

Energy Matters

The trusted source for sound-bite summaries of the energy news you need to know.

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The energy news you need to know

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Headline News

Conventional

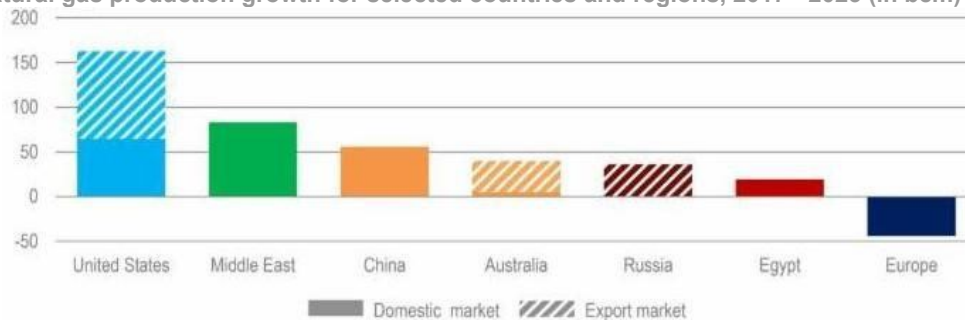
Oil: Crude oil production in the US has hit an all-time high, lowering prices to about \$9/barrel less than competitors. This is the widest price-margin in years and has launched a [new phase of arbitrage as Asian refiners import less oil from the Middle East and Russia and more from the U.S.](#) Indeed, last month about half of all US crude exports (1.3 million bpd) went to Asia, including:

- Sinopec (China) cut Saudi imports and bought a record 16 million barrels (533,000 bpd) of US crude.
- South Korea purchased 7 million barrels of US crude in June.
- India acquired 6 million barrels in June, with Indian Oil Corp alone buying 3 million barrels.
- Taiwanese state refinery snapped up 7 million barrels of US crude oil.
- Thailand increased its purchase of US crude to at least 2 million barrels, with Thai Oil and Esso Thailand each buying 500,000 barrels of Bakken crude.

Gas: *Featured sources:* **Top-3 global gas market trends** according to "Life in the Fast Lane," a report by the IEA. AES Members have access to the IEA's [Executive Summary](#) of the report and its supplemental [slide presentation](#). A summary of the trends:

1. China will soon become the world's largest importer of natural gas.
2. The US accounts for 75% of growth in LNG exports.
3. Industrial demand growth is about to surpass demand for natural gas from power generators.

Natural gas production growth for selected countries and regions, 2017 - 2023 (in bcm)



Coal: *Featured story:* **Sometimes, carbon-capture sequestration technologies can make a coal plant a "better" choice than a natural gas plant, even if the emission of greenhouse gasses is a primary criterion.** (AES offers access to the peer-reviewed [study](#)):

- **Coal > Natural gas:** if the coal plant benefits from carbon capture and sequestration technology and the natural gas power plant's methane leakage rate is more than 2% of the total produced.
- **Natural gas > Coal:** if neither plant has implemented carbon capture technologies and if natural gas methane leakage stays below 5% of the total.
- **Coal = Natural gas:** if both natural gas and coal plants benefit from carbon capture and sequestration technology, and the natural gas power plant has a methane leakage rate of 2% or less.

Nuclear: Despite controversy about the Trump administration's offer of subsidies to the coal and nuclear industries (see "[POLICY - Beltway Buzz](#)" below); however, more than 100 thought-leaders have sent the Administration an endorsement letter **in support of civil nuclear generated electricity as necessary for national security.** AES Members have access to a true and correct copy of the [endorsement letter](#).

Renewables

- Though impossible to forecast with certainty, wind and/or solar power will become more economical and more reliable than coal or natural gas [when storage can hold four hours of capacity](#). **That will allow renewable providers to sell power for about 3.5 cents per kWh.**

- Pacific Gas and Electric (PG&E) just received approval from the California Public Utilities Commission for [four large energy storage projects totaling about 2,270 MWh](#), including the largest lithium-ion battery installation in the world (300 MW / 1,200 MWh), three times the size of the current world record: Tesla's 100 MW, 129 MWh battery in Australia.

