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The Energy Trilemma Series – Part 2

Opportunities in North American midstream infrastructure

Global Listed Infrastructure
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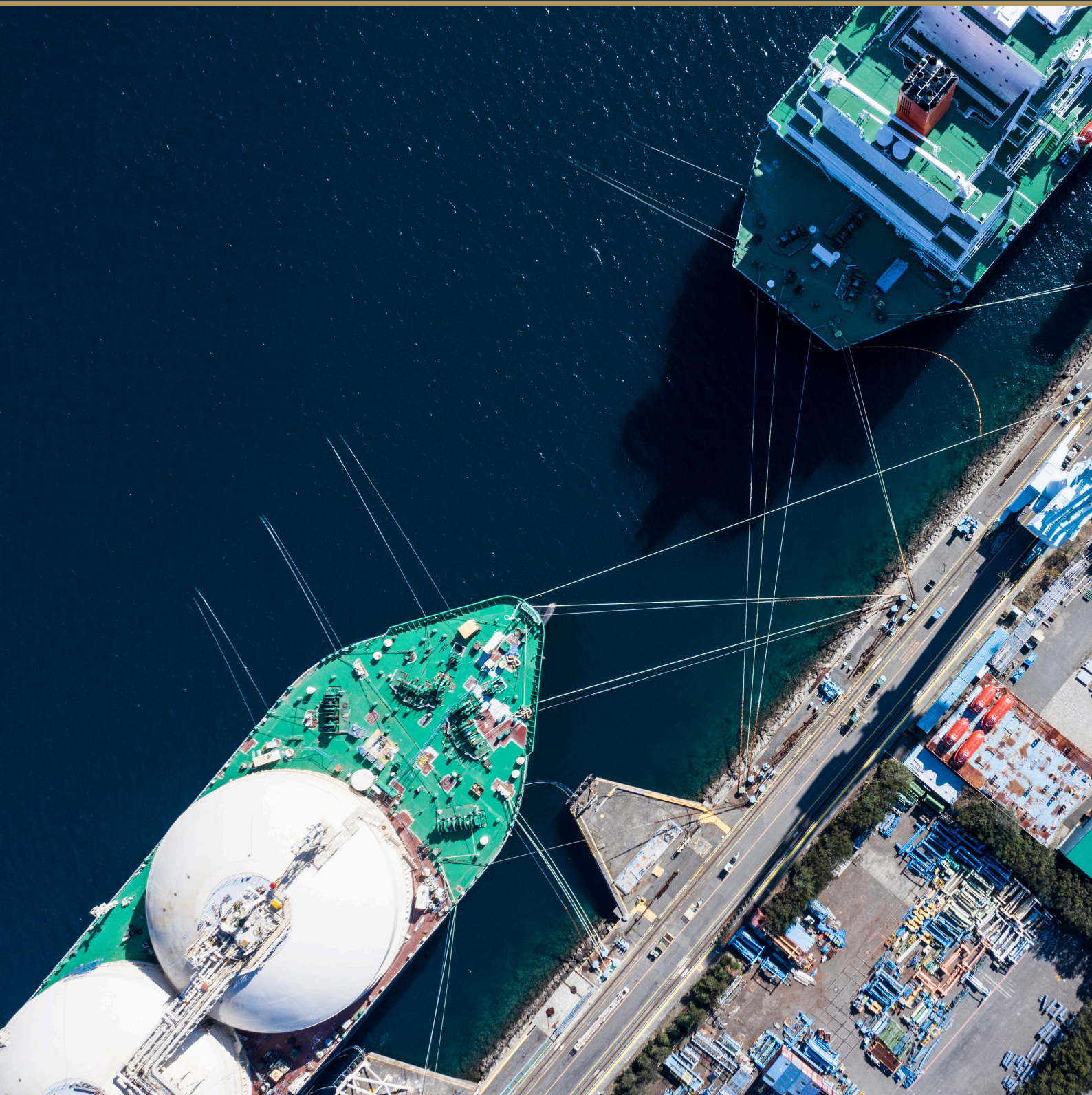


Executive summary

North American midstream infrastructure is well placed to address many challenges of the global energy trilemma, particularly with regards to contributing to global energy security needs. North America's abundant natural energy resources, extensive energy infrastructure networks and stronger focus on sustainability relative to other major energy producing countries are all examples of the region's competitive advantages. In the near-term, we see natural gas midstream infrastructure – such as transmission pipelines and liquified natural gas (LNG) export terminals – as well placed to help economies navigate the challenges of the energy trilemma. Gas has a number of advantages, including its low emission intensity relative to other fossil fuels (so long as fugitive emissions are managed to a minimum); ability to be easily stored, transported and dispatched; and capacity to be produced relatively affordably. In the medium- to longer-term we also see midstream infrastructure playing a greater role in supporting transportation and storage of emerging low-carbon fuel opportunities, such as renewable natural gas, hydrogen and carbon capture, use and storage.

