its economy is losing speed. Gas consumption grew 18% in 2018 but is expected to slow to an average annual rate of 8% to 2024 as a result of slower economic growth.

Demand for natural gas grew 4.6% in 2018, its fastest annual pace since 2010, according to the IEA's latest annual market report. Gas accounted for almost half the increase in primary energy consumption worldwide. Demand is expected to rise by more than 10% over the next five years, reaching more than 4.3 trillion cubic metres (tcm) in 2024.

In Europe, gas demand is seen rising as well - but on a much smaller scale - driven by the shut-down of coal and nuclear power plants in some major economies. But analysts say the subsequent rise in gas demand will be limited by the expansion of renewable power sources.

Industrial demand to overtake power sector

Industry could soon replace the power sector as the main growth driver for natural gas, the IEA says with reference to the global shift to green energy sources and rising adoption of power storage. In fact, hybrid installations consisting of solar power and battery-based energy storage have become competitive with gas-fired peaking power plants in some parts of the world.



Industrial use of natural gas, both as a fuel and a feedstock, is forecast to rise 3% per year and account for almost half of the rise in global consumption to 2024. Still, IEA projections suggest that power generation will remain the largest gas consumer throughout the forecast period, in spite of strong competition from renewables and coal.

Rush for FID on LNG export projects spurs supply

On the supply side, the strong growth in LNG export capacity will enable international trade to play a growing role in the development

of natural gas markets.

"Investment in LNG projects have rebounded in 2018 after several years of decline, and the large number of projects due to take final investment decision in 2019 is likely to further support trade and market expansion," IEA analysts said. But they warned that "more investment will be needed in the future" to keep pace with global demand growth.

Prices on global gas market have converged in recent years due to an increasing globalisation of the natural gas trade. But establishing market-driven pricing mechanisms in fast-growing economies "remains a challenge," analysts caution. ■

China set to import twice as much LNG as India

The International Energy Agency says the massive expansion of natural gas production is having wide-ranging effects on the global liquefied natural gas balance by underpinning major investments in new liquefaction capacity despite low gas prices in both Europe and Asia.

"China, India and other developing Asian markets account for most of the increase in global gas trade. By 2040, Asia consumes one-quarter of the world's gas production, much of it sourced from other regions," said the IEA. In its World Energy Outlook, the Paris-based research body said China will be importing almost twice as much LNG as the next largest importing country, India, and the share of gas in China's energy mix rises from 7 per-

cent today to 13 percent by 2040.

Demand growth for both LNG and pipeline gas consumption will continue in China where it increased by 33 percent in the past two years. On the supply side, the United States will add nearly 200

billion cubic metres to global natural gas production by 2025, over half of which is destined for export.

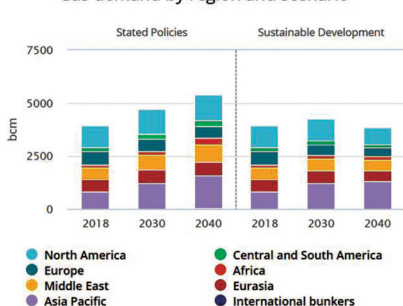
Demand for gas to grow four times faster than oil

Over the next two decades, global

demand for natural gas grows more than four-times faster than demand for oil. "Natural gas sees broad-based growth across the energy economy, in contrast to oil where growth is concentrated in parts of the transport sector (trucks, shipping and aviation) and petrochemicals," explained the IEA report.

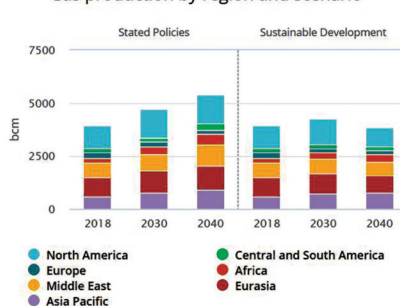
Developing Asian economies account for half of the global growth in natural gas demand and almost all of the increase in traded volumes. China overtook Japan as the largest gas-importing country in 2018 and its imports are projected to reach the level of the entire European Union by 2040. ■

Gas demand by region and scenario



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Gas production by region and scenario



IEA. All rights reserved.

Investors wary as Argentina's new President may alter energy policy

Efforts to develop Vaca Muerta, Argentina's vast shale reserves in northern Patagonia, have slowed as national energy companies await direction from the incoming President. Alberto Fernández, who took office on December 10, has yet to decide whether to keep focused on pushing up domestic oil and gas production and LNG exports.

The alternative would be to use more of the cheap, domestically produced shale oil and gas for Argentina's petrochemical and energy-intensive industries, as well as for power generation.

President Fernández has just named Guillermo Nielsen as president of YPF and Sergio Lanziani as Minister of Energy but has not clarified his policies when it comes to royalties for upstream companies, or fuel subsidies. Hence, international investors have hence adopted a "wait-and-see" attitude.

Some investors turn their back on Argentina

Foreign partners of YPF, Argentina's state oil company, have for some time been blaming inadequate infrastructure for the slow pace of development in Vaca Muerta. Limited pipelines, railroads and roads have constrained development, as producers strug-

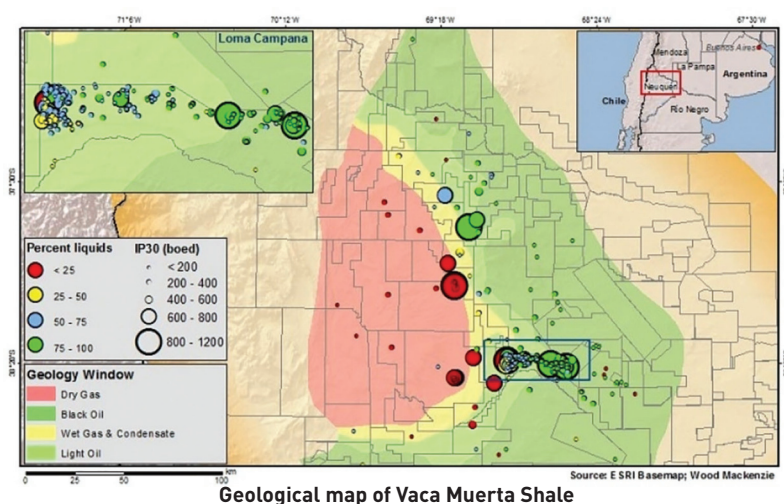
gle with an oversupply of natural gas.

