

Energy Matters

The energy news you need to know.

February 4, 2019

(Every two weeks)

The official e-newsletter of ...



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Headline News

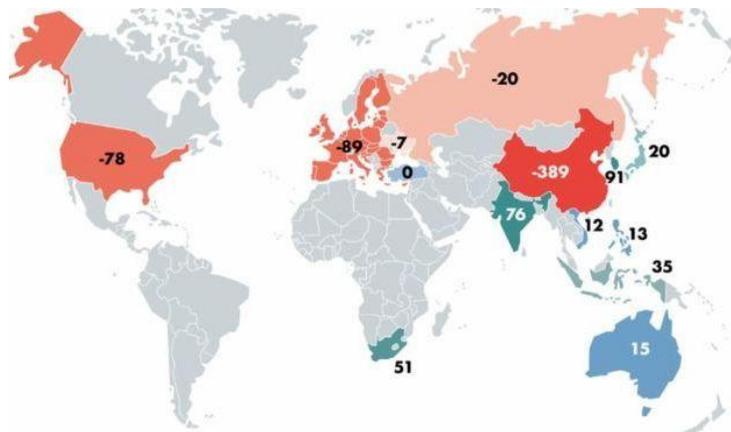
Fossil Fuels

Oil & Gas: Energy records set by the US in 2018:

- *Oil production.* The US produced a record 10.7 million barrels of crude oil per day last year, putting the country firmly among world leaders Saudi Arabia and Russia. (Note: current oil prices are slightly higher than expected. Why does this matter? Producers are taking advantage of the price uptick and increasing their total production, which means that the US will break its record later this year.)
- *Natural gas production.* The US produced about 81 billion cubic feet of natural gas per day, up almost 10% from 2017. Moreover, the price of natural gas in the US is around \$3.00 - 3.50 MMBtu, a price that works in just about every market in the world, so expect the natural gas records of 2018 to be shattered in 2019.

Coal: The state of the global coal sector, [by the numbers](#) :

- Two-fifths (or 40%) of the world's coal power stations are operating at a loss.
- The operating costs of 35% of all coal plants in the world are higher than current operating costs for either natural gas or renewable energy plants.
- Aggregate total number of coal plants operating at a profit (blue/green) or at a loss and at risk as a stranded asset (red/orange), by country:



Carbon Capture: The [National Carbon Capture Center](#) in Wilsonville, Alabama, has been in operation for ten years. In the last decade, the Center has partnered with, among others: the DoE National Energy Technology Laboratory, six countries, and more than 60 individual technology companies.

Low-Carbon Energy

Renewables: The levelized cost of energy (LCOE) for solar (large scale PV) and wind (onshore) has [fallen](#) 13% and 7% in the last year, respectively.

Solar: Since 1975, the cost of photovoltaic solar panels has [declined](#) by roughly 99%, not with a single breakthrough, but with small improvements over time:

- Scientists have made incremental advances in the efficiency of the panels.
- Manufacturers found ways to use less silicon per panel.
- Solar factories got larger and cut costs through automation.

Solar: Due to declining prices, solar installations in the US have grown, producing from 1.2 gigawatts (GW) in 2008 to nearly 30 GW today. So where, exactly, are these installations? This is not an empty question - knowing trends can provide a better understanding of policy and consumer choice. The [DeepSolar Project](#) used a machine learning framework and satellite imagery to count the installations. So far, they have found **1.47 million unique solar installations**, much more than the most commonly cited estimates.

Nuclear: The DoE Office of Nuclear Energy has awarded \$111.2 million to General Electric, Westinghouse and Framatome to develop accident-tolerant fuels that can enhance nuclear fuel reliability and safety. It has also **awarded eleven other advanced nuclear technology projects**, including a First-of-a-Kind ([FOAK](#)) Nuclear Demonstration Readiness Project.

