

ENERGY MATTERS

Soundbite summaries of the energy news you need to know

AN OFFICIAL PUBLICATION OF



AMERICAN ENERGY SOCIETY

January 4, 2021

News from the Society

In case you missed it... special end-of-the-year publications

- [The Lighter Side of Energy](#)
- [The Energy Awards of 2020](#)
- [The Energy Writer of the Year](#) (the premier literary award for energy)
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Fossil Fuels

- Oil -

Trend-spotting AES data. Comparing the hottest topics in energy, 2020 vs. 2016

Trending topics Q4 2020

1. hydrogen (including "green" and "grey")
2. carbon capture (including EOR)
3. methane management
4. electric vehicles / smart-grid (tie)
5. geothermal (drilling/frac'ing)

Trending topics 2016

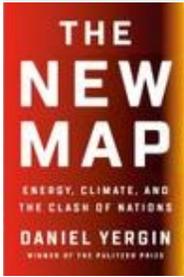
1. Tesla home battery systems
2. smart-grid
3. autonomous vehicles (new)
4. LNG exports
5. building efficiencies (fading)

What does this mean? It could mean that the energy sector is chasing the next fad. Or, it could suggest that the sector has new interest in alternatives within the fossil fuel sector (as opposed to "alternatives to fossil fuel"). AES Editors believe it is the latter, which suggests:



- traditional fossil fuel companies may be considering new strategies;
- opponents of fossil fuels may be more open to collaboration;
- the sector might be entering a new (and perhaps more mature) era.

[Contact us](#) for more information about our data insights.

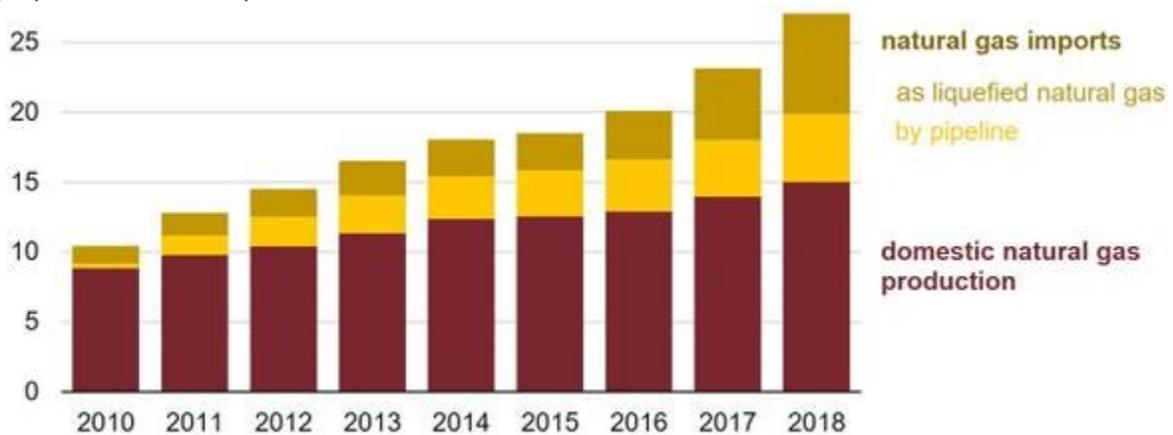


"The American Energy Society is seeing striking new trends in its data about the energy sector. As low carbon and zero carbon targets continue to come into focus, it becomes clear that the future of energy is not "either/or", but rather mixed. An industry with scale, engineering skills, and execution abilities has to be part of achieving the scale changes that are envisioned and at the same time continuing to meet the growing needs of consumers worldwide. The data suggests that interests are shifting towards 'alternatives within fossil fuels' as well as outside fossil fuels."

- Dan Yergin, Pulitzer Prize winner, *Energy Writer of the Year 2020*, author of [The New Map](#).

- Natural Gas -

- The Chinese government has introduced [a new subsidy program](#) to incentivize domestic production of natural gas from tight formations (e.g., shale and coalbed resources). *Insert:* China domestic natural gas production and imports

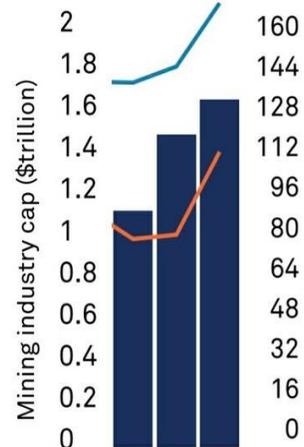


- Coal -

- Spotlight on the growing [mining](#) sector, including REEs (*Insert:* Industry market capitalization in 2020)

- Mining industry capitalization (approximately 2,300 companies) has been climbing
- Fastest growing mining markets: Australia
- Slowing mining markets: Latin America

• Mining Industry Market Cap • Exploration Price Index (EPI)
• Pipeline Activity Index (PAI)



- Carbon Capture -

- Spotlight on **carbon-offset markets**. There are two kinds of carbon offset programs: removal and avoidance.

