



2019 Global Energy Outlook

Trends, Impacts + Opportunities

Schneider Electric's 2019 Global Energy Outlook explores the trends creating the most significant regional, national and international shifts in energy market dynamics, including:

- Policy & Politics
- Commodity Volatility
- Non-Commodity Trends
- Geographic Variations
- Extreme Weather
- Supplier Diversification

Explore more trends at the [Global Energy Outlook Hub](#)

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Introduction

Near the end of 2018, we reconvened more than a dozen experts from Schneider Electric offices around the globe representing Operations, Research, Analytics and Risk Management. As we've done for nearly a decade, we began the conversation with a fundamental question:

“What trends will have the greatest impact on energy supply strategy in 2019?”

Our experts discussed geopolitical tendencies, consumer behavior, policy evolution, technological innovation, and a variety of economic factors that influenced the energy landscape in 2018. After another spirited discussion, the team agreed on six primary domains where 2019's supply trends are most likely originate:

1. Global Policies and Politics
2. Renewed Commodity Volatility
3. Increasing Non-Commodity Charges
4. Emerging Geographic Opportunities
5. The Escalation in Extreme Weather
6. Diversification of Energy Supplier Offerings

Our 2019 Global Energy Outlook will monitor developments in these topics throughout the year. This document primarily focuses on the first four, but you can follow our extended coverage of all six topics at bit.ly/GEO19.

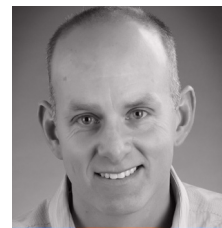
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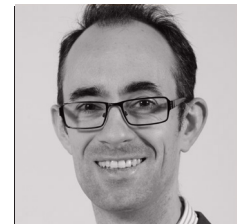
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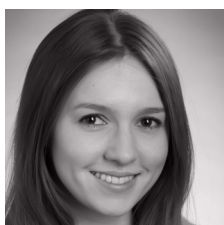
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2019 Global
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Energy security and political rhetoric influence energy markets

The intersection of Politics and Energy Policy is a busy one. Unfortunately, not everyone agrees on the traffic signals and, as a result, there's a lot of gridlock. Even as scientists warn that world leaders are running out of time to take comprehensive action on climate change, some politicians are still debating the existence of the problem. Across the globe, the carbon-free future campaigners are in a tug of war with the fossil fuel advocates. Bold plans set in motion by one administration are postponed or cancelled by the next.



In the **United States**, the Trump Administration is opening up protected public land and offshore waters for gas and oil drilling. At the same time, market forces are tipping in favor of renewables. According to a Reuters analysis, more coal plants closed during President Donald Trump's first two years in office than during the first five years of the Obama administration. Executives have realized they can generate more revenue from a new wind farm than a new coal plant, with or without federal subsidies.



In **Australia**, the Liberal and National parties want to guarantee coal's future with a \$5 billion fund for future power plant construction. The Labor Party, meanwhile, wants to set even more ambitious targets for reducing emissions than the ones set by the Paris Agreement.



Even in the **European Union** — where politicians are taking some steps to address climate change — progress has been slow. There is existing uncertainty in the UK over participation in the EU ETS for the 2019 and 2020 compliance years: to stay in, in case there's a deal by end of October, or drop out in case of a no-deal Brexit. Looking much further ahead for the UK: the scrapped nuclear project, and the ambitious net zero carbon emission target by 2050 will require a significant ramp up in alternative sources of power generation, such as an almost 10-fold increase in offshore wind generation.

There is regulatory uncertainty in France and Germany, as well, in regard to long-term energy plans. Leaders say they want to phase out coal, but there is uncertainty about the speed and specifics of the transition. At the start of the year, French President Emmanuel Macron paused a planned tax increase on fossil fuel to allow a national debate on energy policy.

These changing strategies and the associated uncertainty complicate strategic planning and create price volatility. Government energy policies – those simply debated and those haltingly implemented – affect global energy prices. This slow, sometimes contradictory, process makes it a challenge to build an energy strategy.

In 2019, energy buyers must remain alert in tracking political developments, as well as traditional concerns about energy security, trade policies and sanctions on Iran, for example, to understand the impact on energy markets.



