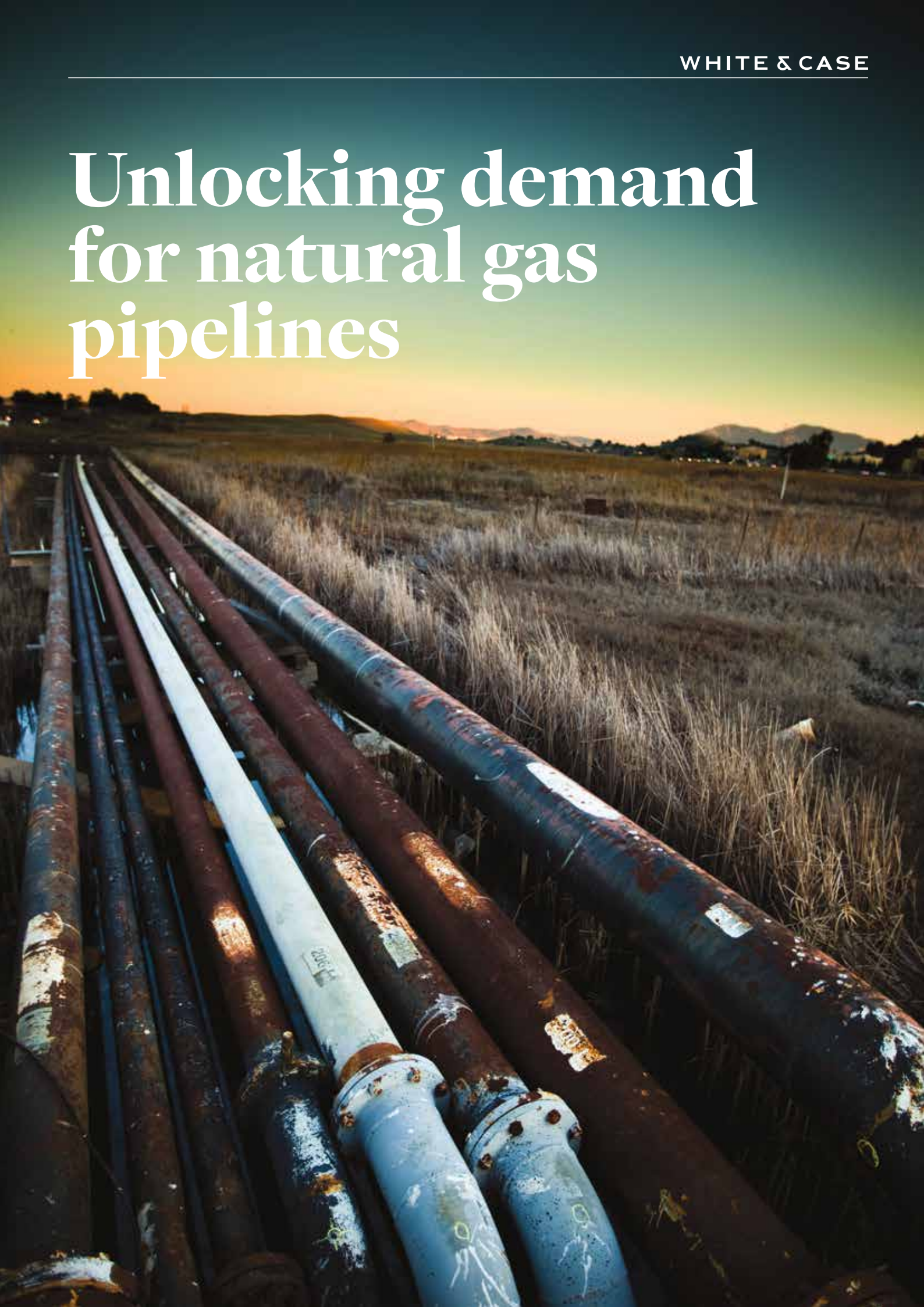
WHITE & CASE

Unlocking demand for natural gas pipelines



Opportunities like these don't come around every day. The United States can make energy independence a reality only if it seizes this moment to draft a blueprint to finance needed infrastructure. Pipelines are an efficient way to lock in the energy security we need to usher in a new industrial renaissance in America.

The US administration has understood this, but now it is up to the country's best minds to also set off on an urgent search for both new and time-tested ways to finance America's pipeline network.

– White & Case's Dan Hagan

Fresh ideas can unlock demand

The shale oil and gas revolution in the United States has radically changed the country's energy outlook. Massive economically recoverable reserves discovered in places such as the Marcellus and Bakken shale formations provide the opportunity for energy independence, new jobs and a manufacturing renaissance that could help put the US economy back on track. Indeed, demand for shale oil and gas continues to rise, even as production volumes increase.

