

ENERGY MATTERS

Soundbite summaries of the energy news you need to know

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AMERICAN ENERGY SOCIETY

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- The Power Read -

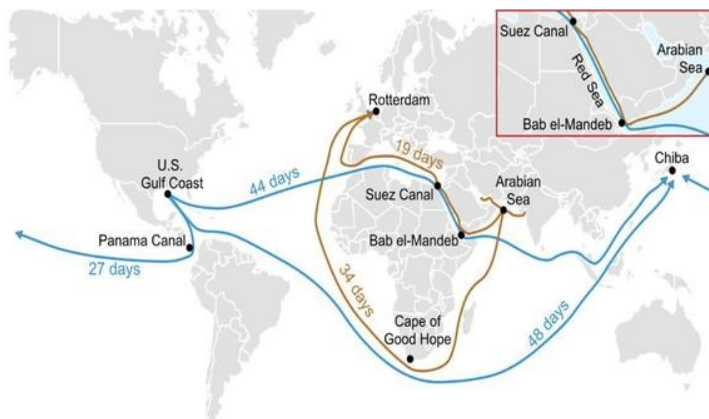
Editor's note: Energy generation is a connecting theme running through many stories in this issue of *Energy Matters*, including those in Natural Gas, Coal, the first story in Renewables, as well as the story about hydropower in the Electricity section.

- **Natural gas:** The US is the largest exporter of LNG in the world — by a large margin.
- **Coal:** The share of coal exports from the US to the world is increasing
- **Renewables:** Wind + solar energy is the fastest growing source of power in the US.
- **Electricity:** Hydropower in the US is at full capacity, especially in the Pacific Northwest.

- Fossil Fuels -

- Oil -

- Because of ongoing conflict in the Middle East, some commercial ships (including O&G tankers) are [avoiding](#) the Bab el-Mandeb chokepoint—a narrow strait that borders the Yemeni coast and is the southern entrance to the Red Sea. Instead, commercial ships are choosing to **take longer, more costly routes around the tip of Africa**.



- Natural gas -

- President Biden's decision to pause approvals for liquefied natural gas exports has touched off heated responses (see - [Policy](#) - below). Politics aside (especially during [The Year of Elections](#)), global demand for natural gas is substantial and growing. **The US is the largest exporter of LNG in the world — by a large margin** (the US exported a record 8.6 million metric tons in December), and LNG export capacity is on pace to reach 24.3 billion cubic feet per day (Bcf/d) by the end of 2027. Kinder Morgan, operator of the largest natural gas transmission network in the US, has a \$2.2 billion natural gas project [backlog](#).

- Coal and mining -

- Coal consumption is declining in the US and globally; however, **the share of coal exports from the US to the world is [increasing](#)**, from 14% in 2019 to 19% this year, and is on pace to pass 21% in 2025 (based on existing contracts). *Note:* the recent issue of [Energy Today](#) highlights coal as a key political issue all over the world in "The Year of Elections."

- Carbon capture and removal -

- [BiCRS](#): in CDR (carbon dioxide removal) lexicon, BiCRS means biomass carbon removal and storage. (*Note:* biomass and biochar are essential components of CDR but are not included in the acronym.) AES recommends the CDR [leaderboard](#), a ranking of the most active BiCRS.

- **Calpine received a \$270 million award** from the DoE to help build the Baytown Carbon Capture and Storage (CCS) project that will capture CO₂ from the Baytown Energy Center (BEC), a natural gas combined-cycle power plant in Baytown, Texas.

- **The Bezos Earth Fund is holding an [essay contest](#)** (max 500 words) about new CDR ideas; all winners receive \$4,000 (deadline to submit an essay is March 1, 2024).

- No- / Low-Carbon and Renewable Energy -

- China installed [more](#) solar panels in 2023 (217 gigawatts) than any other nation has in its entire history; also, its installed solar and wind capacity will [surpass](#) total coal capacity this year (40% vs. 37%).

- **The share of power generated by wind and solar energy in the US is [growing faster](#) than other sources** (like coal, nuclear, and natural gas).

