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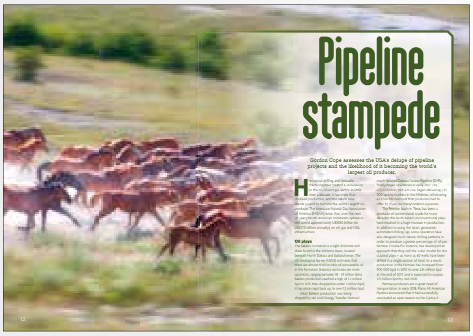

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ON THIS MONTH'S COVER

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WORLD PIPELINES

Comment

THE PRESSURE'S ON SHALE

In the third week of May, US President Donald Trump announced that he was withdrawing the USA from a 2015 international agreement to curb Iran's nuclear programme, and was reinstating sanctions against Iran. By pulling out of the Joint Comprehensive Plan of Action, which was negotiated and implemented under Barack Obama's presidency, Trump dips out of the agreement by which Iran submits itself to international inspections in return for a waiver on nuclear sanctions.

The reinstatement of US sanctions against Iran looks likely to push oil prices further up, as uncertainty lingers over global oil supply. The IEA recently warned of a "double supply shortfall" and subsequent price hike, as oil from Iran and Venezuela (where oil production has bottomed out following an economic crisis) is withdrawn from the market.

In addition to these losses, OPEC has been curtailing production for more than a year as Saudi Arabia's state-run oil company, Saudi Aramco, prepares to sell its shares on the open market as part of an upcoming IPO.

In the wake of the Iran news, oil prices were holding at over US$71/bbl (WTI) and US$77/bbl (Brent). Prices have risen by nearly 75% since June 2017.

Replacing the crude exported from Iran (2.5 million bpd) will be a long-term endeavour and OPEC is confident that the world won't experience any impact on supply for at least 180 days after the sanctions are due to take effect (November 2018).

November will see midterm elections in the US. Midterms are often regarded as a referendum on the President's, and his party's, performance and they typically see the incumbent's party lose seats in Congress (only two past Presidents have avoided this and gained seats for their party in both the House and the Senate in midterm elections: answer at the foot of the page).

US voters (or at least the ones that drive) are being pinched at the pump lately as the price of oil creeps up. In May, US gasoline prices were at their highest level since Hurricane Harvey caused a brief spike in August 2017. Will retail prices spill over the US$3/gal. price point that so many US consumers hold sacred? Will this negatively impact President Trump's midterm results?

The IEA expects that higher oil production from the US will need to compensate for lower volumes from elsewhere in the world. US oil production has indeed been increasing, combined with a recent decline in oil and gas inventories.

Thanks to the shale industry, which since 2010 has been a shot in the arm to America's domestic production, the US has overtaken Saudi Arabia as an oil producer and domestic gas production levels break records every year.

The Permian shale basin has dominated a recent rebounding of the shale oil sector (following a slump in 2015 - 2016 due to oversupply). But the Permian sector is experiencing problems in getting oil to market. Pipelines are full, there are no easy routes to refineries or terminals and trucks and trains are pretty full too, mostly with sand shipments for application in hydraulic fracturing. Three new pipelines that will help the situation won't be online until 2019: Cactus II (Plains All American), Gray Oak (Phillips 66 and Enbridge) and EPIC are all due in service next year and will help ease the bottleneck. Nevertheless, some analysts predict that Permian supply will exceed pipeline capacity by 750 000 bpd by September 2019.[1] US refineries are also mostly set up to process heavier crude, so the light oil produced in abundance in the shale regions may have to be traded at a discount overseas, where the market for light crude isn't especially promising.

> "HIGHER OIL PRODUCTION FROM THE US WILL NEED TO COMPENSATE FOR LOWER VOLUMES FROM ELSEWHERE IN THE WORLD"

President Trump's move to isolate Iran by cutting off its access to international oil markets will likely contribute to a rise in global oil prices and encourage more domestic oil drilling, which will boost oil – and with it, gas – output from the shale plays. Surely the existing US gas supply glut and oil transportation bottlenecks will be felt even more keenly as a result.

President Donald Trump has, in recent months, accused OPEC of 'artificially' boosting prices, but this time he would have to admit his own hand in creating a problem.

1. https://plgconsulting.com/News/whitepaper-a-problem-in-the-permian/

Answer: Franklin D. Roosevelt (1934) and George W. Bush (2002).