Trump & Trade: The Impact on the Energy Sector

In the U.S., Congress is divided, with Democrats controlling the House of Representatives and Republicans in charge of the Senate. There is no one policy or piece of legislation influencing the energy markets though the federal government continues to fund research and offer grants, loans and tax incentives to promote renewable programs.

For oil-producing countries, Saudi Arabia and Iran are still the countries to watch throughout 2019. While restrictions on sales of Iranian oil and petrochemicals took effect on November 4, 2018, a six-month waiver installed for the European Union, Turkey, China, Japan, India and South Korea helped blunt the immediate impact of those restrictions. And, as of May 2, the waiver officially expired. As a result, Iranian oil exports that had first tapered off earlier in the year, now appear to be approaching a complete halt.

The loss of Iranian exports from the global market reduced total supply by ~1-1.5 million barrels a day since late last year. However, the end of waivers means the market will likely have to confront a further 1.2 mmbbl/d of lost exports. Saudi Arabia and the US have agreed to a mutually beneficial – albeit tentative – agreement designed to mitigate price-related impacts of the sanctions with Saudi Arabia pledging to boost oil output if needed. But, the extent to which the Saudis follow through on that promise is still unclear. What is clear is the expectation Saudi Arabia will proceed with caution as it looks to avoid the same mistake it made in flooding oil market in 2018. Looking ahead, it remains to be seen if Trump's Iran policy contributes to higher prices in 2019 as a result.

For natural gas suppliers, the issue is one of necessity. More specifically, LNG necessity in critical Asian markets. Beginning in 2018 and projected through 2019, data points to US liquified natural gas (LNG) export capacity nearly doubling by the end of the year. The US could realistically ship as much as 10% of its domestic production internationally, or approximately 9 Bcf/day of its anticipated 90 Bcf/day total output.

As of early 2019, Iranian exports have already dropped well over 1 million barrels per day and should continue to about 2 million barrels per day based on current estimates.

However, while demand for LNG remains relatively strong in Asia, that demand lagged much more than anticipated over the mild winter. As a result, US LNG stayed home creating an unexpected bear market. The effects of yet another mild winter throughout Asia could again dampen US LNG exports and leave more supply than expected (or desired) stateside.



Economics vs. Energy Security in Europe

New energy export infrastructure in Europe is causing tension there, as well. The Nord Stream 2 pipeline would double the capacity of an existing pipeline to 110 billion cubic meters per year – more than 25 percent of the EU's gas consumption. Western European country leaders generally support the project, though central and eastern countries are opposed.

Since the project was first proposed, Germany has framed the project in economic terms. The new pipeline will make Russian gas cheaper for German consumers. Other European leaders have said that building the pipeline sends a signal that Europe is back to business as usual with Russia, despite the alleged election interference, support of Bashar al-Assad in Syria, and ongoing hostilities in eastern Ukraine.

A strictly economic analysis of the benefits of the pipeline quickly gives the obvious economic answer: build it. Russian pipeline gas is cheaper than imported LNG from the US (or anywhere else for that matter). However, when energy security takes on greater importance, the calculus changes. Supply diversity becomes an important defense against Russia using its increasingly powerful leverage granted by Europe's reliance on Russian gas supplies.

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Gazprom — Russia's state-owned gas company — is leading the project, which could possibly reduce volume through Ukraine once NS2 is online, where transit fees contribute between \$2-3 billion dollars to the Ukrainian economy every year. In addition to Ukraine's financial loss, eastern European countries would also lose leverage with Russia if their land no longer hosted a vital pipeline.

At a NATO summit in July 2018, President Trump accused Germany of being held captive by Russia because of this pipeline. In January, the Trump administration threatened to sanction Russia and construction companies building the pipeline, but construction continues. Russian leaders promised to complete construction even under sanctions and Russian President Vladimir Putin claimed Gazprom could complete the pipeline without external funding, if necessary. Collectively, Shell, Germany's Wintershall and Uniper, France's Engie and Austria's OMV are paying half of the construction costs.

In addition to making threats, the Trump administration has taken diplomatic steps to protect the market for U.S. gas in Europe through a partnership with Poland on a Joint Declaration of Energy Security. In parallel – and to further reduce its dependence on Russian pipeline gas – Poland plans to increase imports of LNG from Qatar and the U.S. In October, Polish Oil & Gas finalized two contracts to purchase approximately 1 million tons of LNG annually for the next 20 years from an American supplier.

