



2019 Global Energy Outlook

Increasing complexity and new global relationships make managing energy costs more challenging than ever

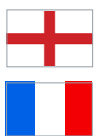
Infrastructure advancements, political agreements and complex financial partnerships are connecting energy markets in North America, Europe and Asia more closely than ever before.



In 2019, American natural gas producers will have new access to European markets due to greatly expanded export facilities. That's due in large part to developments in late 2018 when Poland's state-owned gas company finalized a deal to buy liquid natural gas (LNG) from American suppliers for the next two decades. Around that same period, the United States and Poland also signed a deal to support construction of nuclear plants in Poland.



Meanwhile, Russia's state-owned natural gas company, Gazprom, began construction in late 2018 on the Nord Stream 2 pipeline, which will deliver gas directly to Germany. The new pipeline would add new export capacity and bypass traditional 'transit' European markets.



A bit further north in the EU, a nuclear plant under construction in Britain — Hinkley Point C — is owned and will be operated by Électricité de France (EDF). EDF has partnered with China General Nuclear Power Group (CGN) on the project, with the state-owned nuclear company providing 33.5 percent of the funding for the new plant.



And, of course, China's demand for energy continues to rise.

These and other intertwined developments present new challenges in managing energy costs for commercial and industrial organizations. Energy buyers would be wise to develop and maintain a comprehensive view of the [complexities, political dynamics and, in some cases, tensions](#) that influence energy markets generally and commodity volatility specifically. While managing budgets and financial forecasts for 2019, energy consumers should understand these trends that will most influence their costs.

LNG Export Capacity in America

The U.S. natural gas market has traditionally been insulated from activities in other markets. However, America's burgeoning ability to export its natural gas is changing that dynamic. According to the U.S. Energy Information Association, during the first six months of 2018, net natural gas exports from the United States were more than double the average daily net exports during all of 2017. That trend is likely to continue, with the U.S. currently expected to roughly double its LNG export capacity by the end of 2019 compared to where it finished 2018.

Asia buys 75 percent of the world's LNG. And China, Japan and South Korea are the top three purchasers. The International Energy Agency reports that Chinese demand for LNG will rise 60 percent between 2017 and 2023. Increased access to world markets gives American natural gas producers more options to sell their product in Asian markets; they are no longer limited to selling in the U.S. alone.

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This is likely to change the supply and demand equation globally, where the market could shift to oversupply. Or China could absorb the extra capacity. A particularly cold winter in China, for example, could increase demand substantially, and the supply needed to meet that demand could drive up U.S. prices. Increasingly, energy buyers will have to keep an eye on price exposure based on variables in those regions.

Future of Nuclear Power in Flux

As natural gas consumption rises and coal use declines, nuclear power is stuck in limbo. Nuclear energy is an attractive option for countries looking to reduce carbon dioxide emissions. However, voters and environmentalists often believe the safety risks associated with nuclear power plants outweighs this benefit.

Immediately after the 2011 earthquake and subsequent meltdown at the Fukushima reactor in Japan, officials shut down all 54 of the country's nuclear power plants.

Other nations have followed suit.

For example, German Chancellor Angela Merkel shut down eight plants and limited operations of the remaining nine with plans to permanently close those too by 2022. Nuclear power capacity in Germany has been reduced significantly, dropping from 20.4 gigawatts per year in 2010 to 12.1 gigawatts in 2011. Capacity rates have fallen only slightly since then.

The problem: Finding a replacement for this low-carbon energy source has not been easy. Plus, public sentiment about nuclear plants and politicians' plans for them have diverged in both a positive and negative direction.



In 2015, the French government passed an energy transition bill with plans to reduce its share of nuclear energy from 75 to 50 percent by 2025. These plans changed in November 2018, however, when the government announced this target was not realistic and would endanger its supply security. France's heavy reliance on nuclear energy is unique in Europe and a result of its decision in the 70s to expand generation capacity. As a result, the country is the world's largest net exporter of electricity thanks to the low cost of generation. This robust nuclear generation system has provided the country more energy independence than most European countries, as well as low carbon dioxide emissions per capita from electricity generation.



