

Energy Matters

The energy news you need to know.

May 28, 2019

(Every two weeks)

The official e-newsletter of ...



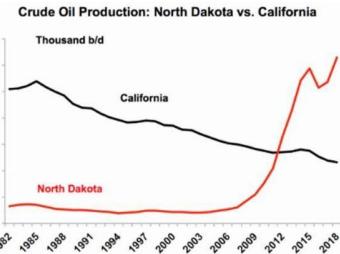
*Thank you for your Premium Membership in the American Energy Society.
Please share this issue with colleagues and encourage them to [join the Society](#).*

Headline News

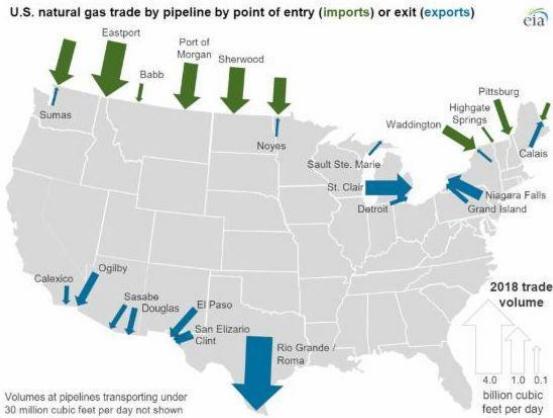
Fossil Fuels

Oil: *Spotlight, California:* In 1985, California was the second highest oil producing state in the US; since then, output has declined about 60% to about 460,000 barrels per day. In the meantime, total US crude oil production has soared to record highs. The **separation between California and all other oil producing states took place when the shale era began in 2008** - crude oil reserves have since doubled to 45 billion barrels while California's production declined 25% (See insert for a comparison of production between California and North Dakota). Editor's notes:

- California still uses a lot of oil - each day the state consumes 40 million gallons of gasoline, 8 million gallons of diesel fuel, and 20% of all US jet fuel.
- California imports 70% of the oil that it needs; most of its own oil comes from the Monterey shale formation.)



Natural Gas: Saudi Arabia is purchasing US liquefied [natural gas](#). Related, **since November 2018, the US has been the top natural gas exporter in the world for 19 consecutive months.**



Carbon Capture: In two empty North Sea gas fields under the three largest ports in Europe – Rotterdam, Antwerp and Ghent – **10 million tons of carbon will be captured and buried - it will be the largest CCS project in the world.**

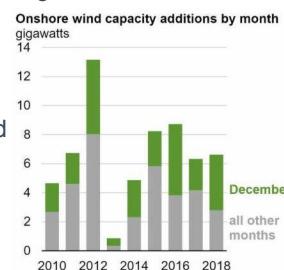
Low-Carbon Energy

Storage: In spite of recent geopolitical difficulties in South Africa, the ANC ruling party is calling for an immediate and significant investment in energy storage projects that will safeguard 1,400MWh of potential electricity. The plan calls for storage in all nine provinces and has two phases of development and construction. *Members interested in this project's development are encouraged to [contact AES](#) for more information.*

- Phase 1: 800MWh of battery energy storage will be deployed in Eastern Cape, Northern Cape, Western Cape and Kwa-Zulu Natal at various points. *These projects are scheduled for completion by December 2019.*
- Phase 2: 640MWh of battery energy storage will be deployed in combination with 60MW of distributed solar PV, scheduled for completion by December 2021.

Hydrogen: [Hydrogen](#) fuel for transportation remains a niche market due to the price of the fuel system. However, a new material, **Kubas manganese Hydride-1, can compress and store hydrogen in smaller, cheaper, and more compact fuel tanks - aka, greater energy density.** (Note: hydrogen is the most abundant element in the universe.)

Wind: New electricity generating capacity is brought online throughout the year, but **December has historically been the most significant month for onshore wind capacity additions in the US.** In the last nine years, 43% of all onshore wind capacity has been added in December. For instance, in 2018, 58% of all wind capacity additions were installed in December. (Note: Wind energy receives a production tax credit (PTC), which provides incentives to come online before the end of the year.)