The Trans Adriatic Pipeline (TAP) is another hedge against Europe's complete reliance on Russian gas. TAP is the last leg in a pipeline that will transport Caspian natural gas from Central Asia to Western Europe. Project leaders closed the last round of financing in December 2018 and expect the first delivery of gas in 2020. TAP represents 3.9 billion euros in the total budget of 40 billion euros for the Southern Gas Corridor.

Connecting with the Trans Anatolian Pipeline (TANAP) at the Greek-Turkish border, TAP will cross Northern Greece, Albania and the Adriatic Sea before coming ashore in southern Italy. According to Reuters, TAP will be the first non-Russian gas pipeline to supply Europe since the Medgaz link connected Algeria to Spain in 2011.

Brexit and More Regulatory Uncertainty

For European Union and United Kingdom leaders, the challenge is figuring out new regulations to guide a similarly difficult transition: *Brexit*. For energy markets, one of the top issues is the EU's Emissions Trading System (ETS). If Britain leaves the EU with no plan in place, the most likely options are the creation of its own carbon trading system or the implementation of a new carbon tax. In contrast to the moving ETS price, a carbon tax would be reportedly fixed at between 16 and 18 £/tonne.

In the longer term, limits on energy trade between the UK and the EU – whether through regulatory barriers or decreased physical interconnectivity – will increase overall price volatility. The UK government will still have the triple challenge of securing energy supplies, cutting carbon emissions and providing affordable energy. UK leaders likely will face higher transportation costs and decreased EU investment in the UK's energy infrastructure. And, the ongoing uncertainty around Brexit and its impact will discourage outside investments in general.

The Brexit challenge for EU leaders will be filling a 13.45-percent revenue gap created by Britain's departure. In February 2018, a group of former EU officials recommended the implementation of new carbon taxes to address this shortfall. An annual fee of 5 euros per ton of carbon dioxide generated from burning fossil fuels would generate 17 billion euros per year. The group also suggested raising or adding fees on diesel fuel, kerosene and airline tickets. This push toward higher energy taxes got an additional push from the Organisation for Economic Co-operation and Development report on taxes on fossil fuels. Researchers found that current worldwide tax rates on energy use are inadequate to compensate for the toll pollution from energy production takes on the environment and on human health.



Vehicle Fuel Tax Fuels Unrest in France

The French government also got a painful reminder of the public backlash that new fees related to energy and fuel use often provoke. Earlier, President Macron's government planned a January 1 increase in vehicle fuel taxes to support emissions reduction. (Increases in gas and electricity prices this winter and stricter rules for vehicle emissions tests were planned, as well.) Macron was forced to delay all the measures after several days of riots, vandalism and four deaths.

This public protest in France mirrors a similar reaction to a 90s-era gas tax increase scheme in Britain. The fuel duty escalator increased taxes on gasoline from 1993 through 1997, until the fee reached 75 percent of the total cost of one liter. Britons went from paying some of the lowest fuel prices in Europe to among the highest. The increases stopped at that point, until 2006, when additional taxes pushed the tax portion of a liter of fuel over 80 percent. Politicians abandoned the scheme after 2011 due to its unpopularity. The increase planned for 2017 was cancelled, reflecting the persistent challenge of increasing fuel prices to balance the impact of rising carbon dioxide levels.

Australia: More Coal or No Coal?

In Australia, the debate centers around the fuel source that has long been a cornerstone of Australian energy policy: coal. The Liberal Party wants to stick with coal while the Labor Party wants to accelerate coal's retirement. A staggering 70 percent of Australia's electricity is generated from coal, though that figure is down from 80 percent only a few years ago. Between 2019 and 2030, many coal-fired power plants in Australia will reach 50 years of age, and it's likely that more than half will be retired.



However, the right-wing of Australia's Liberal Party wants to build new coal-fired power stations as a means to pressure power prices, while the more center-left Labor Party wants to increase efforts to meet the Paris emissions targets. The current target calls for a 27 percent reduction of CO₂ emissions by 2030. Labor's proposed target is a 45 percent reduction by 2030, but it is unclear whether they can implement any of their policies. There are suggestions that the Labor Party may take a majority of seats in the upcoming 2019 election, which would only help its cause. These radically different potential futures create tremendous price uncertainty in a country where burning coal represents so much of the total electricity production mix.

