

Energy Matters

The energy news you need to know.

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(Every two weeks)

The official e-newsletter of ...



**AMERICAN
ENERGY
SOCIETY**

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Headline News

Fossil Fuels

- *Petroleum*: One century ago, the US was the world's uncontested petroleum [powerhouse](#). (AES Editors recommend a [retrospective study](#) of oil and gas.) Dominance of the oil sector ended with the 1973 Arab oil embargo. As 2019 opens, consider that **the US is once again the world's top producer by a wide margin** (in million barrels/day):

1. United States - 15.65 (16% of the world total)
2. Saudi Arabia - 12.09 (12% of the total)
3. Russia - 11.21 (11%)

- *Natural gas*: US LNG export capacity grew from just 0.8 Bcf/d (billion cubic feet / day) in 2016 to about 9.5 Bcf/d in 2017. But now, **the US is [not building](#) LNG export infrastructure at a rate that can keep up with increasing demand**. Among the reasons, it takes years to get the required permits to build an LNG export facility in the US (see "Policy" below.)

- Related, **China is the world's largest importer of LNG**, (ten years ago, its LNG market was irrelevant). Among the reasons, China has [invested](#) substantially in its infrastructure:

- China has installed super-chilling technologies in its entire fleet of LNG trucks; the trucking industry is now capable of transporting 12% of China's entire market.
- China has introduced a new fleet of ocean-going LNG tankers.
- Most of China's LNG facilities are owned and operated by three state-owned giants: 1) CNPC; 2) Sinopec Group; and 3) China National Offshore Oil Corp. In the past, these companies operated in isolation; today, the trio collaborate and share their terminals and pipelines to ease bottlenecks and improve distribution networks.

Coal

- The Wyoming Integrated Test Center was recognized by the industry as having **the [most advanced](#) carbon capture storage technologies in the world**.

- Germany [imports](#) about 90% of its coal, nearly 17% from the US.

The Low-Carbon Energy Sector

- **Renewables:** **At the end of the 20th Century, the world got about 20% of its total electricity from renewable sources** (most of it from hydro-). Today, 18 years later, the world gets about **23%** of electricity generation from renewable sources (most of it from hydro-). Taking a closer look, Iowa gets about **40%** of its electricity from wind-power alone; the state of Tamil Nadu in India generates **30%** of its electrical power from just wind.

- **Solar:** **NV Energy has submitted a 300 MW power purchase solar project at \$23.76/MWh for 25 years; or, 2.3-cents.** If the bid is accepted by regulators, the price will beat the \$24.99/MWh contract recently signed in Arizona, which is currently **the record lowest-cost solar** contract in the nation.

- **Nuclear:** There are 30 states in the US that have a nuclear power plant; these plants provide power for 73 individual utilities. **These 73 utilities provide about 56% of all non-carbon generated electricity in the US.**

- **Renewables:** **The US military considers "renewable energy" a superior defensive strategy** - it guards against blackouts due to floods, storms or cyber-attack. AES Premium Members have access to **Beyond the Fence Line**, a DoD report on the strategic adoption of renewable energy at US military bases.

- **Featured story:** **Kenya is the 8th largest producer of geothermal energy in the world;** the Kenya Electricity Generating Company (Kengen) is currently building an 83 megawatt **geothermal plant** in Olkaria, Naivasha.



Policy

- **Congress overwhelmingly passed the Farm Bill.** AES Members have access to the **bill** (807 pages). The big winners are:

- The US Department of Agriculture will provide funding for algae agriculture.
- Generous insurance, loan and financing in support of sustainable farming practices.
- A new soil health provision designates funding for farmers who adopt practices that improve soil health and increase carbon levels, a crucial step toward monetizing a new agricultural product — carbon capture and storage.

