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ENERGY MATTERS



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Headline News

Conventional

Petroleum

- The state of the US oil market (an import/export global-trade historical comparison):

- The US is pumping about 10 million bpd (the highest levels since the early 1970s).
- The US is [exporting](#) a bit more than 1 million bpd.
- The US is importing 2.5 million bpd (the lowest since official data were first collected in 1973).
- The [US was importing](#) 12 million bpd 10 years ago.

Gas

- [Gas production in Appalachia has increased about 85% since 2014](#) (from 13,837 bcf/d to 26,027 bcf/d). Appalachia is now the most productive region in the country, producing more gas than all other shale plays in the US combined. As the number of operating rigs declines, production per well continues to increase - last month it reached the record high level of 26,027 mcf/day, about double traditional yield rates. If there was just one cause of Appalachian gas production improvements, it would be [technological innovation](#).

Coal

- [Coal mining jobs by state, 2017](#) (Note: a net total of 771 new coal jobs were created nationwide in 2017):

Winners: 1. West Virginia (+ 1,345 jobs); 2. Alabama (+ 950 jobs); Virginia (+ 500 jobs).

Losers: 1. Texas (-455 jobs); 2. Ohio (- 414 jobs); Kentucky (- 300 jobs).

(Note: Dana Mining is about to close, which means 400 people will soon lose their jobs in Pennsylvania.)

Nuclear

- The FAA has announced that **all 7 federal nuclear sites are now "no drone zones."** As a helpful resource, the FAA provides a map of all nuclear no-drone zones and the FAA's "no-drone" cautionary sign:

Renewables ... the "resource constraint" challenge

Editor's Note: It may appear that the renewables sector is struggling with weakening policy support - and in the US, that might indeed be true; however, perhaps a more imposing obstacle is what economists call "resource constraint." The following section focuses on some of these constraints:

- **Cobalt.** One of the key ingredients added in electric batteries used in electric vehicles is cobalt.
 - The Democratic Republic of the Congo produces more than [60% of the world's cobalt](#).
 - Many of the mines in The DRC are [illegally run](#) -- slave labor, underaged workers (20% are underaged children who work with just their hands), illiterate workers -- and the pay is terrible.
 - Warlords control the movement of people and resources into and out of the mines.
 - 7 of the 10 largest cobalt producers in The DRC are Chinese-owned (and they stockpile the mineral).
 - The DRC just doubled the tax rate on all [exported cobalt](#).

Mined Cobalt Output, 2016

1. Congo - 60%
2. Other - 14%
3. Canada - 6%
4. (tie) Australia, Philippines - 4%
5. (tie) Russia, Zambia, New Caledonia, Cuba - 3%

- **Lithium.** Contrary to popular reports, Earth has plenty of lithium to support growth of the battery/storage sector. However, the availability of lithium and the growth of this sector faces some obstacles:

- There are very few operating lithium mines in the world, the next is scheduled to open in 2019.
- 49% of all mined lithium comes from the [lithium triangle](#) - Argentina, Bolivia and Chile - and this region is not always geopolitically stable.
- [Demand](#) for laptops, cell-phones and electric vehicles isn't slowing down, which means demand for lithium isn't slowing down, either.
- Because of uncertainties, [market prices for lithium](#) are extremely unpredictable; for instance, two years ago prices for the metal tripled to more than \$20,000 a ton in just 10 months.
- Chinese companies own or control a majority of all operating and near-term lithium mines

- **Transmission lines.** A new report has found that [current transmission capacity](#) in the US fails to accommodate up to 51 gigawatts of near-term renewable energy procurement.

- **Polysilicon.** Global solar capacity is about to reach 100 gigawatts, primarily because of demand in China. However, 100 gigawatts is [close to the top end of what can be achieved](#), based on the global manufacturing capacity of polysilicon. Solar projects in some regions might be delayed or even canceled because market prices are higher than were estimated during the planning phase.