Former Prime Minister Malcom Turnbull was elected in 2015 on a promise to repeal Australia's carbon tax. His proposed alternative was the "national energy guarantee." The "NEG" sounds like a fair compromise: it requires energy retailers to provide a sufficient and reliable source of power while lowering emissions at the same time. Generally, business leaders still favor the plan while environmentalists are against it. No one can agree on how to do this or even if it is the right path forward. The central question is whether it's viable for Australia to keep swimming against global initiatives to reduce carbon emissions.

The current target calls for a 27 percent reduction of CO₂ emissions by 2030. Labor's proposed target is a 45 percent reduction by 2030.

Strategies for Tracking and Understanding Political Changes Worldwide

Tracking the economics behind the energy market is a significant and ongoing challenge. Buyers must take a comprehensive view of all the factors that affect the market. Monitoring political changes makes it easier to respond to regulatory and economic shifts.

It's tempting to leave the work of negotiating regulations in the hands local, state and federal politicians, but that runs counter to the strategy of active energy management. Often, network operators, generators and retailers will lobby against new competition and in favor of additional market regulations that discourage competition. Without the consumer's point of view to influence the conversation, generators are able to maintain outsized influence on the market and end users end up picking up the tab for any extra costs that influence creates.

It's crucial for end users to engage governmental decision-makers as part of the regulatory process. Energy consumers should know how regulatory changes will affect their organization, then act proactively and plan accordingly.



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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 have already had more influence on European markets due to expanded export facilities. One recent example of how that influence is increasing is illustrated by a deal between Poland's state-owned gas company and American LNG suppliers. The deal will remain in place for the next two decades, in fact. (Incidentally, 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 possibly 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 North America 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.

In the U.S., nuclear energy currently supplies about 20 percent of the country's electricity. However, six stations have closed in the last few years and 16 more are scheduled to shut down in the next decade.

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 2015, 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 EU gas hubs move 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. There is weaker connectivity between European and Asian prices, but LNG trade ties the markets together to some degree. We've also seen nascent connectivity between U.S. prices and prices in other markets. This connectivity will continue to evolve, and likely increase, with enough LNG export capacity. 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 was especially apparent — when an identical barrel of oil in Midland could trade at a discount of 25% or more compared to that same barrel in Cushing — until recently. Over the previous few months, that price delta has narrowed considerably to only a few dollars. And, if current trends remain steady, prices in Texas may recover completely vs. Cushing over the next 6 months, potentially even to the point of asking a slight cost premium.

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 generally smoother path, but not without some issues. 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, however Denmark is still hesitating over permits for construction through its waters and this, together with possible project delays, raise the risk that the project may not complete on time in December.

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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Optimizing non-commodity costs requires new expertise and a more active role in managing energy costs

Target is known for its red bull's-eye logo and its ability to quickly adapt to consumer tastes. Over the last few years, America's second-largest retailer has adapted to another important trend: Active Energy Management.

In 2015, the retailer began installing solar panels on store roofs with a goal of 500 installations by 2020. This new energy source will supply up to one-third of a store's electricity needs. Target has used Power Purchase Agreements (PPAs) to enable these installations. With a PPA, a developer handles the design, permitting, financing, and installation of the solar energy system on a customer's property. The customer then purchases the generated solar power at a fixed rate for a set amount of time. The customer gets a lower rate, and the developer gets the guaranteed revenue, as well as any tax credits and other incentives.

Onsite generation has helped Target evolve from being a bill payer to an active participant in the energy market. IKEA, Walmart, and Kohl's are making a similar shift. The growth of renewables, changes to various charges, and the ability for organizations to take an active role in the energy market are making non-commodity costs — all the charges beyond the price of the actual electricity — as important as the commodity element on your energy bill. In many markets, these fees have grown into a significant share of the costs on energy bills and, in some cases, the majority of the invoice. Electricity non-commodity costs include:

- Capacity costs
- Climate change levies
- Distribution charges
- Renewables obligations
- Transmission charges
- Other ancillary service charges

This part of the average energy bill — both as a percentage and in absolute terms — has grown exponentially.

