

ENERGY MATTERS

Soundbite summaries of the energy news you need to know

AN OFFICIAL PUBLICATION OF



AMERICAN ENERGY SOCIETY

Week of August 30, 2021

- The Power Read -

- **Oil:** China cracks down on teapots.
- **Policy:** Afghanistan is sitting on a "gold" mine, and Russia and China know it.
- **Policy II:** Indonesia is dealing the dirtiest coal.
- **Low-carbon:** New highs in renewables.
- **Climate:** Wetter *and* drier.

- Happy Birthday! -

Did you celebrate American Energy Society's [10th anniversary](#)?

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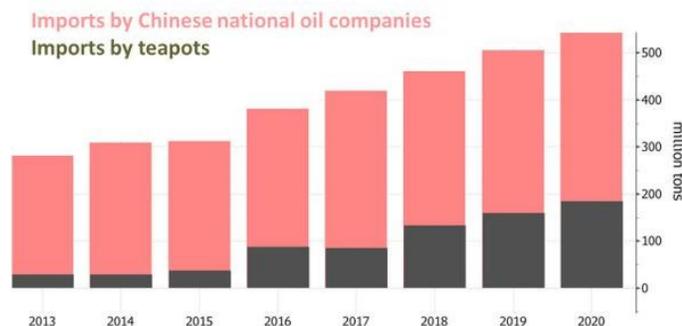
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- Fossil Fuels -

- Oil -

- In 2015, the Chinese government relaxed [restrictions](#) and quotas for 39 small, independent "teapot" refineries in order to support more free market activity. However, **in 2018, many of these teapot companies began violating the state's production limits** (*see insert below*) and are now being punished, closed, or restricted ([down 35% y-on-y](#)). The current oil market in China, by the numbers:

- Sinopec (downstream, refining and petrochemicals), CNPC (onshore oil and gas), and Cnooc (offshore) account for 94% of China's total oil production.
- China [imports](#) 55% of its crude oil from OPEC and 15% from Russia.



- Gas -

- In 2020, US annual production of associated natural gas (or, natural gas produced from oil wells) **declined for the first time since 2016**. (Note: of the five major US production regions, the Permian still produces 50+% of all-natural gas.)

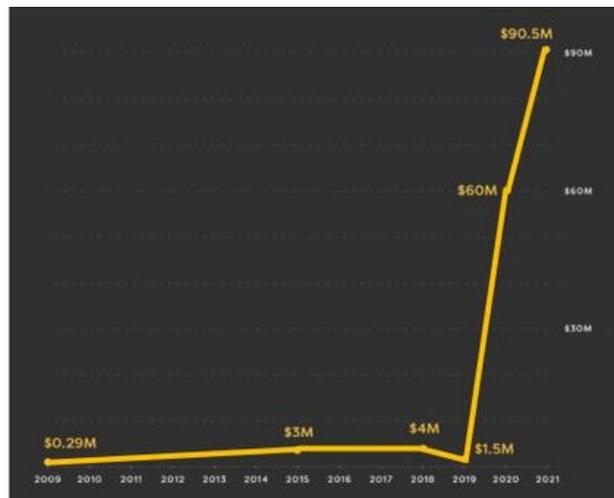
- Mining, Minerals and Coal -

- If CO2 emissions are calculated per unit of energy produced (kWh), the following are the average **pounds of CO2 emissions per million Btu, by various types of coal** (all US based and a 36% heat efficiency rate):

- Anthracite: 227
- Lignite: 216
- Subbituminous: 212
- Bituminous: 205

- Carbon Capture -

- Last year, Congress passed an **omnibus spending bill** that appropriated \$90.5M for **negative emissions technologies** at the Department of Energy with \$32.5M set aside for direct air capture; **the trend continues** this year (*insert*) with broad support for soil health practices, professional development, technical assistance, and \$175M for a range of R&D priorities, including direct air capture, mineralization, and storage monitoring.