- Removal: The [market price](#) for an individual or organization to **purchase a carbon-offset** is \$1–15/ton (substantially less than the estimated cost of carbon removal).
- Avoidance: Off-market, there are many options for DIY carbon offsets. AES editors recommend "[Principles of Net-Negative Carbon Offsetting](#)," by Oxford University.

Low-Carbon Energy

- [Trend-spotting](#), fastest growing renewable markets in the world (by size and speed of growth)

- Solar: Asia (56 GW), US, Australia, Spain, Ukraine, Germany
- Wind: China (26 GW), US (9 GW)
- Hydro: China, Brazil (combined 12 GW)
- Bioenergy: China (3.3 GW), Germany, Italy, Japan, Turkey
- Geothermal: Turkey (232 MW), Indonesia (185 MW), Kenya (160 MW)

- **Wind and solar projects announced or in early development** (*insert*). The current pipeline would increase capacity by 150%, with about 123,000 MW of wind and 110,000 MW of solar capacity at various stages of development; also, there is about 9,000 MW of storage tied to solar.



- A [comparison](#) of wind and solar (and storage) markets in Texas and California

- **California**: About 2,090 MW of wind and 12,450 MW of solar (with 3,940 MW of batteries) will be built in the CAISO region by 2025.
- **Texas**: 1,540 MW of wind, 3,390 MW of solar and 8,380 MW of gas-fired generation, both combined-cycle and peaking, will be built in the ERCOT region through 2025.

- “Green” hydrogen is a zero-carbon fuel made by electrolysis, using renewable power from wind and solar to split water into hydrogen and oxygen. Currently, production costs are too high to be competitive. ACWA Power and Spanish utility Iberdrola have formed a joint initiative to scale up production of “green” hydrogen. And, a gas plant in Ohio has an ambitious timeline to test green hydrogen. Note: Nearly all of the 10 million metric tons of hydrogen produced in the US comes from converting methane from natural gas into hydrogen.

Policy

- Early thoughts on key appointments by the incoming Biden administration, including the five nominees that require confirmation by the Senate (thank you Stephen Bolotin of [Nexight](#) for insights):

- **Department of Energy - Jennifer Granholm.** Consistent with recent appointments that value political experience over professional expertise. Will focus on jobs, jobs and jobs.
- **Department of Transportation - Pete Buttigieg.** Buttigieg will focus on modernizing transportation, which aligns with Sec. Granholm's experience as governor of Michigan.
- **Administrator of the EPA - Michael Regan.** The press focused on his interest in "energy justice," but Regan is a very strong bureaucrat with experience in the EPA.
- **Secretary of the Interior - Deb Haaland.** Has the support of the Sunrise Movement (she co-sponsored the Green New Deal) and will probably focus on development of utility-scale solar on federal lands and shifting offshore energy policies from fossil to wind
- **Secretary of Agriculture - Tom Vilsack.** With this "old-guard" appointment (Vilsack held the same position under Obama) Biden is making an appeal to the Midwest to vote for Democrats in the 2022 election; expect strong support of all biofuels and no change in corn ethanol RFS.
- **National Climate Adviser - Gina McCarthy.** The first ever "Climate Czar", McCarthy has extensive administrative experience to coordinate climate activities across all agencies.
- **Chair of the Council on Environmental Quality - Brenda Mallory.** A wonky appointment that matters a lot. This is the council that develops the strategy that coordinates the efforts of the administration.
- **Climate Envoy - John Kerry.** Former Secretary of State under Obama, Kerry's new position conveys an unmistakable message that the US will rejoin the Paris Agreement and that the Biden administration is committed to policies that reverse climate change.
- **US Trade Representative - Katherine Tai.** A top trade lawyer, Tai will immediately revisit solar trade policies between the US and China.
- **FERC - Allison Clements (Democrat).** The appointment of Clements returns the Commission to its traditional partisan balance, with one more open seat to follow.
- NOAA and NASA appointments are pending.