Non-Commodity Costs Vary, Can Be Very Costly

Non-commodity costs vary by market, representing about 20 percent of the average electric bill in some U.S. states and rising to 60 percent in others. In Germany, non-commodity costs can be **up to 70 percent of the total electricity bill**. This upward trend will continue as utilities, grid operators, and other parties in the market pass on the costs of infrastructure improvements, new regulatory fees, and renewable investments to their customers

Non-commodity costs can represent 20% of the average electric bill in some U.S. states and as much as 60% in others.

Non-commodity charges are complex and vary from country to country (often city to city) and year to year. Understanding the drivers behind these costs is the first step in learning how to manage and optimize them.

Extreme Weather Events Drive Up Charges

The UK had of its hottest summers ever in 2018 with temperatures tied with the highest readings since records began in 1910. The heat wave lasted throughout June and July and broke records for solar power generation. At the end of June, solar installations produced more than 8GW for eight consecutive days for the first time. Solar broke the record for weekly output during this time, as well, by producing 533 gigawatt hours of power.

Obviously, this burst of solar energy was entirely due to the weather, which cannot be relied on to provide the same boost on grey winter days. Generators have to accommodate extra energy from renewables when it is available and compensate for the lack of it on cloudy days.

The British government is working on a plan to require utilities to pay homeowners for each unit of solar electricity they export to the grid. Energy suppliers with more than 250,000 customers will be required to offer a “smart export guarantee” tariff.

In addition to paying these fees, grid operators and distributors must upgrade infrastructure to accommodate distributed generation, such as power coming onto the grid from homeowners or an IKEA store with excess energy generated from a solar installation. Distributors are passing on the costs of building a smart grid to bill payers in the form of non-commodity charges.



Similar grid charges are also being assessed in the U.S., where climate change is taking a serious toll on the energy grid. Wildfires and hurricanes have completely destroyed distribution systems in several states, and replacement costs will need to be passed on to consumers.

Extreme weather conditions can increase costs even when the infrastructure is not affected. In 2014, a polar vortex settled over the upper half of the United States. Temperatures in the Midwest, South Central, and East Coast regions of North America experienced sustained temperatures 20 to 30 degrees F below average. These temperatures resulted in record-high electrical demand for these areas on January 6 and again on January 7. Grid operators passed on enormous ancillary charges due to the spike in consumption during that weather event. **Ancillary costs went from less than \$1 per megawatt hour up to more than \$40 per hour.**

To ensure reliability during these extreme events, many grid operators must now manage capacity markets. Due to low commodity prices over the last several years, thermal generators have been unable to operate at a profit and many face the decision to lose money or shut down. Gas- and coal-fired plants are squeezed by depressed market costs and low marginal cost renewables, but are still required to provide power when renewables can't. Incentives to these thermal generators ensure there will be electricity when the wind doesn't blow or the sun doesn't shine.

To help these generators stay online, grid operators now pay generators fees to support these capacity markets. These fees change from year to year with costs as low as \$3 per MW/day one year to perhaps \$12 per MW/day the next. In other countries, this capacity is auctioned in advance, adding predictable additional costs to the billpayer.

Higher Carbon Taxes on the Horizon

Politics is a constant influencing factor on non-commodity costs, and two recent developments in Europe are no exception. In early 2018, the Organization for Economic Co-operation and Development analyzed taxes on fossil fuels in 42 Organisation for Economic Co-operation and Development (OECD) countries and G20 economies. The research found that tax rates on energy use are inadequate worldwide to compensate for the toll that pollution from energy production takes on the environment and on human health.

Coal accounts for almost half of carbon emissions from energy use in the 42 countries, but is taxed at the lowest rates or is fully untaxed in almost all countries. Even in the relatively forward-looking United Kingdom, carbon prices are €20.2 per ton, well below the €30 per ton the OECD recommends to cover the environmental impact of climate change. Tax rates were below the low-end estimate of climate costs for 97 percent of emissions.

European Union leaders have an even bigger short-term problem that could influence energy costs: a looming budget gap due to Brexit. Germany, France, the UK, and Italy contribute 60 percent of the European Union's entire budget. When Britain leaves the EU and takes its contributions with it, the EU will take a 13.45 percent hit to its overall budget.

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In February 2018, a group of former EU officials suggested the implementation of new carbon taxes to address this shortfall. A fee of €5 per ton of carbon dioxide generated from burning oil, coal, and gas in Europe every year would generate €17 billion per year. The group also suggested raising the minimum tax on diesel, adding a fee to airline tickets and introducing a kerosene tax to address aviation emissions.