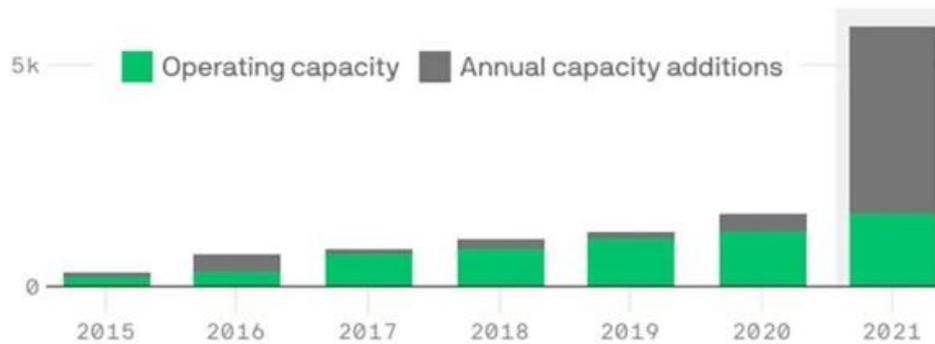


- Low-Carbon Energy –

- **The state of renewables in the first half of 2021**, by the numbers (*note*: 1 megawatt of capacity ≈ electricity consumed by 400 to 900 homes in a year, depending on location):

- 9,915 megawatts of capacity came online in the first half of this year — a 17% increase over the first half of 2020;
- On a quarterly basis, new solar installations in April-June were 2,226 megawatts of capacity, a 73% jump over the first quarter;
- Q2 wind capacity installations were 2,824 megawatts, similar to Q1 and above the same period last year;
- New battery storage capacity is growing even faster, albeit from a much smaller base, with Q2 installations of 570 megawatts compared to roughly 100 in Q1;
- Total storage added this year so far almost matches 2020's full-year.

Insert: Large-scale battery storage capacity in the US, in thousands of megawatts.



- A potential market within the circular economy? **About 13 million tons of EV lithium-ion batteries will go offline between 2021 and 2030**; in the same time frame, about 10.35 million tons of lithium, cobalt, nickel, and manganese will be mined to manufacture new lithium-ion batteries.

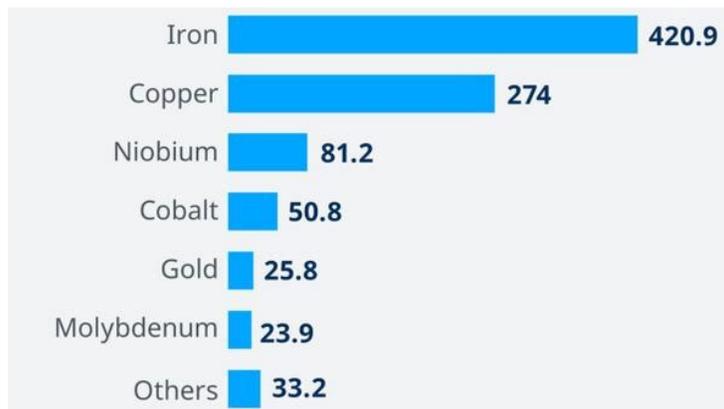
- **Spotlight hydropower** (AES Members have access to the white paper, [Water Works](#)):

- Hydropower generates 55% more total electricity than nuclear and more than that of all other renewables combined, including wind, solar PV, bioenergy, and geothermal.
- Hydropower supplies 17% of global electricity generation, the third-largest source after coal and natural gas.
- Most new hydropower capacity will come from large-scale projects in Asia and Africa.
- The known-unknown: what happens to hydropower capacity under extreme climate change conditions?

- **Stanford University is converting to 100% solar** next year.

- Policy -

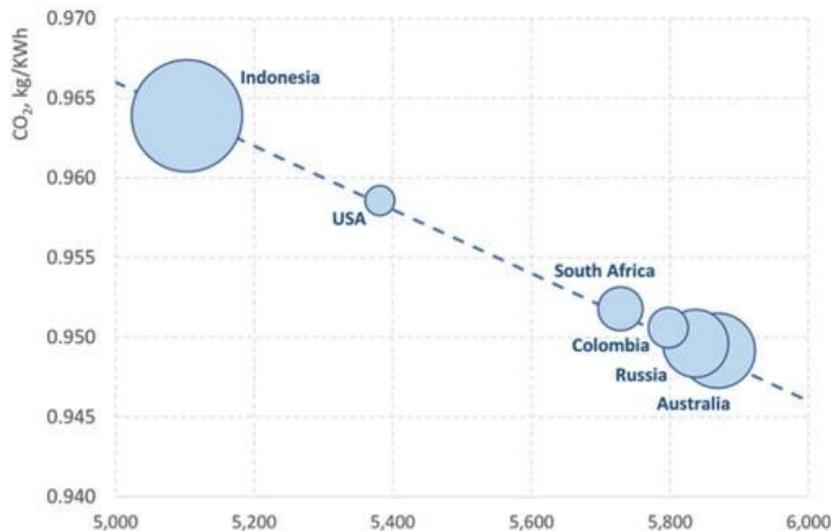
- *Special:* Afghanistan's economy is in freefall following the Taliban's return to power. While the foundation of its economy is its drug-trade – 80% of global opium and heroin supplies originate in Afghanistan – the country also sits on an estimated **\$1 trillion worth of rare earth mineral deposits** such as **iron, copper, gold, and lithium**. *Insert:* Afghanistan's projected mineral wealth in \$USD billions. *Note:* not included in the list is lithium, which some estimate may be as large as Bolivia's reserves, one of the worlds largest.



