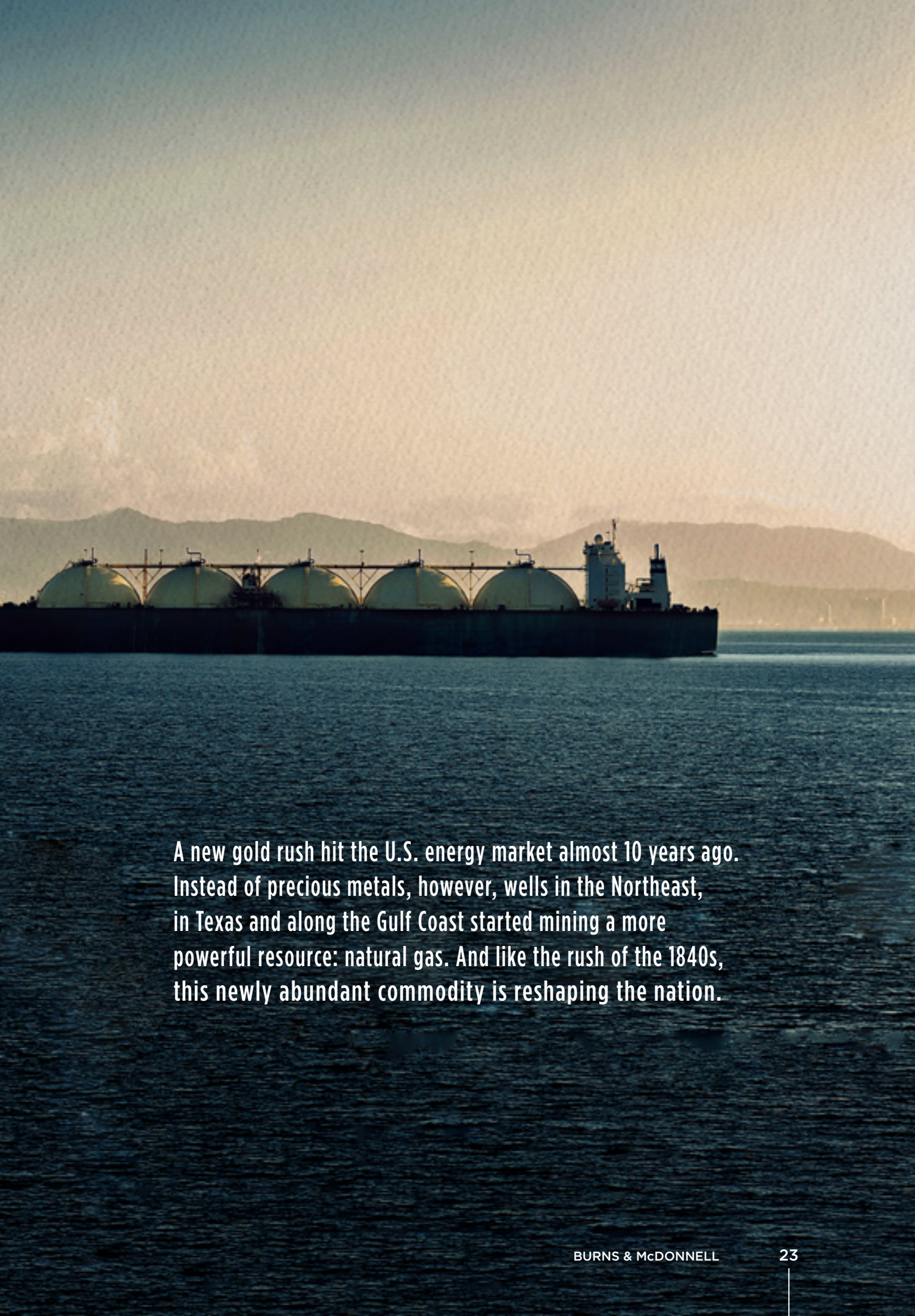




THE RISE of NATURAL GAS



A new gold rush hit the U.S. energy market almost 10 years ago. Instead of precious metals, however, wells in the Northeast, in Texas and along the Gulf Coast started mining a more powerful resource: natural gas. And like the rush of the 1840s, this newly abundant commodity is reshaping the nation.



The U.S. was the largest producer
of natural gas worldwide in 2017,
extracting almost

735
BILLION

cubic meters of natural gas.

Source: Statista, June 2018

Though natural gas has always had a seat at the energy table, its dominance is just a decade in the making — and isn't showing signs of slowing down. A reliable energy source produced largely in Texas and the Gulf Coast, natural gas has been used primarily to heat homes and fuel industrial demand since the 1970s. Transporting it to other areas in the country, whether the Northeast, Midwest or Northwest, resulted in more expensive overall prices relative to the oil and coal resources available to those regions. But that all changed with the increased development of rich natural gas fields.

THE RISE OF SUPPLY AND DEMAND

Advancements in natural gas extraction technologies have launched an unstoppable ripple through the energy market, underscoring the rising significance of powerful shale basins in the U.S., such as the Marcellus and Utica plays in the Northeast, the Permian Basin in western Texas and southeastern New Mexico, the Niobrara Formation in Colorado and Wyoming, and many more. Suddenly, regions formerly dependent on coal and nuclear power had an abundant supply of a cleaner, more cost-effective option to source.