Daniel Hagan
Partner, White & Case

Jane Rueger
Counsel, White & Case

But the United States currently lacks the capacity to transport all its available oil and gas to users, and investors have been slow to support the development of additional pipeline capacity. As a result, crude oil and natural gas liquids (NGLs) are often transported by rail or truck, which is more expensive than pipelines, and an alarming volume of dry natural gas is simply flared at the wellhead. Thus, producers are losing billions, and the country is falling short of capturing the full potential of its shale revolution.

Given the excitement over the opportunities presented by shale discoveries, why has it been difficult to build momentum for investments in natural gas pipelines? There are many complex roadblocks discouraging investors. Crude oil and NGLs command higher prices than gas, so it can be difficult to attract investors that are focused on dry natural gas. In today's environment, investors are generally unwilling to commit funds to build significant new pipelines using traditional financing models. At the same time, the lack of coordination between the gas and power sectors has hampered demand for long-term capacity among gas-fired electric generators. These and other challenges addressed in this paper have contributed to the lag in the development of natural gas pipeline infrastructure.

Fresh ideas are needed to address these roadblocks if the United States is to capture the full benefit from its shale gas reserves. This piece explores steps in four areas that could hasten development of critical infrastructure, including making it more attractive to invest in natural gas pipelines. We hope these ideas invigorate discussion and help prepare the ground for the next wave of growth—in the industry and across the country.

Pump jack in North Dakota.

Production and demand surging, infrastructure lagging

In only a handful of years, the United States has found more oil and gas in new and remote production centers, such as the Bakken formation in North Dakota, than it previously discovered in its history. Recent advances in extraction technology have made vast US shale resources economically recoverable. The price of shale oil, which is pegged to prices on the world market, is currently high, and the United States is sitting on recoverable reserves that are second in volume only to Russia's. Moreover, US reserves of recoverable shale gas are the fourth-largest in the world. The massive potential of US shale gas is demonstrated by the effect of rising domestic supplies on US net gas imports, which have reached their lowest level since 1995. The US Energy Information Administration (EIA) projects that this trend will continue, with imports falling from 16 percent of total domestic consumption in 2012 to 4 percent by 2040.

Domestic demand for US shale oil and gas has steadily increased over the past ten years—even as production has surged—and growth in demand is expected to persist for some time into the future. Demand from power generators is a major source of this growth, since natural gas is expected to overtake coal as the biggest fuel source for generating electricity by 2035. Moreover, demand for natural gas has risen dramatically in nearly every corner of the globe. Major liquefied natural gas (LNG) importers—such as Japan, China, India and Spain—are additional sources of demand for US shale gas.

"Fully harnessing our unconventional oil and natural gas resources would act as a powerful engine of sustainable growth: generating well-paid jobs; spurring innovation in manufacturing; and contributing to the well-being of states and local communities," said White & Case counsel Jane Rueger. "Assuring energy security also ensures US national security and has major foreign policy implications."

Yet the United States continues to experience sharp spikes in gas prices and shortages in gas supply, as evidenced during the recent bitterly cold winter in New England and parts of the Southeast. Low gas prices and a lack of sufficient pipeline infrastructure have caused producers to slow their efforts to drill for dry gas in the United States. Comparatively high prices for crude oil and NGLs spurred producers to continue drilling for wet gas and crude oil. When they tap into dry gas in the process, they often have to flare it for lack of sufficient capacity to carry it to market. In the last year, the estimated revenue loss from flaring in the Bakken alone was US$510.8 million. To meet demand for North American natural gas, the Interstate Natural Gas Association of America estimates that US$641 billion will have to be invested in the United States and Canada to build infrastructure for transporting dry natural gas, crude oil and NGLs.

Also, due to transport bottlenecks, crude oil from new production centers trades at a discount to crude from other domestic sources, further reducing margins for producers. About three-quarters of the oil produced in the Bakken reservoir is transported by rail. It costs about US$4.50 more per barrel to ship oil than to transport it by pipeline, which adds up to an excess cost of about US$104 million per month of oil production.

ESTIMATED REVENUE LOSS FROM THE BAKKEN ALONE IN THE PAST YEAR IS

US$510.8

Million

Addressing the pipeline infrastructure gap could bring significant benefits. Expansion could also boost innovation, facilitate economic growth, and generate increased tax and royalty receipts for state and local governments as well as landowners. A December 2013 study by consultancy firm IHS estimates the increased investment in oil and gas transport and storage infrastructure would add a minimum of US$94 billion to US GDP, and increase US tax revenues by US$21 billion. The same study found that investments in pipeline infrastructure could generate more than 900,000 jobs over the next 11 years.