Changes in subsidy levels, pipeline bottlenecks and a general oversupply on global gas markets have prompted many upstream companies to rethink their strategy. Schlumberger, the world's largest oil services and equipment manufacturer, is trying to sell its investments in Argentina.

Shell and ExxonMobil executives openly spoke of the need for stable government policies, greater spending on infrastructure, and other incentives at an industry conference in Buenos Aires in late November.

President advised not to follow U.S. path

Kathy Hipple, financial analyst at the Institute of Energy Economics



and Financial Analysis (IEEFA) recommend that Fernández move away from the former President Macri's 2018 Energy Plan that sought to double production and create an export market beyond Argentina's regional partners.

In her view, Argentina would do well to avoid the path followed by the U.S. fracking industry that has

led to a gas glut, falling prices, and rising bankruptcies among exploration and production (E&P) companies. "To continue with the previous government's policy would be a recipe for disaster," agreed IEEFA analysts Tom Sanzillo. "Hopefully, Fernández will move the economy forward and learn from past mistakes." ■

FERC's landmark permits put the United States on path to become world's No.1 LNG exporter

US LNG exports received a regulatory boost when Cheniere Energy Corpus Christi expansion

was approved in mid-November along with three other development projects in Texas proposed

by NextDecade Corp., Texas LNG Brownsville and Annova LNG. With other projects under construction, the United States is on track to become the world's No. 1 exporter by 2025 and beyond with output of over 120

million tonnes per annum (mtpa).

The Federal Energy Regulatory Commission (FERC) latest approval comes for what Cheniere calls the 'Stage-III Project', comprising seven mid-scale liquefaction Trains adjacent to the Corpus Christi plant, each with an expected nominal production capacity of around 1.4 mtpa of LNG. The total expected nominal production capacity of the seven mid-scale Trains is around 10 mtpa.

Once Corpus Christi Stage 3 is completed, it will take total overall output for Cheniere to 52

mtpa. Sabine Pass currently has five processing Trains on stream with nameplate capacity of 22.5 mtpa and contractors have substantially completed the second Train at Corpus Christi. Construction of Train 3 at Corpus Christi continues, as well as Train 6 at Sabine Pass.

Factoring in the output from six Trains at Sabine Pass and the Corpus Christi Trains, Cheniere's output rises to 52 mtpa -- making it the third-largest in the world behind the nations of Australia currently with 80 mtpa and Qatar with 78 mtpa, ahead of Malaysia with 24.5 mtpa. ■



Rendering of Corpus Christi Liquefaction Stage III

Golar hails Brazil's potential to use LNG to fuel trucks and power gen

Defending Golar LNG's new strategy to spin off shipping operations, chairman Olav Troim said "significant progress" has been made on downstream LNG distribution for power generation and as a transportation fuel. In Brazil, Golar just won a 605 MW gas power project in Barcarena, while a similar project in Sergipe is about to come onstream.

Golar believes its latest Brazilian power project, together with progress on downstream distribution of LNG using spare FSRU capacity, will help transform Golar Power from a single project company into a business with "significant and demonstrable growth."

In Brazil, a 50:50 joint venture with Stonepeak Infrastructure Partners, has recently won a 25-year power purchase agreement (PPA) for the construction of a 605 MW combined-cycle power plant in Barcarena. Referring to Golar's second Brazilian venture, Mr Troim said "gas has just been introduced to the Sergipe power station and hot commissioning is underway."

In a strategic shift to downstream LNG and power markets, Golar wants to facilitate bespoke solutions for smaller customers allowing for demand aggregation, the chairman said, trying to shift analysts' focus away from the company's disappointing Q3-2019 results. Operating revenues in the third quarter plunged 20% to \$98.67 million, while net losses for the first nine months of 2019 amounted to \$236.7 million compared with a profit of \$81.52 million in the pre-year period.



Golar Nanook

Putting a positive face on it, Mr. Troim said there was "increasing interest from international oil majors (IOCs) and national oil companies (NOCs) that are appreciative of our low cost and flexible FLNG solutions and impressed by our flawless operational track record."

"Naïve to think" renewables can replace hydrocarbons

In an analysts' call, the Golar chairman accepted that wind and solar power, together with greater energy efficiency, will have a role to play in the world's future energy mix. "It will, however, be ex-

tremely naive and impossible to think that wind and solar over the next 20 to 30 years can replace the hydrocarbon industry," he stressed.

Based on the fundamentals, LNG has grown in the last 10 years with available volumes doubling since 2007, he said, explaining "the major reason for this is that gas is a lot cheaper than oil to produce."

"We know that gas prices in the US currently are \$2.5 or equivalent to around \$15 oil. I was in Russia together with Russian producers last week and they claim that the upstream gas which goes out into the Yamal project, cost

less than \$1 per MMBtu or in effect \$6 for a barrel of oil," he said.

Aspiring to run all Brazilian trucks on LNG

Looking ahead, Mr Troim said the Golar story was about lowering the cost of produced energy with material environmental benefits.

"The diesel price in Brazil which had a diesel crisis a year ago, have over the last three or four years been equivalent to \$26 per MMBtu. Future LNG prices are today around \$6 per MMBtu. This creates a spread between what the commodity trades at and their retail sales of around \$18 per MMBtu," said Troim.

"If you price delivered LNG at a discounted diesel, for example, \$4 per MMBtu that gives every truck driver in Brazil a benefit of \$10,000 a day in fuel cost. He will save 170 tons of CO2 emission, which has the effect of the equivalent of planting 27 hectares of trees, he added, concluding: "So if you add all this together, and think that Brazil have 2.7 million trucks, you have actually had \$27 billion in savings to be done by converting the whole truck fleet to LNG." ■

Chart builds Europe's largest public LNG vehicle fuelling station

Chart Industries has installed and commissioned Europe's largest LNG fuelling station near the northern German city of Bakum. Using cleaner-burning LNG as a transport fuel will help reduce sector emissions before Germany's new national emission trading system (ETS) for transport comes into effect in 2021.