World News

API concerned over US steel tariffs and quotas

In mid May, the American Petroleum Institute (API) joined other trade associations in sending comments to the Department of Commerce on Section 232's Interim Final Rule (IFR), to raise concerns over the ability of natural gas and oil companies to receive relief from steel tariffs and quotas.

"US natural gas and oil companies should be granted relief from the tariffs and quotas on imported steel that will harm US businesses, our economy and American consumers," said Kyle Isakower, Vice President, Regulatory & Economic Policy. "Tariffs will raise the cost of imported steel by 25%, while quotas will stop US businesses from receiving steel for US energy projects around the country – harming the president's agenda of continuing our energy renaissance, strengthening our infrastructure and creating US jobs.

"Any disruption of our complex global supply chains of specialty quality steel – in the quantities we need for US energy projects – could negatively impact building energy infrastructure that benefits consumers, the US military and manufacturers," said Isakower.

API's comment letter urged the administration to revise the IFR in order to improve the process whereby companies will be granted relief from tariffs and quotas, as not to sever the supply chains of the oil and natural gas industry, which would ultimately impact US businesses, investments and consumers.

The letter requests a number of important and necessary revisions, including:

- The Final Rule should make clear that exclusions granted apply both retrospectively and prospectively, as not to have costly consequences or create confusion among US businesses.
- The Department of Commerce should grant relief for purchases made before tariffs were announced.
- The Department of Commerce should define and release metrics that will be used to determine whether US steel manufacturers have the capacity to meet demand, in order to provide greater clarity on how Commerce will make its determination regarding production in the US to supply companies in a sufficient and reasonably available amount.
- The Department of Commerce should grant categorical exclusions for products it determines are not available in the US.
- The Department of Commerce should defer to companies' own quality standards and define and release metrics that will be used to determine whether US steel manufacturers have the capacity to meet demand, in order to provide greater clarity on how Commerce will make its determination regarding satisfactory quality steel being produced in the US.

Enbridge sells its US midstream businesses

Enbridge Inc. has announced that its indirect subsidiary, Enbridge (US) Inc. has entered into a definitive agreement to sell Midcoast Operating, LP and its subsidiaries (Midcoast), which conducts the company's US natural gas and natural gas liquids (NGL) gathering, processing, transportation and marketing businesses, serving established basins in Texas, Oklahoma and Louisiana, to AL Midcoast Holdings, LLC (an affiliate of ArcLight Capital Partners, LLC) for a cash purchase price of US$1.120 billion, subject to customary closing adjustments.

The transaction is expected to close in 3Q18, subject to receipt of customary regulatory approvals and satisfaction of other customary closing conditions.

"The sale of Midcoast is an important step in our shift towards a pure regulated pipeline and utility model, and positions us well to achieve our goal of selling CAN$3 billion in non-core assets in 2018," said Al Monaco, President and Chief Executive Officer of Enbridge. "This transaction includes our 100% owned gathering and processing assets in Texas and Oklahoma. Proceeds from the sale will be used to accelerate the strengthening of our balance sheet and enhance the financial flexibility to fund our industry leading CAN$22 billion secured growth programme."

The Midcoast businesses include (i) natural gas gathering, treating, processing and transportation, and NGL transportation, assets located in the East Texas, Western Anadarko, and Barnett shale plays and consist of approximately 11 200 miles of natural gas gathering and transportation pipelines, 2075 million ft^3/d of natural gas processing capacity, and 1330 million ft^3/d of treating capacity; (ii) a NGL logistics and marketing business (including ELTM, LP and Enbridge Marketing (US) LP); and (iii) a 35% interest in Texas Express Pipeline, consisting of a 594 mile, 20 in. NGL pipeline, and a 35% interest in Texas Express Gathering, consisting of 115 miles of NGL pipelines and other NGL infrastructure comprising the company's Texas Express NGL pipeline system.

"I'd like to thank our colleagues at Midcoast who have done an exceptional job running the business safely and reliably day-in and day-out. This sale places great people and great assets in a strong position for future growth," added Mr. Monaco.

AL Midcoast intends to maintain Midcoast's workforce and anticipates that they will join AL Midcoast upon transaction close. Enbridge will work with AL Midcoast to ensure a safe transition of Midcoast's operations.

Citi acted as financial advisor and Norton Rose Fulbright US LLP acted as legal advisor to Enbridge on the transaction.