"The United States has a golden opportunity to become a powerhouse in global energy markets, to truly achieve full energy independence and to use natural gas to power our economy. But that path is far from assured without a major expansion of the long-distance pipeline network," said White & Case partner Daniel Hagan.

IHS estimates that the increased investment in oil and gas transport and storage infrastructure would lead to a minimum of

900+
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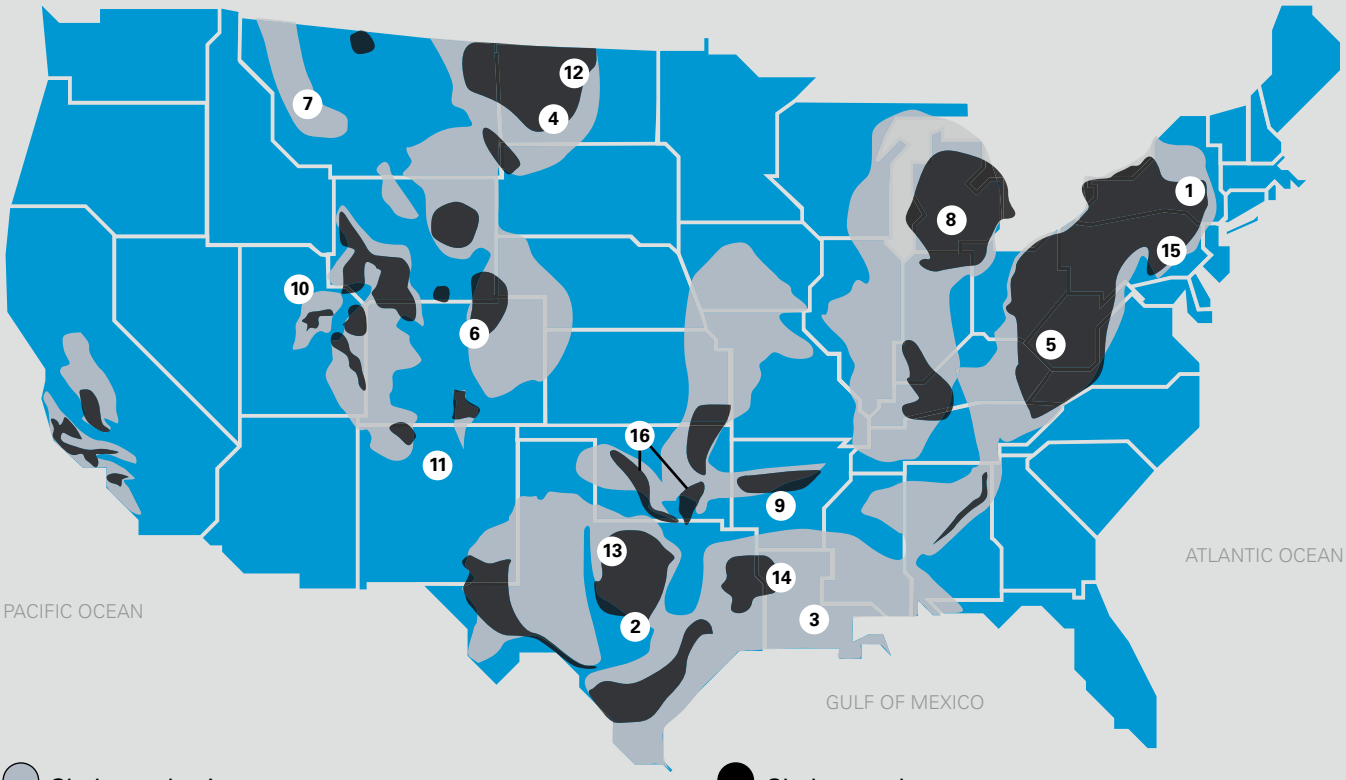
INJECTION TO GDP

+

US$21
Billion
IN TAX REVENUES

Growing natural gas supply and demand

Shale basins and shale plays in the United States



Shale gas basins

1 ALBANY
2 AUSTIN
3 BATON ROUGE
4 BISMARCK
5 CHARLESTON
6 DENVER
7 HELENA
8 LANSING
9 LITTLE ROCK
10 SALT LAKE CITY
11 SANTA FE

Shale gas plays

12 BAKKEN
13 BARNETT
14 HAYNESVILLE
15 MARCELLUS
16 WOODFORD

Source: EIA: "US Energy Mapping System"

US proved reserves and reserves changes 2010 – 2011

	Oil and lease condensate billions of barrels	**Wet natural gas** trillions of cubic feet
US proved reserves at December 31, 2010	**25.2**	**317.6**
Total discoveries	3.7	49.9
Net revisions	1.4	-0.1
Short-term interest rate (%)	0.7	6.0
Production	-2.1	-24.6
Net additions to US proved reserves	**3.8**	**31.2**
US proved reserves at December 31, 2011	**29.0**	**348.8**
Percentage change in US proved reserves	**15.0%**	**9.8%**

Notes: Wet natural gas includes natural gas plant liquids. Columns may not add up to total due to independent rounding.
Source: EIA: Form EIA-23 "Annual Survey of Domestic Oil and Gas Reserves."