After months of political bickering, the German coalition Government on October 23 adopted the first draft law for enacting a new national (ETS) for emissions from the transport and heating sectors. Europe's current ETS only covers power sector emissions but is meant to be extended to the transport sector in due course.

As per Germany's new 2030 climate protection programme, Berlin will issue emissions rights for €10

per tonne in 2021, with prices rising annually to €35 until 2025. In addition, a cap will be placed on emissions from 2026 onwards that will be lowered every year.

SoF technology

The LNG-fuelling station at Bakum, in the Vechta district of Lower Saxony, is based on Chart's proprietary Saturation on the Fly (SoF) technology. It recognizes both spark-ignited and compres-

sion engines, allowing the station to fuel all LNG trucks regardless of original equipment manufacturer or brand. Alvernoil will operate the station following final approval by local authorities. Going forward, Alvernoil is planning further LNG filling stations in their intended German network, including in the

cities of Fulda, Cologne, Hamburg, Bremen and Remscheid. ■



LNG vehicle fuelling station in Bakum, Germany.

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FLNG technology helps expand Asia's gas-to-power infrastructure

Fast adoption of floating LNG technology across Asia is opening up new gas markets in Indonesia, Malaysia, Singapore and the Philippines. According to Black & Veatch, gas-fired power projects are “attractive for emerging markets” due to advantages in price, reliability and fuel access over developing technologies such as battery storage.

Energy demand in Asia is expected to almost double by 2030. India, for instance, has a current installed capacity of approximately 365 gigawatts (GW) is expected to grow five-fold in the next 30 years to a whopping 2,300 GW. Hence, investment in new gas power projects is see surge 64% in the next five years amid escalating energy demand, according to Black & Veatch's 2019 Strategic Directions: Natural Gas Report.

“We anticipate that the spending on gas-fired projects will surpass coal investment as spending is driven by sustainability goals, financing issues and government regulations,” said Narsingh Chaudhary, Executive Vice President, Asia Power Business, Black & Veatch.

To promote energy security and access, Asian utilities are integrating their generation, transmission and distribution assets. According to Mr Chaudhary, “this approach helps them overcome the pitfalls

of aging infrastructure assets while meeting rising customer demand for energy that is renewable and reliable.”

Debt financing is also forthcoming for projects in fast-growing Asian markets - both from commercial and development banks. The ADB, for example, recently provided \$305 million for the Jawa-1 project, Indonesia's largest combined cycle gas turbine power plant (1,760 MW). The integrated LNG-to-power project is expected to supply electricity to 11 million homes from 2021.

In Thailand, Black & Veatch in consortium with Marubeni Corp recently provided EPC services to Glow Energy for the completion of a combined-cycle cogeneration plant near Rayong, Thailand. Glow Phase-5 delivers up to a nominal

382 MW of electricity when operating in full condensing mode, and 342 MW in cogeneration mode.

To identify opportunities in complexities and sustainability, the energy leaders in region are teaming up with business partners that provide quality engineering, procurement and construction solutions at varying scales.

According to Black & Veatch, global EPC firms and project fi-

nanciers can offer local utilities consistent execution and safety practices to make LNG import and power generation projects more bankable and revenue more certain. On the other hand, international project developers are relying on regional experts to mitigate business risks and overcome complexity from planning and development to construction and operations. ■



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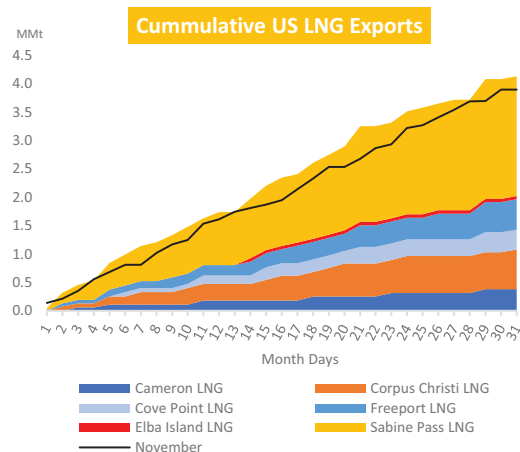


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US LNG in December

LNG Unlimited Data

- December exports at 4.13mmt on 31 December
- Total shipments up by 10% m/m
- Average US capacity utilisation at 102%



Source: LNG Unlimited Data

reductions of 0.03 and 0.02mmt, respectively. Cove Point LNG also dampened US output growth. Although Elba Island LNG - the US' latest capacity addition - shipped its first cargo in December, its final impact on overall capacity growth will be limited due to its relatively small eventual size of 2.5mmt.

Our data indicates the focus of US LNG trading currently rests once more on the Atlantic Basin. To date, around 58% of total US LNG shipped in December was en route to or had arrived in the Atlantic region, whilst 36% travelled to

US LNG exports stood at 4.13mmt as of 31 December, suggesting roughly 194bcf will be delivered with an arrival horizon of around 30 January 2020. US LNG's exporting performance thus saw monthly export growth of 0.38mmt (10%).

Following robust growth last month, utilisation of installed US liquefaction capacity continued to grow robustly by 17pp in December. Overall, the month's capacity utilisation stood at 102% compared to 86% in November.