Nuclear: *an AES special retrospective report:* In 1957, the US Congress asked the National Academy of Sciences (NAS) to come up with the best strategy for spent nuclear fuel. The NAS reported that deep geologic disposal (half-a-mile or so below the Earth's surface) was best. And they had a particular rock in mind, called massive Permian salt, which is the best rock for isolating anything - forever - and there is a lot of it in the US. On the other hand, the NAS specifically said that the rock in the Yucca Mountains of Nevada has too many uncertainties and its properties are too unpredictable to store dangerous nuclear waste. But **the politicians of the day ignored the NAS report and chose Yucca Mt as the national spent nuclear fuel (SNF) and high-level waste (HLW) disposal site.** Then, in the 1970s, Congress decided to retrieve that spent nuclear fuel for reactivation - a dangerous process that requires digging back into the porous Yucca rock. The 1982 Nuclear Waste Policy Act (NWPA) and its 1987 Amendment renewed the country's commitment to the Yucca mountains as the national nuclear waste storage, disposal, and retrieval site. Nevada has always fought the decision. AES Premium Members have access to a published copy of the [1957 NAS report](#).

Energy policy around the world

- Energy companies from all sectors in North America and Europe have long complained that they are often compelled to reveal prized technological IP to China in exchange for trade access to the world's second-largest economy. **The incidence of IP transfers to China (30%) was especially high in the petroleum and petrochemical sector**. Other sectors coerced into sharing IP with China include: medical devices (28%) and pharmaceuticals (27%).

- **Australian voters turned against center-left candidates who supported aggressive strategies to combat climate change** and instead re-elected Australia's conservative government. Climate change, and whether to act aggressively to address it, featured prominently in the election. Either Australia's voters don't care as much about the issue compared to other issues or they prefer less aggressive measures like funding for RD&D of new technologies and innovation.

- Much like the Bahrain and Iranian governments, **ExxonMobil is evacuating its foreign staff from Iraq**. According to Iran's Revolutionary Guard, Iraq is in a "full-fledged intelligence war with the US" and the situation has become dangerous. However, Thamir al-Ghadban, Iraq's Oil Minister criticized Exxon's decision, saying that the security "situation" has nothing to do with the oil fields in the southern region of the country: "the withdrawal is unacceptable nor justified."

Energy policy in the US

- Senior officials from 75 companies representing \$2.5 trillion in YoY revenues and 750,000 US employees visited the Hill to **"educate" lawmakers to support a carbon tax, 45Q carbon capture subsidies, and carbon pricing**. Companies that participated include: Shell, BP, Johnson & Johnson, LinkedIn, eBay, CapitalOne, PepsiCo, Tesla, PG&E, EDF Renewables, Microsoft....

- A number of Republican Senators - John Cornyn (Texas), Lamar Alexander (Tenn.), Bill Cassidy (Louisiana), Susan Collins (Maine), Thom Tillis (NC), Lindsey Graham (SC), Mitt Romney (Utah) - are **preparing separate bills that support more generous funding for RD&D related to renewable energy and climate change**.

- In spite of the White House's commitment to deregulating the energy and environment sectors, **a cadre of left-leaning blue states are going ahead with their own anti-pollution measures**. (Note: The problem with patchwork regulations is that it is very hard for inter-state businesses to sort through multiple and competing standards). For a survey of state regulatory activity, see the [AES website](#).

Energy policy in the states

- To cover lost gasoline tax revenues, **24 states have added extra taxes and fees for owners of electric vehicles**. Meanwhile, the US federal government and many other countries give subsidies to EV owners; the most generous EV incentives are, in order: California, Colorado, Georgia, Louisiana, and Massachusetts.

- Recommended resource: The EIA has launched its new [State Energy portal](#), which delivers timely state-specific energy information.

- California Air Resources Board Chairman Mary Nichols said **the state would be forced to pursue "extreme" measures** - like banning the sale of all cars that burn petroleum fuels - to offset the uptick in pollution that would be unleashed if the Trump administration forces the state to weaken its current vehicle emission and fuel economy standards.

