

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

- **Fossil** - The refinery redux: less is more.
- **Low-carbon** - More or less: Europe wants more solar from China but less EVs.
- **Policy** - On or off: the US SCOTUS is reconsidering the *Chevron deference*
- **Climate** - There is bad, and then there is worse: HFCs are the worst GHGs.

News from the Society



AES special reports: The seven winners of the H2Hubs competition have been announced and AES has an exclusive resource — a comprehensive directory of the H2 SMEs to watch. AES Members who want to download the report can [contact us](#).



Don't miss the [2023 Materials Research Society Fall Meeting](#), including a special tribute to AES friend George Crabtree. The special event will feature our recent [Energy Today](#) publication, *Remembering George Crabtree*.

Fossil Fuels

- Oil -

- The [refinery](#) redux:

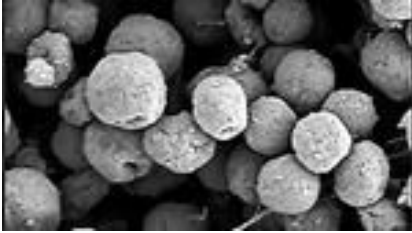
- There are 124 refineries operating in the US — 51 fewer than three decades ago; [and yet ...](#) US petroleum-refining capacity is down just 3.7% from its 2020 peak;
- The Texas International Terminals (45,000 b/cd) in Channelview, Texas, which started operating in 2022, is the newest refinery in the US; [but ...](#) the newest refinery with significant downstream capacity is Marathon's facility in Garyville, Louisiana (596,000 b/cd), which came online in 1977.

- There hasn't been a major new oil refinery built in the U.S. since the late 1970s, and many refineries are more than 100 years old; [however](#) ... existing refineries have increased capacity.

- Natural gas -

- Total natural gas production in the lower 48 states will [increase by 5%](#) this year (and are projected to set a new record again next year); most of the growth comes from the Permian region in Texas. Related, [10 new natural gas-fired power plants](#) have come online in the US this year (with a total of 6.8 gigawatts of electric generating capacity).

- Coal and Mining -



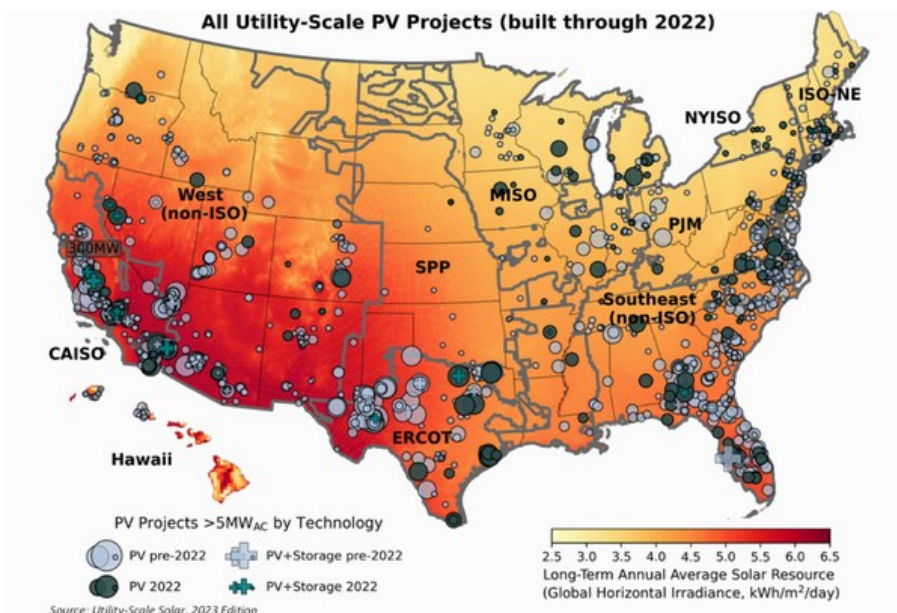
- An ancient microbe can be used to isolate and bioaccumulate critical minerals like nickel from its rock surroundings. The microbes are called methanogens, and they can break down rocks and minerals. [AES Members](#) have access to the peer reviewed research out of Montana State University.

- Carbon/Carbon Capture -

- Related, biotech firm [Living Carbon](#) has genetically altered about 100 different trees with the aim of making them better at absorbing carbon dioxide. Four of its leading lines have been planted on private land in Georgia and Ohio as pilot projects. Both the [Salk Institute for Biological Studies](#) in San Diego and the [Innovative Genomics Institute](#) in Berkeley are also testing genetically altered plants that use photosynthesis to process large amounts of carbon dioxide.

No- / Low- Carbon and Renewable Energy

- AES recommends this [special report](#), a comparison of ground-mounted photovoltaic, PV+battery, and concentrating solar-thermal power (with capacities exceeding 5 MWAC), by availability of long-term annual average solar resources (aka where the sun shines).