Against this backdrop, we maintain a positive outlook for certain midstream infrastructure assets. That said, our exposure to the sector has materially reduced in recent years as we have become more selective in our investments due to heightened ESG concerns. Specifically, we have revised our growth outlook for some midstream infrastructure assets as the pace of the energy transition accelerates and new projects face ongoing headwinds. We have also stepped up our ESG efforts by more closely scrutinising companies' sustainability progress and performance while testing our ongoing assumptions related to stranded asset and climate change risks through scenario analysis. Minimising stranded asset risk for certain midstream infrastructure assets requires an in-depth understanding of the complexities associated with climate risk management, stakeholder relations, legal and regulatory affairs and the pace of the energy transition.

In this paper, we highlight the unique opportunities that exist across the North American midstream sector to address issues in the energy trilemma, which is helping drive a stronger investment outlook for natural gas infrastructure assets. This paper follows on from part one of our The Energy Trilemma series where we explain the three dimensions of the energy trilemma (sustainability, security and affordability) and why governments need to ensure a balanced outcome going forward. In the third paper, we delve into our approach to managing ESG risks and how we specifically integrate these into our investment process to help balance the opportunities with heightened stranded asset risks in the midstream infrastructure space.

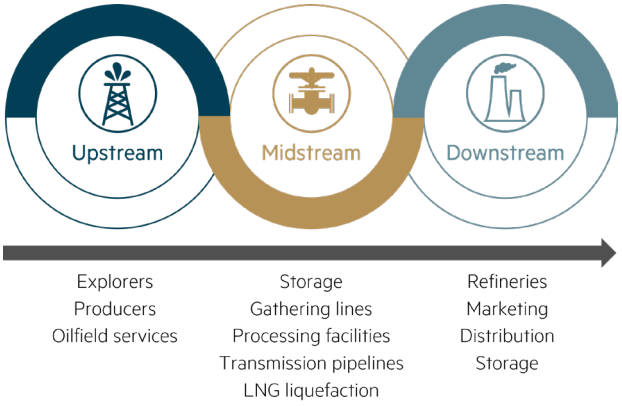
The role of North American midstream infrastructure

The North American midstream infrastructure sector is uniquely positioned to address all three dimensions of the global energy trilemma – namely security, affordability and sustainability. Namely, the region is rich in economic natural resources, there is a strong and growing focus on sustainability, and it has a large network of existing energy infrastructure assets.

- **Rich in resources** – North America possesses an abundance of economic conventional energy resources (primarily oil, gas and natural gas liquids), which have been growing since the shale boom began in 2005.
- **Strong sustainability focus** – North American institutions are generally among the strongest globally in driving long-term sustainability. Companies generally face high scrutiny around their environmental, social and governance (ESG) responsibilities, particularly when compared to other major energy exporting countries, owing to high legal and regulatory standards coupled with strong stakeholder scrutiny.
- **Extensive existing energy infrastructure** – North America is home to an extensive network of existing pipelines, processing facilities, storage and export terminals which form the backbone to the supply of energy both domestically and abroad. The network serves as a valuable platform for many future low-cost brownfield expansion opportunities.

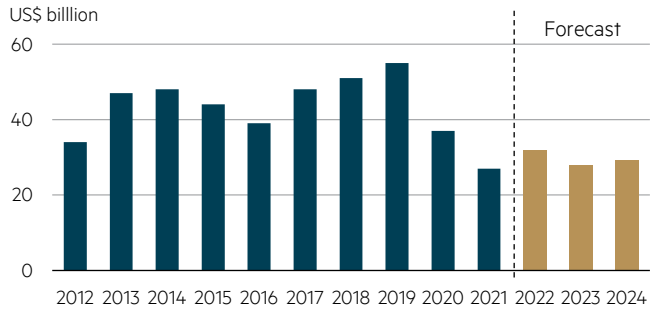
What is midstream infrastructure?