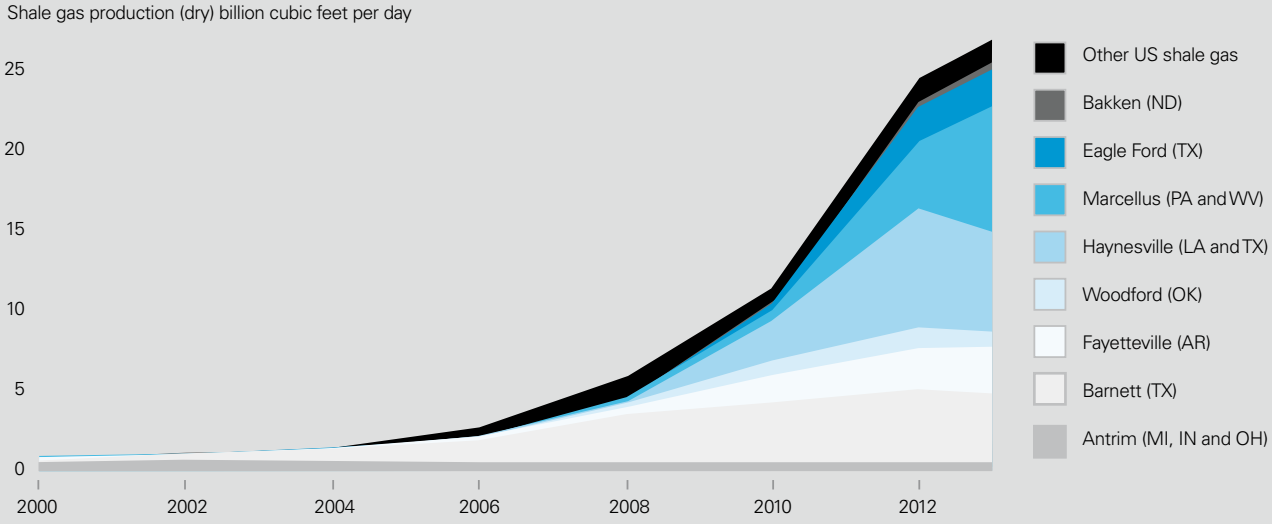
Share of US gas-fired generation

NATURAL GAS 2002
17.9%

NATURAL GAS 2012
30.3%

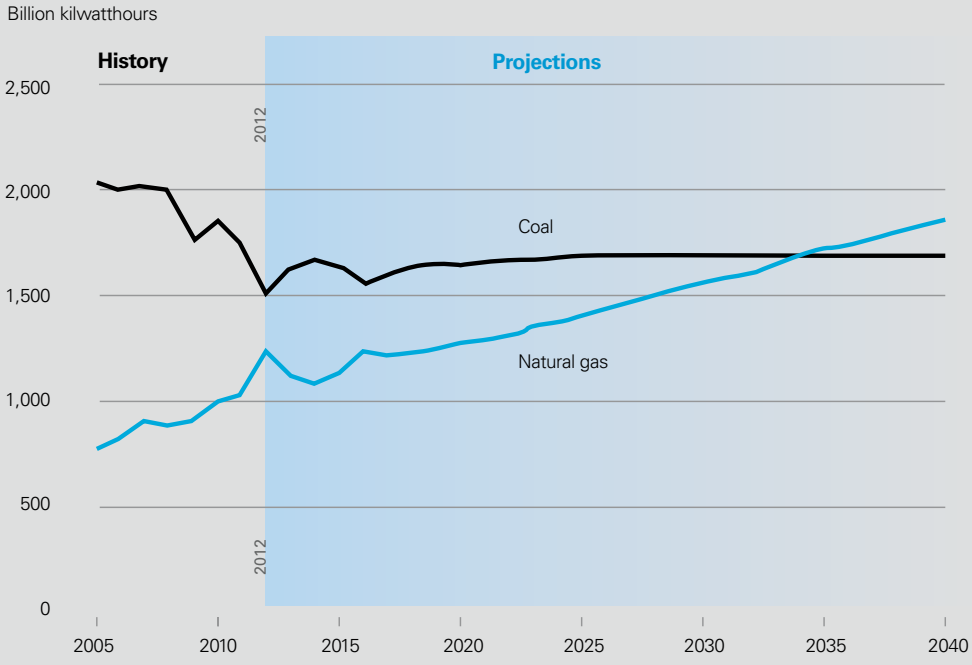
Source: EIA: "Energy Explained"

Volume of shale gas production



Source: LCI Energy Insight gross withdrawal estimates as of January 2013 and converted to dry production estimates with EIA-calculated average gross-to-dry shrinkage factors by state and/or shale play.