- Featured policy news -

As part of the coronavirus relief and government funding package, the House and Senate agreed to the bi-partisan [America Energy Innovation Act](#) that provides \$2.2 billion (USD) for a variety of research and demonstration pathways. It is a massive document (5,500+ pages), including more than 500 pages in the [Energy Act](#) (starting at pg. 3,194) and grid modernization provisions (starting on pg. 3,630).

- Smart Grid Regional Demonstrations (section 8001)
- Integrated Energy Systems (section 8003)
- Grid Integration R&D (section 8004)
- Technology Demonstration on Distribution Grid (section 8007)
- Integrated Microgrid Systems Program (section 8011)
- See also Title 1 Section 1007, in support of Smart Building Acceleration
- And also Title 3 Section 3202, for Energy Storage Technology & Microgrid Assistance

-Most likely, the Biden Administration will return the US to the 2015 Paris Climate Accord on Wednesday, January 20, 2021.

- The Biden Administration's energy and climate policy strategies will be determined by the outcome of the two Georgia Senate races on January 5. If the Democrats win both seats, the focus will be on legislative action, which has more lasting impact, and then both parties will focus on control of Congress in the 2022 off-year election. If the Republicans win at least one seat, the Biden Administration will focus on Executive Orders, which are easier to overturn. And, in Washington, DC, the proverbial political shoe will eventually (aka 'always') end up on the other foot.

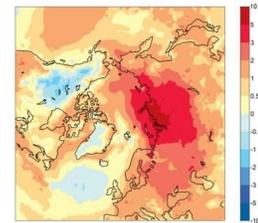
Climate and Sustainability

- Featured: [The state of greenhouse gases in the atmosphere](#)

- CO₂: 410.5 ppm (+148% of preindustrial levels)
- Methane: 1,877 ppb (+260% of preindustrial levels)
- N₂O: 332 ppb (+123% of preindustrial levels)

- **The Arctic has a new climate:** near-record warming, shrinking ice and snow cover, extreme wildfires, and new biological diversity (including earthworms). Indeed, the Arctic is [warming faster](#) than any other region on the planet (*insert - temperature difference in the Arctic between 1981 - 2020*).

- Arctic surface air temperatures have warmed at least twice as fast as the global average.
- Greenland's ice sheet and glaciers have declined.
- Permafrost temperatures north of the Tropic of Cancer have increased.

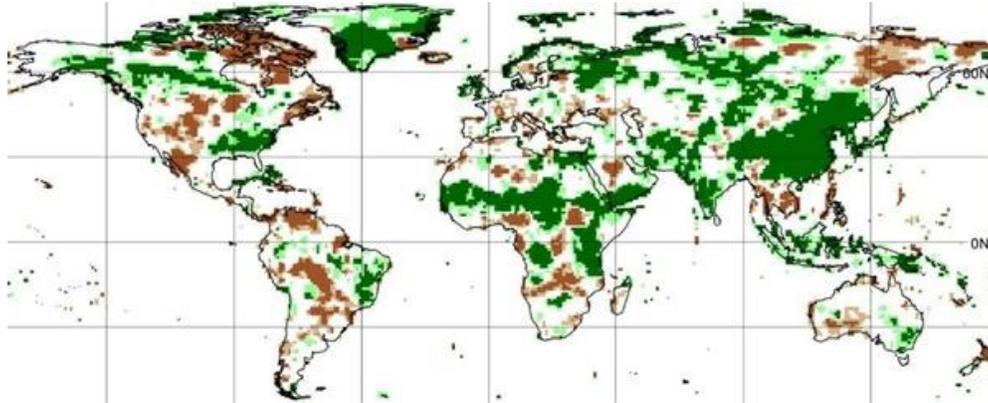


- AES editors recommend: [The Largest Polar Expedition of All Time](#), by Esther Horvath, Sebastian Grote, and Katharina Weiss-Tuider. This large-format **book documents the largest Arctic science expedition** ever undertaken. The photos are worth the price alone (*insert: a curious polar bear inspecting the expedition's flag at night*).



- There are about 29,400 terrestrial vertebrate species on Earth; of that total, **515 are close to extinction** (with populations below 1,000) and more than half of those species have populations of 250 or less.