Midstream infrastructure assets facilitate the processing, storing, transportation and marketing of oil, gas and liquids. This represents the 'middle' segment of the energy value chain, connecting upstream production to downstream consumption. Midstream infrastructure companies operate intricate networks of pipelines, rail, trucking, barges, storage tanks and export docks to ultimately transport goods to end-users, such as utilities.



Building on the North American advantage, we believe that midstream infrastructure will continue to play a significant role in the energy space, particularly in addressing energy security and affordability, that will necessitate meaningful ongoing investments. The midstream investment opportunity set is broad and ranges from growth in gathering and processing facilities, to expansions of long-haul pipelines, to the development of export terminals and low carbon solutions. The IEA's 2021 World Energy Outlook estimates that over $150 billion will be invested each year between 2021 and 2050 in North American oil and gas under the Sustainable Development Scenario. We estimate that of this approximately one-quarter, or $35 billion annually, relates to potential investments in midstream assets.[i] This compares to research by Wells Fargo Equity Research's forecast of a relatively flat $28 billion in annual capex across its current coverage of listed midstream companies through to 2027.[1] While these estimates reflect a step down in investment from the preceding decade, they still represent sizeable investment opportunities relative to the aggregate market capitalisation of the sector (Figure 1).[ii]

Figure 1: Listed midstream capital investments



Source: Wells Fargo; Factset (June 2022)

Disclaimer: Forward-looking statements are provided as a general guide only and should not be relied upon as an indication of the future performance.

Despite a positive outlook for the sector, the hurdles faced by new projects are getting higher and harder to meet. Federal and state level agencies are increasingly scrutinising the environmental and climate change-related impacts of projects while permitting regulation has become more stringent over time. More in-depth consultation processes alongside growing and legitimate opposition from those impacted by projects has also contributed to a significantly altered risk profile, particularly for greenfield projects, going forward. When coupled with the pace of the energy transition away from fossil fuels, stranded asset risks remain an ongoing concern on the Maple-Brown Abbott Global Listed Infrastructure team given the long-lived nature of midstream infrastructure assets. However, we believe that such risks can be managed and minimised through in-depth analysis of company assets, ongoing active engagement with company management and a constant retesting of investment theses as the energy transition evolves..[iii]

Balancing the opportunities and risks within the North American midstream space, we believe that ongoing investment in natural gas infrastructure is necessary to help address the global energy trilemma. Natural gas is less emissions intensive than other fossil fuels, can be easily stored to balance seasonal demand-supply imbalances, is a dispatchable form of energy and can be supplied affordably.[iv] According to most IEA models, global demand for natural gas continues to grow through to at least 2030 and continues to be a material share of the total energy mix in 2050. The only exception is the Net Zero Emissions Scenario, where natural gas shows a modest decline out to 2030 and declines quickly thereafter.

While North American oil will continue to play a part in meeting the energy needs of the global economy in the near-term, its long-term future is somewhat more challenged. As a result, we believe that the investment opportunities within North American oil midstream will be more limited than in the past and much more exposed to the pace of the energy transition.

The outlook for capital investments

Investment in the oil and gas sector – including across midstream assets – fell meaningfully over 2020 as the pandemic, environmental opposition and permitting challenges contributed to a difficult environment for projects (see box on recently cancelled midstream projects). Some companies are only now starting to "catch up" on this period of underinvestment. In some cases, cancelled projects have unlocked opportunities for others to step in and provide stronger alternatives to meet the same underlying demand. For example, in the case of brownfield expansion projects along existing right of ways in place of previously proposed greenfield projects. Compared to previous projects, it is likely that new opportunities will be lower cost and lower risk investments that build on existing infrastructure, for instance, by adding compressor stations and looping (adding parallel pipelines) to increase capacity.

i Based on the proportion of upstream investment relative to total oil and gas investments published by the IEA. Data not available for the net zero emissions scenario.
ii Forecast investment from 2022-2024 represents roughly 17% of the market capitalization of listed midstream companies as of 30 June 2022.
iii In the third paper of this series, we detail our approach to ESG risks for midstream companies and discuss how we integrate these risks into our investment process.
iv Compared to coal, natural gas is estimated to emit half as much carbon dioxide when burned for fuel. This assumes that methane leaks, which are significantly more potent than CO2 emissions, are minimal along the value chain.