Electricity generation from natural gas and coal 2015 – 2040



Source: EIA: "AEO 2014 Early Release Overview"

US use of imported fuels due to growth in domestic crude oil and natural gas production

30%
in 2005

16%
in 2012

4%
in 2040

Barriers to progress

There are many complex barriers to investment in gas pipelines, including:

Lack of incentives.
The usual investment model involves a pipeline company building, owning and operating the pipeline, supported by gas producers or gas purchasers who are willing to enter into firm, long-term contracts for capacity. But producers are reluctant to commit to long-term contracts because gas prices are too low and volatile. Major gas purchasers, such as local distribution companies, are usually only interested in expanding pipelines when they are confident that demand for gas among core customers is increasing. In the current environment, they often do not believe it is economical to finance large-scale pipeline construction. Even power companies that are thinking about building gas-fired plants are caught in a "chicken and egg" dilemma: The gas-fired plant won't be built if there's no infrastructure to deliver gas supplies, but the infrastructure won't be built unless the power company guarantees a revenue stream to the pipeline provider via a firm contract. Many generators are not willing to provide such guarantees. "Traditionally, pipelines aren't built until they have sufficient market support in the form of long-term contracts. But in regions such as New England, independent generators aren't required to sign up for long-term firm capacity, and typically they don't," said Peter Fox-Penner, Co-Chairman of the Brattle Group.

Lack of coordination between the natural gas and electric markets.
Lack of coordination between the gas and electric markets contributes to the unwillingness of power generators to commit to firm, long-term contracts for gas. A brief look at how a day is structured for gas and power companies illustrates the mismatch. The "gas day" starts at 9:00 a.m. Central time and ends at 9:00 a.m. Central time the following day. Scheduling for natural gas transportation is done in regimented nomination cycles, and all nominations are for daily quantities to be delivered over the gas day. By contrast, the "electric power day" runs from midnight to midnight. While scheduling practices in power markets vary significantly across regions, most regional transmission organizations operate a day-ahead market in which generating units are committed to run the following day. They also run reliability and real-time markets in order to schedule additional generation necessary to meet changing estimates of load. Real-time markets can be run as often as every five minutes. "There is significant work to be done to bring gas and electricity markets into better alignment. We need a change in protocols for operating gas pipelines and electricity generators with better coordination. We also need better planning procedures and pricing mechanisms that harmonize development in gas and electric markets," Fox-Penner went on to say.

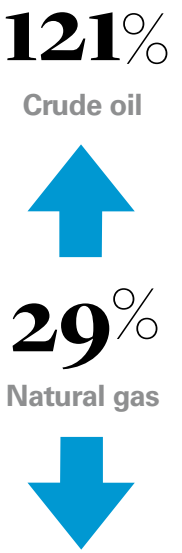
LNG exports have been slow to take off.
While world consumption of gas is expected to grow exponentially, regulatory uncertainty has kept US producers of shale gas from exporting LNG to gas-hungry countries such as Japan or Spain. LNG exports require a permit from the US Department of Energy (DOE), but the DOE has been cautious about issuing permits to countries that have no free trade agreement (FTA) with the United States. A study commissioned by the DOE concluded that exporting about 12 billion cubic feet (Bcf) per day would provide net benefits to the US economy. The DOE since issued seven permits to non-FTA countries that would enable exports of about 12 Bcf per day. The DOE's next steps—whether to authorize additional studies or permits—is unclear.

The existing pipeline network was not designed to serve new production centers.
The US gas pipeline system was developed primarily to move gas from traditional production centers in Texas and the Rockies to major demand centers such as the East Coast. Major new shale plays located near major demand centers—such as the Marcellus play, which is near the East Coast—are difficult for existing pipelines to accommodate. Regulatory and contractual problems have plagued some pipeline companies that have tried to reverse flow on their pipelines to transport gas from new shale plays.