- Related, **China and Russia are strengthening economic ties with the Taliban** in order to gain [access to the region's rare earth elements and minerals](#).

- *AES trend-spotting:* **The hottest energy policy topic right now is the Clean Electricity Payment Program (CEPP)**, a non-regulating no-carbon standard under consideration in Congress. The CEPP is similar to the Federal renewable fuel standard (RFS) or electricity renewable portfolio standards (RPS). *Note:* AES Members have access to a 2-page [summary of CEPP](#). A variety of CEPPs are currently being considered; however, there are some [concerns](#) that a CEPP may have fundamental legislative flaws.

- Indonesia exports the [dirtiest](#) coal, while Australia and Russia export what is considered "eco-grade" coal. *Insert:* **volume of CO2 emissions by kWh of main coal exporters** on the international market (NCV, kcal/kg).



- Spotlight COP26 -

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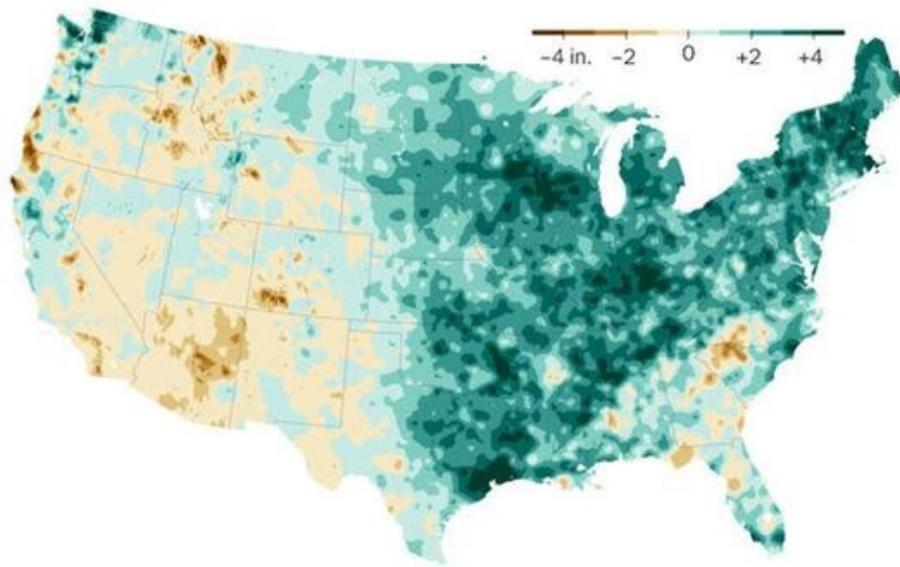
- In advance of the global climate meeting in Glasgow in November: **delegates at the COP21 conference in Paris in 2015 committed [\\$100 billion](#) for the clean energy economies of the developing world. Nothing close to that amount has been invested.**

- Climate and Sustainability -

- AES recommends an interactive [resource](#) by ProPublica that identifies the changing global human climate niche: the regions where temperature and precipitation have been most suitable for humans to live. AES Members also have access to a [peer-reviewed paper](#) on the global human climate niche.

- The [Dixie Fire](#) in Northern California is now the largest single wildfire in recorded state history (the entire Gold Rush town of Greenville was destroyed).

- **A wetter and drier region.** (Insert: annual average precipitation, in inches; last 20 years, as compared with the 20th century; **extreme rainfall** vs. **drought conditions**.)



- Research and Markets -

- *AES recommended resource:* a shortlist of **shovel-ready sustainability ideas that seek creative finance instruments**, by CPI:

- Amazonia sustainable [supply chains](#)
- [Data-driven](#) energy access for Africa
- Guarantee fund for [biogas](#)
- The ACT [Fund](#)



- [Fusion](#) research at Lawrence Livermore National Lab — a laser light was focused onto a target the size of a BB which resulted in a hot-spot the diameter of a human hair, generating more than 10 quadrillion watts of fusion power for 100 trillionths of a second.

