

Energy Matters

The energy news you need to know.

April 15, 2019

(Every two weeks)

The official e-newsletter of ...



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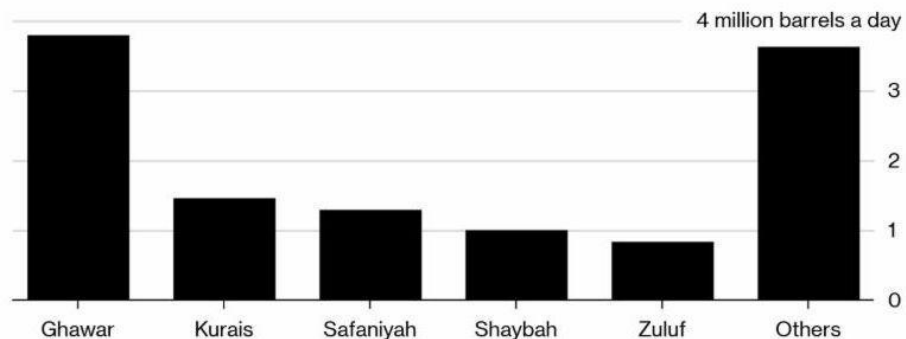
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Headline News

Fossil Fuels

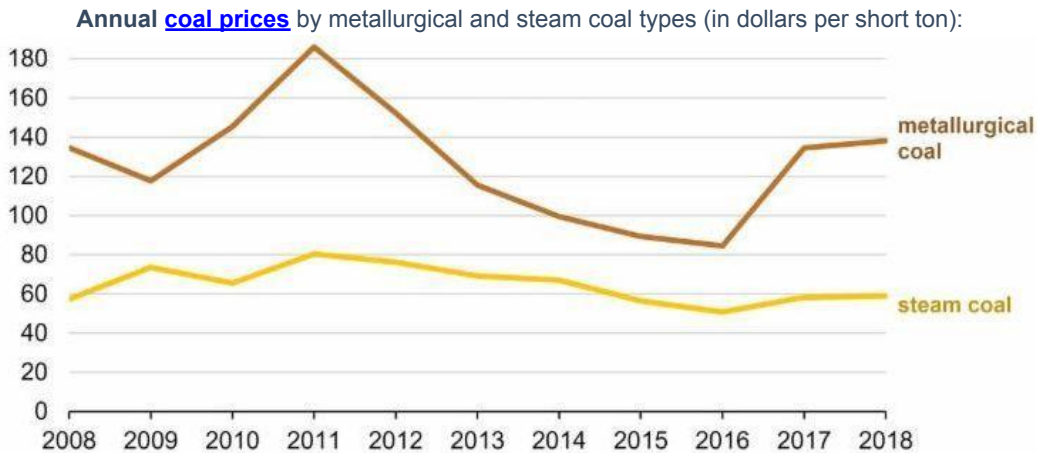
Oil: The Ghawar oil field in Saudi Arabia is pumping 3.8 million barrels a day - well [below](#) the 5 million bpd that the company claimed. Premium Members have access to the newly released [Saudi Aramco Bond Prospectus](#), previously one of the world's most secretive companies. (Note: the document is 469 PDF pages long.) **The top-5 mega-fields in Saudi Arabia** (in million bpd):



Gas: Natural gas prices in the Permian of West Texas have fallen to **-\$3.38/MMBtu** - yes, [negative \\$3.38](#). In other words, producers are paying customers to take their gas. (Note: Unlike other shale regions such as

the Marcellus and Utica, producers consider natural gas in the Permian a byproduct of unconventional crude oil drilling.)

Coal: While US coal consumption has generally declined since its 2008 peak, **coal exports have reached the highest level in five years**, driven by increasing international coal demand and rising prices (particularly in three of the five major coal-producing regions in Northern and Central Appalachia).