- **Combined sales of hybrid vehicles, plug-in hybrid electric vehicles, and battery electric vehicles (BEV) in the US rose to 16.3%** of total new light-duty vehicle (LDV) sales in 2023. Of these, so far in 2024 the PHEV market (plug-in hybrid) is growing the fastest.

- The clean hydrogen space is evolving and growing rapidly. AES recommends the [Global H2 NewsFeed by SEP](#) (manager of the North American Hydrogen Data Consortium). The feed provides a wide range of information, including but not limited to: patents, new peer-reviewed publications, grants and awards (ARPA-e, LPO, SBIR/STTR...), and so on. The H2 NewsFeed is accessible through a [free trial](#).



- **A thermal energy battery is a physical block or brick that can store and release thermal energy.** The two leading thermal battery startups are [Rondo](#) and [Antora](#).

- Energy Policy & Geopolitics -

- Beltway buzz -



- White House adviser John Podesta will replace former Secretary of State John Kerry as the Biden administration's top climate diplomat; Podesta will also keep his current position overseeing implementation of the 2022 Inflation Reduction Act.

- The Biden administration will [freeze new export permits for natural gas](#) while it studies its impact on the climate. The review will hold 10 projects that have applied for permits but not yet received them and whose backers have not made final investment decisions whether to build them. That includes the [CP2](#) project, a massive facility that gas exporter Venture Global plans to build along the Louisiana coast. *Note:* some on the political left are angry in spite of the freeze because the entire fossil fuel industry has prospered during the Biden administration, and the right is angry because, among other reasons, the freeze would limit production; meanwhile, total NG exports will continue to increase Y/Y because there is a pipeline of projects already approved and under construction.

- Spotlight Houston -

- For five consecutive years, Houston has [outspent](#) its revenues by \$100–\$200 million each year. It isn't yet clear what this means for energy or the energy capital of the world.

- On February 9, attend the "[Gulf Coast Clean Hydrogen Market Overview](#)" workshop, a survey of current and future H2 supply and demand in the Gulf Coast.

- Global energy politics -

- **Europe:** "kalte Dunkelflaute" (noun), def: prolonged periods of low renewable energy output due to sustained low wind and low sun. Germany is [considering](#) a €7 billion earmark to build uneconomical natural gas power plants that will only operate during *kalte Dunkelflaute*.

- **Asia:** The cost to transition to low- and no-emission electricity is [most expensive](#) in "Other Asia-Pacific", which consists of about 40 countries, like Korea, Bangladesh, and Philippines.

- **South America:** In light of the conflict in the Middle East, a few O&G developers are looking at South America, especially along the [deep water coast](#) from the northern shoulder down to Patagonia, though none are considering Venezuela.

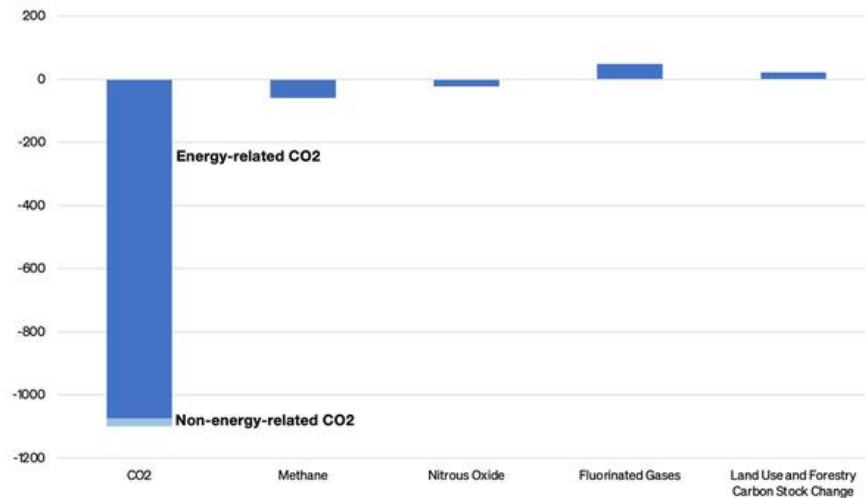
- **Africa:** African Union's Continental Power System [Master Plan](#) has finalized its strategy for a proposed interconnected power market. However, there is a wide gap between current levels of supply and what is needed for universal electricity access, especially in the most impoverished Saharan regions. *Insert right:* proposed Africa Union interconnected power grid.