- Previous estimates of gas-related methane emissions in Colorado were overstated. AES Members have access to the peer-reviewed [research](#).

Climate and Environment

- **The 6-10 most impactful solutions for reducing greenhouse gases** (in total atmospheric CO2/EQ GT reductions). Visit the [AES website](#) to see the Top-5.
 - 6. Educating Girls (51.49)
 - 7. Family Planning (51.48)
 - 8. Solar Farms (36.90)
 - 9. Silvopasture (31.19)
 - 10. Rooftop solar (24.60)

- Currently, there are 1,337 unique Superfund "National Priority" (NPL) sites in the US, with 53 in the pipeline waiting for final assessment.



- The cement sector accounts for around **7%** of the world's CO₂ emissions.

- Many common household cleaning products contain volatile organic compounds (VOCs), which easily become vapors or gases that trigger asthma, headaches and allergic reactions. When VOCs are used at home, they accumulate on surfaces; when cleaning products with VOCs are rinsed or washed down the drain, the chemicals they contain, including benzene and formaldehyde, ultimately end up in lakes, rivers and landfills. Some cleaning products [do not have VOCs](#).

- Recommended resource: A [calculator](#) developed by a start-up in Poland will tabulate an individual's plastic footprint.

- For the first time, there are [earthworms](#) in the Boreal Forest (the region across North America and Eurasia just below the Arctic Circle).

- Iceland's Fjadrárgljúfur canyon is now closed but visitors keep coming. Justin Bieber, the Canadian pop star with a worldwide reach, filmed a music video "[I'll Show You](#)" at the canyon, creating overwhelming demand for the once-pristine spot.



Electricity, Power and Efficiency

- [Energy consumption](#) in the US reached an all-time record high last year of 101.3 quadrillion Btu's, up 4% from 2017 and 0.3% more than the previous record set in 2007.

- One out of three households in the US struggle to pay their home energy bills. Federal welfare programs only reach about 20% of the eligible households struggling with "energy poverty."

Energy Security Threat Post

- The smart-city movement has hit a wall. Hackers took down a county government in California, a city in Maine lost control of all its data, New York State's capital, Albany, admitted that hackers had crippled the city's technology operations, and [Baltimore's](#) housing department database is being held hostage while the hackers demand a ransom. Cities around the world were supposed to be moving into a dazzling smarter future that moved quicker and more efficiently. But there have been 21 attacks on municipal governments so far this year. AES provides Premium Members with access to a [real-time report](#) of all cyber attacks on government agencies.

- AES special retrospective: The first recorded cyber-attack happened 30 years ago. PC Cyborg, also known as the AIDS Trojan because it targeted AIDS researchers, was clunky and required mailing a physical check to an address in Panama.

Research and Markets

- ESG (environment, social and governance) **sustainable investing is gaining traction**:

- Global investment giant Apax Partners forecasts impact investing across all asset classes could be a \$30 trillion market.
- GIM's Sustainable Solutions Fund III, co-founded by former US VP Al Gore, raised a \$1 billion fund, significantly higher than its previous \$300 million effort.
- BlackRock CEO Larry Fink has re-focused his firm to seek out investments that also make positive contributions to society.

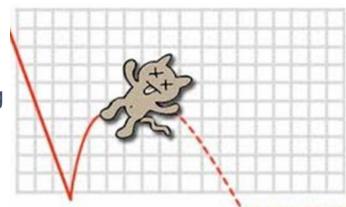
- The demise of the nuclear industry has created an enormous [market opportunity](#) for companies that specialize in dismantling decommissioned reactors. For instance, Northstar Group Services recently acquired a Vermont nuclear plant. The plant, while shuttered since 2014, was not due to be demolished until 2068 "using a \$510 million decommissioning trust fund that would appreciate over time to cover \$1.2 billion in

anticipated costs". Northstar will dismantle the Vermont plant over 40 years and at a lower cost - the trust fund will guarantee payment for the work, and then when it is completed the company will get 45% of whatever's left in the fund. With nine other plants expected to shut by 2025, Northstar has a very strong position. Premium Members are encouraged to [contact AES](#) to learn more about this market.