Russia's invasion of Ukraine, and to a lesser extent the culmination of localised reliability issues in the US, has shifted public perceptions of the role of fossil fuels slightly more favourably given the pressing need to ensure energy security. While low-carbon energy is a clear focus of the European Union's REPowerEU plan to achieve energy independence, certain fossil fuels, particularly gas, will play a critical role in the overall energy mix which is evident in the targets to diversify gas supplies and mandates on the minimum level of gas in storage ahead of winter. Facilitating this shift will not only require infrastructure investments within the EU (for example in gas transmission pipelines, LNG import terminals and storage facilities), but it will support infrastructure investments in partner energy exporting countries, such as the US. The March 2022 US and European Commission announcement of a joint Task Force included a goal to deliver approximately 50 billion cubic meters (bcm) of additional US LNG each year until at least 2030, which signals the clear intent of both governments.[2]

Within the US, there have also been some signs that policymakers' perception of fossil fuels has perhaps become more constructive. For instance, the Federal Energy Regulatory Commission's (FERC) recently reversed two policy statements it had issued in February 2022 into draft policy statements seeking public comment, which related to the certification of interstate natural gas pipelines and stricter GHG emissions requirements in natural gas projects, suggesting that a more balanced approach may be adopted going forward in order to achieve sustainability goals without compromising energy security and affordability.[3] Furthermore, the resumption of selling leases for oil and gas drilling on federal lands, a key policy during Biden's campaign, is another sign of a potential softening of the previous stance towards fossil fuels. The culmination of these developments suggests a more supportive environment for new investments than we have seen in recent years.

Shareholders continue to pressure oil and gas producers and midstream companies to show capital discipline. They often prioritise the strengthening of balance sheets through debt reduction and the return of capital to shareholders through dividends and buybacks, before accepting well-considered investment opportunities with strong ESG characteristics. In practice, this may temper the overall pace of growth, but on the other hand it is expected that projects on average will tend to be lower-risk, higher-return, less capital intensive and more robust than investments in the past. The expectation is that most of this spending will be internally funded to protect balance sheets.

A potential implication of a more capital disciplined US oil and gas sector is that energy prices may remain higher for longer. This is because investments by upstream producers are less responsive (but still positively correlated) to commodity prices than they were a few years ago. A high commodity price environment would nonetheless continue to support midstream investments as production volumes become less volatile, given the strong economics, and the creditworthiness of counterparties would be strengthened.

Recently cancelled midstream projects

The past few years have seen an unusually high number of midstream projects abandoned by project developers. The nature of these large-scale projects often mean that they have broad social, environmental and economic implications for a wide range of stakeholders, and can often become highly politicised. We highlight some high-profile projects that have been challenged in recent years, outlining some of the difficulties faced as well as the ensuing opportunities for incumbent midstream asset operators.

- **Keystone XL (KXL)** – the project intended for a 1,900km pipeline, carrying 830,000 barrels of oil per day, to ship Canadian oil sand from Alberta to Nebraska. The pipeline was largely opposed on environmental grounds and faced opposition from a number of Indigenous communities. TC Energy, abandoned the project following President Biden's revocation of the cross-border permit. Enbridge's Mainline, including its recently completed Line 3 Replacement project, was seen as a key beneficiary of KXL being abandoned.
- **Atlantic Coast Pipeline (ACP)** – the proposed 970km pipeline was intended to connect gas from the Utica and Marcellus region to serve demand in eastern Virginia and North Carolina. Opposition to the project mostly came from a number of Indigenous communities as well as environmental groups who questioned the demand (and therefore need) for gas transported by the pipeline. Midstream company Williams Companies has since progressed two expansion projects of its Transco pipeline – the Southside Reliability Enhancement and the Commonwealth Energy Connector – to help serve the unmet demand in the region.
- **PennEast pipeline** – the project proposed building a 185km gas pipeline from Northeast Pennsylvania to New Jersey. Opponents to the project believed that it would harm forests, wetlands and waterways; posed a danger from potential explosions; and was inconsistent with New Jersey's decarbonisation goals. The project was cancelled in 2021 due to lack of support from the state of New Jersey, which attempted to block the seizure of state-controlled land and withheld necessary water permits. Williams Companies' Transco expansion project, the Regional Energy Access pipeline, intends to help serve some of the unmet utility and power demand in Pennsylvania and New Jersey following the cancellation of PennEast pipeline.