- Climate, Sustainability, and Resiliency -

- There are about 100 individual oil and gas fields, primarily in the Middle East and Africa, that contribute less than 1% of total global production [but emit](#) nearly 100 million tons of **Scope 1** CH₄ methane emissions (as per satellite detection and field-level data analysis). Meanwhile, even though Europe's direct upstream methane emissions are very low, the region relies very heavily on imported oil and gas — constituting about 80% of its consumption — which means Europe has a substantial **Scope 3** CH₄ methane footprint, in part because it consumes oil and gas from these same 100 fields. *Editor's note: who is responsible for Scope 1 and 3 emissions?*

- An emissions inventory shows that net GHG emissions in the US has declined by 16.6% between 2005 and 2021, with CO₂ emissions (which fell by 17.9%) accounting for nearly all (more than 99%) of the decline. Excluding energy-related CO₂ emissions, all other net GHG emissions fell by just 5%, or just 3% of the total decline. *Note: in other words, **it's not just CO₂ emissions that are a concern.** Insert below: [changes](#) in US greenhouse gas emissions, 2005–21, in MMT eCO₂.*

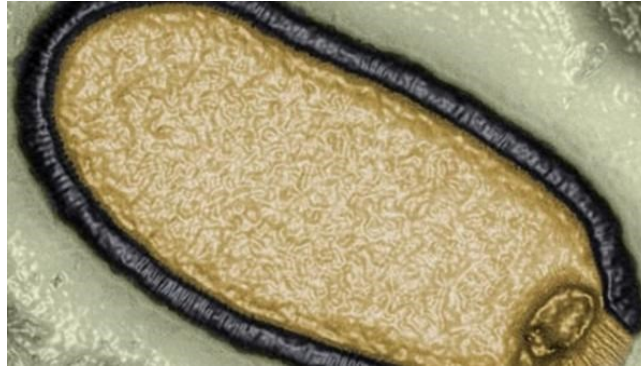


- For every 1 degree Celsius of warming, yields of major crops [fall](#) by about 20% and net farm income declines around 67%.

- The Buriganga River in [Bangladesh](#) now flows with fast-fashion trash instead of water. Discarded clothes and plastics are piled up in the empty riverbed. AES Members have archival access, including "[What Really Happens To Your Clothes You Donate](#)," in *Energy Today*.



- "**Methuselah microbes**" (*noun*), def: viruses that have been frozen in the Arctic permafrost for hundreds of thousands of years; the deepest layers of permafrost are beginning to melt, which will release [virus microbes](#) that inhabited the planet long before humans. *Insert below: a pithovirus sibericum* microbe isolated from a 30,000-year-old sample of permafrost.



- Research and Markets -



- Fission is used to power 436 nuclear reactors around the world. Meanwhile, there are a handful of **operating fusion projects around the world**, such as: the Tokamak (in Moscow), JT-60SA (Japan), HL-2M, EAST, and J-TEXT (all in China), SST-1 (India), MAST-U and also ST40 (U.K.), WEST (France), LTX (in Princeton, NJ), and KSTAR (S. Korea). [Commonwealth Fusion Systems](#) in Boston has the most private investment support. **ITER, in France, is perhaps the most**

ambitious fusion project in the world, but it is struggling in the proof-of-concept phase:

- ITER has been at work on fusion since 2005.
- The main chamber isn't close to withstanding temperatures of up to 302 million degrees Fahrenheit.
- The original budget was for \$5.5 billion (USD), but now is \$17 billion over budget.

- **The greenhouse gas reducing benefit of replacing high polluting cookstoves has been overstated**, in some cases by 10X. AES recommends the peer-reviewed article, "[Pervasive over-crediting from cookstove offset methodologies](#)," by [Berkeley ERG](#).