- Solar power is growing rapidly in the southeast. Right now, it only produces about 6,000 megawatts of power, but there are more than 15,000 MW of solar power projects in the development pipeline. However, even at 15,000 MW, solar would just be 3% of the power mix in the Southeast, highlighting **the region's slow adoption of solar power relative to other solar-heavy regions** like Arizona, Nevada, and California. AES Members have access to the [Southeast Solar Report](#). Summary, by state (regional total: 5,977 MW):

1. North Carolina (2,699 MW)
2. Georgia (1,222 MW)
3. Florida (839 MW)
4. South Carolina (777 MW)
5. Tennessee (252 MW)
6. Mississippi (113 MW)
7. Alabama (75 MW)

- There are about [1.9 million jobs in US energy related sectors](#); of these, 19.4% are [solar related jobs](#), of which more than half are in installation.

- [The Burden](#), a new documentary about why the military is transitioning to clean energy, is too new to have received a professional review; however, a few thought-leaders/Members of the Society have seen the film and the consensus is that sometimes the film is smart and informative, but sometimes it feels like a strategic engagement campaign trying to inspire a political viewpoint.

- [Energy Observer](#) (left), a 46' X 30' catamaran, is currently **circumnavigating the globe using power from renewable energy** - wind, solar, sea water, and a 106 kWh battery. Right now [The Observer](#) is docked in the Port of Venice, Italy.



Policy

- Scott Pruitt, the Administrator of the EPA, has [resigned](#) . Second-in-command [Andrew Wheeler](#) is now the acting-Director of the EPA.

- **Federal Energy Regulatory Commission member Robert Powelson has resigned.** Powelson, a Republican, was confirmed by the Senate last August after he was nominated to the Commission by President Trump in May 2017. *Powelson had opposed the administration's proposed use of emergency funds to support coal and nuclear plants.*

- The lawsuit brought by the cities of San Francisco and Oakland against five major oil companies - BP, Royal Dutch Shell, Exxon Mobil, ConocoPhillips and Chevron - demanding that they pay for damages caused by anticipated climate change and eventual sea level rise was [dismissed](#) by US District Judge William Alsup because " **regulation of the worldwide problem of global warming should be determined by our political branches, not by our judiciary.** "

Beltway Buzz

- One of a few arguments used by the Trump administration to defend the use of federal funds to support struggling coal and nuclear plants is summarized in a National Security Council memo: **natural gas "pipelines are increasingly vulnerable to cyber and physical attacks** [which would have] severe effects on electric generation necessary to supply critical infrastructure facilities." AES Members have access to a true and correct PDF copy of the NSC 40 page [memo](#).

- There are **seven executive positions within the Department of Interior that have [neither an office- holder nor a nominee](#) waiting for confirmation** — including directors of NPS, the Bureau of Land Management and the US Fish and Wildlife Service (AES recommends the resource, [Appointee Tracker](#)):

- **At 8:45 pm on Friday, June 30th, the relationship between two seemingly unrelated policies led by two different federal agencies became much clearer:**

1. On August 23, 2017, the US DoE released a grid study that raised questions about the security of the nation's backup power baseload; for almost one year, the Trump Administration has been searching for a new policy mechanism that could rescue uneconomical coal and nuclear plants.
2. Late Friday evening June 30th, the commissioners at FERC (the US agency that regulates interstate electricity markets) **issued an "unprecedented" order against the PJM Interconnection** (which runs the electricity grid that spans 13 Atlantic Coastal states), ruling that it had undermined national security by not requiring that individual power plants store sufficient emergency backup power baseload. FERC has ordered PJM to mandate backup power.

In spite of criticism from utilities, free market economists, federal policy-makers, the Chamber of Commerce, etc., it appears that the US Department of Energy and FERC are both supporting the Trump administration's attempt to protect coal- and nuclear power plants by requiring backup power baseload. FERC is taking public comments on the new "order" - [contact AES](#) if you would like a Community Manager to help submit a public comment. AES provides access to a true and correct [copy of the FERC ruling](#) from June 30th, 2018.

Climate

- **It is hard to know how to interpret the data:**

- According to NASA, from Feb. 2016 to Feb. 2018, global temperatures [dropped](#) 0.56 degrees Celsius; or ...
- According to NASA, 2016 was the [hottest year](#) on record since 1880; and, in the last 365 days, there have been 1.91 [high temperature records](#) for every 1 cold temperature record (1:1 is considered a stable climate.)

- **There is a new global CO2 emissions record** - the Mauna Loa Observatory in Hawaii recorded an average concentration of atmospheric [carbon dioxide above 410 parts per million](#) (ppm). According to ice core records, this is the highest rate in at least 800,000 years.