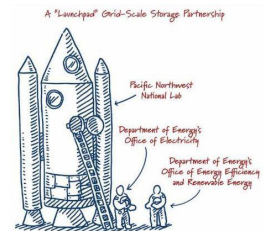


Carbon Capture: Three major fossil fuel firms — Chevron, Occidental Petroleum and the Australian mining company BHP — have invested in **Carbon Engineering**, a startup that is developing "direct air" and "air-to-fuel" conversion technologies to remove carbon from the atmosphere.

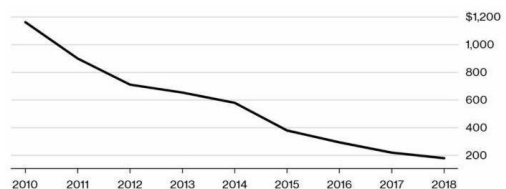
- In case you missed it, the last issue of [Energy Today](#) featured "carbon capture."

Low-Carbon Energy

Solar-wind-storage (featured story): Currently, energy storage RD&D is spread throughout the DoE, such as the Office of Electricity, the Office of Energy Efficiency Renewable Energy (EERE), the Office of Science (OS), and the Office of Advanced Research Project Agency-Energy (ARPA-E). Many of these programs focus on transportation rather than grid-scale storage. The proposed US **budget considered by Congress includes a new program, "Advanced Energy Storage Initiative (AESI),"** a cross-cutting grid-scale storage RD&D collaboration between all DoE programs. This Initiative is similar to other collaborative "moonshot" programs that helped introduce new technologies like [hydraulic fracturing](#) and more recently [6 cent per kilowatt-hour \(kWh\) solar](#). **AES recommends that anyone in related fields should begin preparing a collaborative program now if this Initiative is passed in the Budget.**



Storage: Quite a few new lithium-ion manufacturing factories in China, the US, Australia and Thailand are [increasing production](#), which is **driving down prices that have already plunged 85%** since 2010 (by year and \$/kWh, *insert*).



Storage: At least four types of "**beyond-lithium-ion**" batteries are studied at the [JCESR](#), Argonne National Laboratory.

1. Multivalent battery (useful for transportation)
2. Flow battery (replaces solid electrodes with liquid solutions)
3. Aqueous flow battery (the lowest-cost rechargeable battery chemistry yet known)
4. Lithium-sulfur battery (using low-cost sulfur offers enormous potential).

Nuclear: The top-5 European countries [most reliant](#) on nuclear energy, by the percentage of total generated electrical power:

1. France (71%)
2. Ukraine (56%)
3. Slovakia (55%)
4. Belgium (51%)
5. Hungary (48%)

- Amazon appears to be ignoring or breaking its public commitment to power its cloud with [100% renewable energy](#); however, the company has been very quiet about developing new "lighthouse" relationships with ExxonMobil, Chevron, Aramco, BP, ConocoPhillips, Halliburton, HESS, Shell, and Schlumberger.

Energy Policy

Beltway Buzz

- *2020 watch*: **President Trump's reelection campaign is reportedly looking for "climate change victories"** that it can tout ahead of the upcoming Presidential election, especially in critical battleground states like Michigan and Florida (the White House included funding for the Great Lakes Restoration Initiative and repairs to Lake Okeechobee's Herbert Hoover Dike in its proposed budget). On the other hand, the White House's National Security Council is preparing a new federal advisory committee to challenge the scientific consensus on climate change.

- **Energy Secretary Rick Perry is being considered to replace Kirstjen Nielsen as head of Homeland Security** following her recent resignation. President Trump would [prefer to nominate](#) the newly assigned acting director, Kevin McAleenan, who was the head of Customs and Border Protection, but Perry's confirmation is a sure-thing.

- **The California Air Resources Board has filed a [lawsuit](#) against the Trump administration to force it to release information that supports rolling back the Obama-era auto emissions standards.**

- **A group of environmentalists is [suing](#) to block the new permit that the Trump administration issued to allow the Keystone XL oil pipeline project to resume.** They contend Trump lacked authority to issue the permit because the Constitution gives Congress, not the president, the power to administer federal lands and regulate foreign commerce.