Liquified natural gas

Given the important role natural gas plays in addressing the energy trilemma, global LNG trade continues to be an area that is expected to continue to grow over the next few decades. McKinsey & Co's latest global gas outlook expects global LNG demand growth of around 3.4% per annum through to 2035, which then slows to a growth rate of about 0.5% per annum from 2035 to 2050.[v] Most of this growth is expected to come from the US, given its abundant availability of low-cost gas and the expected ramp up in LNG export terminal capacity.

What is LNG?

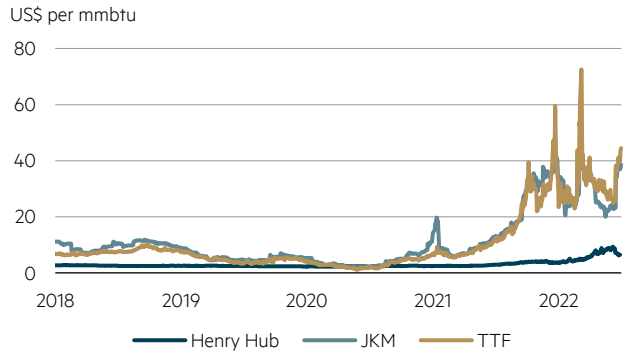
Liquefied natural gas (LNG) is formed by cooling natural gas to 162ºC at a liquefaction plant, commonly called a "train". The liquefaction process generally involves removing any contaminants and then compressing the gas into a liquid form that is 600 times smaller in volume than its gaseous counterpart, making it efficient to transport over long distances where gas pipelines are not practically feasible.

LNG is transported overseas on special-purpose built LNG carriers designed specifically to maintain the LNG at optimal temperatures. A standard LNG cargo can carry 72,000 tonnes of LNG, which is enough to heat around 45,000 homes a year.[4] Once the LNG is received downstream, it undergoes a process called regasification where it is returned to its gaseous state to be transported to end-users via pipelines.

Growth in demand for LNG is expected to primarily come from Asia and Europe. Asian demand continues to be driven by the need to replace declining domestic gas production and to support their decarbonisation efforts, such as through coal-to-gas power generation switching. China, which is already the largest LNG importer, is expected to be the largest driver of growth in the region with coal still representing approximately 56% of its electricity generation and final consumption mix in 2021.[5] Renewed European demand for LNG is largely being driven by the need to reduce the region's reliance on Russian energy following the invasion of Ukraine. Roughly half of the 102 bcm of annual imported Russian gas that needs to be replaced is expected to come from LNG imports, with renewables, energy savings and pipeline imports representing the bulk of the balance.[6]

The continued growth in Asia and the unexpected source of new demand from Europe is straining an already tight global LNG market. Australia and Qatar have historically been the two largest exporters of LNG, but strong growth in the US has allowed it to catch up and the country is now expected to become the largest LNG exporter in 2022.[vi] US and Canadian LNG is expected to grow as its low-cost gas, destination flexible contracts and increasing emissions focused projects appeal to a broad range of offtake customers. The strong Asian and European LNG demand continues to be reflected in the wide global LNG price spreads relative to US gas prices (Figure 2).

Figure 2: US gas and global LNG prices



Source: Bloomberg (June 2022).

Note: The reference price for US gas is Henry Hub; whereas the reference price for Asian and European LNG is the Japan Korea Marker (JKM) and the Title Transfer Facility (TTF), respectively.

US LNG projects are often underpinned by very strong contracts that protect the long-term value of future cash flows to the developer. The contracts tend to be long-term take-or-pay (typically 20 years) across a range of offtake customers. Pricing of the contracts are often linked to Henry Hub gas prices with an inflation component to eliminate commodity price risks and protect the real value of earnings for these long-dated assets. Recently announced sale and purchase agreements (SPAs), as well as our recent conversations with LNG developers, suggest that these factors remain strong.