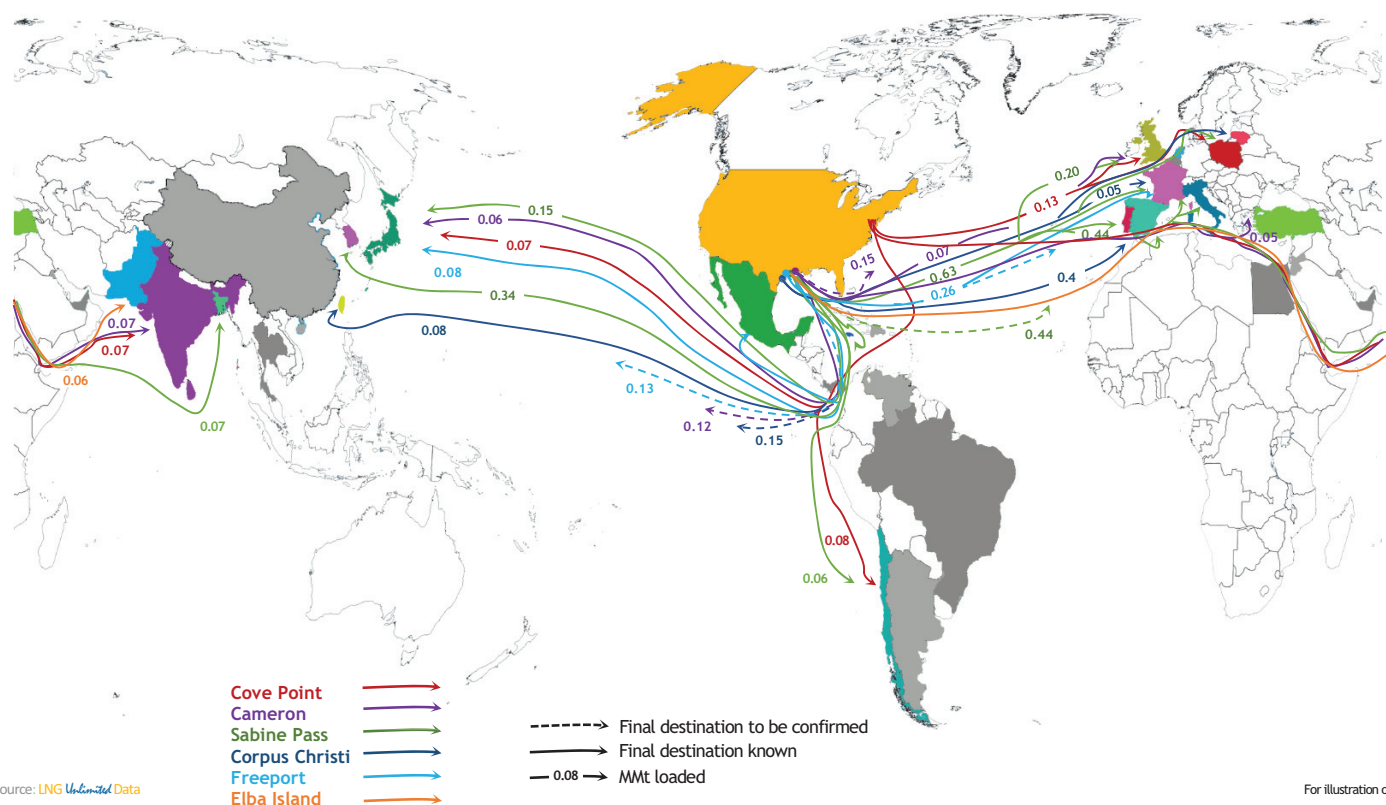
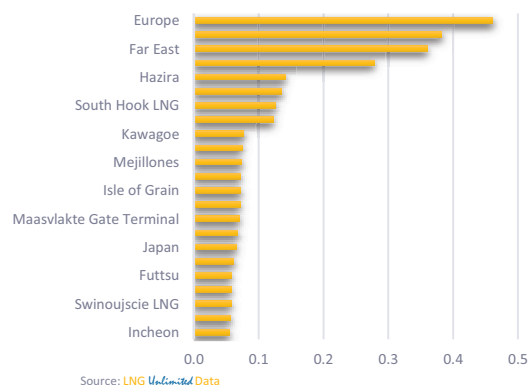
Notably, monthly growth in US LNG exports in December continued to be

based on performance by the country's smaller terminals as Sabine Pass and Corpus Christi LNG, which lead in installed capacity, are already at or close to their current productivity ceilings. As such, growth in December was led by Freeport LNG, which increased shipments by 83pp over November. Significant growth support also came from Cameron LNG, which increased LNG exports by 42pp. In contrast, Sabine Pass and Corpus Christi kept exports broadly steady, finishing the year with slight month-on-month

destinations within the Pacific Basin, led by destinations in Japan and South Korea. Notably, no cargoes are currently destined for the Middle East.

Nevertheless, both Far Eastern winter demand growth and the rise of US LNG as an important alternative to pipeline gas in Europe have allowed US LNG exports to grow by 1.78mmt year-on-year in December.

In-transit LNG w/ Closest Known Destination (mmt)



For illustration only.

US LNG Still in Transit

LNG Unlimited Data

At the time of writing, 38 (2.52mmt) of the 62 cargoes shipped in December remain in transit, with 19 (1.25mmt) still lacking confirmed destinations within the Pacific and Atlantic Basins.

Roughly 43% of in-transit US LNG exported in December is expected to arrive at destinations throughout the Atlantic Basin, most of which we

expect to arrive in Europe. At the same time, the Pacific Basin is currently expecting 57% of in-transit LNG, with 44% headed for the Far East.

We highlight that shorter journey times from the US to Europe compared to the Far East mean that cargoes earmarked for Europe and the Atlantic

in general arrive much quicker than their counterparts headed for the Pacific, resulting in a nuanced trade picture at the end of the month. Consequently, the Atlantic Basin in general constituted the prime destination for US LNG whilst Europe was trailing behind that of the Far East at the time of writing.