Policy

- During his State of the Union address, President Donald Trump called on Congress to advance a **\$1.5 trillion plan to "rebuild our crumbling infrastructure."** A [draft of the plan](#) highlights six broad principles, as well as the federal government's pledge to [commit \\$200 billion](#) to the \$1.5 trillion total, or about 13%:

- Incentives for cities and states to create dedicated revenue streams for their own projects.
- Block grants for rural states, a portion of which will target broadband access.
- Expansion of existing federal loan programs, especially transportation and railroads.
- Transformative projects (like Elon Musk's Hyperloop) must have in place matching private investment.
- Workforce development, programs that procure and retrain employees.
- Permitting reform that shortens government approval for projects.

- Sen. John Barrasso (R-Wyo.) is placing a [hold on President Trump's nomination](#) to lead the Energy Department's environmental cleanup program (Anne White) until the DoE promises to **end the practice of selling government-owned uranium.**

- **The recently passed US solar tariff was a direct response to China's industrial planning model** using state incentives, subsidies, and tariffs to dominate the global solar supply chain. As a result of these state-directed initiatives, China's share of global solar cell production skyrocketed from 7% in 2005 to 61% in 2012. China currently produces 60% of the world's solar cells and 71% of all solar modules. Over this same period, the US solar manufacturing industry "almost disappeared," with 25 companies closing since 2012. AES Members have access to the US Trade Representative [fact sheet](#).

- A tanker of [Russian liquefied natural gas](#) unloaded in Boston, making it **the first shipment of gas from Russia to ever arrive in the US.** The gas comes from a Russian company on the Treasury Department's sanctions list, but technically the gas shipment does not violate any import/export trade laws because a French energy trader bought the Russian shipment mid-route and it arrived on a French-owned vessel.

Climate

- The rapid decline and death of coral reefs around the world has been well-documented [here](#) and [elsewhere](#). Less understood is why. A new peer-reviewed study may have found the answer: the likelihood of [coral disease](#) **skyrockets from 4 percent to nearly 90 percent when coral comes in contact with plastic.**

- **There is about a [ton of plastic trash](#) for every person on Earth.**

- The Pentagon completed an internal study of its military facilities around the world and found that **half have struggled with climate extremes** and threatening weather. Members have access to the [internal study](#). [Energy Today](#) offers a closer look at the disagreement between the White House and the Pentagon on this issue.

- The average price for coal in 2015 was about \$2.23/MMBtu. Using current "Social Cost of Carbon" estimates, **the [price for coal](#) is approximately four times the market price.**

- Road salt used as an anti-icing agent is extremely [harmful for waterways](#) (as it increases the salinity in lakes and can affect species living in and around the bodies of water). Some municipalities are **replacing road-salt with various mixtures** of beet juice, molasses, beer waste, pickles and cheese brine.

- **World [methane emission levels have doubled](#)** in the last 10 years after remaining flat for the previous 20.

- **Climoji has designed 27 emojis to represent a variety of changes to the climate.** Here are two:



Electricity and Efficiency, Utilities and Power

- **The average age of Puerto Rico's Electric infrastructure is about 45 years old**; the average age of the infrastructure for all utilities in the US is about 18 years.

- The US Federal Emergency Management Agency will **"officially shut off" the aid effort to Puerto Rico**. Meanwhile, **30% of all K-12 students in Puerto Rico are [going to schools that have no electricity](#).**

- Not long ago, [microgrids were seen as a threat to utilities](#). However, **at least one utility sees microgrids as a business opportunity: Southern Co** signed a strategic alliance with Advanced Microgrid Solutions to jointly develop and deploy behind-the-meter distributed energy microgrids across the US, and an agreement with Bloom Energy to develop 50 MW distributed fuel cells for microgrids.

- Ukrenergo (Ukraine's state-owned National Electric Power Transmission Co.) is seeking [candidates](#) for four independent member positions on its Supervisory Board of Directors. Mandatory candidate requirements for the Supervisory Board of Directors:

- Higher education: Engineering and areas such as Power Industry, Finance, Economics, Energy, Law, Business Administration (MBA is preferable).
- At least 10-year overall work experience; at least 3-year experience as top or at least 5-year experience as top-level public servant.
- Proficiency in Ukrainian and/or English language.
- Comply with the requirements to independent members and have no conflict of interest.

