

# Energy Matters

The energy news you need to know.

**July 29, 2019**

(Irregular publication schedule in July)

The official e-newsletter of ...



**AMERICAN  
ENERGY  
SOCIETY**

## News from the Society

- AES is co-hosting [CyberCon](#), a solutions-oriented **cyber-security conference for executives and decision makers in the power and utility industry**, on November 19 – 21, 2019 at the Anaheim Convention Center in California. [Contact us](#) for special registration pricing for AES members or other questions.

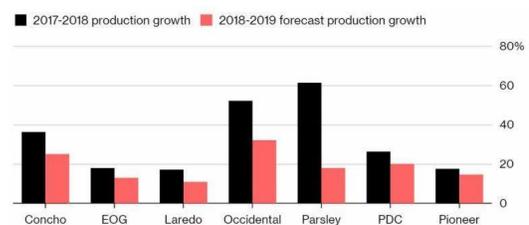
- In case you missed it: [Energy Today](#) (vol. 12.3), The "Energy Finance" issue.

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## Headline News

### *Fossil Fuels*

**Oil:** The [Permian](#) has been the world's fastest-growing major oil region over the past two years, growing 72% to 4.2 million barrels a day. But **the pace of growth is slowing down**. The constraints are many: pipeline limits, reduced flow from wells drilled too close together, low natural gas prices, high land costs, etc. **But the most consequential reason for declining production is that all shale-well production naturally falls off at a high rate** - as much as 70% after the first year. (See insert for oil production in the Permian Basin.)



**Gas:** The [International Energy Agency](#) issued a statement in support of replacing coal with natural gas - with an important caveat:

- Coal-to-gas switching has avoided CO2 emissions equivalent to putting another 200 million electric vehicles on the road.

- On average, coal-to-gas switching reduces emissions by 50% when producing electricity and by 33% when providing heat.
- *Known-unknown*: We don't know the full extent of methane emissions globally because no one has conducted a comprehensive field study of actual emissions.

**Note:** AES Premium Members have access to a tool for tracking methane emissions from oil-and-gas development and access to the [IEA report](#).

**Coal:** AES Members can begin preparing for a forthcoming RFP. The Coal FIRST initiative (Flexible, Innovative, Resilient, Small, Transformative) **supports the development of a new generation of coal plants capable of flexible operations to meet the needs of the grid for a stable baseload**. AES Premium Members have access to a special [infographic](#) on coal by NETL.

**Carbon Capture:** A [new study](#) explores a variety of complimentary carbon capture/sequestration/utilization techniques, including Direct Air Carbon Capture and Storage (DACCS). At peak scale, DACCS could remove up to 1.5 billion tons of CO2/year of the tens of billions of tons released in the atmosphere annually. AES Premium Members have access to the peer-reviewed study.

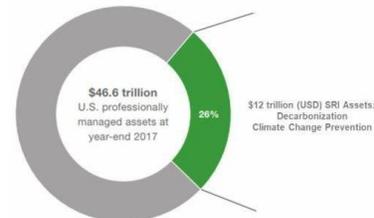
## Low-Carbon Energy

**Nuclear:** [TRISO](#), or "TRi-structural ISOTropic" particle fuel, is **the most robust nuclear fuel on earth**. TRISO particles are extremely small (about the size of a poppy seed) and made of a uranium, carbon and oxygen fuel kernel contained in a triple-coated ceramic cover. TRISO pellets are structurally more resistant to irradiation, corrosion, and oxidation than traditional reactor fuels. In other words, they are less likely to melt in a reactor and can withstand extreme temperatures well beyond the threshold of current nuclear fuels.



**Storage:** [Portland General Electric](#) (an Oregon utility) has determined that **the combination of wind + storage is a cheaper source of electricity than natural gas or coal**. The utility is planning to install and expand its wind + storage capacity.

**New Energy Financing:** [Impact investing](#), also known as "sustainable, responsible, and impact" investing (SRI) now totals close to \$12 trillion in US assets under management. Of that, nearly **a fourth is being used to support decarbonization and/or combat climate change** (insert).



**Hydrogen:** A [summary](#) of the state and future of hydrogen as energy:

- Identify a role for hydrogen
- Stimulate commercial demand
- Address investment risks
- Support R&D to bring down costs
- Eliminate unnecessary regulatory barriers
- Encourage international collaboration

## Policy

- *Special report:* From the mid-20th century to the present, the US Supreme Court has consistently interpreted car ownership as a "virtual necessity." In other words, **America is car-dependent by choice and also car-dependent by law**. For instance, in the 1973 case [Wooley v. Maynard](#), SCOTUS determined that policies that made car ownership difficult caused harm ("an individual has no other reasonable alternative"). Car ownership in the US, [by the numbers](#):

- Every employee in the US has the equivalent of two parking spaces at work.
- In urban areas, employers are often required by law to build garages that cost approximately \$50,000/parking space.
- Houston is estimated to have 30 parking spaces for every single resident.

