



— HEADLINE NEWS —

Conventional

Petroleum

- *Special report: The technology-driven US-led shale revolution is now causing geopolitical upheaval in virtually every oil-producing nation outside of North America.* The sum-total of all the geopolitical instability among oil-producing nations should be considered as a single consequence as opposed to isolated cases - this is an on-going market-driven phenomenon:

- [Venezuela's](#) oil output has fallen to its lowest level in nearly 30 years, causing an economic crisis that will become a political revolution in April when a fraudulent presidential election won't be recognized. Banks are already preparing - the public cannot withdraw even \$1. (Note: crude oil makes up about 95% of Venezuela's exports. The country has no other source of foreign income.)
- [Russia's](#) oil-and-gas sector accounts for about 16% of GDP, 52% of federal budget revenues, and over 70% of total exports. Seeking additional markets to offset lower prices, Putin's government has proposed new pipelines throughout Europe and to Asia; however, it's too late to have a major impact. For instance, to cut its reliance on Russian natural gas, Poland has decided to build a pipeline through the Baltic Sea as an alternative to Russia's Nord Stream. Other countries are preparing to do the same. (Note: US officials publicly oppose Russia adding new pipelines.)
- [Syria](#) has granted Russia exclusive rights to produce its oil and gas, and Russia has hired [Iran](#) to oversee construction, even though the latter is struggling to overcome its own series of catastrophes. It's an understatement to say that Russia has taken over a desolate ruin - Syria is a failing state.
- [Yemen](#) has no government that can take responsibility. It's not a failed state, it's a dying one.
- [Colombia's](#) beleaguered oil patch has led to considerable political disruption. The failure of recent peace talks and end of a temporary ceasefire has inspired the Marxist insurgency.
- [Iraq](#) is trying to recover from the recent US sanctions by committing virtually all of its exports to only China and India, shifting negotiating power to the buyers.
- [Saudi Arabia](#) is surrounded by external and internal geostrategic struggles. For instance, the Saudi military intercepted a Yemen-born ballistic missile, and the prolonged proxy war between Saudi Arabia and Iran is threatening to re-emerge on new fronts; meanwhile, opposition by Saudi youth who question their government is growing, and the anti-corruption crackdown led by the new crown prince has led to the arrest of more than 17 princes and top officials.

Gas

- In 2016, [NG proved reserves](#) in the US reached 341.1 trillion cubic feet (Tcf), an increase of 5% from 2015. **Pennsylvania had the largest net increase in natural gas proved reserves of all states** - 6.1 Tcf of new natural gas reserves in the Marcellus (Northern Appalachia). [New gas reserves](#) were also added in several other shale plays, including Wolfcamp, Marcellus, Eagle Ford, Utica, Woodford, and Haynesville.

Coal

- *Featured report:* About 20,000 research papers listed on Google Scholar mention a worst-case scenario for climate change in which an overpopulated, technology-poor world digs up and burns all the coal it can find. However, according to a new peer-reviewed study, all 20,000 of these publications might be wrong since they all assume that by 2100 coal will provide 94 percent of world energy, even though coal currently provides only about 28 percent of the world's power. **There is probably not enough extractable coal to make the worst-case climate-change scenarios possible.** It seems that the only people who project more coal use in the future than the Trump administration are climate-scientists. AES Premium Members have access to this peer-reviewed article and the work of the graduate student at the University of British Columbia who's [research](#) was the first to identify a

disconnect. (Editor's note: the above research should not be used as a case for or against any policy; more research is needed.)

Nuclear

- There are six nuclear reactors that are currently being [decommissioned](#) (aka, site deconstructed, waste disposed, equipment decontaminated, and property returned to greenfield status): three are in California (VBWR, EVESR, and Humboldt Bay reactors), one is in Wisconsin (La Crosse); and two are in Illinois (Zion 1 and 2). The decommissioning process is paid for through a fund that each plant operator creates during construction. However, **when reactors are retired earlier than planned, shortfalls in funding usually result in additional expenses** to the ratepayers for the utility operating the nuclear plant.