Pipeline infrastructure faces stiff competition for investment dollars.
In the near term, pipeline companies must compete with rail and trucking companies for investment dollars, and shippers have the advantage of flexibility—they can build capacity and adapt to changes in delivery points, even remote ones, more quickly. However, rail and trucking options, which are able to transport only NGLs and crude oil economically, not dry natural gas, require more capital and present significantly higher public safety risks than pipelines. Because NGLs and crude oil command higher prices than natural gas, recent infrastructure investments have focused on NGLs and crude oil pipelines. Indeed, recently there have been a number of conversions of natural gas pipelines into NGL and crude oil pipelines. Yet recent reports estimate that investments in crude oil and NGL pipelines will wane within the next five years as investors turn their focus to natural gas infrastructure.

Permitting delays at state and federal levels stifles investment.
Permitting and siting approval for pipeline infrastructure—particularly for greenfield projects—is often a labyrinthine nightmare. It can take several years to clear these hurdles before construction can even begin.

Increase/decrease in capital investments in gathering, pipelines and storage (2010 – 2013)



Source: American Petroleum Institute, *Oil & Natural Gas Transportation & Storage Infrastructure Report*, Dec. 2013

There is significant work to be done to bring gas and electricity markets into better alignment

CASE STUDY

Existing pipelines' ability to respond to new gas supply centers: the Rockies Express example

The experience of the Rockies Express Pipeline (REX) demonstrates the difficulties inherent in repurposing existing infrastructure to take advantage of new US shale gas resources. Completed at a cost of US$6.2 billion, the REX pipeline was built to deliver gas from Colorado and Wyoming to areas as far east as Ohio. Though REX began shipments in 2009 near its full 1.8 Bcf daily capacity, REX's load factor was reduced to 66 percent by 2013 due to burgeoning production in the Marcellus and Utica shale plays which reduced demand for the Colorado and Wyoming gas in eastern markets. Bond ratings agencies began to question the pipeline's prospects after 2019 when its contracts with anchor shippers will expire.

REX sought to boost throughput on its pipeline by transporting Marcellus and Utica shale gas to eastern markets which, unlike transportation of Colorado and Wyoming gas, requires use of just one segment, or zone, of its existing pipeline. On July 15, 2013, REX announced that it had signed a contingent agreement to ship 200 million cubic feet of gas daily through its eastern zone to points such as Chicago and St. Louis. Though REX was designed to transport gas west-to-east, REX maintained that flow in both directions could be accomplished through the installation of compressors. However, REX asserted that it had to offer a lower rate than it charged its anchor shippers in order to compete in these Midwest markets, but it could not give its anchor shippers the same lower rate without jeopardizing its ability to make debt payments. The anchor shippers challenged REX's ability to charge less to new subscribers without lowering their rates as well, based on specific most-favored-nation (MFN) clauses in their contracts.

REX brought the dispute to the Federal Energy Regulatory Commission (FERC), asking it to find that the terms of the anchor shipper contracts did not require a reduction in anchor shipper rates if REX entered into the new contracts. Based on a technical analysis of the specific contract terms, FERC agreed with REX that the potential transaction would not invoke the anchor shippers' MFN rights. FERC noted that the MFN clauses were only triggered by service over the same zones as used under the anchor shipper agreements. Although FERC found the contract terms to be ambiguous, it reasoned that because the anchor shipper contracts involved transportation across all three of the pipeline's zones, while the proposed transaction would be limited to service in a single zone, the MFN clauses were not triggered. The contract-specific analysis in which FERC engaged highlights that there is no one-size-fits-all answer to the problem of refocusing existing infrastructure on new shale resources.

Preparing the ground for pipeline development

Fresh ideas will unlock demand for natural gas pipeline infrastructure and allow the United States to fully capitalize on shale resource opportunities.

Incentivizing investment. Pipeline investment and financing must be made more attractive. One way to do this is to add revenue streams from pipeline systems. Legislation before Congress offers one way to do this. Specifically, the Master Limited Partnership (MLP) Parity Act extends the benefits of MLPs to infrastructure firms and renewable energy concerns. To date, the MLP structure, which is taxed as a partnership and provides access to a lower cost of capital, has been a highly effective means of bringing unconventional oil and gas resources onstream rapidly.

The MLP Parity Act would provide strong incentives to infrastructure firms to invest in pipeline expansion and boost the development of clean power generation from solar, wind, biomass and other sources. Passage of the Act has received broad-based support across the renewable energy industry.

The MLP Parity Act would offer favorable tax options to pipeline operators and enable them to use their knowledge of siting and permitting to install renewable capacity, such as solar panels, to reduce their costs. The electricity generated from solar panels would offset the cost of purchasing fuel or power to run compressors; it would also enable many to generate revenues from surplus electricity and renewable energy incentive programs that are available in 19 states.