World News

IN BRIEF

NORWAY

Statoil ASA has changed its name to Equinor ASA following a successful vote at the annual general meeting.

CANADA

Enbridge announced a simplification of its corporate structure.

EQUATORIAL GUINEA

Noble Energy, Inc. announced that it has executed a Heads of Agreement establishing the framework for development of natural gas from the Alen field located offshore Equatorial Guinea.

USA

A Louisiana judge found that the state Department of Natural Resources (DNR) violated state environmental guidelines when it approved a permit for a portion of the controversial Bayou Bridge Pipeline crossing coastal wetlands.

ALASKA

University of Alaska Fairbanks will partner with Alyeska Pipeline Service Company to test the use of UAS out of the pilot's line of sight in the Trans Alaska Pipeline System (TAPS) corridor.

GLOBAL

Global capital raising activity in the midstream sector totalled US$55.9 billion in 1Q18. This was a significant increase of 52% from the US$36.8 billion in capital raising deals announced in 4Q17, according to GlobalData.

AFRICA

EnerMech has appointed Salvatore Cutino as Regional Director for Africa as it looks to double revenues in the region to more than £50 million over the next three years.

CANADA

An Alberta pipeline was disrupted by fire when a blaze cut power to the Polaris Pipeline system in the oilsands, causing heavy crude prices to surge.

Transneft reduces oil transit through Ukraine amid crude oil quality complaints

Oil transit through the territory of Ukraine via the Druzhba pipeline went down during the first four months of this year in the wake of consumers' complaints about the quality of crude oil, an official Transneft spokesperson told press.

"Reduction at Druzhba's northern line reached 1.4%; at the southern line the volume of oil transported to Hungary fell by 18%, while the volume of oil pumped to Slovakia decreased by 8%," he said. The company specified that during the four months, exports to Hungary contracted by 280 000 t and exports to Slovakia shrunk by 130 000 t.

The company reported that Hungarian consumers explained the reduction of consumption as due to the quality of Russian crude oil: whereas its sulfur content presently stands at 1.75%, they would prefer a maximum of 1.5%. Russian crude oil's sulfur content is within the normal values, but this quality does not suit them.

Prior to this announcement, Ukrtransnafta said that oil transit through Ukraine had sunk by 9.3% to 4.023 million t during the four months.

According to Anatoly Golomolzin, Deputy Head of the Federal Antimonopoly Service (FAS) of Russia, consultations held with Transneft and the Ministry of Energy of the Russian Federation on the issue of the sulfur content in the crude oil exported via the Druzhba oil pipeline give hope that the quality of the crude oil supplied via this pipeline will not change. Prior to that, press who attended the said FAS meeting had suggested that the sulfur content in the crude oil transported via the Druzhba oil pipeline may reach 1.8% in 2018. Currently, the standard maximum sulfur content in the pipeline for the Urals brand stands at 1.6%.

Transneft earlier proposed to the Ministry of Energy of Russia to form a new export oil grade under the working title of Urals Heavy.

Williams announces agreement to acquire all public equity of Williams Partners LP

Williams and Williams Partners LP announced in May an agreement under which Williams will acquire all of the outstanding public common units of Williams Partners in an all stock-for-unit transaction at a 1.494 ratio of Williams common shares per unit of Williams Partners. The transaction is valued at US$10.5 billion; representing a premium to the public unitholders of 6.4% based on closing prices on 16 May 2018, or a premium of 13.6 % to the unaffected closing prices on 15 March 2018, the day prior to Williams' announcement.

In a Williams and Williams Partners joint news release, Williams and Williams Partners indicated the potential for a corporate restructuring in response to the Federal Energy Regulatory Commission's (FERC) 15 March 2018 issuance of a revised policy statement that reversed the FERC's 2005 income tax policy that permitted master limited partnership (MLP) interstate oil and natural gas pipelines to maintain an income tax allowance in cost-of-service rates. Since that time, Williams and Williams Partners considered a number of alternatives relating to the FERC ruling and determined that the transaction described herein is in the best interests of Williams' shareholders and Williams Partners' public unitholders.

Alan Armstrong, Williams' President and Chief Executive Officer, made the following statements regarding the transaction:

"This strategic transaction will provide immediate benefits to Williams and Williams Partners investors. [The] announcement will maintain the income tax allowance that is included in our regulated pipeline's cost-of-service rates. This transaction also simplifies our corporate structure, streamlines governance and maintains investment-grade credit ratings. The transaction will allow Williams to directly invest the excess coverage in our expanding portfolio of large-scale, fully-contracted infrastructure projects that will drive significant EBITDA growth without the need to issue equity for the broad base of projects currently included in our guidance.