Australian Solar Scheme Increases Capacity and Liability

Australia has its own version of political indecision causing volatility in the energy sector. Uncertainty around the future of renewables kept non-commodity costs low for a time. But, when it became clear that renewable sources were going to be part of the energy mix, retailers were unprepared. To catch up to the new requirements, **suppliers tripled non-commodity costs in the space of a year and a half**, passing on construction costs to customers.



The other dynamic influencing non-commodity costs is Australia's rooftop solar scheme. Encouraged by a variety of incentives, Australian homeowners have added around 100 megawatts of new solar power for every month in 2018, according to *The Sunday Morning Herald*, with an average of six solar panels being installed every minute. According to Green Energy Trading, megawatts generated from solar power went up 197% from 2017 to 2018, going from a total of 1,269 megawatts to 3,775 megawatts.

Residential solar installations reduce power bills for individuals, but all homeowners are covering the cost of the governmental rebates that drive these installations. The Australian Competition & Consumer Commission's electricity affordability report estimated that environmental schemes across the National Energy Market add anywhere from \$76 in Queensland to \$170 in South Australia to the average domestic consumer's electricity bills. Subsidies for home solar installations cost households an average of \$42.40 a year in non-commodity charges.

While households with rooftop solar panels benefitted financially from selling energy back to the grid and from reduced electricity use, non-solar customers pay the extra charges to cover the solar incentives without seeing a direct benefit. The Commission wants the Australian government to end the rooftop solar program and for states to take on the costs of the solar feed-in tariffs (FIT). Most state governments mandate a minimum feed-in tariff rate that an energy retailer must provide to consumers with solar installations.

According to Green Energy Trading, megawatts generated from solar power went up 197% from 2017 to 2018, going from a total of 1,269 megawatts to 3,775 megawatts.

Active Energy Management: A New Skill Set

Corporate energy buyers know how to manage the average 44 percent commodity cost across a portfolio by using effective sourcing and risk management strategies. Research shows that non-commodity charges make up 56 percent of an average corporate energy budget. Managing these costs is a new skill set buyers must develop to stay on top of this growing part of the energy bill.

To learn these skills and make the transition from being a passive bill payer to an active energy market participant, corporate leaders can take several actions:

1. Take a Deep Dive into the Details

Look at current non-commodity charges and evaluate the short- and long-term impact. Buyers must have a more granular understanding of which energy component is most relevant, as well as the options for managing the risk associated with that component.

2. Audit Opportunities Across Geographies

Audit all aspects and opportunities presented by network and policy costs across all geographies. Germany, for example, has many local operators, which can mean hundreds of separate grid charges in one country alone. Global energy buyers need to be familiar with taxation and grid rules in all countries in which they operate.

3. Explore Options for Active Energy Management

Onsite generation is one way energy consumers can take more control of their energy costs. Solar and wind installations should be used to create a new revenue source in addition to lowering energy costs as customers export excess energy to the grid.

4. Explore Demand-Side Incentives

Large industrial customers have the option to “interrupt their call” or temporarily pause their power consumption on the grid during periods of high demand. Actively managing consumption can help companies reduce energy use when prices are at high and attract payment for being “on-call” to switch load from the grid to onsite generators.

5. Purchase RECs Directly

In Australia, customers can see significant cost savings by purchasing renewables certificates directly instead of through a retailer. Retailers will charge a premium to ensure a fixed price for the certificates. By using an Active Energy Management strategy, consumers can time the purchase to get the best price instead of signing a two-year contract.

There is a huge opportunity for companies to be more dynamic in how they source their energy and interact with the grid and utilities. The long-term upward trend in non-commodity charges is clear across all markets. And, even though the complexity of these charges could suggest non-commodity costs are opaque and non-negotiable, **the opposite is true.**

Although these costs can't be negotiated in the same way that commodities can, it doesn't mean that organizations are powerless to optimize them. And as these costs rise to support grid investment and flexibility measures, together with costs of the clean tech transition, organizations that are passive ‘price takers’ will be left with the greatest burden of grid and tax bills. Buyers who recognize the opportunities to engage with the changes with a more active strategy can turn this challenge into an opportunity.