In the U.S., nuclear energy supplies about 20 percent of the country's electricity. But the increased age of the infrastructure means many of these plants are approaching permanent shut-down. Six stations have closed in the last few years and 16 more are scheduled to shut down in the next decade. Nuclear power can't compete economically with natural gas, a much cheaper alternative. The rapid expansion of renewable power has worked against nuclear power producers, as well.

Three U.S. states offer financial assistance to keep their nuclear plants operating. New York, Illinois and New Jersey offer Zero Emission Credit (ZEC) programs to preserve this source of carbon-free generation. The program provides one ZEC for each megawatt-hour (MWh) of electricity produced. A few related notes:

- The New Jersey program was approved at the end of November. Nuclear operators had about one month to apply for the subsidy, provided they were able to demonstrate a clear need for the credits and the ability to help the state reduce carbon emissions.
- In Illinois, the price of a ZEC drops if a state-set market-price index exceeds a certain level.
- In New York, the price of the ZEC is fixed for two years and is based on the federally determined social cost of carbon.

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A recent U.S. deal with Poland encompasses both nuclear power and gas. The energy security agreement includes the development of civil nuclear energy infrastructure and the construction of nuclear power plants. Poland's primary gas company also signed a deal to import LNG from an American supplier for the next 24 years.

Other European countries that are keeping nuclear power in their energy mix include Britain, Finland, the Czech Republic, Slovakia and Hungary. Britain's Hinkley Point C is the largest construction site in Europe and when the plant is completed, it will be the most expensive power station in the world. In an article from *The Guardian* about Hinkley Point C, the project was criticized by energy policy experts and industry leaders as being too expensive, poorly designed and potentially obsolete by the time it opens in 2025.

The French utility that owns the plant will receive a fixed price that rises with inflation for the first 35 years of operation. In 2012, the guaranteed price was set at 92.50 MWh per pound. This fee will be recovered via electricity bills around the country, not just customers who are actually using energy generated at Hinkley Point C. At the same time, both Toshiba and Hitachi have scrapped or indefinitely paused plans to build nuclear plants sited in Cumbria and Wales, respectively.

In 2016, Taiwanese President Tsai Ing-wen promised to phase out nuclear power by 2025, which provided some 14 percent of Taiwan's electricity at the time, by 2025. However, in 2017, Taiwan suffered a deadly blackout that threatened the nation's semiconductor industry. The use of nuclear power went to a referendum and the following year, a majority of voters agreed with pro-nuclear campaigners who said renewable energy was too unreliable to support the country's energy needs.

Clearly, a number of critical decisions on nuclear power production are still yet to be made. The only certainty is that any move to retire nuclear plants will mean reduced supply. And, all things being equal, reduced supply will mean increasing power prices.

Infrastructure Expansion

Pipeline construction has increased dramatically around the world over the last few years. The industry has attracted billions of dollars in investment which has, in turn, set off a wave of mergers and acquisitions. In addition to drawing investments to the energy sector, the degree of connectivity among gas markets has led to similar commodity prices across many markets.

Prices on the EU gas hubs moves up and down together because there is enough pipeline capacity and market connectivity to ensure similar movement. PEG — the French hub — breaks away from the pack at times because connectivity is weaker and can be overwhelmed under certain conditions. There is weaker connectivity between European and Asian prices, but LNG trade ties the markets together to some degree. Currently, there is no connection between U.S. prices and prices in other markets because of the limited LNG trade. This will change eventually with enough LNG export capacity to other markets.

Whether the product is LNG or pipeline gas or crude oil or power transmission, the market force is the same. The lower-priced market will build a connection to the higher-priced market if the spread justifies the cost because the suppliers want to get their product to the market with most earning potential. Eventually the two markets will start to move together and see more similar pricing if there is enough connectivity. While increased connectivity to European markets will be a benefit to suppliers, American gas consumers may see higher prices for natural gas.



The report, "North American Midstream Infrastructure through 2035: Significant Development Continues," predicts that the U.S. and Canada will require natural gas, oil and natural gas liquids infrastructure investments of about \$44 billion per year, from 2018 through 2035. Natural gas-related infrastructure represents more than half of the needed energy infrastructure, with an average investment of \$23 billion annually over the next 27 years.