- **Antarctic ice is [melting at a flow-rate](#) that is a bit more than that of the Niagara Falls.**

- **Domestic water use in the US (per capita) has [dropped](#) 27%, from 112 gallons a day in 1980 to 82 gallons in 2015.** Since thermoelectric power (e.g., steam-driven electric turbines) accounts for 41% of all water use in the US, most of the improvement is due to the power industry using water more efficiently.

- **August 1, 2018, is "Earth Overshoot Day,"** an annual event when humanity's consumption outstrips Earth's production of resources. In 2000, Earth Overshoot Day happened in October. In 2015, it was August 13. This year, it lands on August 1. (Note: China, the US, the UK, Germany, and Japan use more than double the amount of resources they produce.)

- The Bank for International Settlements in Basel, Switzerland, is the central bank of the world's central banks and a source for some of the most respected independent research on the macroeconomy. **The BIS has issued a formal statement that bitcoin and other cryptocurrencies require too much electricity to be viable.** Bitcoin's power usage already equals all of Switzerland's because every unique distributed proof-of-work transaction must be duplicated for as long as the currency has value - theoretically, in perpetuity. Ether, with a more efficient proof-of-work system, consumes more than 15 terawatts per hour - more than all of Cuba. AES Members have access to an [early release of the BIS report on cryptocurrencies](#).

Electricity, Power and Efficiency

- **The Top-5 most energy-secure nations** (AES Members have access to a PDF copy of the "Energy Security" [report](#)):

1. Norway remains the most energy secure country.
2. The US is ranked second, a remarkable rise for a country that was ranked 11th in 2000.
3. The UK is in third position, but dropping fast.
4. Mexico is a perennial presence in the top five; like the UK, however, its position has been declining.
5. Denmark rounds out the top five.

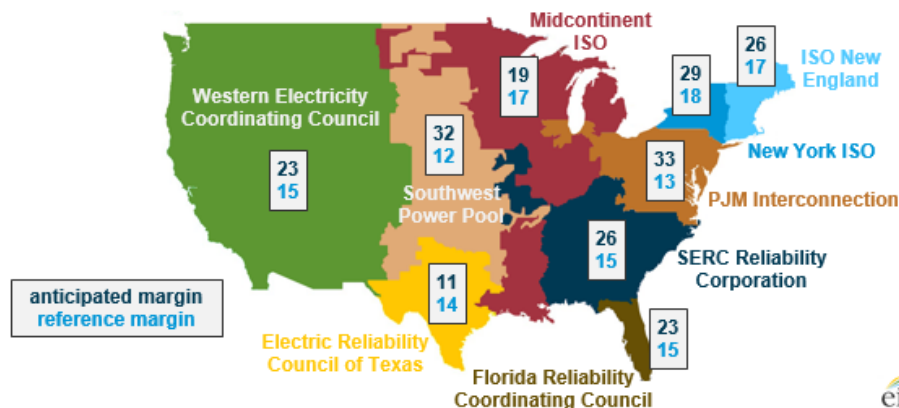
Note: Last place - Ukraine continues its unbroken record (since 1992) of the least energy secure country in the world.

- **Poor road conditions increase the total amount of fuel consumed and GHG emissions.** For example:

- California (50,000 lane-mile system): Pot-holes, rough-roads, and debris account for an additional 1% of overall fuel consumption.
- Virginia (5,000 lane-mile system): Poor roadways add an additional 1 million tons of CO₂, or about 10% of Virginia's total emitted greenhouse gasses related to transportation.

- **There are enough resources to meet this summer's projected peak electricity demand in all regions of the US except Texas.** (Note: a reserve margin of 15% is considered "safe"; Texas' ERCOT has 11% of total power-usage in reserve.)

Planning and anticipated reserve margins in select NERC regions, summer 2018



Research to Market

- **Special report**, AES original research on the [Silicon Valley energy-innovation ecosystem](#).

Please [contact us](#) if you are a Member of the Society and would like a *free copy* of the Executive Summary of the report (forthcoming, September) or 50% off the regular price of the comprehensive *Silicon Valley Energy Venture Directory*. Some early findings:

- 1 distinct energy innovation ecosystems are in Silicon Valley: Morgan Hill, San Jose, Sunnyvale, Mountain View, Palo Alto, San Francisco, Fremont, Berkeley, Oakland, San Ramon and Livermore.
- Only three regions in Silicon Valley have mature late-stage energy innovation ecosystems: (Oakland, San Ramon and San Francisco).