- **The US Congress is working on a national [electric vehicle supply chain strategy](#).** China dominates the electric vehicle supply chain: it produces nearly two-thirds of the world's lithium-ion batteries — compared to 5% for the US — and controls most of the world's lithium processing facilities

- For every purchase of one gallon of gasoline, an 18 cents tax goes to the US Highway Trust Fund. Every state has a similar transportation tax; for instance, in California, for each gallon purchased, 30 cents goes to the state's Road Maintenance and Rehabilitation Program. However, [EV drivers don't pay the gasoline tax](#), so they pay **less for roads**. Several states are considering imposing a mileage tax on electric vehicle drivers to make up for the lost revenue.

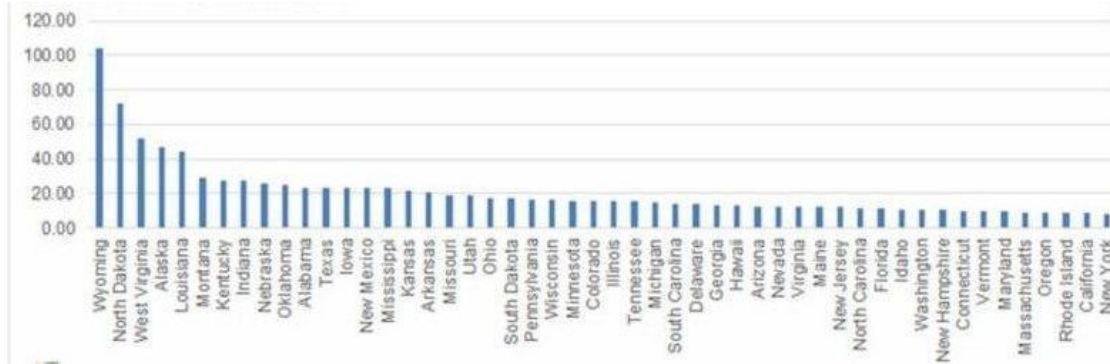
Climate and Environment

- **In the last ten years, energy-related [CO2 emissions](#) fell in 41 states and rose in 9:**

- Maryland had the largest decrease of CO2 emissions during that period: -30%
- Ohio had the greatest absolute decline of emissions: -24%
- Idaho had the largest percentage increase of CO2 emissions: +16%
- Texas had the largest absolute increase of emissions: +9%

- **The top-5 states with the highest CO2 emissions (and the one lowest), per capita:**

1. Wyoming: 104 metric tons per person
 2. North Dakota: 72 mt per person
 3. West Virginia: 52 mt per capita
 4. Alaska: 47 mt per person
 5. Louisiana: 45 mt per person
- Note: New York has the lowest per capita emissions of any state (8 mt per person).
 - Average: 16 mt of CO2 emissions per person



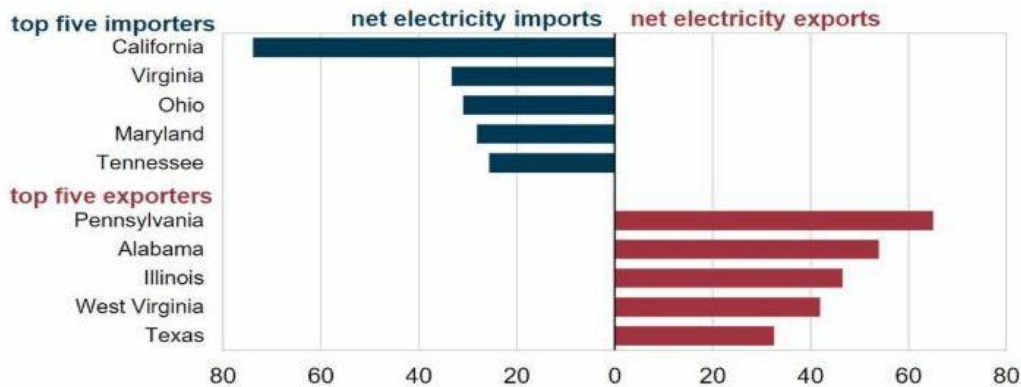
- A new Department of Defense report has determined that 74 out of 79 US military installations around the world are at risk from climate change threats. AES provides Members with access to the [DoD report](#).