Energy Policy

- **The US Congress will be very busy this week:**

- There is bipartisan concern about the EPA's plan to cease regulating two toxic chemicals that have been found in the drinking water of 98% of Americans, and hearings are being scheduled.
- Congress will vote on Andrew Wheeler's nomination to lead the EPA.
- House Democrats are outlining their plans to address climate change, including the [Green New Deal](#).

- **The US DoE has been [secretly](#) shipping weapons-grade plutonium to nuclear security sites in Nevada in spite of the ban by the state legislature.**

Beltway Buzz

- **The Trump administration has announced that it will [not set a limit on PFOA and PFOS toxic chemicals](#) that are used in products such as Teflon-coated cookware and military firefighting foam and have been linked to kidney and testicular cancer. The announcement comes one year after a White House aide warned the EPA that it faced a "public relations nightmare" if it ignored these chemicals. The White House may have complicated Wheeler's confirmation to lead the EPA since both Republicans and Democrats have pressed the agency to do more about restricting these chemicals.**

Energy Policy Around the World

- **The State of Qatar has [withdrawn](#) from OPEC.** Qatar will be the second country after Indonesia, and the first from the Middle East, to voluntarily leave OPEC since its founding in 1960. Qatar, the world's biggest exporter of liquefied natural gas, claims that the decision to leave OPEC was driven by a desire to increase its natural gas production. However, some believe Qatar may be leaving because OPEC has accused its state officials of funneling money to support terrorist activities in the Middle East.

- Russian officials offered a [secret proposal](#) to North Korea last fall: **in exchange for North Korea dismantling its nuclear weapons and ballistic missiles, Moscow would build the country a nuclear power plant.**

- **Spotlight [Singapore](#) :**

- Singapore is the world's primary oil trading hub and serves as Asia's pricing center for all refined oil products, including gasoline, diesel and marine fuels.
- The city-state is the world's largest ship refueling port.
- City-state officials are implementing strict regulatory benchmarks that will lower sulfur in all fuel oils traded at the port.

- Worldwide, more than one-third of national climate goals [cannot be measured](#) .

- Worldwide, fossil fuel subsidies almost halved between 2012 and 2016, and then in 2017 [increased](#) 12% to more than \$300 billion.

Climate and Environment

- The Clean Air Act requires the EPA to set standards for [six](#) common air pollutants that cause harm to health, the environment, and property. There are, right now, lawsuits against the EPA for failing to regulate two of those pollutants:

1. Ground-level ozone (aka "smog")
2. Particulate matter (PM 2.5 and PM 5)
3. Carbon monoxide
4. [Lead](#)
5. Sulfur dioxide
6. [Nitrogen dioxide](#)

- Producing a cell phone [releases](#) about 178 pounds of carbon dioxide, about as much as burning nine gallons of gas or running a modern refrigerator for a year. The average person replaces their cell phone every two years.



- After the deadliest wildfire season in state history, **California fire officials are scrapping 12 years of efforts and creating a new wildfire management system.** [The new system](#) includes faster removal of dense stands and dead trees and setting more controlled fires to burn out thick brush.

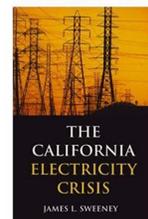


Electricity and Efficiency

- Featured story: **PG&E, the largest power utility in the US, has [filed for bankruptcy](#)** in anticipation of liabilities from California wildfires, including a catastrophic 2018 blaze that killed 86 people. PG&E, which provides electricity to 16 million customers in northern and central California, has been cleared of liability in a 2017 wildfire in California's wine country, but the company still faces dozens of lawsuits from the other 2017 and 2018 fires. Filing for bankruptcy shields PG&E from claims and gives it time to figure out next steps.



- **PG&E bankruptcies in 2001 and 2019 are [very different](#)** . In 2001, PG&E was not bringing in enough revenue to pay its day-to-day bills. For an excellent review of the California electricity crisis in 2001, see the [book](#) of the same name, by Jim Sweeney.



- **States in the Midwest asked utility customers to turn their thermostats down to 65-degrees** to accommodate record natural gas demand and prevent widespread outages; in [Minnesota](#), Xcel Energy asked its customers to turn down their heat even lower.