Research to Tech-to-Market

- *Featured report:* In Q2 of 2016, 100% of all [VC investments in energy](#) (from conventional to renewables) went to companies that needed "follow-on" funding; however, there were **\$0 of initial investment in new start-ups**. Furthermore, In 2014, 0.01% of all philanthropic grants went to energy innovation (Note: 1% of US philanthropic grant making = \$820M/year).

- Techstars Energy Accelerator, in partnership with Statoil, has launched **a new funding program to support the development of "energy platforms of the future."** Ten selected energy start-ups will receive up to \$120,000 (each). [Applications](#) will be available starting February 19, 2018.

- Current lithium-ion battery packs can provide about 150 watt-hours per kilogram and an energy density close to 250 watt-hours per liter. New research has found that **inserting a lithium metal electrode into a lithium battery could increase the battery's stored energy by 35% and energy density by 50%**. AES Members have access to the [peer-reviewed article](#). (Editor's note: the ARPA-e "IONICS" program provides funding for early-stage research in areas like the lithium metal electrode. Past winners working on lithium metal electrodes include [24M](#), Ionic Materials, [PolyPlus Battery Company](#) and [Iowa State University](#).)

- **Following the announcement of the new solar-tariff**, the US DoE introduced the [American Made Solar Prize](#), which will award \$3 million in "prize" money to whomever revives domestic solar manufacturing.

- United Renewable Energy (a combination of three Taiwan-based solar-cell makers) is [preparing a new PV module manufacturing plant](#) (annual production capacity of 500-1,000MWp) in order to be **the first company in the US** to take advantage of the new solar tariff.

— FEATURES —

Spotlight - Energy Jobs, a sample



- *Conventional:* Oliver Wyman is seeking a [Principal for their Oil & Gas](#) practice in Houston, Texas.
- *Renewables, job spotlight:* Empowered by Light is seeking a Program Manager to oversee efforts to provide communities in sub-Saharan Africa, South Asia, South America and US with renewable energy. For information, contact [Moir Hanes, subject line: Empower - Program Manager](#).
- *Policy:* The DoE in Washington, DC, is hiring an [Energy Efficiency Policy Analyst](#).
- *Climate:* The Robertson Foundation is seeking an [Environmental Portfolio](#) director to work in NYC.
- *Research:* University of Auckland is searching for a [Professor of Economics](#), with a specialty in energy. The search closes Feb. 5, but interested candidates may [contact AES](#) to extend the deadline.
- *Business:* The European Bank for Reconstruction and Development is seeking an Associate Director, [Lead Regional Economist for the SEMED Region](#), with headquarters in Cairo, Egypt.
- Amber Kinetics in SF is seeking an MBA to lead [business development](#) of their energy-storage unit.
- Online professional development course: [The Future of Work](#), offered through the Glasscock School of Continuing Studies at Rice University - March 26 thru May 7 (seven Mondays).

What You May Have Missed

- [Natural gas imports into China are surging](#) and have reached an all-time high. At 7.89 million tons, the December total surpassed the previous record - in November - by 20%.

Quotes - "Wait a second ... what did you just say?"

"The United States is not just exporting energy, we're exporting freedom."
- Rick Perry, Secretary of the Department of Energy

"I've won Trump over on climate change."
- French President Emmanuel Macron, as reported by the *Times* of London

"Natural gas has fizzled out... [It] is no longer a contender or pretender, just a relic of the past."
- D. Kennedy, GreenBiz, "The End of Natural Gas Is Near"

- "An unstoppable decay of the West Antarctic Ice Sheet will lead to at least 10 feet of rise at the end of two centuries." (A prediction 200 years out? Really?)
- B. Strauss, Energy Correspondent for Climate Central

"Summer temperatures in Dubai will become too hot for humans by 2070." (As if it isn't already.)
- S. Sherwood, Climate Correspondent for Gulf News Report

"Coal jobs will grow by about 5,000%."
- Scott Pruitt, Director of the EPA, on Meet The Press

"Solar can provide power 24/7."
- Institute for Energy Research, "Germany's Green Energy Destabilizing Electric Grids"

"Offshore [O&G] drilling in North Carolina will create up to 55,000 jobs."
- American Petroleum Institute, in support of President Trump's call to open up off-shore drilling.