Previous Export Port	Vessel Name	IMO	Destination	Arrival	MMt*
Elba Island LNG	Maran Gas Lindos	9627502	Port Qasim LNG	04/01/2020	0.06
	BW Pavilion Leeara	9640645	Swinoujscie LNG	07/01/2020	0.06
Cove Point LNG	Meridian Spirit	9369904	Hazira	09/01/2020	0.07
	Energy Universe	9758844	Negishi	15/01/2020	0.07
	Energy Atlantic	9649328	Pacific Basin	10/01/2020	0.06
Cameron LNG	Gaslog Hong Kong	9748904	Hazira	05/01/2020	0.07
	Diamond Gas Orchid	9779226	Futtsu	03/01/2020	0.06
	Marvel Eagle	9759240	Europe	12/01/2020	0.07
	Bilbao Knutsen	9236432	Rovigo Adriatic LNG	03/01/2020	0.06
Freeport LNG	Sohshu Maru	9791212	Kawagoe	23/01/2020	0.08
	Golar Arctic	9253105	Pacific Basin	15/01/2020	0.06
	Golar Kelvin	9654701	Far East	23/01/2020	0.07
	Maran Gas Andros	9810379	Europe	14/01/2020	0.08
Corpus Christi LNG	La Mancha Knutsen	9721724	Yung-an	18/01/2020	0.07
	Maran Gas Posidonía	9633434	Europe	03/01/2020	0.07
	Maran Gas Troy	9658240	Europe	10/01/2020	0.07
	Marib Spirit	9336749	Far East	06/01/2020	0.07
	Megara	9770945	Atlantic Basin	16/01/2020	0.05
	British Partner	9766530	Far East	19/01/2020	0.08
	BW Tulip	9758064	Yanai	05/01/2020	0.07
	Hyundai Peacepia	9761853	Tongyeong	15/01/2020	0.08
	Kinisis	9785158	Cartagena	07/01/2020	0.06
	Oak Spirit	9681699	Far East	10/01/2020	0.07
Sabine Pass LNG	Creole Spirit	9681687	Japan	06/01/2020	0.07
	Flex Rainbow	9709037	Rovigo Adriatic LNG	07/01/2020	0.08
	GasLog Skagen	9626285	Atlantic Basin	06/01/2020	0.05
	GasLog Sydney	9626273	Atlantic Basin	11/01/2020	0.07
	GDF Suez Point Fortin	9375721	Incheon	30/01/2020	0.05
	Golar Frost	9655042	Atlantic Basin	20/01/2020	0.07
	Hispania Spirit	9230048	Europe	10/01/2020	0.06
	Hyundai Princepia	9761841	Tongyeong	04/01/2020	0.06
	Iberica Knutsen	9326603	South Hook LNG	04/01/2020	0.06
	K. Mugungwha	9373010	Tongyeong	22/01/2020	0.06
	Magdala	9770921	Europe	25/01/2020	0.05
	Marvel Falcon	9760768	Europe	03/01/2020	0.07
	SM Eagle	9761827	Tongyeong	21/01/2020	0.08
	Hoegh Galleon	9820013	Rotterdam	05/01/2020	0.07
	Flex Constellation	9825427	Far East	15/01/2020	0.07
Grand Total		38			2.52

Source: LNG Unlimited Data

*Values are based on journey time to date in accordance with draught at departure and in-transit BOR. Eventual journey times will thus affect the amounts delivered.

Monthly US LNG Exports as of 31 December

Elba Island LNG

The conversion of Elba Island LNG to become the sixth conventional US LNG export terminal on the Atlantic side has reached a milestone by shipping 0.06mmt via the *Maran Gas Lindos* on 14 December. The cargo is currently en route to Dahej in India with arrival scheduled on 4 January.

Cameron LNG

December production at Cameron LNG achieved a month-on-month increase of 0.18mmt as the terminal shipped seven cargoes (0.46mmt) compared to four (0.28mmt) in November. Market visibility, meanwhile, indicates the *Diamond Gas Sakura* is currently waiting in the Gulf but not scheduled to arrive at the terminal before 4 January. Capacity utilisation for December reached 110%, a robust 42pp growth over November.

Cove Point LNG

Cove Point LNG shipped 0.35mmt at the time of writing in December, which represents significant monthly output decrease by two cargoes (0.14mmt) and pegs capacity utilisation at 73%. At 30pp below November, the terminal thus saw capacity utilisation broadly in line with that year-on-year. Notably, the *British Listener* and the *Arctic Discoverer* are en route to load one cargo each, with our LNG Market Tracker suggesting departure within the second week of January.

Freeport LNG

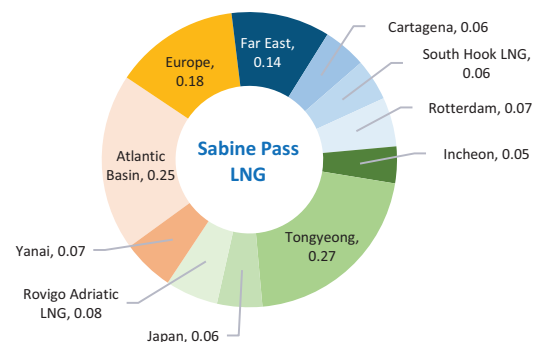
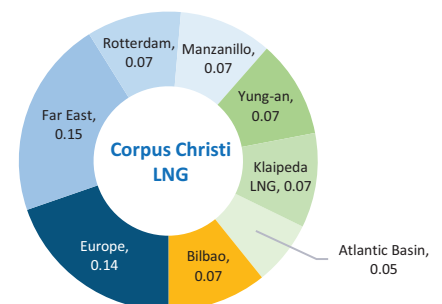
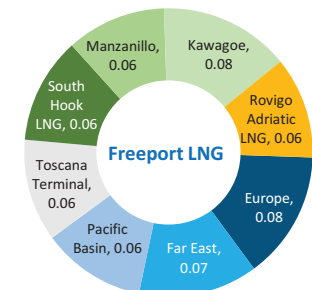
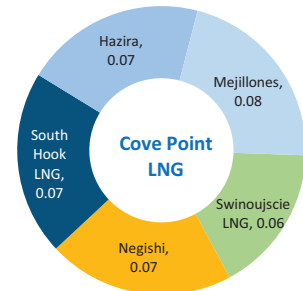
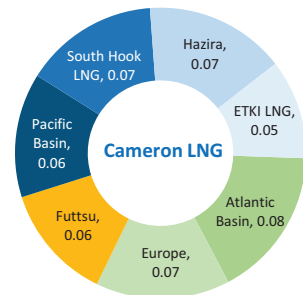
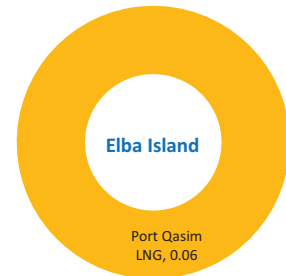
Freeport LNG has continued to grow its month-on-month exports. Accordingly, 0.53mmt of November production had left the terminal at the time of writing, pegging utilisation of currently installed capacity at 128%. Notably, at the time of writing our Market Tracker indicated the *Maran Gas Roxana* was en route to load a cargo and we expect this to take place within the first week of January. Additionally, the *Galea* and the *LNG Schneeweisschen* are also anchored in the Freeport waiting area.