- Regions in the world with extreme **precipitation** or **drought** in 2020



Research and Markets

- **The transportation revolution takes off** ... it seems that when legendary pilot Chuck Yeager passed away (in early December 2020), space travel accelerated (*note: this is not exactly what *Energy Today* editor's had in mind when they called for an energy "[Moonshot](#)."*)

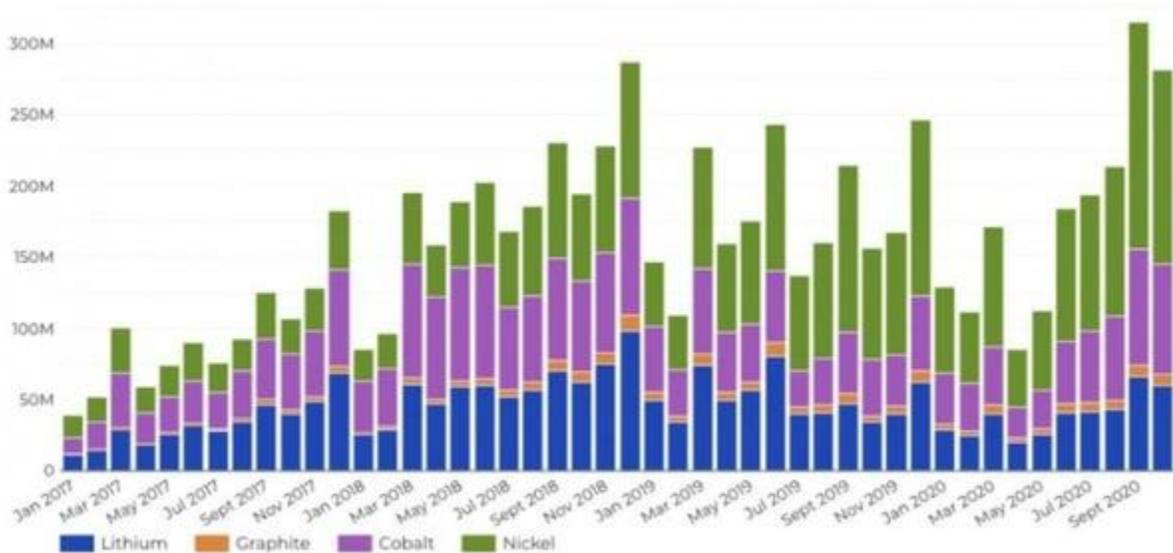
- Space X (except Starship serial no. 8, or SN8, which landed in a massive [fireball](#))
- [Blue Origin](#) (led by Jeff Bezos)
- [Virgin Galactic](#) (led by Richard Branson and [Boeing](#); each trip has a \$250K price tag)
- [EOS-X Space](#) (a US-Spanish joint venture, their "balloon" offers a more affordable trip)
- [Space Perspective](#)
- [Space Adventures](#) (the tour company is looking for its first customer)



- [Zelp](#) makes a bendable plastic mask for cows that rests just above the cow's nostrils. A set of fans powered by solar-charged batteries sucks up burps and traps them in a chamber with a methane-absorbing filter. The chamber is a bit like the catalytic converter on a car: once the filter is saturated, a **chemical reaction turns the methane (CH₄) into carbon dioxide (CO₂)**.



- Value of battery metals in EVs: **lithium, graphite, cobalt, nickel**; sold globally (in USD):



- The US DoE announced a FOA for early-stage research to develop new affordable, efficient, and clean [transportation technologies](#).

- Lithium-ion batteries have been a dominant energy-technology, especially in the field of mobile computing. However, lithium-ion batteries have weaknesses. A new company, [EnerVenue](#), is producing batteries based on nickel-hydrogen chemistry.

- The cost to develop [lab-grown meat](#) is about \$100 to \$150 per pound. (Scientists isolate stem cells from an animal and allow them to multiply in a lab, regenerating muscle, fat and tissues.)

Electricity, Power and Efficiency

- Correction: The AES publication [The Lighter Side of Energy 2020](#) referenced "The Carbon Cost of Binge-Watching During COVID quarantines." Researchers at NREL and LBL let AES editors know that the piece references estimates of carbon impact that have been strongly questioned by data center energy researchers and have been generally [debunked](#).