We offer a hypothetical example to show how solar power can provide a serious alternative source of financing. Consider a 380-mile interstate natural gas pipeline that runs from a fracking production area in the Utica shale formation to an interconnection with a downstream pipeline in Ohio. The operator could install 3 MW solar PV panels to power each of four

Laying a natural gas pipe at construction site in the fog.

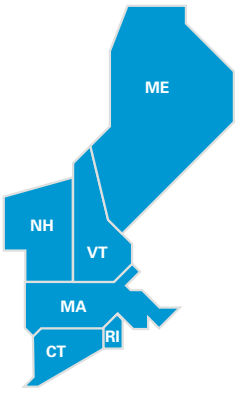
electricity compressors located along the pipeline, thus saving the US$1.19 million in electricity costs that would otherwise be required to run the compressors. The operator could also generate US$2.28 million by selling to the local utility the extra 25 percent in surplus electricity it generated. It could also earn US$4.89 million from renewable energy certificates and other renewable energy incentives available in Ohio. The total amount the operator could gain through this strategy is US$8.36 million. This would provide a substantial revenue stream to help defray the costs of building a long-distance pipeline. Extrapolated across a longer distance, say 1,000 miles of pipeline, an operator could create more than US$80 million in value using this strategy.

This hypothetical scenario is not offered as a concrete business case for the use of solar power; it is an illustration of the results that can be gained by those willing to pursue alternative means of funding pipeline expansion.

In some recent cases, other investment models have brought together the pipeline builder, gas producer, and the gas purchaser and seller as equity owners in infrastructure projects. For example, the greenfield Central Penn Line—a 177-mile spur of a Transco pipeline that will transport gas from the Zick area of the Marcellus producing region—is being developed by Transco with an equity infusion from WGL Midstream, which has agreed to invest US$410 million for a majority ownership interest in the entity that will own the Central Penn line. Cabot Oil and Gas Corporation, a large gas producer, has agreed to enter into a binding precedent agreement for 500,000 dekatherms of natural gas per day for 15 years. Cabot intends to sell the gas to WGL, and part of the US$410 million investment will be made for the gas purchase, with the price set according to a regional gas price index. "This project is unique in that the producer, the pipeline and the market have collectively combined resources to accomplish the individual goals of each party," said Cabot Chairman Dan O. Dinges in February. The Central Penn pipeline is scheduled to go into service in the second half of 2017.

Improving gas-electric coordination.
Another important element is to find ways to improve coordination among gas and electric power companies. As a growing percentage of the electricity generated in the United States is from natural gas, FERC and industry participants are exploring possible solutions to issues related to the coordination between natural gas and electricity markets. These efforts have taken on new urgency in the last two years, with FERC soliciting comments and suggestions from a wide range of industry participants.

Stakeholders have been pursuing various regional initiatives to encourage increased coordination. For example, in January 2014, the New England States Committee on Electricity (NESCOE)—which represents the electricity interests of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont—issued a proposal to address the region's chronic and severe gas-electric coordination issues. New England's reliance on gas-fired generation and its severely constrained pipeline capacity, coupled with increasing demand for natural gas and the retirement of non-gas-fired generation plants, presents increasing risks to grid reliability and could exacerbate the volatility of wholesale electricity prices in the region. NESCOE requested that ISO New England—the regional grid operator for the area—develop tariff provisions that would enable parties to recover the cost of investing in pipeline construction or expansion in New England. NESCOE proposes to recover the net costs for the procurement of this pipeline capacity by passing the costs to electricity ratepayers via ISO New England's tariff.



NESCOE

NESCOE outlined goals for increasing the amount of firm pipeline capacity into New England and making new pipeline capacity

available by the winter of 2017/2018. In order to achieve this, NESCOE is willing to work with ISO New England and other stakeholders, but it emphasizes that it does not have a single preferred mechanism for securing pipeline capacity.

This first-of-its-kind proposal, which has its opponents, is intended to be used to access natural gas supplies from the nearby Marcellus shale formation and reduce the current natural gas pricing disparities. (New England generators are often exposed to daily spot prices for natural gas that are higher than the cost of gas bought through long-term contracts.) The objective is to reduce electricity prices in New England by increasing the supply of inexpensive natural gas from subsidized pipelines.

There is no shortage of possible ways to improve gas-electric coordination. The key to unlocking demand for natural gas pipelines is to pursue multiple incremental improvements, not a single, universal solution.

Breaking the bottleneck in LNG export authorizations.
Tapping into world demand for LNG is critical to spurring investment in pipeline infrastructure. While it is unclear if the DOE will authorize exports above the volume it has already approved, it is clear that world events are unfolding quicker than the DOE's authorization process. The recent events in Ukraine and Crimea have led to several new bills in Congress that would promote LNG exports to US allies. In addition, there are several treaty negotiations that could affect the authorization process. For example, the Trans-Pacific Partnership Agreement (TPP), if executed by the United States and Japan, would cause the DOE to automatically approve LNG exports to Japan. But the United States must act swiftly to seize the opportunity, because other LNG exporting countries, such as Canada, are also racing to build their infrastructure to meet global demand for LNG.