"We continue to see an expanding portfolio of projects to connect the best supplies of natural gas and natural gas products to the best markets. As a fast-growing, investment grade C-Corp with the best natural gas infrastructure assets in the sector, we are confident this combined entity will provide a compelling investment opportunity to a broader range of investors."

World News

Events DIARY

16 - 17 July 2018
Energy Pipeline Management Summit
Irving, USA
https://events.marcusevans-events.com/energy-pipeline-201812/

27 - 30 August 2018
ONS
Stavanger, Norway
http://www.ons.no/

10 - 14 September 2018
IPLOCA Convention
London, UK
http://www.iploca.com/

17 - 20 September 2018
Gastech Exhibition & Conference
Barcelona, Spain
http://www.gastechevent.com/

25 - 27 September 2018
International Pipeline Exposition
Calgary, Canada
https://internationalpipelineexposition.com/

2 October 2018
Pipeline Information Exchange (PIX)
Houston, USA
http://www.api.org/

6 - 8 November 2018
FABTECH
Atlanta, USA
https://www.fabtechexpo.com/

12 - 15 November 2018
ADIPEC
Abu Dhabi, UAE
https://www.adipec.com/

Total pulls out from South Pars 11 project

On 8 May 2018, President Donald Trump announced the USA's decision to withdraw from the JCPOA and to reinstate the US sanctions that were in force before the JCPOA's implementation, subject to certain wind down periods.

As a consequence, Total announced that it will not be in a position to continue the South Pars 11 (SP11) project and will have to unwind all related operations before 4 November 2018 unless Total is granted a specific project waiver by the US authorities with the support of the French and European authorities. This project waiver should include protection of the company from any secondary sanction as per US legislation.

Total has always been clear that it cannot afford to be exposed to any secondary sanction, which might include the loss of financing in dollars by US banks for its worldwide operations (US banks are involved in more than 90% of Total's financing operations), the loss of its US shareholders (US shareholders represent more than 30% of Total's shareholding) or the inability to continue its US operations (US assets represent more than US$10 billion of capital employed).

In these circumstances, Total will not take any further commitment related to the SP11 project and, in accordance with its contractual commitments vis à vis the Iranian authorities, is engaging with the French and US authorities to examine the possibility of a project waiver.

Total confirms that its actual spending to date with respect to the SP11 contract is less than €40 million in Group share. Furthermore, considering the various growth opportunities which have been captured by Total in recent months, Total confirms that a withdrawal from SP11 would not impact its production growth target of 5% CAGR between 2016 and 2022.

On 4 July 2017, Total, together with its partner Petrochina, entered into a contract related to the SP11 project, in full compliance with UN resolutions and US, EU and French legislation applicable at the time. SP11 is a gas development project dedicated to the supply of domestic gas to the domestic Iranian market and for which Total has voluntarily implemented an IRGC-free policy for all contractors participating in the project, thereby contributing to the international policy to restrain the field of influence of the IRGC.

Atlantic Coast Pipeline construction halted

A federal appeals court has nullified a key permit for Dominion Energy's Atlantic Coast Pipeline, with three judges of the US Court of Appeals for the 4th Circuit saying that the US Fish and Wildlife Service had failed to set clear limits for impact on threatened or endangered species.

Dominion Energy released the following statement in response to the US Fourth Circuit Court of Appeals order vacating the US Fish and Wildlife Service's Incidental Take Statement for the Atlantic Coast Pipeline:

"We remain confident in the project approvals and the Atlantic Coast Pipeline will continue to move forward with construction as scheduled. This decision only impacts activities directly covered by the Incidental Take Statement in certain defined areas along the route. We will fully comply as required while we continue to construct the project.

"Although we disagree with the outcome of the court's decision, and are evaluating our options, we are committed to working with the agency to address the concerns raised by the court's order."

News Highlights

- North American pipeline operators restructure following US tax change
- Oil and gas pipeline safety market report published
- PENETRON upgrades Caspian Sea oil pipeline
- CEDIGAZ report: gas market trended upwards in 2017

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Contract News

Subsea7 and Wood win Thames pipeline contracts

Independent Oil and Gas plc (IOG), the development and production focused oil and gas company, has provided an operational update on its Southern North Sea dual hub development project, the Thames Pipeline Intelligent Pigging Programme (IPP).