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2019 Global
Energy Outlook

Emerging Opportunities in SPAIN

As part of its annual Global Energy Outlook, Schneider Electric market analysts and sourcing professionals will share their expertise on emerging opportunities in select geographies around the globe. These market snapshots will be compiled for easy access and updated at our [Perspectives Hub](#) throughout the year.

Below **David Laszlo, Energy Sourcing Manager**, outlines emerging opportunities and key considerations for organizations with facilities in Spain.

MARKET HISTORY

In the span of two decades – 1997 to 2018 – Spain accelerated from starting the liberalization of its electric power market to setting an ambitious goal **to achieve 100% renewable electricity by 2050**. Currently, Spain is a net importer of electric power, primarily from France and Portugal. Nuclear, wind and hydro are the main elements in its generation mix.

Except for the transmission network, Spain's supply chain is dominated by Endesa and Iberdrola. The sum of their retail market share is nearly 50%, which contributes to a moderate market concentration. OMIP is Spain's market operator and offers **futures, swaps, forwards and options**. As of now, prices are published 5 years ahead.



Spain set an ambitious goal for its electric power market: **100% renewable electricity by 2050**.

EMERGING OPPORTUNITIES

Conventional supply agreements continue to attain greater flexibility, either via stand-alone agreements or Risk Managed Portfolios (RMPs). (These agreements can help organizations more easily implement a risk optimization strategy.) Power Purchase Agreements (PPAs) also represent an emerging opportunity. Last fall, Spain's government proposed measures to [incentivize renewable energy generation](#), such as:

- Temporarily suspending the electricity tax applicable to power generation
- Moving part of the electric power contracted in wholesale markets into long-term bilateral agreements (e.g., PPAs)
- Encouraging on-site generation

Although these measures were primarily introduced to tame the recently elevated wholesale prices, they certainly create room for corporate PPAs, both direct (DPPA) and virtual (VPPA).

KEY CONSIDERATIONS

There are two primary considerations for organizations with facilities in Spain:

1. Achieving Sustainability Targets

Several choices are available to an organization in its efforts to achieve its sustainability targets, including accepting green tariffs, sleeving DPPAs into conventional Supply Agreements, negotiating VPPAs or installing on-site assets. One important note: in Spain, Energy Attribute Certificates (EACs) sourced from outside of Spain can be redeemed only by the retail supplier making the unbundled procurement of EACs challenging.

2. Leveraging Energy Intensity

For energy-intensive organizations, two schemes – one existing and one emerging – can provide opportunity. The first is an Auction for Interruptible Demand, which brings companies financial compensation in exchange for their ability to interrupt their facilities' energy supply. (Also called Demand Response in other geographies.) The second is the Energy Intensive Consumers Statute, which is designed to support energy-intensive industries through financial incentives for eligible facilities.

Click to access the latest global energy trends that cover political influences, commodity volatility, non-commodity shifts, weather impacts, emerging market opportunities and supplier differentiation.

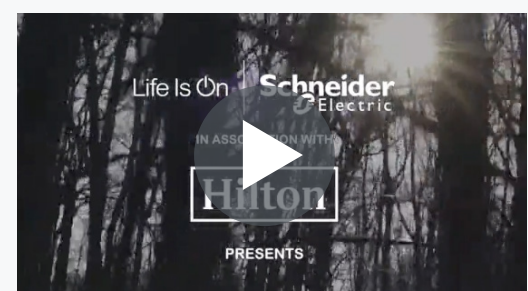
For help navigating power and gas purchasing options for your facilities in Spain, click the [Contact Me](#) button and we'll follow up.

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In Russia, there are two common trends creating energy-related challenges for organizations. The first is increasing sales margins and the growth of distribution tariffs. These factors are forcing energy managers to find new savings opportunities. The second challenge is validating opaque billing details provided by their electricity suppliers.

Schneider Electric's **Kseniya Pfeiffer, Senior Analyst** within Energy & Sustainability Services, looks at the market history informing these and other trends, and outlines emerging opportunities and key considerations across electric power and natural gas commodities.

MARKET HISTORY

In the past decade, Russia's power sector restructuring created an environment for a competitive electricity and capacity market. In this deregulated market, electricity is traded at wholesale spot prices, and all large generators are required to sell the energy to the wholesale market governed by ATS. Various wholesale companies participate in this new wholesale market where the country's transmission grid remains mostly under state control.