- **Feature:** The Society of Civil Engineers evaluated the energy infrastructure in the US and assigned it a "D+ grade." Part of the reason is because the sector struggles with many overlapping regulatory requirements. **The following is a *partial* list of regulatory agencies that require compliance from energy** (Note: the list excludes nuclear power and financial regulations; the oil and gas sector has even more regulatory requirements *in addition* to those listed below):

Army Corps of Engineers
Regional Air Quality Management Districts
Regional Conservation Commissions
Bureau of Weights and Measures
State Air Resource Boards

State Lands Commissions
State OSHA's
Departments of Toxic Substances Control
Dredged Material Management Offices
Environmental Protection Agency

State Wildlife Departments
State Minerals and Raw Materials Depts.
State Energy Commissions
Offices of Enviro, Health Hazard Assess.
State Fire Marshals
Regional Water Quality Control Boards
U.S. Department of Interior

EPA Regional Superfund Task Forces
Governor Offices of Emergency Services
National Marine Fisheries Service
County Offices of Emergency Services
State Water Resources Control Boards
US Coast Guard
US Fish and Wildlife ...

- *Related*, in order to reduce some regulatory burdens on the energy sector, **the DoE Office of Fossil Energy has [eliminated](#):**

- End use reporting requirement on exports of LNG (but only affects future exports).
- End use reporting requirements for 42 existing export contracts.
- Some of the categories of contracts and purchase agreements associated with the export of natural gas and LNG.

Beltway Buzz

- Ryan Zinke stepped down as Secretary of the Interior on December 31; **the [contenders](#) to lead the Interior Department are:**

- David Bernhardt (Deputy Interior Secretary, currently the acting Secretary) - the presumptive favorite
- Rob Bishop (House of Representatives, Utah) - a logical selection since he was demoted to ranking Member when the GOP lost its House majority
- Dean Heller (Senator, Nevada) - criticized President Trump during the 2016 Presidential election
- Raul Labrador (House of Representatives, Idaho) - will be available once he retires from his position in the House in late January
- Cynthia Lummis (former Representative, Wyoming) - actively and publicly campaigning for the job
- Butch Otter (Governor, Idaho) - a consistent friend and fan of President Trump.

- It seems likely that the US government partial shutdown will continue for the foreseeable future (the Senate has warned that related bills won't even come up for a vote). In addition to under-staffing at the National Parks and Homeland Security, **the ongoing shutdown also delays exploration activities in the ANWR refuge and halts the release of [plans](#) for expanded offshore oil and natural gas drilling.**

- The US Congress finally approved a large number of nominees at EERE, EPA, and Department of Interior. But at least 10 nominees have to start over with the new Congress and Trump **has yet to nominate candidates for a dozen more openings**. Moreover, acting EPA Administrator Andrew Wheeler's formal nomination to replace Scott Pruitt is being [held up](#) by the shutdown. And then, sadly, commissioner Kevin McIntyre recently [passed away](#) at age 57. (As chairman, Mr. McIntyre guided FERC as an independent agency and unanimously rejected the Trump administration's plan to support failing coal and nuclear plants.) His passing returns the Commission once again to a 2-2 bipartisan split and another opening to fill.

Climate and Environment

- The changing climate will have an impact on labor, property values, water access and quality, disease, infrastructure, agriculture, air quality, electricity..., but according to new research it will **test geopolitics and national security most of all**. AES Members have access to a 1,600-page [report](#), or a 196 page [Executive Brief](#) on the climate's impact.

- **Greenhouse gas emissions probably [increased](#) 2.7% in 2018**; China, the US, and India are the biggest emitters. Emissions had been relatively flat from 2014 - 2016.

- **It is possible that coral reefs are more resilient than thought.** AES Members have access to the peer-reviewed research [article](#).

- **The Belchatow coal power plant in Poland is the dirtiest in the world** - it emits extremely dangerous amounts of carbon dioxide (CO₂), nitrogen oxides (NO_x), sulphur oxide (SO_x), and other poisonous gases. AES Members have access to the Greenpeace [catalog](#) of photos and videos of the power plant.



- "**Coal rolling**" *noun*, def: A form of conspicuous air pollution, for entertainment or for protest against environmental protection. Practitioners, usually in the United States, modify a diesel or petroleum engine **in order to emit large amounts of black or grey sooty exhaust fumes into the air**. Practitioners will also remove particulate filters or modify their vehicles by installing smoke switches and smoke stacks.