- France generates 2 kilograms (about 4.5 lbs) of radioactive [waste per person](#) each year; about 20% of that total is highly toxic.

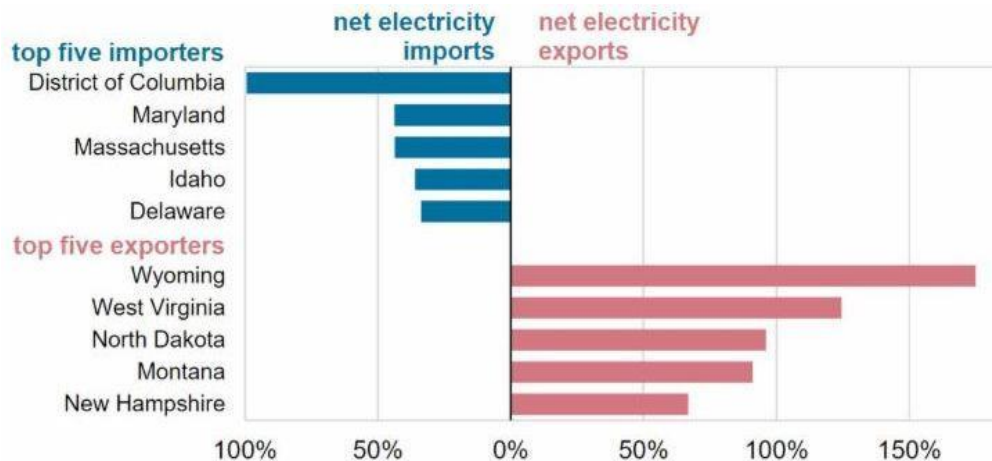
- The Rockefeller Foundation quietly [shut down its 100 Resilient Cities Initiative \(100 RC\)](#) . Since 2013, 100 RC helped member cities hire about 80 Chief Resilience Officers, spent more than \$3.35 billion on 2,600 initiatives to make cities more livable, sustainable and resilient ... and then it just closed the program.

Electricity, Power and Efficiency

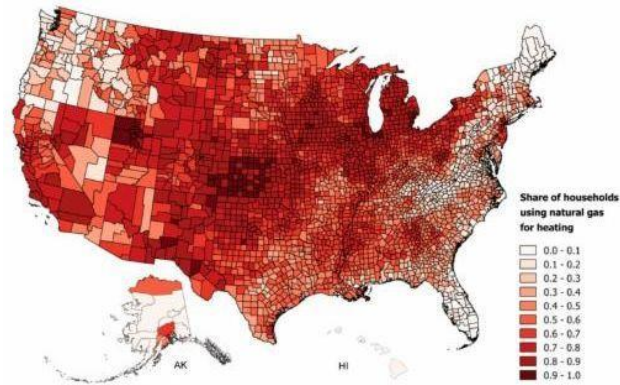
- In terms of [gross totals](#), California imports the most electricity from other states; Pennsylvania exports the most.



- Based on per [capita totals](#), the District of Columbia imports the most energy; Wyoming exports the most power.



- Households that use natural gas for heating, by US county:



- Bill Johnson, who recently retired as CEO of the Tennessee Valley Authority, will lead PG&E, and 7 of 10 current board members will step down. In addition, more than half of Johnson's incentive pay at PG&E will be tied to safety performance.

Cybersecurity threat-post

- LokiBot Trojan, a [bot](#) designed to covertly siphon information from utility-customer billing files, was spotted hitching a ride inside .png files delivered by email.
- Cybersecurity bad-actors have been using [drones](#) to carry out unwanted surveillance of large-scale energy infrastructure and inaccessible facilities.
- Norway-based [Norsk Hydro](#) fell victim to a ransomware attack, which forced the facility to shut down and then resume operations in manual mode.

Research and Markets

- There are (or were as of publication) **4,987 satellites currently orbiting Earth**. Many of these satellites are using remote sensors to geo-locate for navigation, collect data on the climate (weather events, temperatures, etc.) or identify environmental conditions (fires, storms, etc.). Since 1962, the United Nations has maintained a Registry of all objects that are launched into outer space. AES Members have access to the real-time [registry](#).