Corpus Christi LNG

Following a 0.10mmt fall in exports in November, the terminal managed to keep shipments broadly steady at 0.70mmt in December, implying capacity utilisation of 93%. At the time of writing, the *Maran Gas Mystras* was in the process of loading another cargo, though this would not add to the Corpus Christi's December performance. Additionally, our LNG Market Tracker indicates the *LNG Jurojin* will load the terminal's next cargo around 7 January.

Sabine Pass LNG

Sabine Pass LNG's exports stood at 2.18mmt on 31 December, thus representing marginally lower monthly output by 0.03mmt compared to the 2.21mmt seen in November. Nevertheless, capacity utilisation remains robustly above nameplate (116%). At the time of writing, the *Gaslog Genoa* was expected at the plant with an expected departure by the early hours of 4 January, whilst the *Maran Gas Sparta*, the *Seri Balhaf* and the *Hoegh Giant* were lined up to take on cargoes in early January.



US LNG Exports Year-on-Year (MMt)

To Country	2018					2019								Grand Total
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
South Korea	0.60	0.36	0.34	0.35	0.18	0.30	0.38	0.64	0.40	0.14	0.91	0.50	0.34	5.43
Japan	0.27	0.35	0.19	0.15	0.34	0.14	0.29	0.41	0.35	0.52	0.42	0.36	0.35	4.15
Spain	-	0.07	0.14	0.20	0.22	0.32	0.28	0.08	0.34	0.71	0.25	0.40	0.26	3.27
Mexico	0.22	0.30	0.14	0.15	0.22	0.43	0.34	0.49	0.25	0.20	0.14	0.06	0.13	3.06
United Kingdom	0.30	0.20	0.08	0.08	-	-	-	-	0.01	0.07	0.46	0.85	0.41	2.44
France	0.15	-	0.07	0.43	0.32	0.15	-	-	0.07	0.12	0.28	0.47	0.12	2.17
India	0.14	0.14	0.14	0.16	0.14	0.29	0.07	0.07	0.15	0.28	0.17	0.13	0.20	2.07
Chile	0.07	-	0.05	0.20	0.23	0.14	0.37	0.18	0.12	0.19	0.14	0.08	0.14	1.90
Netherlands	-	-	0.06	0.21	0.28	0.21	0.06	0.07	-	0.07	0.13	0.21	0.21	1.52
Italy	0.13	0.21	0.07	0.14	-	0.14	0.07	0.19	0.11	0.07	-	0.13	0.26	1.51
Brazil	-	-	0.12	0.06	0.08	0.10	0.23	0.12	0.22	0.15	0.06	0.07	-	1.23
Portugal	0.07	0.22	0.07	-	0.07	-	0.14	0.13	0.14	0.05	0.08	-	0.08	1.04
Argentina	-	-	-	-	0.09	0.23	0.22	0.32	-	-	-	-	-	0.86
Turkey	0.19	0.20	0.12	-	0.07	-	-	-	-	-	0.07	0.15	0.05	0.85
Poland	-	0.19	-	0.07	0.07	-	-	0.07	0.07	-	0.07	0.07	0.13	0.75
Atlantic Basin	-	-	-	-	-	-	-	-	-	-	-	-	0.70	0.70
Jordan	-	-	0.07	-	0.08	0.13	0.14	0.08	0.07	0.07	-	-	-	0.64
Taiwan	0.07	-	-	-	0.13	0.07	-	-	0.15	-	0.07	0.07	0.07	0.63
Singapore	0.07	-	0.15	0.13	0.03	0.06	0.06	0.07	-	-	0.05	-	-	0.63
Pakistan	-	-	0.08	0.08	-	-	-	0.08	-	0.12	0.08	0.07	-	0.50
Pacific Basin	-	-	-	-	-	-	-	-	-	-	-	-	0.49	0.49
UAE	-	-	-	-	0.15	-	0.07	0.07	0.06	0.07	-	-	-	0.42
D. Republic	-	-	0.06	-	-	-	0.06	-	-	0.09	0.06	0.07	-	0.34
Greece	0.08	-	0.07	-	-	0.07	-	-	-	-	-	-	-	0.22
China	0.07	0.06	0.07	-	-	-	-	-	-	-	-	0.06	-	0.27
Panama	0.06	-	0.07	0.06	-	-	0.07	-	-	-	-	0.01	-	0.26
Jamaica	-	-	-	0.04	-	0.04	-	0.01	0.12	-	-	-	0.05	0.26
Belgium	-	-	-	0.07	-	-	-	-	-	0.07	-	0.06	-	0.21
Kuwait	-	-	-	-	-	0.06	-	0.07	0.07	-	-	-	-	0.20
Colombia	-	0.06	-	0.06	-	-	-	-	0.06	-	-	-	-	0.18
Thailand	-	-	-	-	-	0.06	-	-	-	0.05	-	-	-	0.12
Malaysia	-	-	-	-	-	-	-	-	-	-	-	0.07	-	0.07
Lithuania	-	-	-	-	-	-	-	-	-	-	-	-	0.07	0.07
Bangladesh	-	-	-	-	-	-	-	-	-	-	-	-	0.07	0.07
Puerto Rico	-	-	-	-	-	-	-	-	-	0.01	-	-	-	0.01
Grand Total	2.50	2.36	2.15	2.64	2.72	2.92	2.88	3.12	2.75	3.05	3.44	3.89	4.13	38.54

Source: LNG Unlimited Data

KKR buys majority stake in Canada's Coastal GasLink Pipeline

US equity fund Kohlberg Kravis Roberts (KKR), alongside Alberta Investment, has sealed a deal to purchase a 65 percent equity interest in the Coastal GasLink Pipeline. Spanning over 416 miles, the gas interconnector links the Montney Shale with the Pacific Coast and has been built by TC Energy Corp at a cost of C\$6.6 billion (US\$5.04bn).