- *Recommended resource:* "[US Electric System Operating Data](#) ," a map of the entire electricity system operating in real-time. It is particularly insightful during extreme weather conditions.

- **Utilities have shouldered the [burden](#) of US emissions reductions; power-sector emissions fell 28% between 2005 and 2017** even as carbon levels from other sectors rose. In general, power companies have replaced aging coal facilities with gas and renewable energy sources. American power companies installed 46.3 gigawatts of natural gas and 23 GW of wind and solar between 2013 and 2018.

- Utilities are beginning to test new "dynamic rate models" that better align with the rise in rooftop solar and the extreme range between average and peak demand. (i.e. customers pay more for using electricity during peak hours, less during off-peak.) **The three states testing the most aggressive pricing models: California, [Minnesota](#) , and [Illinois](#) .**

Research to Market

- Commonwealth Fusion Systems (CFS), a new fusion company spun out of the MIT's Plasma Science and Fusion Center, **received funding** from an Italian oil company and private investors, including Breakthrough Ventures founded by Bill Gates. The startup intends to demonstrate that fusion power can work at commercial scale by 2025.



- Meanwhile, researchers at the Max Planck Institute for Plasma Physics used a " **stellarator** " to conduct a **successful fusion experiment** which recorded high values of plasma density (2×10^{20} particles per cubic meter) and plasma energy content (more than 1 megajoule). It also achieved the longest plasma discharge time on record for a stellarator (100 seconds) and a plasma temperature of 20 million degrees Celsius (36 million degrees Fahrenheit).

- The University of Minnesota has introduced a **new program that will encourage research laboratories on campus to collect and recycle polypropylene plastics that had been used in experiments**. According to [Allison Paradise](#), AES expert Member and founder of My Green Lab, there are about 5.5 million tons of plastic waste generated in biological, medical and agricultural research laboratories around the world.

- 2018 was a no good very **bad year** for Uber:

- January: #DeleteUber hashtag goes viral.
- February: Former engineer Susan Fowler publishes a blog alleging sexual harassment.
- March: Google's Waymo files lawsuit alleging theft of its self-driving car technology.
- April: Reports surface that Uber's self-driving mapping technology has glitches.
- May: Reports emerge that Uber is using secret Greyball tool to circumvent law enforcement and secret software to spy on Lyft drivers.
- June: US Dept. of Justice opens criminal investigation into use of Greyball.



- Radiation might help **preserve food** (but don't try this at home.)



Features

Quotes - Frank Maisano of Bracewell and AES expert Member

Five issues to watch in 2019:

1. Even though House Democrats have a "climate" focus right now, it will not be a priority issue during the upcoming 2020 election cycle.
2. The Green New Deal will be a battle point internally among Democrats.
3. The US won't make a formal commitment to reducing HFC's (a devastating greenhouse gas used in air conditioners) even though Republicans, Democrats, the US Chamber of Commerce, and refrigeration trade associations support the ban.
4. Debates about autonomous vehicle will intensify.
5. Environmental activists call them "roll-backs," conservatives call it "right-sizing"; either way, the Obama Administration's regulatory agenda will continue to get a lot of attention from the current administration in the final two years of this first term.

What You May Have Missed: Energy Year in Review, 2018

- [The Energy Year in Review](#), including the prestigious *Energy Writer of the Year* - [Nathaniel Rich](#), "[Losing Earth](#) : The Decade We Almost Stopped Climate Change" (New York Times Magazine, August 1, 2018).

Contacts

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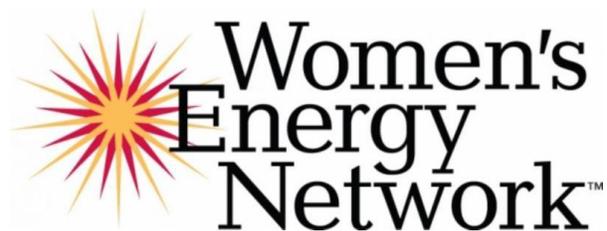
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