- Renewables

- Featured story: **A new report card grades major IT companies on their commitment to renewable energy.** AES Members have access to the ["Renewable Energy for IT" report card](#).

- A: Apple, Facebook, Google
- B: Adobe, Microsoft, Salesforce
- C: Amazon WS, HP, IBM, Naver
- D: Alibaba, Oracle, Samsung
- F: Baidu, Tencent

- **The IT sector uses about 7% of the world's energy**; almost one-fifth of the electricity used by the world's IT sector comes from renewable sources.

- *Special report*: **The US government doubled its financial support for solar power projects overseas last year** under a climate-friendly investment policy written in the last days of the Obama administration. During the first year of the Trump administration, the Overseas Private Investment Corporation, the government's international finance institution, loaned more than \$630 million to foreign energy projects in 2017, 90 percent of which were solar, wind, or other low-carbon ventures. AES Premium Members have access to OPIC's [archive of renewable energy investment projects](#).

- The leading global **automakers have invested about \$90 billion in the research and development of electric vehicles**, with more than half that amount from companies based in Germany.

- **Coral reefs are dying around the world, but not in or around offshore wind farms** - the turbines' underwater bases act like an "artificial reef." (At present, there is no reliable peer-reviewed research that confirms this observation, but AES Members have access to a [video](#) of the phenomenon.)

Policy

- The [budget deal](#), including various energy-related add-ons as well as a supplementary list of "2018 Discretionary Adds" added by the White House, **reverses cuts to a few energy programs** (AES Members also have access to the [CBO rating](#) of the budget.):

- Reinstatement of tax credits for nuclear energy and carbon capture projects.
- In a win specifically for Georgia Power's Vogtle plant, the new budget eliminates a 2020 deadline to claim a tax credit for new nuclear power plants.
- The sale of \$350 million of crude from the Strategic Petroleum Reserve to fund modernization efforts.
- Reinstatement of the 9-cent-per-barrel tax on oil to pay for spill cleanups.
- Perhaps the biggest [surprise](#), a \$35 per ton tax incentive for carbon captured and recycled from power plants using algae or other biologically-based systems.

- FERC has approved a new rule that removes [barriers faced by energy storage](#) in electricity markets. At its most basic level, the new FERC rule allows "stored energy" to submit price bids on the open market.

- The US DoE is reverting its Policy Office back to its pre-Ernest Moniz status. Moniz used the Office to do the heavy lifting for the Obama administration, including study and publication of the in-depth Quadrennial Energy Reviews. The current administration will cut the budget of the "new" Office of Policy" from \$30 million to \$2.5 million, and will reduce the QER to an internal undersecretary report. Meanwhile, the DoE is creating a new Office of Cybersecurity, Energy Security and Emergency Response, with \$96 million in additional funding to pay for the new office and its expanded efforts.

- The Interior Department's Bureau of Land Management has finalized a set of recommendations that would overhaul the way it permits energy exploration and other activities on public land by streamlining environmental reviews. The report — *which was never publicly released* — amounts to a blueprint for how the Trump administration plans to expedite extractive activities on 245 million acres of public land. AES Members have access to the [BLM draft report](#).

Climate

- A draft UN climate science report suggests that global warming will likely exceed the key marker of 1.5 degrees Celsius (or, 3 degrees Fahrenheit), and that it will be exceedingly difficult to repair. AES Premium Members have special access to the [draft UN climate report](#) that has been granted thru Feb. 25.

- **The food system accounts for up to 24% of greenhouse gas emissions**; farming alone is responsible for the equivalent of 574 million metric tons of carbon dioxide emissions in the US each year, and 56 million metric tons in Canada. That's about 9 percent of both country's total [greenhouse gas emissions](#).

- **Everyday chemicals found in personal-care products** (hand-soap, paint, perfume, sunblock, cleaners, lip-stick, etc.) now rival cars as a main source of emissions for volatile organic compounds, or VOCs.