Once completed, the pipeline will have an initial capacity of 2.1 billion cubic feet per day (bcf/d) and connect abundant gas supply from the Western Canadian Sedimentary Basin at Dawson Creek, BC, with the LNG Canada liquefaction and export facility.

"By displacing coal and diesel-fueled generation with cleaner burning natural gas, LNG Canada expects to reduce global greenhouse gas emissions by up to 60-90 million tonnes per year, equivalent to 20-40 coal plants being shut down," KKR said in a statement.

All necessary regulatory per-

mits have been received for the pipeline project and construction activities have commenced. Project finance for the Coastal GasLink is backed by 25-year Transportation Service Agreements with the five LNG Canada owners, Shell, Petronas, PetroChina, Mitsubishi and Korea Gas.

Brandon Freiman, head of North American Infrastructure at KKR welcomed the partnership with TC energy on the critical coastal GasLink project, which represents the fund's third investment in Canadian gas infrastructure. "We believe the export of Canadian natural gas to

global markets will deliver significant benefits for the Canadian economy and local communities in Western Canada, and enable meaningful progress toward reducing global emissions," Freiman said.

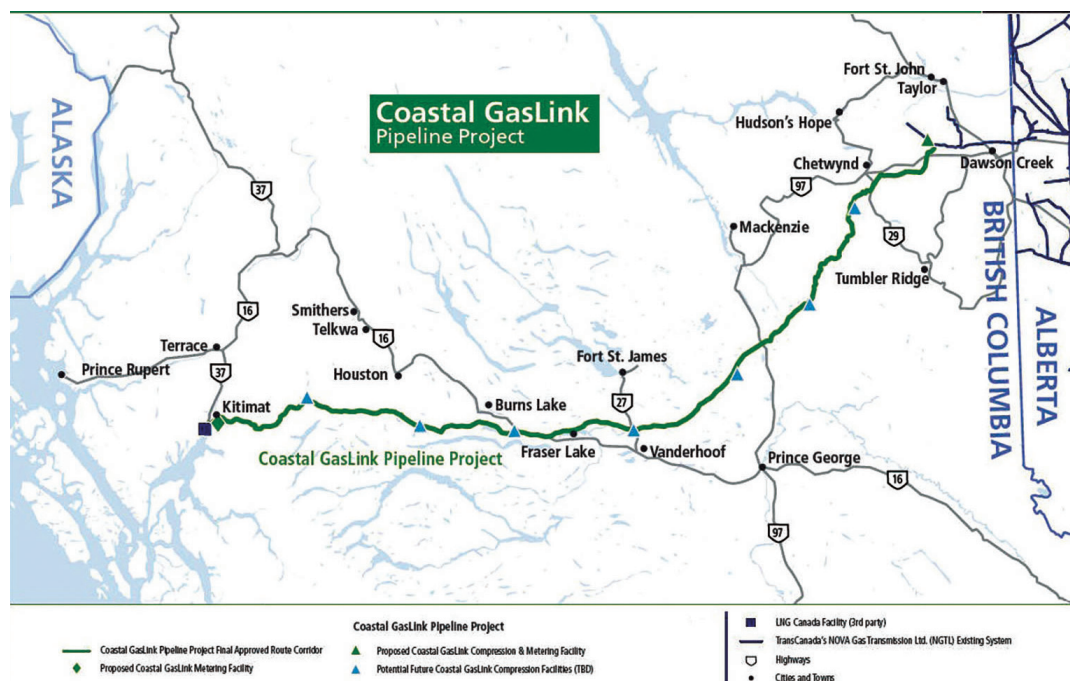
KKR pointed out it was making the investment primarily through a separately managed infrastructure account in partnership with the National Pension Service of Korea (NPS). To help realize the deal, HSBC Securities and TD Securities were serving as financial advisors to KKR, and Osler, Hoskin & Harcourt were acting as KKR's legal counsel.

McDermott and Chiyoda produce first LNG at Cameron Train-2

US engineering company McDermott and Japanese firm Chiyoda in late December announced the Cameron liquefaction plant on the Calcasieu Ship Channel had begun producing LNG. McDermott stressed this step is "a precursor to substantial completion of Train 2."

"This accomplishment is attributable to the entire team's unwavering commitment to project delivery and steadfast focus on safety and quality performance as we work towards completion of Train 2," said Mark Coscio, McDermott's Senior Vice President for North, Central and South America.

McDermott and Chiyoda have provided the engineering, procurement and construction for the Cameron LNG project since the project's initial award in 2014. The project includes three liquefaction Trains with a projected export of 12 million tonnes per annum (mtpa) of LNG, or about 1.7 billion cubic feet per day (bcf/d). Cameron LNG is jointly owned by affiliates of Sempra Energy, Total, Mitsui & Co. and Japan LNG Investment, a company jointly held by Mitsubishi and shipping line Nippon Yusen Kabushiki Kaisha.



Freeport LNG ships its first cargo from Quintana Island Train-2

Freeport LNG in mid-December shipped its first cargo from the second liquefaction Train at the export facility on Quintana Island in Texas. The cargo was apparently lifted by the 138,000 cubic metres capacity carrier "Bilbao Knutsen". Departure of the first cargo was confirmed by Freeport's engineering contractors McDermott International, Zachry Group of the US and Chiyoda Corp. of Japan.

Mark Coscio, McDermott's Senior Vice President for North, Central and South America, said the ongoing momentum of the Texas project had accelerated. "We are well on our way toward commercial operation for Train 2 and I commend the project team for de-

living these results and getting us closer to substantial completion," added Coscio.

Zachry Group, as the joint venture lead, partnered with McDermott for the Pre-FEED in 2011, followed by FEED works to support the early development stage of

the project and Trains 1 and 2. Later Chiyoda joined the joint venture partnership for work related to Train 3.