- **The oil industry in California is coming to an end.** (*Note: about 100 years ago, California was the 4th [largest](#) crude oil producer in the US.*) Exxon Mobil has exited onshore production in the state and Shell has sold its joint-venture properties. Chevron is writing down almost all \$2.5 billion of assets in California but hasn't completely ended its relationship in order to contest state regulations of its oil producing and refining operations.

- **The price of lithium-ion battery packs have [fallen](#) to a record low of \$139/kWh.**

- Wilson Sonsini updated its Clean Energy and Climate Solutions Federal Funding [database](#).

- Electricity & Power -

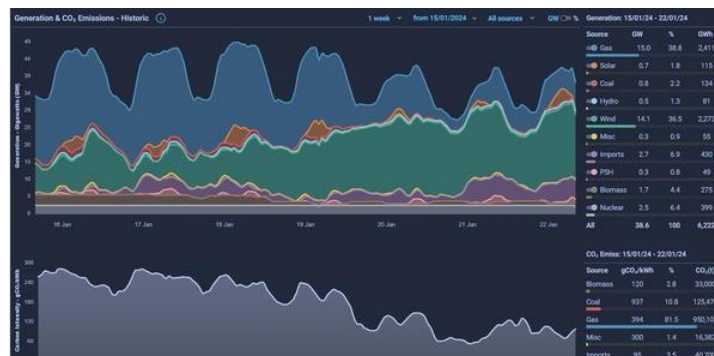


- Now that most of the country is reaching **the end of the coldest weather of the winter season, demand for power is slowing at the same time that hydropower in the US is at full capacity.** For instance, the Grand Coulee hydropower plant on the Columbia River west of Spokane — one of the largest structures ever built by mankind — did not have to release inflow to fill the dam from January 16 – 27 because there was a non-stop downpour of rain. There was so much rain that salmon chum targets downstream were met without the need for support from a Coulee water release. AES Members have access to the hydropower report, [Water Works](#).

- Last year, **US electricity customers averaged five and one-half hours of power interruptions**, about 30 minutes fewer outages than prior years. The decline is primarily due to fewer major weather events.

- **V2X** (*noun*) def: **vehicle-to-everything**; a bidirectional power-charger that connects a vehicle to a building so that either the EV car battery can be charged, or the car battery can be a source of power for a building; an offshoot of VPP (virtual power plants).

- *AES recommends* a real-time and historical [dashboard](#) that compares energy generation (by source) and CO2 emissions in the U.K.



- Universities in the Spotlight -

- Don't miss the top issues facing the midstream industry, a [webinar](#) by the [Center for Midstream Management and Science](#) at **Lamar University**.

- On [February 8 and 9](#), the **UC Berkeley** Energy and Resources Collaborative is hosting its annual Energy Summit, 2024: *Accelerating the Energy Transition for All*.

- The national [Mag Lab](#) at **Florida State University**, the largest and highest-powered magnet lab in the world, has among many dedicated programs a project that is [converting](#) agricultural leftovers like corn waste into jet fuel.

- Quotes -

America in The Year of Elections

"They are definitely getting a divorce."

— Jamie Court, president of advocacy group Consumer Watchdog, on oil and gas companies leaving California because the state doesn't seem like it supports the industry

"While it may be true that economics wins out over politics in the long run, in politics, there is no long run ... especially not in an election year."

— Kevin Book in a ClearView Issue Brief

"The lunatic fringe."

— Frank Maisano, a senior principal at the law firm Bracewell, describing presidential election years

- Bulletin Board -

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- **Orrick** has published its [2024 Offshore Wind Report](#). The report is an update on the current OSW market and trends in 20+ key jurisdictions with some forward looking analysis.

- **Clearpath** has excellent [primer resources](#) on Ag-Tech, CCUS, Water-Tech, Industrial Fuel...

- **Honeywell's Sustainable Building Technologies (SBT)** is hiring for a global [Senior Director Solutions Architect](#).

- **Ubiquitous Energy**, a leader in transparent solar technology, is [developing](#) energy generating windows and door products.

- **Sunrun**, a residential solar and battery storage installer in the US, has partnered with Ford to launch a new [home electric vehicle \(EV\) charger](#) that is compatible with any EV model.

- Gratitude -

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