- Despite the attention that lead poisoning has received in recent years after nearly 100,000 people were exposed to dangerous lead levels in their drinking water in the city of Flint, Mich., a new analysis found that **the number of drinking water systems that exceed the EPA's "lead-action level" remains essentially unchanged** (about 5,000 water systems for 18,000,000 people).

Electricity and Efficiency, Utilities and Power - SPECIAL REPORT: CYBER-SECURITY

- **No sector is more at risk to cyber-security attacks than utilities.** *To explain the sophistication of the bad-actors, the following is an example of a recent attack. For more examples, please see your [personal AES account](#) (Note: thank you [DarkTrace](#) for helping identify the threats listed below and on the AES website.)* **A major casino in Las Vegas** recently installed a high-tech fish tank for its Great White Shark as a new attraction. The tank had advanced sensors that automatically regulated temperature, salinity, and feeding schedules. To ensure the tank's computer system remained separate from its commercial network, the casino configured the tank to use an individual VPN to isolate the tank's data. However, a hacker in Finland gained access to the tank's separate VPN system, and was able to infiltrate the casino's commercial network through it, allowing sporadic exfiltration of its data, including financial.

- **By the numbers** (Source: *Popular Science*, Jan/Feb, 2018, pp. 6 and 7):

- 84% - The percentage of utilities where non-specialists make cyber-security decisions.
 - 21,500 - Number of high-powered utility substations in the US. (Note: a vast majority of these substations lack the staff, time or resources to update virus scans and software patches.)
 - 215 - Estimated utility-master control centers in the US. (Note: A hacker's ultimate goal is to access a master control center. If a malignant program breaks through, it could corrupt data in the system.)
 - 697,000 - Circuit miles of transmission lines that are susceptible to physical attack.
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- 72 - Estimated total hours from attack on a utility to the beginning of a community's downfall.

Research to Tech-to-Market

- UK-based researchers have applied **electrical charges to manipulate [liquid metal into 2D shapes](#)**, bringing to mind the terrifying T-1000 character in the *Terminator* films.

- Engineers at the Royal Melbourne Institute of Technology University have developed **a paint that creates energy**. A mixture of molybdenum-sulfide and titanium oxide absorbs sunlight and air moisture to generate hydrogen fuel. Right now the mixture works only under lab conditions and is inefficient - a sealed vessel captures 1% of generated hydrogen (source: Popular Science, Jan/Feb, 2018, p.90).

- Cost to mine one bitcoin, based on average electricity rates:

1. South Korea \$26,170
2. Germany \$14,275
3. France \$8,930
4. Japan \$8,723 ...

US \$4,758

Russia \$4,675

- A small city in a tea-growing province of southeast China is about to open a \$1.3 billion (UD) [EV-battery manufacturing plant](#) with enough capacity to surpass the output of Tesla. Contemporary Amperex Technology Ltd., or CATL, already **sells the most batteries to the biggest electric-vehicle makers in the biggest EV market: China**. Now it wants to expand globally. The company plans to raise 13.1 billion yuan (\$2 billion) by selling a 10 percent stake at a valuation of about \$20 billion. The stock-sale would finance construction of another battery-cell plant — which would cement China as a leader in the sector.

— FEATURES —

Spotlight - Elemental Excelerator

- [Elemental Excelerator](#) is a non-profit accelerator that finds, funds, and nurtures transformative energy technologies. In short, they are looking for "Eureka!", the kind of new innovations that will affect billions of people. But what makes this facility exceptional is that its choice location in Hawaii is as strategic as it is desirable: the eight-island archipelago not easily accessible to the outside world is its own case-study laboratory. If a technology can overcome human, financial and resource obstacles in Hawaii, it can probably scale to the world. **The American Energy Society applauds "Elemental" for its incredibly successful portfolio.**

Quotes

"Silicon Valley missed Energy 1.0. It won't miss Energy 2.0." -- Dave Danielson: former Assistant Secretary of the US Department of Energy's Office of Energy Efficiency & Renewable Energy (EERE); current Precourt Energy Scholar at Stanford University and Managing Director, [Breakthrough Energy Ventures](#) (L.P.s include Gates, Bezos, Zuckerberg, Branson....)