The project scope includes three pre-treatment Trains, a liquefaction facility with three Trains and 15 mtpa of output, a

second loading berth and a 165,000 cubic metres capacity full containment LNG storage tank. McDermott said Freeport Trains 2 and 3 remained on schedule with initial production of LNG at Train 3 scheduled for the first quarter of 2020.

"Inopportune times" for investing in Appalachia pipeline projects

American oil and gas producers are shying away from building major pipelines in the Appalachian Shale as production has slowed down in the current low-price environment. "No exit pipelines will come into service in 2020," Energy Aspects says, pointing at scheduling delays and massive cost overruns at the Atlantic Coast Pipeline and Mountain Valley Pipeline.

Looking at third quarter earning calls this week, several E&P companies active in the U.S. Northeast disclosed they are lowering investment in the current difficult gas price environment. In Q3-19 releases, Range Resources committed to reduce 2019 spending by \$20 million, down 3% from earlier estimates, and Cabot Oil & Gas confirmed it would slash 2020

Capex by \$100 million, down 12% year-on-year.

Anticipating persistently low prices for Appalachia gas, with Northeast production unlikely to outstrip takeaway capacity until 2021 at the earliest, Energy Aspects says "now would seem like an inopportune time to be investing." The consultancy does not believe any basin exit pipelines in

the region will enter operations in the coming year.

Spiraling costs and legal disputes

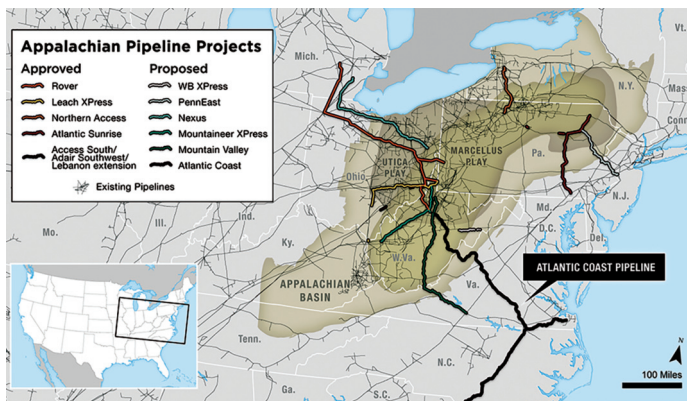
Cost overruns for the Atlantic Coast Pipeline (APC), developed by Dominion and Duke Energy, have propelled up total project costs to over \$6.7 billion - more than 30% over the original estimate of \$5.1 billion. In a court filing, Dominion said it had already been spending \$20 million per week on the project since that August, totalling more than \$300 million, or 4% of the total project cost. In addition, developers had to budget over \$109 million for lobbying and legal fees amid disputes as to whether the pipeline's current permit to cross the Appalachian Trail, granted by the US Forest Service, is valid.

Similarly, the Constitution

Pipeline project is also beset with spiraling costs. The 124-mile project in Pennsylvania and New York was originally slated to cost \$683 million before years of delays ballooned the projected outlay to \$875 million, up over 25% on initial cost considerations. After having spent \$25 million in 2017 and 2018, developers saw the project halted by the New York State Department of Environmental Conservation (NYSDEC) decision to deny water quality certification.

Cabot has started an appeals process, but analysts say "the longer the legal battle drags on, the more costs will be sunk into a project with no realistic time-frame for start-up."

"Given the stress on budgets that E&Ps are currently facing," analysts expect "the increasing capital requirements on these high-priced projects may give them additional pause."



Appalachian pipeline projects

U.S. South Central region adds 17 Bcf/d of gas takeaway capacity

A flurry of pipeline projects has been proposed throughout the United States. The U.S. government counts 134 active projects but only 46 entered service this year, adding 16-17 billion cubic feet per day (Bcf/d) of gas transport capacity. More than 40% of this – or 7.2 Bcf/d – is situated in the South Central region.

Most of the new capacity is designed to provide additional takeaway capacity out of the Permian Basin in western Texas, or help additional Permian gas production reach the interstate pipeline system. These projects include:

- Kinder Morgan's 2.0 Bcf/d Gulf Coast Express Pipeline, set to span from the Waha Hub in the Permian Basin near the Texas-New Mexico border to demand markets on the Gulf Coast at the Agua Dulce Hub.
- ONEOK's Roadrunner Eastbound Expansion, which added about 1.0 Bcf/d of bidirectional ca-

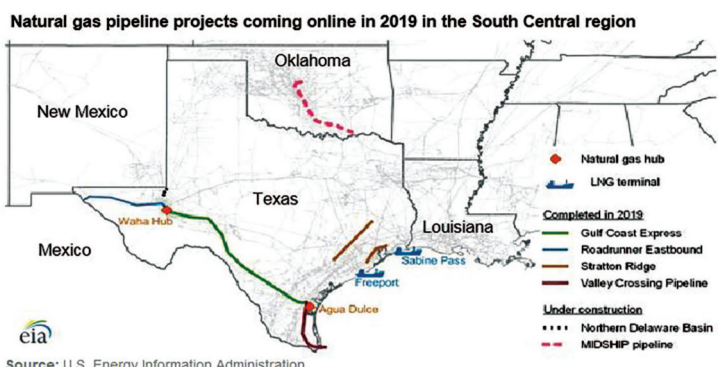
capacity on the pipeline, and the 300 MMcf/d WestTex Expansion, which added northbound takeaway capacity out of the Permian.

- El Paso Natural Gas Pipeline's 320 MMcf/d Northern Delaware Basin Expansion Project, still under construction. It will boost westbound flows in Texas into the El Paso system.

The remainder of the natural gas pipeline projects slated for completion in the South Central region in 2019 will deliver natural gas to demand centers, in particular to LNG export facilities on the Gulf

Coast. Cheniere's 1.4 Bcf/d MIDSHIP Pipeline is still under construction. When completed, it will connect natural gas supply from

Oklahoma to the Sabine Pass LNG facility in Louisiana, providing additional sources of secure supply to the export terminal.



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