- **Spotlight [electric vehicles](#):**

- There are about 10 million EVs operating world-wide.
- About 1% of total vehicles world-wide are EVs (about 1.3 billion are oil-powered).
- Europe's car market contracted 22% in 2020; yet, new electric car registrations more than doubled to 1.4 million, representing a sales share of 10%.

- Related, General Motors is **recalling all 2017 thru 2022 Chevy Bolt EVs for [battery replacement](#)**. The LG-supplied batteries have two serious defects and could catch fire.

- [KoBold](#) is using **artificial intelligence and machine learning to find rare earth minerals (for green technologies) in Greenland**.

- Sweden's [SSAB](#) has produced the world's first fossil-free steel.

- Electricity, Power, Efficiency, and the Grid -

- **Electric grid operators were forced to shed excess load for 22.4 hours in 2020 across the bulk power system**, a significant increase over recent years and a potentially worrying trend as the changing climate continues to impact the grid. (*Note*: according to SME John Moura, NERC Director, load shedding is perhaps the single most important [metric](#) to evaluate grid reliability and performance: "It is how to determine if the system ran out of options." AES Members have access to the 2021 State of Reliability [report](#) by NERC.
- **Utilities in the US are capable of storing and withdrawing about 500 GW of natural gas**, which is about [20 times greater](#) than total battery storage capacity for US utilities.
- AES Members have access to a peer-reviewed **comparative [study](#) of nuclear, CCS, and zero-carbon fuels in decarbonized electricity systems**.
- **A growing number of utilities and ISOs are adopting quantum software AI**. AES Members have access to free and downloadable (API) [quantum AI software](#) by super.tech.

- Cybersecurity Spotlight -

- President Biden and the National Institute of Standards and Technology (NIST) had a high-profile meeting with industry leaders to discuss the nation's cybersecurity preparedness, a framework to protect the integrity of the technology supply chain, and **expansion of the Industrial Control Systems Cybersecurity [Initiative](#) to natural gas pipelines**. In addition, the administration formally called out the Chinese government for its involvement in exploiting vulnerabilities in Microsoft's Exchange Server email application earlier this year.

- Bulletin Board -

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- Bolivia has an emerging energy-tech ecosystem, including a new micro-mobility venture, [Mo-Bi](#).
- The [Midwest Regional Innovation Partnership](#) was awarded EPIC funding.
- Edge Energy (Member) announces its [new president](#), Greg York.
- DroneDeploy just [acquired](#) Rocos, a New Zealand-based robotics software company.
- Orrick was named [Energy Project Finance Law Firm of the Year](#) by Law360 ... again.

Hot Energy Jobs

[Contact us](#) to post a job, find qualified candidates, or fill difficult positions.
In case you missed it, see the special *Energy Today* issue: [Hot Jobs Market](#).

- *Featured:* The Wilton E. Scott Institute for Energy Innovation at [Carnegie Mellon University](#) is looking for an Assistant Director of Partnerships.
- The Department for Business, Energy & Industrial Strategy (London) is looking for a visionary leader as its [First Chair](#) of the Advanced Research and Invention Agency.
- AfDB, a pan-African development institution (Ivory Coast), is looking for an [Evaluator General](#).
- MIT is looking for a [Lead Instructor](#), Renewable Energy Machines.
- VaTech is looking for a [Director](#) of Climate Action, Sustainability and Energy.
- The Climate Reality Project in DC is looking for a [Social Media Manager](#).
- The Energy Transition Fund is looking for a [Global Strategy Director](#).
- Patch Personnel (Brisbane, Australia) is looking for a [Senior Development Geologist](#).
- Wood (office in Portland, Maine) is looking for a [Senior Mechanical Engineer](#).

Something to think about...

How desperate is China for oil? Consider the city of Panjin (pop. 1.4 million). Panjin sits atop the Liaohe oilfield. Pumpjacks (painted red) bob up and down in residential neighborhoods, with one located in the middle of a high school campus, and the name of its main street in the business district is Crude Oil Avenue. (Panjin is perhaps better known for Red Beach, a famous landscape that features the red Suaeda plant that blooms in the biggest wetland and reed marsh in the world.)



- Gratitude -

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