Industrial users are now free to choose their energy supplier or buy directly from the market. Tariffs for transmission and distribution are fully regulated, and are determined annually. JSC Rosseti, which unites federal and regional distribution companies under a single umbrella, controls transmission and distribution services, as well as grid availability.

The natural gas commodity market is currently dominated by Gazprom, but independent suppliers Novatek and Rosneft have been poaching market share over the past decade plus. To illustrate, Gazprom sold 221 billion cubic meters of gas in 2015 versus 307 billion cubic meters in 2015.



Gazprom's natural gas sales fell by 28% between 2005 and 2015.

EMERGING OPPORTUNITIES

Electricity

Significant opportunities for cost management and savings now exist in Russia. Industrial users have options to switch from regulated power suppliers to independent ones whose margin is not regulated. This approach reduces the tariff, as well as overall energy cost. That's because independent suppliers are now free to offer competitive commercial conditions, including better prices, payment terms, and consumption flexibility compared to regulated companies. The benefit of switching to another supplier depends on the region, but results in a **2- to 10-percent reduction in electricity spend** on average.

Regardless of whether they are regulated or unregulated, distribution tariffs provide several options to industrial users. Depending on the load profile and peak hours of operations, one distribution rate might be more beneficial than another. (Analyzing an organization's interval data each year is necessary to make the optimal decision on the following year's rate.)

Natural Gas

Russia's natural gas market – which many people *incorrectly* believe is regulated – also opens up savings opportunities. Gazprom is not the only option and switching to a different producer can trim costs. Additionally, the recently-created Saint Petersburg Commodity Exchange lets users buy the commodity directly from the market and ship it to their facilities. (A commercial gas contract with Gazprom or a broker is required.) Savings tend to be most substantial in summer periods.

KEY CONSIDERATIONS

While new electricity opportunities generate savings, they also bring a number of logistical considerations. Among those:

1. **Optimizing Electricity Supply**
100+ electricity suppliers are available regardless of the customer's location. Additionally, the wholesale electricity (capacity) market is easily accessible by organizations within the boundaries of European Russia, the Urals and Siberia.
2. **Validating Invoices**
In Russia, electric power bills do not typically include full transparency into cost components. As a result, energy managers do not have an opportunity to validate their bills. Some customers receive their power invoices from landlords, which only complicates this lack of transparency. This reality can mean significant billing inaccuracies.
3. **Managing Energy Data**
Companies with multiple sites experience additional challenges, including keeping their energy data organized and managing accounts with different vendors for each location.

Organizations seeking natural gas savings must overcome a persistent misconception: *Gazprom is the only supply option*. Independent suppliers exist, and an organization's supply reliability isn't tied to its supplier since Gazprom maintains the pipeline. As such, customers can safely choose to:

1. Contract with an independent supply company or commodity broker.
2. Buy natural gas on its own through the commodity exchange.
3. Enter into a commercial gas purchasing contract with Gazprom.

[Learn More](#)

For help navigating power and gas purchasing options for your facilities in Russia, click the **Contact Me** button and we'll follow up shortly.



Conclusion

Increasingly intertwined geopolitics, unique regional dynamics, emerging technologies and traditional supply and demand influences will continue to impact global energy markets throughout 2019, often in unpredictable ways. The complexity of these competing influences will only grow, and with that growth comes organizational exposure to greater risk and greater cost. Understanding these trends – and acting upon that intelligence – becomes critical to business resilience.

Watch these market dynamics closely. This increased focus could change the way you source your energy supply, help improve your efficiency and lead you to operate more sustainably this year and beyond.

To stay close to developments across energy markets and geographies, just click..

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Additional Resources

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PODCAST (Pt. I)

PODCAST (Pt. II)

WEBINAR

Global Energy Outlook
Global Energy Outlook: 2019 Trends, Impacts & Opportunities

Politics & Energy Discussion: US & China Trade Policy, LNG Imports & the Nord Stream Pipeline
 4:04
Politics & Energy: US & China Trade Policy + More [Podcast]

Politics & Energy Discussion: The Impact of Brexit and the Iran & Venezuela Sanctions
 5:05
Politics & Energy: The Impacts of Political Climates [Podcast]

Weather Update: Why Energy Strategies Matter
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