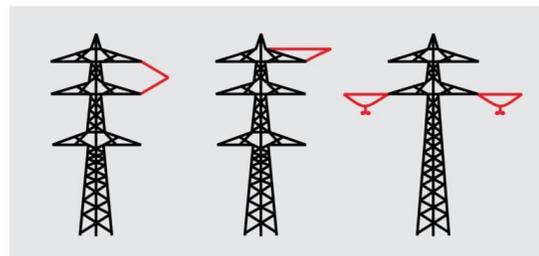
Electricity and Efficiency

- The world [consumes](#) more than 50,000 billion Wh of electricity every day; the US alone uses about 10,000 billion Wh daily.

- Globally, PC gamers [use](#) about 75 billion kilowatt hours of electricity a year, equivalent to the output of 25 electric power plants. In the US, gaming systems consume \$6 billion worth of electricity annually. In California, video gaming uses more power than electric water heaters, cooking appliances, clothes dryers, dishwashers, or freezers. **American gamers emit about 12 million tons of carbon dioxide annually** — the equivalent of about 2.3 million passenger cars.

- During the winter months, **about 40% of US households set their thermostats at 70 degrees and leave it unchanged** . About 4% have a smart-thermostat connected to the Internet and have it programmed for greater efficiency.

- Utilities that serve rapidly growing communities often struggle to meet new demand. One reason: conventional AC transmission networks have limited capacity. **One solution: convert AC to HVDC transmission** . Among the benefits, **AC lines can be converted to HVDC without having to build new lines.** (*right: black illustrations are conventional AC transmission towers; red identifies three different HVDC conversion options.*)



Research to Market

- *First-mover advantage*: **Three RFPs to build an electric grid in Afghanistan**; applications due February 1, 2019.

1. Governance and Management [Assessment](#)
2. Short-term Local Logistics [Support](#)
3. Local Electricity Sector Subject Matter Expert [Support](#)



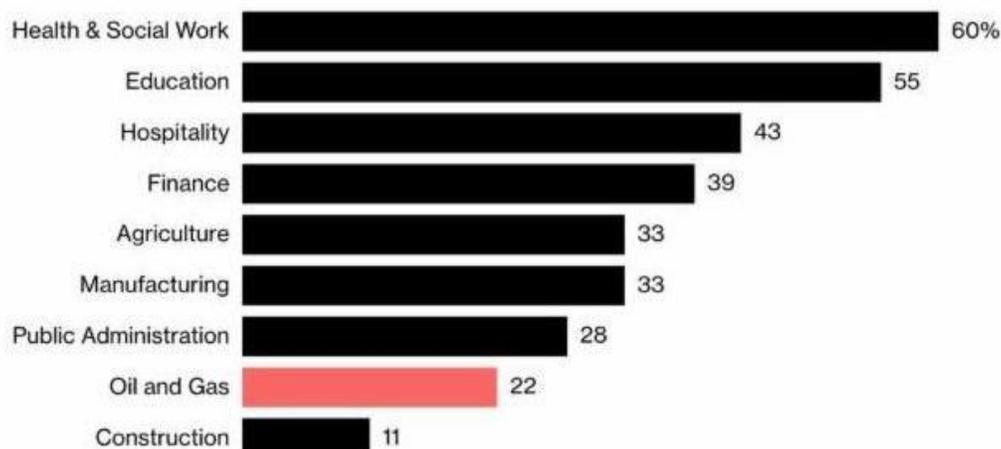
- **Electric Vehicle [capitols](#) of the world**:

1. (tie) Beijing, Los Angeles, Shanghai
2. (tie) Shenzhen, Oslo

- *Spotlight* : **the gender imbalance in the global petroleum employment sector**:

- "Forty Under 40" awarded by Oil and Gas Investor magazine named 37 men and three women.
- The oil and gas sector has a controlled pay gap of -7.4% for women. ("Controlled pay gap" - men and women working similar jobs.) For comparison, the next closest industry was transportation, with a controlled pay gap of -4.9% for women.
- About 18% of all people hired by the oil and gas industry who have bachelor degrees in engineering, computer science and physics are women

Percentage of female workers, by sector:



- Egyptian blue, a color developed thousands of years ago, is a fluorescent pigment derived from calcium copper silicate - **used on rooftops and walls it can boost energy efficiency; injected into glass it can enable solar generation of electricity via windows**. AES Members have access to the peer-reviewed [article](#) from Lawrence Berkeley National Lab.