- Proximity to capital and talent is expensive throughout Silicon Valley, but three ecosystems (Palo Alto, Berkeley, and Oakland) have offset the extreme costs by working closely with nearby research universities (Stanford and UC Berkeley).
- Entrepreneurial experience with energy start-up is relatively equal across all Silicon Valley eco- systems, but talent-pools have clustered. Among all Silicon Valley energy ecosystems, San Francisco has the highest talent-retention rate.

- Funding: [MONITOR](#) funding program through ARPA-e. The expansion of horizontal drilling and hydraulic fracturing has led to a rapid increase in US natural gas development. However, an average of about 2% of gas resources are wasted through leaks, with higher rates at some production sites. **Existing methane monitoring devices have limited effectiveness; oftentimes, drillers cannot identify leak locations.** MONITOR aims to address these shortcomings by introducing new technologies that improve the accuracy of methane detection.

- The [agriculture industry](#) uses a significant amount of energy - **globally, about 14% of total food costs are directly or indirectly related to energy consumption** . With the global demand for protein for human consumption increasing, there is greater pressure throughout the energy supply chain. Diversification and alternative foods offer greater stability for farmers, for producers of energy, and for all consumers. The following are three new start-ups in the food-energy nexus:

- [KnipBio](#) - microbes that convert low-cost feedstock proteins for aquaculture feed.
- [Unibio](#) - bacterial protein fermentation solutions for animal feed.
- [Calysta](#) - fish and animal nutrition products and industrial materials via methane conversion.

- The US Internal Revenue Service is [extending incentives](#) for solar power and other clean energy sources for **up to four more years**. Developers can claim an IRS 30% tax credit for solar projects as long as they have started construction by the end of 2019 and begin producing energy before the end of 2023. For projects that begin construction after Jan. 1, 2020, the credit drops to 26%. The incentive also applies to fuel cell power plants, small wind turbines and a few other technologies. According to AES expert Members, these investment tax credit guidelines are better than expected. **AES encourages Members to [contact experts at Orrick](#) for more information** (ask for Wolfram Pohl).

- **Tesla acquired SolarCity on June 21, 2016; since then, total solar installations by SolarCity have [dropped 62%](#)** (as measured by megawatts of capacity installed).

Features

Spotlight - EPRI

For the last year or so [the Trump administration](#) has been seeking a policy mechanism that would financially support uneconomical coal- and nuclear-fired power plants in order to stabilize electricity markets, power baseloads, national security, regional economies, etc.... Often overlooked in this debate is the stabilizing effect on the electricity sector provided by the [Electric Power Research Institute \("EPRI"\)](#), an independent, nonprofit organization that conducts research and development related to the generation, delivery, and use of electricity. With principal offices and laboratories across the US - Palo Alto, California; Charlotte, North Carolina; Knoxville, Tennessee; and Lenox, Massachusetts - the underappreciated EPRI has stabilized electricity markets for more than fifty years. In November 1965, the Great Northeastern Blackout left 30 million people in the US without electricity, demonstrating the nation's growing dependence on electricity and vulnerability to its loss. In response, The Great Blackout also triggered the creation of the Electric Power Research Institute (EPRI). Since then, there have been enormous changes throughout the electricity industry, and EPRI has responded with short- and long-term insights and leadership, helping to ensure that tomorrow's electricity sector is as stable and effective as it is today. The American Energy Society applauds and admires the work of EPRI and its commitment to optimizing clean, efficient production, delivery, and use of electricity.

What You May Have Missed

Featured story : **The mixture of sources used by the global power industry to generate electricity has remained mostly [unchanged](#) over the last two decades.** For instance:

- The share of coal in the global power mix was 38% in 2017 and in 1998.
- Global carbon dioxide emissions increased last year by about the same amount as in 1998.
- Since 1998, natural gas consumption has increased 3%, and oil consumption by 1.8%.
- Renewable energy increased by 17%, most of it via wind and solar power.
- Energy consumption increased by 3.1% in China in 2017; and, China was the largest growth market for energy for the 17th consecutive year.

Quotes

"I'm the deputy administrator, that's the position I signed up for, that's the position I wanted. I didn't want to be the administrator. I still don't want to be the administrator."

- Andrew Wheeler, the new Director of the EPA, right before his boss, Scott Pruitt, announced his resignation.

"You bomb a pipeline, that's the end of the pipeline. With coal, that stuff is indestructible."

- President Donald Trump, on why he wants to use federal funds to support coal-fired power plants.

"You don't solve problems with the same thinking that created them."

- Albert Einstein



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American Energy Society
654 Gilman Street
Palo Alto, CA 94301