Interest in US LNG has increased in 2022, with the volume of agreements signed year-to-date totalling over 40 million tonnes per annum (MTPA) across 20 different counterparties. Furthermore, McKinsey's latest LNG buyers' survey (of over 50 companies globally together accounting for 90% of global demand), found that the proportion of companies looking for long-term contracts has increased from ~40% in 2020 to ~60% in 2022 and that the average contract tenor preference has increased from 5-9 years to 10-14 years.[7]

v The report was published in February 2021, prior to the 2022 Russian invasion of Ukraine which is likely to have altered the long-term outlook for LNG.
vi Australian LNG is expected to slow due to increasing competition, the natural decline in production due to aging gas fields and limited new projects. Qatar may regain its dominance once its North Field LNG project expansion is completed in 2026.

Growth in US LNG supply further necessitates and supports investment in other midstream infrastructure assets. For example, the additional gas needed to feed and power growing LNG exports will call for increased production volumes and this will require higher investment in gathering and processing facilities and long-haul gas transmission pipeline capacity (primarily along the Gulf Coast and western Canada). Natural gas producer EQT Corporation believes that 'unleashing' US LNG to replace international coal at an unprecedented pace could quadruple capacity to 55 billion cubic feet per day (bcf/d) by 2030. Under this scenario, the incremental 40 bcf/d of LNG export capacity is estimated to require over US$245 billion of investment and be supported by 6,500 miles of new pipeline infrastructure requiring a further US$75 billion of investment.[8]

Finally, momentum continues to build in decarbonising the LNG value chain. For example, new LNG projects are increasingly looking to use electric drive motors to replace gas turbine drives, manage fugitive emissions and implement carbon capture and storage solutions to help lower overall lifecycle emissions. In 2021, 30 carbon-neutral LNG cargoes, which had their emissions offset by carbon credits, were delivered worldwide – one of which was delivered to Europe from Cheniere Energy's Sabine Pass terminal located in Louisiana, with more expected in the future. In saying this, in order for companies to contribute to the long-term temperature goal of the Paris Agreements, we believe the emissions hierarchy should and must be mitigation first and foremost, with offsetting measures used sparingly.

Natural gas pipelines

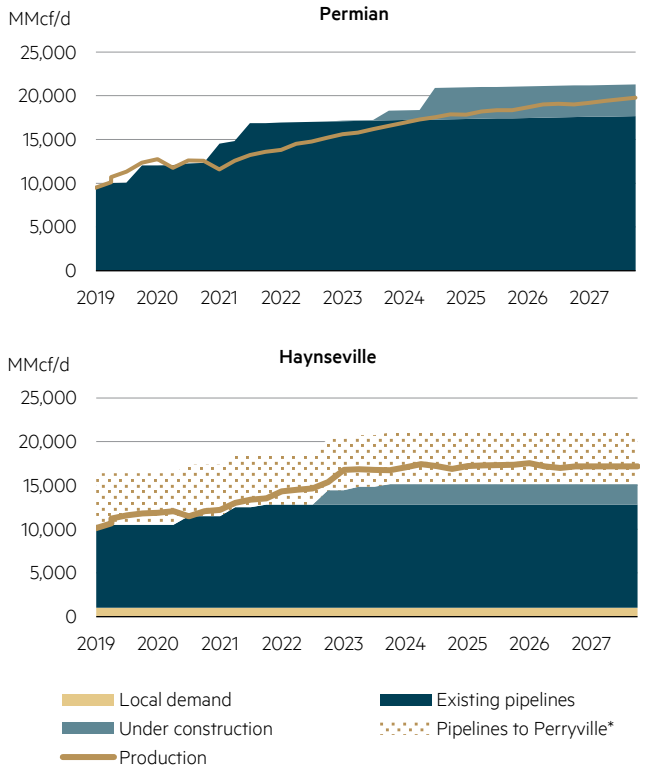
Pipelines represent the bulk of North American midstream infrastructure assets and ongoing investment is required to ensure that domestic and global energy needs continue to be met. Pipelines are typically safer, more economical and environmentally friendly than most other forms of oil and gas transport, such as via rail or trucking.[9] In North America, there are currently over 1.2 million kilometres of oil and gas pipelines (excluding local distribution lines), connecting regions of supply to demand centres, forming an extensive backbone for future expansions.[10] New investments in pipelines are typically supported by long-term contracts or can earn regulated returns through a rate base.