"The Northeast has rocketed toward natural gas," says Dave Daley, a regional practice manager



at Burns & McDonnell. “There is an enormous new supply of natural gas in the U.S. now, and the market has responded with new sources of demand that didn’t exist 10 years ago.”

Unlike coal, which primarily serves the power industry in the U.S., natural gas provides a wide range of profitable potential. While natural gas continues to heat homes, the power industry has taken an interest in its ability to respond to gaps in reliability left by renewable sources — a valuable option for a basic supply of electricity, or the baseload. As an added benefit, natural gas burns cleaner, produces a significantly lower level of carbon dioxide (CO₂), and does not produce ash ponds, ash piles or other waste collections.

“Natural gas could be a solid baseload supply for the next 30 to 50 years,” says Tom Graves, an economist and market strategist at Burns & McDonnell. “As the nation transitions to more renewable energy, natural gas can provide a bridge to the flexible power we need to fill in those gaps.”

The chemicals industry also is responding to this abundant domestic fuel source. The Marcellus field produces wet gas — natural gas that contains a substantial amount of heavy hydrocarbon compounds that must be stripped out — and the chemical industry has developed a market for that liquid byproduct. As a result, the number of ethane cracker facilities has risen, breaking down these compounds to create polyethylene used in packaging, insulation, bottles and more, as well as other chemical components, such as ethylene oxide, vinyl acetate and ethylene dichloride.

Whether producing, consuming or converting, the demand for natural gas has spread across the nation — even into areas that don’t have indigenous sources, such as Georgia, Florida and Alabama. To reach these markets, the pipeline industry is charting new courses.

THE RISE OF INFRASTRUCTURE

From cross-country routes to short-haul connections, pipelines are feeding untapped corridors in the country and changing the landscape of natural gas transmission.

“Over the last five years, the market has seen a rampant escalation of new, major pipeline corridors being built,” Graves says.

One such example is Energy Transfer’s Rover Pipeline, a 713-mile natural gas pipeline that will transport natural gas from Marcellus and Utica to markets in Michigan, West Virginia and Ohio. This massive pipeline could extend even farther west by connecting into the Rocky Express Pipeline, or it could transfer into Chicago and go south to the Gulf. The connection possibilities could be never-ending. And the new surplus supply in the Northeast is encouraging a reverse in flows.

“Historically, pipeline transportation routes for natural gas were from the Gulf Coast to the rest of the country, such as the Northeast,” says Dana Book, pipeline director at Burns & McDonnell. “But because of new production areas, some existing pipelines are being made bidirectional to accommodate.”

The natural gas surge also has changed directions for power generators as an increasing number of coal-fired plants are retired or converted to natural gas-fired plants for electricity production. A cost-effective

Predictions show U.S. shale
natural gas production could reach

16.7
TRILLION

cubic feet in 2040, up from
360 billion cubic feet in 2000.

Source: Statista, June 2018

transition, these new facilities run more efficiently than the former coal options and require less ongoing operations and maintenance. And as they continue to appear across the nation, more ancillary pipelines stretching 2 to 10 miles are in demand to transfer gas from major lines to fuel the new facilities.

“New production areas and new areas of consumption are really driving the transportation of natural gas,” Book says. “There is currently a pent-up need for new pipelines.”

THE RISE OF NATURAL GAS'S FUTURE

Following a decade of growth in production, the U.S. natural gas market has taken center stage in global energy trade. Oversupply generated in the Northeast created the first major global energy commodity produced in the U.S., and forward-thinking utilities are charging toward this opportunity.

In March 2018, Dominion Energy opened the Cove Point liquified natural gas (LNG) facility, a \$4 billion export terminal in Maryland targeting European and Asian markets that either can't produce natural gas or are constrained geographically. Only the second LNG export facility in the U.S., Cove Point boasts a storage capacity of 14.6 billion cubic feet (BCF) and can send out 1.8 BCF daily.

Additional utilities are expected to follow in Dominion's footsteps, with the potential to see five new LNG export facilities on the U.S. Atlantic, Pacific and Gulf coastlines by 2021, according to the Energy Information Administration's 2018 Annual Energy Outlook report. In the meantime, existing LNG import facilities in the U.S. have been applying for federal approval to reverse course and begin exporting.

These facilities also will need direct pipeline connections for their natural gas supply, increasingly expanding the network of pipelines spreading across the nation.

“Exporting energy is a new market for the U.S., and it was started by natural gas,” Book says. “We are at the very beginning of developing natural gas export facilities and the pipeline infrastructure to support them, and it will only increase. It's a brave new world.”

So, will the natural gas market continue its rise? That's unknown. The supply in the U.S. is prominent, but outside influences might affect fracking capabilities or transportation opportunities.

“The most important thing to watch is policy, whether environmental, trade or economic, especially in the next five to 10 years,” Graves says. “Those will be the main factors affecting our ability to secure this long, stable, cost-effective natural gas supply for the next century.”



Read more insights from
Tom Graves, an economist
and market strategist at
Burns & McDonnell, on how natural gas
is altering our energy supply landscape at
burnsmcd.com/AlternatingCurrents.