- Europe purchases about [60%](#) of all its solar modules from China, and Brazil purchases the second most. (Note: Exports of solar panels from China increased 34% in the first half of 2023.)
 - Meanwhile, the EU is [investigating](#) potential tariff-offset subsidies given by China to domestic companies that manufacture EV parts. (Note: [Tesla's](#) Chinese parts will also be investigated.)
 - The International Biochar Initiative (IBI) is hosting the 2023 annual [virtual symposium](#) on November 7-9. If you are currently a student and have a .edu email address, [contact AES](#) to attend the IBI for free.
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Policy

- Beltway Buzz -

- This is a busy week for members of Congress who have a full slate of tasks and less than a month to solve another funding challenge. Actions are further complicated by the leadership vacuum for the US House Republicans. Upcoming congressional hearings include:

- House Resources will look at offshore drilling leasing/issues.
- Senate Environment will review the *Sackett* SCOTUS decision (note: AES Members have access to the most important energy and environment Supreme Court cases, including [Sackett](#)).
- Senate Energy will ask the DOE's David Crane and Jigar Shah about competitive grants from the IRA and Bipartisan Infrastructure laws.

- Spotlight on the US Strategic Petroleum Reserve:

- President Biden sold off nearly half the federal government's oil reserve last year to offset rising fuel prices after Russia invaded Ukraine.
- The reserve is at its lowest level since the early 1980s.
- The [SPR](#) currently holds 351 million barrels, about 56 days of total US oil imports.

- The SCOTUS announced that in January it will reconsider the *Chevron Defense*, with questions focused on the power of federal government agencies to interpret their own legal authority. AES Members have access to its review of the [Chevron Defense](#).

- State Spotlight -

- **Arizona** regulators are [lowering](#) the rates electric utilities must pay homeowners with rooftop solar for their excess power.

- **Georgia** receives more energy-related federal money than any other state (on a per capita basis). The most recent example is \$249M for technologies and systems that will help prevent electricity [outages](#).

- Global Spotlight -

- **L/S America:** At the confluence of the Amazon River and the Rio Negro, water levels are the lowest in 121 years of record-keeping, causing severe shortages of hydroelectric power in Brazil, among other consequences.

- **Europe:** Starting in January, major US companies that raise money on European stock exchanges must compile information about their carbon emissions, climate risks, and strategies to counter the damage.

(Note: an estimated 3,000 US businesses will be required to provide such disclosures — more than 250 employees, more than \$42 million in local revenue, or a balance sheet larger than \$21 million.)

- **ME/NA:** The conflict between Israel and Hamas is starting to disrupt exports of LNG by Qatar, the third largest supplier in the world, especially to Asia, Europe, and the UK. (By contrast, Qatar's exports of LNG increased significantly soon after Russia invaded Ukraine.)

- **Asia:** India's steel manufacturing sector is growing rapidly. To make steel, manufacturers require large amounts of coking coal. However, India's steel industry is growing so fast that it cannot import enough coking coal — it is about to pass China as the top importer. Top exporters of coking coal to India, in order: Australia, Russia, Canada, Mozambique. (Note: The supply of coking coal is so precarious that India's steel manufacturing industry is starting to [shift](#) from coking coal toward green hydrogen.)

- Climate and Sustainability -

- **Refrigerants (like HFCs) are the [most potent](#) greenhouse gas** and 1000X worse than CO2.

- *Special insight:* The EIA has determined that **global energy consumption and associated CO2 emissions will [increase](#) through 2050**. Also, global growth of manufacturing and higher living standards will push energy consumption beyond advances in energy efficiency.

- **Almost all [ocean plastic](#) pollution (80%) enters via 1,000 rivers worldwide**. For example, see this [time lapsed video](#) of Rio Dulce in Guatemala, which feeds into the Caribbean.

- **Biohybrid microorganisms use solar energy to convert carbon dioxide into value-added chemical products, such as bioplastics and biofuels**. It is unclear how biohybrids work. [AES Members](#) have access to the peer reviewed research out of Cornell.



- **21 species that were endangered are now [extinct](#) this year in the US**. Ten species were birds, 8 were mussels, two were fish. One species, a Hawaiian herb, is growing and is no longer endangered, while the ivory-billed woodpecker (*image*) may go extinct before the end of the year.