IOG has signed a contract with Subsea 7 to provide a diving support vessel (DSV) to execute the offshore scope of work for the IPP.

Ahead of the IPP commencing, the DSV mobilised to location on 26 April 2018 and has commenced work. The IPP will include pressure tests of the Thames Pipeline before and after pigging operations. The initial IPP and pressure test results are expected by early June 2018.

In addition to the IPP, the Front End Engineering and Design (FEED) contract has been awarded to Wood, for the subsea and pipelines scope of work on the dual hub development. Platform fabrication FEED was completed by Heerema Fabrication Group on 30 April 2018 and design notification will be submitted to the UK Health and Safety Executive (HSE) shortly.

The company remains on schedule for field development plan approvals for the Blythe and Vulcan Satellites Hubs by the end of August 2018, with first gas planned in 4Q19.

Andrew Hockey, CEO of IOG commented: "We are pleased to have progressed from the onshore mechanical preparation stage of the Thames Pipeline IPP, which commenced in February, to the crucial offshore stage of operations. This pigging is an essential step in confirming to all stakeholders that our proven and fully-licensed 2P reserves of over 300 billion ft^3 can be produced safely and efficiently via the recommissioned Thames Pipeline."

McDermott wins subsea flowline, equipment contract

McDermott International, Inc. has announced a contract award from Anadarko Petroleum Corporation for subsea umbilical and flowline installation in support of a tieback to Anadarko-operated Lucius field located 275 miles southeast of Galveston, Texas, in the US Gulf of Mexico.

McDermott will provide engineering, fabrication, installation and pre-commissioning of subsea infield flowlines, production umbilicals and related subsea equipment.

"We appreciate Anadarko's confidence in our experience and ability to deliver this project on schedule with the highest quality in the Gulf of Mexico," said McDermott Vice President for the Americas, Europe and Africa, Scott Munro.

Engie hopes to buy TAG pipeline network

Reuters is reporting that French gas and power group Engie is in talks with Brazilian state-controlled oil company Petroleo Brasileiro SA to buy Petrobras' gas pipeline network Transportadora Associada de Gas (TAG).

Confirming a Reuters report, Engie Chief Executive Isabelle Kocher said on an analyst call that the company – which has major investments in Brazil hydropower – wants to diversify its Brazilian activities and had made an offer for the network.

"Apparently, we presented the best offer in the bidding phase and we are currently negotiating the terms and conditions of a potential transaction," Kocher said.

She added the talks are not based on exclusivity yet and are set to continue in coming months.

Engie is also starting to develop an energy services activity in the country.

Sources told Reuters in May that in order to comply with rules established by a federal audit court, Petrobras will (in June) invite the other two groups that presented bids – led by Australia's Macquarie Group and UAE's Mubadala Development Co – to offer new bids for the pipeline, based on the contract negotiated with Engie.

Hydratight and Altus Intervention collaborate in the North sea

Integrity assurance specialist Hydratight has announced a three year contract with a major North Sea operator to support flange management and end-to-end process services.

The contract covers the North Sea operator's onshore and offshore assets and facilities and has scope for future development following a move to integrate its process and pipeline services (PPS) into one frame agreement.

Hydratight UK has collaborated with Altus Intervention UK in Aberdeen to successfully secure the contract for the next three years with a potential of two one-year extensions. The collaborative approach for the North Sea operations will see Hydratight and Altus Intervention deliver efficiencies across the contract ensuring comprehensive joint integrity assurance, system verification for a flawless and leak-free start-up.

Dean Mayall, Business Development Manager for ESSAI region Hydratight, said: "The oil and gas industry today is characterised by global competition, increased specialisation and integration of high value services aimed to improve efficiency and reduce costs. Hydratight and Altus Intervention have identified an opportunity to form a strategic collaboration in the UK to deliver excellence in engineering and technical services, supporting ongoing maintenance and turnarounds. The integrity strategy, including PPS, further strengthens our ability as well as expanding our product and service offering. Our team is looking forward to the supply chain collaboration over a sustained timeframe, which we know will be beneficial for the operator by combining our people, resources and expertise.

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Pipeline stampede

Gordon Cope assesses the USA's deluge of pipeline projects and the likelihood of it becoming the world's largest oil producer.