The demand for North American natural gas is expected to continue to grow for at least the next decade, which should support ongoing pipeline investments in the region. McKinsey & Co estimates that new investments will primarily be driven by the need to support increased LNG exports in the Gulf Coast and industrial demand for hard to abate industrial processes, such as petrochemical and cement plants.[11]

Pipelines to support further coal-to-gas power generation switching will also remain important in some states. For example, the Transco pipeline owned by Williams Companies claims to still have 59 operating coal plants representing 61GW of capacity along the pipeline's state corridor, which if all converted to gas would equate to a potential 9.6 bcf/d of additional natural gas demand, relative to its current 17.3 bcf/d of transmission capacity.[12]

As the demand for gas grows, the need for increased pipeline takeaway capacity from key gas supply basins will continue to grow. Key supply basins, including the Permian, the Haynesville and the Marcellus and Utica basins, face potential bottlenecks that will over time constrain the supply of low-cost gas to demand areas in the absence of new pipeline capacity projects (Figure 3). New pipelines are also necessary to reduce the wasteful and emission intensive practice of routine venting and flaring of gas associated with oil production, given increasing stakeholder pressure and more stringent regulations in some states banning the practice.

Figure 3: Permian and Haynesville gas pipeline takeaway capacity and production



* Pipeline capacity to Perryville, LA separated as the hub does not have sufficient downstream takeaway to end markets and does not represent the true constraints.

Source: Wells Fargo Equity Research (June & July 2022)

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vii We discuss the details of realising the environmental benefits of coal-to-gas switching in the third paper of this series, specifically in the 'Why methane matters' section located in the appendix.

A small, but growing, opportunity set across pipelines also involves investment in the modernisation of equipment to improve operating efficiency and reduce emissions. For example, some companies have begun multi-year programs of replacing old gas-driven compressor units with new electric-driven units and investing in enhanced leak detection and repair in an effort to minimise their overall carbon footprint.

The permitting and construction of new pipelines has become more challenging over time owing to increasingly stringent regulatory requirements, a heightened focus on climate change action and growing opposition from those directly and indirectly impacted by such projects, for example, in the case of local communities and traditional landowners. We believe the level of scrutiny that greenfield pipeline projects face is warranted in light of the scale, geographical footprint and potential impacts of the construction and operation of such assets. These factors can lead to delays and additional costs, and in some cases, mean that greenfield pipeline investments do not materialise at all. Against this backdrop, existing pipelines have emerged to become valuable assets that could benefit from higher utilisation rates and optionality to account for a future of fewer greenfield projects.

Low carbon fuel opportunities

There are further opportunities for the midstream sector to play a bigger role in supporting the sustainability dimension of the energy trilemma through low-carbon fuel technologies. Some companies have already made investments in midstream infrastructure to support renewable natural gas (RNG) and renewable fuels (such as ethanol and biodiesel), while carbon capture, use and storage (CCUS) and hydrogen are starting to gain significant momentum (see examples of sustainability-led investments in the midstream sector box on the next page).

In the near-term these opportunities remain small in comparison to oil and gas midstream investments, but are growing and increasingly viewed as necessary to achieve net zero emissions by 2050. Currently viable low carbon fuel technologies, such as RNG and CCUS, are gaining support from governments and regulators. For example, the Californian public utility commission has adopted a renewable gas standard that requires 12.2% of the gas delivered in California to be RNG by 2030; and the Canadian government has introduced a 37.5% tax credit for investment in carbon capture transportation and storage equipment.[13]

Longer-term opportunities, such as hydrogen, have the potential to be transformational. To provide a sense of the potential investment opportunities, the European Hydrogen Backbone Initiative (formed by 31 European gas infrastructure companies) estimates that based on the European Commission's REPowerEU targets, there could be €80-143 billion of investment needed in gas transport networks by 2040, which could represent nearly two-times the current European gas transportation asset base. However, there is a higher level of uncertainty as to whether these opportunities will ever fully materialise given the cost of producing green hydrogen remains high compared to natural gas and the continued strong focus on electrification to support decarbonisation..

Conclusion

North American midstream infrastructure can play a significant role in addressing all three dimensions of the energy trilemma, particularly in the case of energy security with natural gas infrastructure. Natural gas has the ability to displace current use of high emitting fossil-fuels to achieve immediate emission reductions, can be easily transported, stored and dispatched when necessary to provide energy security and be supplied cost-effectively. We see a strong investment need – particularly in natural gas pipelines and LNG terminal capacity – at least in the near- to medium-term, to support ongoing global decarbonisation efforts. Opportunities to support the development of low-carbon fuels and CCUS continue to grow, representing additional optionality.