- Methane – about 60% of which is generated by humans – is now at an atmospheric concentration level that is two and a half times greater than pre-industrial levels. Although the amount of carbon dioxide in the atmosphere is much greater, methane is 84 times more potent in terms of warming the climate system over the first 20 years after its release. Most scenarios for stabilizing average global temperatures depend on strategies for both reducing the overall amount of carbon dioxide entering the atmosphere and removing what's already in the atmosphere. However, removing other greenhouse gases, such as methane, could provide a complementary approach. Researchers are currently testing zeolite, a crystalline material that acts like a sponge and soaks up methane. AES Members have access to the peer reviewed [research](#).

- The "Mystery Gasoline Surcharge" is the difference between California's gas price and the average price in the rest of the country after the state's higher taxes and environmental fees. Californians pay \$1800 per household more than the rest of the country ... and [no one knows why](#). The MGS is a mystery, because after a refinery explosion in February 2015 25 cents has been added to each gallon of gasoline in California. These extra payments are not filling government coffers. They are going to suppliers, though which suppliers are getting the money is unknown. The MGS was over 40 cents per gallon in 2015 and between 25 and 30 cents in 2016, 2017, and 2018. And it remains in that range in 2019.

- "dead-cat bounce", adjective; def: **a temporary very short-term recovery of a market after a substantial fall.** Often used to describe the performance of an underperforming oil and/or gas shale play. "Is well production recovering or is it a dead cat bounce?"



Features

Spotlight: Energy ConFusion

[Energy ConFusion](#), a conference in Skelleftea, Sweden, on June 3 - 5. Eric Vettel, President of the American Energy Society, will deliver a keynote address. Please [contact AES](#) for more information about the conference, or inquiries about discounted tickets.

Quotes: Seeing Completely Different "Big Pictures"

"The world is not investing enough in traditional elements of supply to maintain today's consumption patterns, nor is it investing enough in cleaner energy technologies to change course. Whichever way you look, we are storing up risks for the future."

- Fatih Birol, IEA Executive Director

AES provides access to the World Energy Investment 2019 [report](#).

vs.

"I'm not losing any sleep over it."

- Interior Secretary David Bernhard, on recent reports that carbon dioxide measurements in the atmosphere have reached 415 ppm.

In case you missed it

- **Gas:** *The natural gas revolution in context* - once upon a time, markets naturally paid more attention to oil than natural gas because transportation was the biggest energy-consuming sector of the economy (electricity generation was the second biggest energy-consuming sector). However, the electricity sector is now the biggest energy-consumer, using 50% more energy than transportation. With the rise of electricity consumption, **natural gas is displacing oil as the primary source of global energy supply.**



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*.

Partner-Sponsors

The American Energy Society deeply appreciates the support of its Partner-Sponsors:



In the category of cybersecurity
[Darktrace Industrial IoT](#)



In the category of engineering firms
[The Cadmus Group](#)



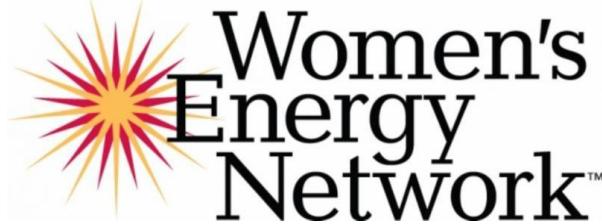
In the category of law
[Orrick](#)



In the category of Accelerators/Incubators
[Nordic Innovation House](#)



In the category of academia
[Energy Analysis and Policy Program](#)
University of Wisconsin - Madison



In the category of Associations
[Women's Energy Network](#)

Please [contact us](#) if you or your organization would like more information about the Society's exclusive Partner-Sponsor program .

BE A CATALYST FOR CHANGE

Change global energy
Support energy literacy
Engage with thought-leaders