Horizontal drilling and hydraulic fracturing have created a renaissance in the US oil and gas sector. In little over a decade, it has more than doubled production, and the nation now stands poised to become the world's largest oil producer. The Interstate Natural Gas Association of America (INGAA) notes that, over the next 20 years, North American midstream operators will spend approximately US$550 billion (or US$27.5 billion annually) on oil, gas and NGL infrastructure.

Oil plays

The Bakken Formation is a tight dolomite and shale found in the Williston Basin, located beneath North Dakota and Saskatchewan. The US Geological Survey (USGS) estimates that there are almost 8 billion bbls of recoverable oil in the formation (industry estimates are more optimistic, ranging between 18 - 24 billion bbls). Bakken production reached a high of 1.2 million bpd in 2015 then dropped to under 1 million bpd; it has since crept back up to over 1.2 million bpd.

Most Bakken production was being shipped by rail until Energy Transfer Partners' much-delayed Dakota Access Pipeline (DAPL) finally began operations in early 2017. The US$3.8 billion, 1885 km line began delivering 570 000 bpd to markets in the Midwest, eliminating a US$8/bbl discount that producers had to offer to cover rail transportation expenses.

The Permian basin in Texas has been a producer of conventional crude for many decades; the multi-tiered unconventional plays have resulted in a huge increase in production. In addition to using the latest generation automated drilling rigs, some operators have also designed much denser drilling patterns in order to produce a greater percentage of oil per hectare. Encana for instance, has developed an approach that they call the 'cube' model for the stacked plays – as many as 60 wells have been drilled in a single section of land. As a result, production in the Permian has increased from 900 000 bpd in 2010 to over 2.8 million bpd at the end of 2017, and is expected to surpass 2.9 million bpd by mid 2018.

Permian producers are in great need of transportation. In early 2018, Plains All American Pipeline announced that it had successfully concluded an open season on the Cactus II pipeline. The line, with an initial capacity of 585 000 bpd, will run from the Permian basin to Corpus Christi, Texas. Using a mix of existing and new pipeline, the US$1.1 billion project is expected to be completed in late 2019.

In late 2017, Energy Transfer Partners brought Phase 1 of its Permian Express 3 pipeline online, and the company is currently evaluating an additional 200 000 bpd capacity expansion on the system.

Buckeye Partners is seeking shipping commitments for a Permian to Gulf Coast line that would carry up to 600 000 bpd of crude and condensate.

Phillips 66 and Enbridge are looking to build a 600 000 bpd line using a similar ROW. Enterprise says it will convert an existing NGL line to deliver up to 650 000 bpd crude from the Permian to Houston.

The Eagle Ford shale extends as a wide belt through southern and mid Texas. It was one of the earliest unconventional crude targets, receiving much drilling attention from 2010 - 2014; by early 2015, production stood just shy of 1.7 million bpd. Although hard hit by the downturn, production has now started to rise again, and stood at 1.3 million bpd in early 2018. EPIC, a pipeline company based in San Antonio, Texas, announced early in 2018 that it would proceed with a 590 000 bpd line to deliver both the Permian and the Eagle Ford production to Corpus Christi, Texas.

Gas plays

The US has several major unconventional gas plays, including the Barnett shale in Texas, the Haynesville in east Texas and Louisiana, and the Niobrara in Midwest states. The Marcellus formation, which occupies about 100 000 square miles of the Appalachian Basin beneath Pennsylvania, Ohio and West Virginia, has been the major producer. The US Energy Information Administration (EIA) estimates it holds at least 141 trillion ft^3 of recoverable gas. As of early 2018, production from the Marcellus and nearby formations surpassed 27 billion ft^3/d.

EQT Midstream, headquartered in Pittsburgh, Pennsylvania, and partners received approval to build parts of its Mountain Valley natural gas pipeline in Virginia and West Virginia. The US$3.5 billion system is designed to deliver up to 2 billion ft^3/d from the Marcellus and Utica shale formation in Pennsylvania to customers in the US southeast and Mid-Atlantic. The operators expect the 488 km line to enter service in late 2018.

Sunoco Pipeline is nearing completion of its Mariner 2 East NGL expansion. When commissioned, the Mariner East system will have the capacity to move up to 345 000 bpd of NGLs from the Marcellus and Utica shale plays in Pennsylvania to customers in the Philadelphia area. In mid 2017, the Pennsylvania Department of Environmental Protection (DEP) ordered construction to halt after fluid spills occurred during horizontal drilling (which is commonly used to cross rivers and roads). While strenuously denying that it had acted in a willful or egregious manner, the company paid US$12.6 million in fines in order to resume construction.