- "Scrum" *verb*, def: An increasingly popular business approach that is being adopted by the oil and gas industry. **"Scrumming" involves forming a group of highly-trained professionals from a variety of disciplines** - an engineer, scientist, manager, etc. - and then giving them all the resources they need to quickly solve a single problem. Though not part of the Hollywood script, the technique was used during the [Deepwater Horizon](#) oil spill when BP and the US DoE brought together a physicist specializing in fluid mechanics, a petroleum engineer, a mathematician, etc., to design a plan that stopped the leak.

Spotlight: Autotech

- There are about **350 new electric vehicle (EV) models that will debut in the next five years**. (Note: this is not a forecasted number; auto manufacturers must know today the models they will manufacture five years ahead.)
 - Oil companies and utilities are investing heavily or outright acquiring [electrical vehicle infrastructure](#) such as charging startups.
 - Related, electric vehicles manufactured in Europe cost 7,800 euros [more](#) than conventional cars (and plug-in hybrids are about 5,000 euros higher).
 - [Apple](#) hired Michael Schwekutsch as the Senior Director of Engineering; previously, Mr. Schwekutsch worked for Tesla as VP of Engineering.
 - [GM](#) is expanding its EV manufacturing plant in Michigan.
 - [Rolls-Royce](#) recently hired a team of automotive engineers and digital software developers who specialize in autonomous fleet management.
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Features

Spotlight: Wawira Ngiru and scaled growth of Food4Education, sustainable/circular-economy non-profit

- 2014: Wawira Ngiru graduates from University of South Australia with a degree in nutrition, returns to her home in Kenya and with just one kitchen feeds 25 kids.
- 2015: Feeds 10,000 children.
- 2016: Receives her first grant, starts managing Food4Education full-time, and feeds 25,000 kids.
- 2017: Feeds 75,000 kids.
- 2018: Serves 250,000 meals.
- 2019: On pace to feed 1,000,000 lunches that are changing lives.



Quotes : *The President vs the two Iowa Senators disagree about wind energy*

"... and they say the noise from windmills (aka wind turbines) causes cancer."
- US President Donald Trump

"I have church bells that ring across from my office here in D.C. I know that noise doesn't give me cancer, otherwise I'm sure I'd have church bell cancer."
- Senator Joni Ernst (Republican-Iowa) responding to comments by President Trump about windmill noise causing cancer.

"He isn't showing much respect for Chuck Grassley as the grandfather of the wind energy tax credit."
- Chuck Grassley (Republican-Iowa) on recognizing himself as co-author of the Wind Energy Incentives Act of 1993, which provided wind energy tax credits; one of nineteen senators who submitted a bipartisan request for more federal funding to support the wind industry. AES Premium Members have access to a true and correct copy of the [letter](#).

Note: Iowa generates about 37% of its in-state electricity from wind energy; it is the second largest wind-energy producing state in the US and the largest per capita.

What you may have missed

-Nuclear: The Kilopower project is a near-term [fission nuclear power system](#) designed to enable long-duration stays on planetary surfaces. After successful completion of the Kilopower Reactor Using Stirling Technology (KRUSTY) experiment, the Kilopower development team is now performing risk reduction activities to prepare for possible human outposts on the Moon and Mars.



Contacts

- [The American Energy Society](#)
- American Energy Society [LinkedIn Group](#)
- American Energy Society introductory [video](#)
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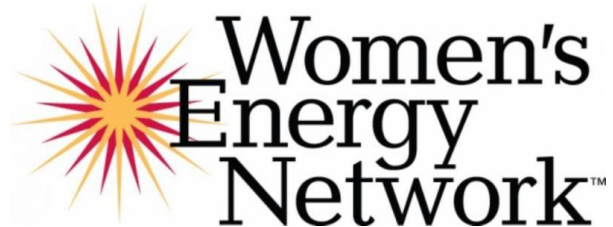
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