- Those who walk or bike to work receive no commuter tax benefit; on the other hand, those who drive receive a range of tax-deductible benefits (i.e. car buyers qualify for tax rebates, and electric or hybrid buyers can get a \$7,500 tax break).

- **23 US governors signed a pledge supporting California leaders in their showdown with the Trump administration over its plans to relax vehicle mileage standards:** in addition to California, the other states/territories that favor strict emission standards include Puerto Rico, Colorado, Connecticut, Delaware, Hawaii, Illinois, Maine, Maryland, Massachusetts, Minnesota, Montana, Nevada, New Jersey, New Mexico, New York, North Carolina, Oregon, Pennsylvania, Rhode Island, Vermont, Virginia, Washington and Wisconsin. (Note: since the 1960s, California has had Congressional [permission](#) to set its own mileage standards as a way of fighting the state's chronic smog.)

### *Beltway Buzz*

- Congressional budget negotiators are close to a budget agreement, including **\$75 billion in new revenues generated by [selling](#) some of the Strategic Petroleum Reserve.** Lawmakers are pressing to get a deal done before the Senate leaves for recess Aug. 2 (the House is already on break). Neither chamber is due back until the second week of September.
- Since 2012, **the federal government has been sponsoring 39 [different](#) energy storage initiatives run by six different agencies.** The [most recent](#) to launch energy storage programs include NIST and the EPA.
- **The White House invoked the [Defense Production Act](#) , which classifies 17 obscure rare earth elements as "essential to the national defense."** These metals are used for heat-resistant magnets found in technologies like advanced weapon systems and common hard-drives. China supplies 80% of the world's rare earth minerals and also processes all the metals produced at the only American rare earth mine — the Mountain Pass project in California.

## *Climate and Sustainability*

- Eighteen of the 19 warmest years on record have occurred since 2001; meanwhile, **the last five " [Januaries through Junes](#) " are now the five warmest such spans on record.**
- PM10 (small particulate pollution) levels are **starting to decline in Delhi, Mumbai, Varanasi, Ranchi, and Bengaluru, and other large cities in India.** AES recommends the "PM10 India" [real-time resource](#).
- **The following nine countries are getting [hit hardest](#) by the changing climate:**
  - India - heat; water/food scarcity
  - Namibia - water/food scarcity
  - Mauritania - heat; flooding
  - China - water/food scarcity
  - Seychelles - rising sea levels; water/food scarcity
  - Marshall Islands - rising sea levels
  - Maldives - rising sea levels
  - Bangladesh - heat, tides and water/food scarcity
  - Vietnam - rising sea levels
- **The following eight countries contribute about 63% of all [ocean trash](#):**

• China	• Sri Lanka
• Indonesia	• Thailand
• Philippines	• Egypt
• Vietnam	• Malaysia
- **The 10 most " [environmentally friendly](#) " large corporations in the US:**

1. Microsoft	6. Xerox
2. Biogen	7. Goldman Sachs
3. Bank of New York Mellon	8. Adobe
4. Accenture	9. IBM
5. Apple	10. Intel
- From 1970 to 2018, **the combined emissions of six key air-pollutants dropped by 74%**, while the U.S. economy grew 275%. AES Premium Members have access to the EPA " [Fact Sheet](#)."

## Electricity, Power and Efficiency

- **There are five new trends for distributed energy resources (DERs)**; AES Premium Members have access to the [study](#):

- Increased implementation of residential time-based rates.
- Development of rates and programs that promote midday load building.
- Increased application of residential three-part rates (i.e., demand charges).
- Development of new net-metering alternatives.
- Development of new electric vehicle-specific rates.

- Once upon a time, most utilities in the US billed their customers according to a "[demand charge](#)" system - an average cost based on each customer's highest usage in any 15-minute (or sometimes, hour) interval of the billing period. Demand charges increased a customer's bill, sometimes by 30%. Eventually, most utilities phased out this billing practice. However, **demand charges are going through something of a revival**. Some utilities are assigning demand-charge rates to customers who have installed solar in order to generate more revenues.

- **Electricity prices in Europe** (highest and lowest; includes all taxes and fees; in USD).

*Note:* in Germany, the taxes on electricity are 15 cents/kWh, while the cost of buying natural gas is 6 cents/kWh:

<u>Highest</u>	<u>Lowest</u>
Denmark \$.30 / kWh	Hungary \$.11 / kWh
Germany \$.30 / kWh	Lithuania \$.11 / kWh
Belgium \$.28 / kWh	Bulgaria \$.09 / kWh

- The Ohio legislature and its governor signed a [bailout bill](#) that will provide \$150 million/year to **save its two nuclear power plants**. The money will come from rate-payers (\$4.74/month); however, its cost will be an offset - the legislative bill also ends its "energy-efficiency and renewable-energy" mandate, eventually reducing the ratepayers' overall bill by \$3.78/month.