The permitting and construction of greenfield projects is complex and involves a higher degree of consultation and regulatory scrutiny than in the past. While there are some signs of certain pressures easing in the context of global energy security challenges, the challenges faced by greenfield projects is set to remain as governments and communities increasingly recognise and value the environmental and social implications of these major projects. These factors are set to dampen midstream growth rates over the medium to long term and should be a serious concern for midstream pipelines going forward. These are risks the GLI team actively factors into industry assumptions, company modelling and portfolio construction decisions alongside our ESG engagement and stewardship activities.

In the final part of this series, we discuss our approach to ESG risks and how we specifically integrate this into our investment process to help balance the opportunities associated with heightened stranded asset risk in the midstream space.

Examples of sustainability-led investments in the midstream sector

Responsibly sourced gas (RSG)

Responsibly sourced gas (RSG) is a relatively nascent market which aims to cater to natural gas customers striving to minimise their carbon footprint. RSG is natural gas that has received independent third-party verification for being produced in adherence with certain ESG standards, including but not limited to emissions, methane intensity, land restoration and community engagement.[15] Several players across the natural gas value chain are committing to produce, transport or purchase certified natural gas. For example, upstream gas producer EQT Corporation has announced it would begin sourcing RSG certification for selected production areas, midstream operator Kinder Morgan received approval from federal regulators for a service to enable certified producers on its Tennessee Gas Pipeline (TGP) system to sell RSG to customers via a supply aggregation pooling service, and US multi-utility Xcel Energy has announced a pilot program to purchase RSG in an effort to reduce their operational emissions.

Renewable natural gas (RNG)

Renewable natural gas (RNG), also referred to as biomethane, is the gaseous by-product of the decomposition of organic matter, which can be directly blended with natural gas in pipeline networks. Wide-scale deployment of RNG is currently inhibited by challenging economics and supply constraints, leaving its potential contingent on the enactment of supportive policies. As political support has increased over recent years, several midstream companies have devised RNG strategies. In the US, pipeline operator Williams Companies has a particularly ambitious RNG capex program amounting to approximately US$200 million through 2025. Williams currently operates seven interconnection pipelines that connect RNG production facilities to its network of transmission pipelines. Currently, the interconnection network has a capacity for 13 million cubic feet per day of RNG which is expected to continue growing as Williams executes its strategy to construct new interconnection pipelines, expand existing pipelines and potentially invest in RNG production.

Hydrogen

Hydrogen is another emerging form of energy that has the potential to support the intermittency of renewables generation and contribute to decarbonisation of hard-to-abate sectors such as industry and long-haul transportation. Enbridge, a Canadian oil and gas pipeline operator, has launched a series of initiatives to explore hydrogen opportunities across its businesses. In 2018, Enbridge established the first North American utility scale power-to-gas (P2G) facility in the Canadian city of Markham. In late 2021, Enbridge launched its first pilot project to inject some of the green hydrogen produced at its P2G facility into the Markham gas distribution network, creating a 2% hydrogen blended gas. The company is currently progressing a second pilot hydrogen blending project in Quebec with the potential to blend up to 15% hydrogen into gas distribution networks. Most recently, Enbridge announced a partnership with Humble Midstream to develop low-carbon hydrogen and ammonia production and export facilities at Enbridge Ingleside Energy Center in order to fulfil growing global and domestic demand.[16]

QMRV (Quantification, Monitoring, Reporting and Verification)

Historically, emissions across the natural gas value chain have been calculated based on estimated factors from environmental regulators due to limited understanding and technology equipped to quantify real-time emissions. To address this shortcoming, several industry players – including midstream companies Cheniere Energy, Williams Companies, Kinder Morgan, DT Midstream, MPLX LP and Crestwood Equity Partners – have committed to collaborate on implementing QMRV of GHG emissions at upstream and midstream facilities. Sites will be monitored for carbon dioxide and fugitive/vented methane emissions using advanced monitoring technologies and protocols to ultimately enhance visibility of actual GHG emissions and identify opportunities to reduce emissions.

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