- Research, Development and Markets -

- **The largest [sovereign wealth funds](#) with oil and gas as their "origin" source of surplus funds**, by estimated total assets (in USD):

1. Norway (Government Pension Fund Global / NBIM), \$1.5T
 2. United Arab Emirates (Abu Dhabi Investment Authority, among many), \$850B
 3. Kuwait (Kuwait Investment Authority), \$800B
 4. Saudi Arabia (Public Investment Fund), \$780B
 5. Qatar (Qatar Investment Authority), \$460B
 6. Russia (Russian National Wealth Fund), \$150B
- ... and then there is Alaska, United States (Alaska Permanent Fund), \$80B

- [Special report](#): There are now **more than 100** different EV models for sale in the US, up from only 2 in 2011. Offerings are available from Audi, BMW, Cadillac, Chevrolet, Ford, Genesis, Hyundai, Jaguar, Jeep, Kia, Lexus, Lucid, Mercedes, Mini Cooper, Nissan, Polestar, Porsche, Rivian, Subaru, Tesla, Toyota, Volkswagen, and Volvo. Meanwhile, Tesla [reduced](#) its MSRP markups (On January 1, 2019, US tax credits available for Tesla vehicles decreased from \$7,500 to \$3,750 on certain; Tesla immediately decreased their prices by \$2,000.)

- The DoE has launched its eighth and final Earthshot ... the [Affordable Home Energy Shot](#). Grant funds support RD&D that helps decarbonization and reduces energy costs in affordable homes. The [8 DoE Earthshots](#) are:

1. Carbon Negative Shot
2. Clean Fuels & Products Shot
3. Enhanced Geothermal Shot
4. Floating Offshore Wind Shot
5. Hydrogen Shot
6. Industrial Heat Shot
7. Long Duration Storage Shot
8. Affordable Home Energy Shot

- The DoE is also providing **\$300,000 individual grants** (passed through the Industrial Assessment Center program) to support energy efficiency improvements for small- and medium-sized manufacturers (SMMs).

- [ByFusion](#) converts plastic from bottles and grocery bags into construction material.

- Electricity, Power, and Efficiency -

- *Crisis averted*: most of the western states (Colorado, Utah, Wyoming, Idaho) are facing an early cold start to the winter season; the Pacific Northwest is still waiting for its primary rainy season; and the Southwest is unseasonably warm (averaging 90 degrees) and needs extra air conditioning. In other words, **there was a recent power-shortage across most of the Western US. This meant that the US West leaned on the CAISO grid** to provide enough power during crucial ramp periods (late afternoons). Basically, California's storage gas and battery volume was consumed at a record pace. AES recommends [peer reviewed research](#) on frameworks for evaluating grid resiliency.

- Related, the DoE is awarding \$3.5 billion under its Grid Resilience and Innovation Partnerships program ([GRIP](#)) to **support 58 transmission projects in 44 states**. (The smallest award is \$1M, and the largest is \$464M to build 5 transmission lines across 7 Midwest states.)

- **Global energy consumption is outpacing efficiency gains**. [AES Members](#) have access to the *Energy Today* article about Jevon's energy efficiency paradox.

- **Google has developed a carbon-intelligent computing software platform to support "demand-response" electricity consumption for its data centers** and a [.gif](#) to map it.

- University Spotlight -

- On November 2, **Boise State** is hosting a [webinar](#) about the CHiPs Act and its implications for energy.

- **University of Houston** offers an 8-week, [online](#) executive education course that examines the technology, economics, and challenges of Carbon Capture Utilization and Storage. (*Note*: the CCUS course is taught by world-recognized experts from the energy industry.)

- The OpenSeas Technology Innovation [Hub](#) at **Old Dominion University** is collaborating with **James Madison University** to study offshore wind for the US Department of Defense.
 - [Energy Terminal](#) is organizing the next generation of energy leaders and catalyzing youth involvement in energy by providing student-focused content, community, and career resources to inspire, empower, and enable people to create their unique impact.
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- Bulletin Board -

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- [Nextcorps](#) received \$4.5 million from the National Science Foundation to support innovation in deep tech.
 - Geoff Duncan at [Ubiquitous Energy](#) published "A Diversified Approach to Renewable Energy in Construction"
 - [Centrus](#) is beginning first-of-a-kind production of High-Assay Low-Enriched Uranium (HALEU) two months ahead of schedule at the American Centrifuge Plant in Piketon, Ohio.
 - AES applauds the new **WE2** (Women for Energy Efficiency) [program](#) of the IAC.
 - **SPOTLIGHT: Schneider Electric** is hiring [Project Development Managers](#), [Senior Account Executives](#), [Automation Engineers II](#), and [Performance Assurance Consultants](#).
 - #SolarAPP+, a free online [platform](#) developed in partnership between **Sunrun** and the US DoE, helps local governments navigate the solar permitting process.
 - **Uearth** is a dynamic Mobile GIS that connects assets, data, and field teams for critical infrastructure providers. Start your [free](#) trial today.
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- Quotes -

OSW headwinds, tailwinds, and no wind at all

"Every OSW development project is a very big deal and should be celebrated as such."

- Boyd Rabin, Vice President of policy, Environmental League of Massachusetts

"Negative."

- The credit rating assigned by Moody's Investors Service to Ørsted, the Danish energy company behind half of the offshore wind farms under construction in the US.

"We are keeping all options open."

- Siemens Energy, on reconsidering its strategic interest in OSW following its multi-billion losses in the sector.


- Gratitude -

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