Forging a solid partnership between industry and regulators.
The United States needs a national energy strategy to kick-start an ambitious pipeline expansion program.

To that end, in January 2014, US President Barack Obama ordered a Quadrennial Energy Review. The Review charges an interagency task force to develop an integrated energy strategy that addresses national security and safeguards the environment. The task force will seek input from state and local governments, the private sector, academia, nongovernmental organizations, consumers and other interested groups. The task force is expected to issue its first report in January 2015.

Initially, the task force will focus on determining the country's infrastructure needs for the transmission, storage and distribution of oil, gas and electricity. The report will assess current legislation and recommend necessary steps to promote infrastructure investment. It will consider how investments would affect the environment, the economy, jobs, energy security and other priority areas.

The Obama Administration has noted that the need to build pipelines is urgent, because doing so can close the gap between surging production and demand, and inadequate transport. Awareness of the need for solutions is growing throughout the administration. "The core approach, really, is that our infrastructure needs to be built out," US Energy Secretary Ernest Moniz said last January in a *Reuters* interview.

The Quadrennial Energy Review must examine current pipeline economics and conduct a wide-ranging search for new solutions to fund pipelines. In parallel, the Energy Review will need to take a hard look at the current practice of shipping huge amounts of oil by rail, carefully comparing the costs and benefits of transporting oil by rail versus pipeline. Safety concerns around rail transport are rising, especially after several recent major accidents, including a train explosion in Lac-Mégantic, Quebec that resulted in the deaths of 47 people last July. "Increasing volumes of crude oil transported by rail raise questions of safety," the International Energy Agency said in its 2013 medium-term oil market report. "Our analysis reveals that compared to pipelines, rail incident rates are higher."

Other innovative approaches to energy infrastructure must be developed by industry participants and regulators cooperating together to achieve common goals. They already have begun to do this in North Dakota. Only through fresh ideas and cooperation can the United States succeed in developing the energy infrastructure necessary to unlock demand for shale gas.

The core approach, really, is that our infrastructure needs to be built out

The United States needs a national energy strategy to kick-start an ambitious pipeline expansion program

CASE STUDY

The search for solutions to extinguish flaring in North Dakota

At the epicenter of controversy over gas-flaring practices in shale oil fields, industry representatives, regulators and government officials in North Dakota are actively searching for a solution to wasteful gas flaring. Approximately 30 percent of shale gas in the Bakken formation is currently flared. In January 2014, the Flaring Task Force (FTF) made recommendations that, if implemented, could increase natural gas capture from the current level of 70 percent to 85 percent within two years and 90 percent within six years, with the potential to reach as high as 95 percent, given the full support of all relevant participants. The recommendations include:

- Requiring oil producers and relevant midstream companies to develop Gas Capture Plans (GCPs) that detail their capabilities and a timeline to connect to gas pipeline infrastructure before a drilling application is filed.
- Establishing regulatory consequences for failing to submit or comply with a GCP. Under current regulations, wells can flare natural gas for a year before the producer must obtain an extension or face royalties and taxes, cap the well, or interconnect with gas pipeline facilities.
- Establishing policies and legislation to facilitate acquisition of necessary Right of Way (ROW) for pipeline infrastructure development. The FTF reported that difficulty obtaining ROWs is a primary cause of natural gas flaring because it often takes 180 days or more to obtain a ROW in North Dakota, and those initial 180 days are the most productive days of a new oil well. The FTF suggests that a coalition be formed to address this issue, composed of the ND Pipeline Authority, the State Energy Impact Coordinator, county leaders, landowner groups and industry members, and led by the state Attorney General.
- Creating financial incentives, including property tax credits, production tax credits and low-interest loans for infrastructure construction, enhanced funding for research regarding advanced capture technologies and other markets and uses for natural gas.

The response to the FTF proposal has been cautiously optimistic. For example, FERC Commissioner Tony Clark, who served as the former Chairman of the North Dakota Public Service Commission, stated that the FTF's reduction targets are "doable," but that obtaining the necessary ROWs will raise the "thorny issue" of eminent domain. Ultimately, resolution of the gas-flaring issue in North Dakota will require lengthy and politically sensitive actions at the state and local level. Nonetheless, the efforts so far are a prime example of the collaborative thinking necessary to advance public policy solutions to the problems of pipeline infrastructure development.

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