In early 2018, the New Jersey Resources Corp. and partners received approval from the Federal Energy Regulatory Commission (FERC) to construct the PennEast natural gas pipeline that would move gas from the Marcellus and Utica shales in Pennsylvania to market in New Jersey. Pending approval from the New Jersey Department of Environmental Protection, the US$1 billion, 190 km line is expected to be in service by 2019.

In early 2018, TransCanada's Leach Xpress (LXP) gas pipeline entered service. It is part of the company's Mountaineer Xpress (MXP) and Gulf Xpress (GXP) projects. All three projects are designed to deliver several billion ft^3/d of Appalachian natural gas to markets in the southeast and Gulf Coast.

Kinder Morgan and partners are moving ahead with the Gulf Coast Express Pipeline (GCX). The US$1.7 billion, 450 mile project is designed to transport almost 2 billion ft^3/d from the Permian basin to Agua Dulce, Texas, near Corpus Christi.

LNG

Liquefied natural gas (LNG) for export has been making big strides in the US. Cheniere now has four, 700 million ft^3/d trains operating in Sabine Pass, Louisiana, and has been shipping LNG to various consumers in Europe and Asia. Construction of two, 4.5 million tpy trains in Corpus Christi is expected to be completed in 2018, and first LNG shipments could happen before the end of the year.

Other LNG projects require new pipe – in early 2018, TransCanada completed the US$300 million Cameron Access gas system. The 43 km pipeline is designed to deliver up to 800 million ft^3/d to Sempra Energy's Cameron LNG train, currently under construction. In all, the EIA reckons that the US will have almost 10 billion ft^3/d of LNG capacity by the end of 2019.

Permian Global Access Pipeline, a subsidiary of Tellurian, is proposing a 42 in. pipeline that would move up to 2 billion ft^3/d of natural gas from the Permian basin to southwest Louisiana. The 625 mile line is expected to cost US$3.7 billion and be in service by 2021. The line is part of Tellurian's larger proposed project, the US$15.2 billion Driftwood LNG plant near Lake Charles, Louisiana.

NGLs

Natural gas contains up to 8% natural gas liquids (NGL), mainly consisting of ethane, butane and propane. NGLs are valuable to petrochemical producers – several multi-billion dollar plants have been built in the Gulf Coast region and the Eastern Seaboard over the last five years in order to take advantage of the plentiful feedstock. Several bespoke networks serve their needs.

DCP, which is the largest gas liquids producer in the US, is currently expanding its Sand Hills NGL network from the Permian Basin to Mont Belvieu, Texas. The first phase, from 280 000 bpd to 365 000 bpd, was completed in early 2018. The second phase, from 365 000 bpd to 450 000 bpd, is expected to be complete in mid 2018.

Enterprise Products Partners (EPP) is building its fourth NGL line from the Permian to its NGL fractionation and storage complex near Mont Belvieu, Texas. The 571 mile Shin Oak line, which is expected to enter service in 2019, will have an initial capacity of 250 000 bpd. As long-term commitments warrant, EPP can expand the capacity to 600 000 bpd (EPP is also looking at re-purposing some of its NGL assets to transport crude).

In early 2018, Kinder Morgan's Utopia ethane pipeline entered service. The 400 km system is designed to move 50 000 bpd of

ethane from Utica shales in Ohio to petrochemical clients in Windsor, Ontario. The system can be expanded to 75 000 bpd.

Oneok is proposing a 900 mile line to move NGLs from Montana to Kansas. The Elk Creek Pipeline would have an initial capacity of 240 000 bpd, and could be expanded to 400 000 bpd. The line would shift NGL transportation in the Williston Basin from current rail cars, a costly and more hazardous form of transportation. Pending approvals, the US$1.2 billion line would be in operation by the end of 2019.

Mexico

Mexico's energy ministry (SENER) has estimated that natural gas demand will grow from around 8.2 billion ft^3/d in 2017 to 11.6 billion ft^3/d by 2027. Increased consumption will be driven by a switch from oil to natural gas as the fuel for electricity production, as well as strong growth in the automotive, manufacturing and aerospace sectors.

Although Mexico possesses vast natural gas resources (the Eagle Ford shale in Texas extends into northern Mexico), the majority of its 5.5 billion ft^3/d production is associated with oil production. In addition, Mexico imports 2.7 billion ft^3/d, mostly from the US, but that number is expected to grow dramatically.