## Cyber-Security Threat Post

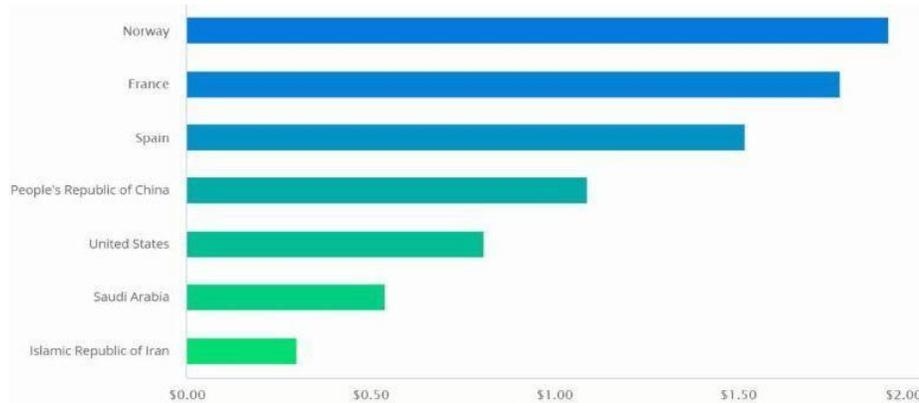
- [The Securing Energy Infrastructure Act](#), if and when the president signs it into law, will **support the development of low-tech solutions to combat cyber-attacks, like manual procedures controlled by human operators**. ( *Note:* the legislation was inspired by Ukraine, which was attacked in 2015 but was able to keep the grid running because it relies on "retro-" manual technology to over-ride automated operation.)

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## Research and Markets

- Y-Combinator is seeking to fund frontier technologies that straddle the border between very difficult and science fiction. If current attempts to combat the changing climate don't work out, **Y-Combinator intends to fund "Plan B" programs** like: Ocean Phytoplankton; Electro-Geo Chemistry; Cell Free Systems; Desert Flooding.

- **Gasoline prices worldwide**, a comparison, by USD per liter. ( *Note:* Norway has the highest per capita rate of electric vehicles in the world):



- *Featured research:* Oil and natural gas have generally returned energy at a ratio of 25:1, meaning that for every barrel of oil used in production, 25 barrels have been made. But that measurement, called "energy return on investment" (EROI), has traditionally been taken when fossil fuels are removed from the ground, and fails to account for energy used during the refining process. **When the refining process is accounted for, EROI drops** to about 6:1. The increasing cost of extracting hydrocarbons from shale causes the ratios to decline further. AES Premium Members have access to the peer-reviewed [abstract](#) of the research.

## Features

### Spotlight: the AES e-Internship program

For the last six years, the American Energy Society has run a robust e-internship program for students interested in energy and sustainability. Many of our interns have gone on to attend top-tier research universities and secure prominent professional positions throughout the energy sector: Stanford, Harvard, Berkeley, Northwestern, MIT, etc.; McKinsey and Booz Allen; start-ups and large corporations; government and NGOs. We have had 100s of interns, and they shape the energy sector.

Two of our current interns, rising high school seniors [Carol Klingler](#) and [Claire Dillion](#), are helping build the Chicago Energy Ecosystem, an interactive resource with a directory of all energy-related ventures in the greater Chicago region. That's right - *all* energy related ventures (so far, more than 400+). In their spare time, between college visits, studying for standardized tests, preparing for AP courses, and having fun, both Carol and Claire launched [Save The Future](#), a non-profit that supports the velocity of the circular economy by collecting and redistributing used clothing that has been updated with hip artwork.

The American Energy Society applauds the passion and commitment of AES e-interns like Carol and Claire, anchoring the next generation of energy professionals.



### Quotes: What more can be said?

"Due to the climate emergency, Congress is *shut down* until sufficient action is taken to address the crisis." - From a placard worn by demonstrators who Gorilla Glued themselves to the walls in the basement tunnels of the US Capitol.



## In case you missed it - Energy Matters, vol. 14.6

- [Gas](#). Last year, **90% of all natural gas used in the US was produced domestically**, and natural gas production **exceeded consumption** for the first time since 1966.

## Contacts

- [The American Energy Society](#)
- American Energy Society [LinkedIn Group](#)
- American Energy Society introductory [video](#)
- [Contact us](#) with comments about the Society or this issue of *Energy Matters*.

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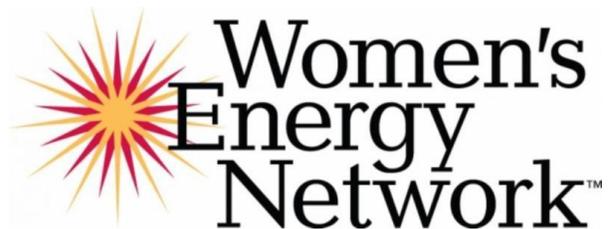
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