In Texas, companies are scrambling to build sufficient infrastructure to support the booming oil and gas production in the Permian Basin. Texas provides about 40 percent of America's oil production, about 3.7 million barrels a day. Many drillers are leaving oil in the ground and flaring off natural gas as they wait for the new pipelines to be built. Companies are planning to spend more than \$40 billion to build or expand nearly 10,000 miles of pipeline to connect to refining and export markets along the Gulf Coast. That's because as West Texas sees record oil production growth from the Permian shale basin, the discrepancy between the cost of oil in a place like Midland, Texas compared to oil in the nearby hub of Cushing, Oklahoma has become a function of a lack of pipeline capacity. While Cushing is better connected to refineries, Midland is where production is booming.

The impact has been especially apparent over the past year, when an identical barrel of oil in Midland could trade at a discount of 25% or more compared to that same barrel in Cushing. That type of spread is only possible because pipeline capacity — or rather lack thereof — allowed for different prices of the same commodity in different regions, creating an opportunity for new pipeline capacity to take advantage of the spread between the two markets (i.e. buy low, sell high: shale boom edition).

The regulatory climate in Texas favors this construction; however, projects in other states face more challenges from state regulators. Among the most noteworthy:

- The Constitution Pipeline, designed to transport natural gas from northeastern Pennsylvania to the Iroquois Gas Transmission and Tennessee Gas Pipeline systems in Schoharie County, N.Y., is in continued litigation with New York regulators who denied a water quality permit for the work.
- Construction on a portion of the Mountain Valley Pipeline, that will carry shale gas from West Virginia to Virginia, was suspended after the U.S. Army Corps of Engineers withdrew the project's water crossing permits in West Virginia. Additionally, the pipeline continues to face other regulatory hurdles and opposition in Virginia, which may cause further construction delays.
- After facing several delays due to regulatory reviews, the Atlantic Coast Pipeline received unanimous approval from the Virginia Air Pollution Control Board on January 1, 2019, for an air quality permit for a compressor station. This was the final state approval needed.

Other projects have had more success. The NEXUS Gas Transmission system went into service in October 2018 to transport natural gas supplies from Appalachian shale plays. This pipeline will transport gas to the upper Midwest and Canada. And the new interstate Rover Pipeline has entered its final phase of construction, which will transport natural gas through Pennsylvania, West Virginia, Ohio and Michigan.

At the start of 2018, the European Investment Bank approved a 1.5 billion euro loan to TAP – the bank's largest ever single loan to an energy project.

The changing fortunes of individual pipeline projects illustrate the many challenges of building out this energy infrastructure. Pipeline projects in Europe have had a smoother path. The Nord Stream 2 pipeline from Russia to Germany has received permits in four out of the five countries through whose waters the pipelines will pass. Construction at the Russian and German landfalls is underway and vessels have laid about 370 kilometers of pipeline as of early January 2019.

Construction will start this year on the Trans-Adriatic Pipeline (TAP), the final leg of the Southern Gas Corridor. At the start of 2018, the European Investment Bank approved a 1.5 billion euro loan to TAP — the bank's largest ever single loan to an energy project. The company completed the financing process for the 3.9 billion euro project in December 2018.

The pipeline will transport gas from the Caspian Sea to the Mediterranean and is crucial to the EU's plan to establish alternatives to Russian gas.



Managing Multiple Market Dynamics

Executives need a nuanced understanding not only of the impact of energy volatility on their businesses, but also the increasing financial risks that accompany this volatility. When market volatility increases costs, the first impact is to margins and budget certainty – a front-line impact. If volatility will have a significant impact in the short-term, corporate leaders can hedge in the market to mitigate higher costs. An understanding of the most relevant risk factors can minimize expenses and increase budget certainty.

With constant cost uncertainty, it's difficult to plan and budget. This increases tenfold with operations in more than one country. Energy buyers working with a multi-country portfolio need a global understanding of politics and market dynamics, including intelligence that integrates all energy market factors and pinpoints those that will have the greatest impact on the bottom line.



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