US gas pipeline capacity into Mexico is expanding at a rapid clip. In late 2016, capacity stood at 7.3 billion ft^3/d, an almost 100% increase in the last five years. The bulk of the expansion has occurred in Texas; in addition, there is over 3 billion ft^3/d under construction in the state, and over 3 billion ft^3/d in the planning stage. Total capacity is expected to be near 14 billion ft^3/d by the end of the decade.

Mexico imports more than half of its refined fuel needs, primarily from the US via ship, but refined products pipeline networks are also expanding. Howard Midstream's subsidiary, Dos Aguilas Pipeline, is building an open access network to transport refined products from the Laredo region in Texas to northern Mexico. The company expects the network to enter service by mid 2018. The network includes the Border Express Pipeline (141 miles), the Borrego Pipeline (10 miles), the Poliducto Frontiers Pipeline (12 miles), and the Poliducto del Norte Pipeline (124 miles).

Magellan Midstream, based in Tulsa, Oklahoma, launched an open season to gauge interest in expanding its refined products Magellan South System. The expansion would add 40 000 bpd of fuel capacity to its 100 000 bpd line running in Texas from Frost to Odessa. The expansion would be operational by 2020, and ultimately increase export capacity to Mexico.

Problems

Environmentalists and other protest groups know that pipelines are a vulnerable link in the oil and gas supply chain and continue to oppose their development. The Keystone XL saga, for instance, sees no sign of ending. Originally proposed over a decade ago, the 1900 km line, designed to carry up to 830 000 bpd of crude from Canada to the Gulf Coast, was eventually refused the right to enter the US by President Obama. Even though the Trump administration subsequently gave TransCanada approval in early 2017, it still faces opposition. Bold Alliance and the Sierra Club filed a complaint in a Montana federal court claiming that the presidential authorisation relied on outdated environmental assessments.

In early March, a state judge temporarily halted construction on a Louisiana oil pipeline in order to prevent "further irreparable harm" to wetlands. Energy Transfer Partners has been building the US$750 million Bayou Bridge extension from Lake Charles to St. James, Louisiana. It passes through the Atchafalaya basin wetland. Prior to the beginning of construction, the US Army Corp of Engineers conducted two environmental assessments and found no significant impact. However, environmentalists and fishermen argued successfully that the Atchafalaya basin is vital for flood protection and commercial fishing.

The company appealed the decision, and in March the fifth US Circuit Court of Appeal agreed to lift that order. As it now stands, rising waters may force the company to stop construction for several months, regardless. The Bayou Bridge pipeline is the last link in a pipeline network connecting the Bakken oilfields in North Dakota with Louisiana refineries and export terminals.

The Trump administration recently proposed a series of tariffs against imported steel. A group of pipeline associations, including the Association of Oil Pipe Lines (AOPL) and INGAA sent a letter in response, highlighting the problems. They noted that pipeline-grade steel is a high-cost, cyclical-niche product that some producers have dropped, leaving zero domestic availability for certain grades. If tariffs cannot be avoided, they recommended exemptions for scarce products.

Future

The Trump administration released a proposal to speed up the permitting of natural gas pipelines. The proposal would take away the authority of Congress to give approval to projects that cross national parks, and give it to the Interior Secretary instead. It would also speed up the time states could take to issue 'section 401' water certificates as required under the federal Clean Water Act.

The major goal of the administration is to eliminate redundant reviews under various state and federal authorities. It also seeks to clarify who has ultimate authority over interstate pipelines. The state of New York, for instance, has denied section 401 certificates to the Constitution interstate gas pipeline, at odds with FERC.

If successful, the proposal would alleviate many of the bottlenecks in the pipeline approval process, as well as delays in a larger US$1.5 trillion infrastructure proposal. Environmental groups have come out against the plan.

The price of oil will largely dictate much of what happens with unconventionals over the next several years. Too much US production, for instance, could undermine the agreement between OPEC and Russia and cause the price to plunge. But operators in all unconventional basins have been working hard to reduce their breakeven points, with many major plays now sitting within the range of US$30 - US$40/bbl. The EIA expects US production to exceed 11 million bpd by 2019 and for gas production to reach 100 billion ft^3/d in the next few years.

These new sources (and the expansion of existing ones) require ever greater carrying capacity to deliver them economically to consumers. The North American midstream sector is expected to invest billions of dollars to meet that demand in the coming years.


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