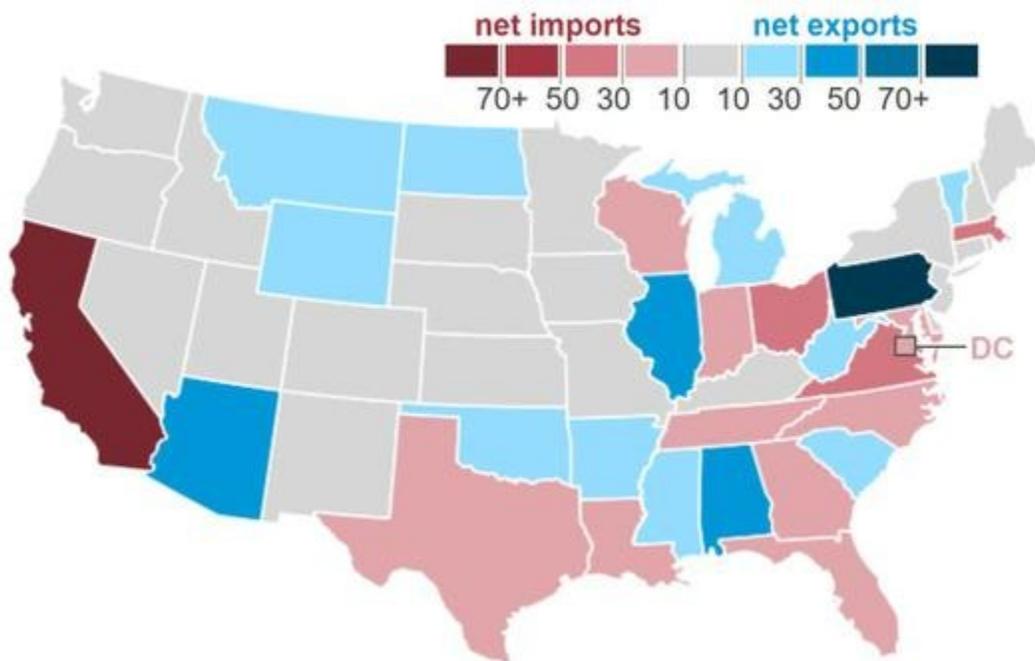


- Sidewalk Infrastructure Partners (SIP) and OhmConnect have partnered to create [Resi-Station](#), a 550-MW clean energy virtual power plant that is about to launch in California. At full-scale, it will be the largest residential power plant in the world, **harnessing the power of a fleet of energy saving homes and smart devices.**

- Acclaimed co-founder of Apple, **Steve Wozniak, unveiled his second company, [Efforce](#)**, with a slick website and much media fanfare. Efforce claims to disrupt the energy efficiency market by using blockchain and 'WOZX' tokens to finance energy efficiency projects.



- Although **California is the largest net electricity importer of any US state** at 70.8 million megawatt hours (MWh), or 25% of the state's total electricity supply, the highest share of [imported electricity](#) (amount/capita), in order, is: Washington, DC, Massachusetts, and Delaware. (*Insert: state net electricity exports and imports, 2019*).



- *Spotlight 5G*: Electric utilities are heavily dependent on sensors and interconnectivity. Smart meters, dispersed generation, and variable generation (like wind and solar) require real-time data streams in order to make split-second adjustments on the grid. **Expect 5G to be a very big play for the energy sector in 2021.**

- Cybersecurity Spotlight -

- **Multiple federal agencies were targeted in the sweeping [SolarWinds cyber-attack](#)**; the full scope and consequences of the suspected Russian hack remain unknown. Key US federal agencies were reportedly targeted, as were large tech and security companies, including Microsoft.

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- Warm congratulations to the new US Secretary of Energy, Jennifer Granholm. According to colleagues at the American Jobs Project, Sec. Granholm made sure to advance evidence-based clean-energy solutions that were the right fit for states. Her focus was always on how she could build a clean energy future and create jobs while doing it. She is innovative and knows how to work across party lines and with stakeholders to develop effective policy. — [Kate Ringness](#)

- The [Norwegian Consulate General in San Francisco](#) is looking for an engaged and reliable coworker who will be responsible for reporting on tech trends and analysis. The application deadline is January 10, 2021.

- Northwestern University has a new degree program. The [Masters of Science in Energy and Sustainability](#) has a full-time, in-person, cohort-based, integrated curriculum focused on technology, economics, and public policy, a choice among 3 specialization tracks, and a capstone consulting project. Applications are now being accepted for the upcoming term.

Quotes: 2021 could be a wild ride

"The direction is set. We are moving to net zero. There is no turning back."

— Bernard Looney, CEO, BP

"Warriors are known to be brave people who take on whatever it is in front of them with courage, strong will, and power. Someone who fights for a noble cause, putting his principles before his life, all for glory & honor. Together we have force ... 1bn people taking small steps to save the planet. Are you in?"

— Climate Change Warriors, collection by [Rainbowgirl Stories](#)

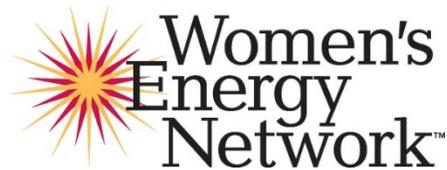
Gratitude

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