

# ENERGY MATTERS

*Soundbite summaries of the energy news you need to know*

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AN OFFICIAL PUBLICATION OF



AMERICAN ENERGY SOCIETY

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**January 9, 2023**

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## - The Power Read -

- **Fossil:** Natural gas and coal are direct competitors, and \$5-\$7/MMBtu is the pivot.
- **Carbon Markets:** Current rates for sequestered carbon: \$60/ton < X < \$180/ton.
- **Low-/no-carbon:** Fusion is now a scientific success and an engineering challenge.
- **Policy:** California slows rooftop solar while Maryland passes an aggressive "climate change" law.
- **Markets:** A special survey and resource — **a review of 2023 energy market projections by the top 15 investment houses**, for AES Members only.

## - News from the Society -

- The [MIT Climate and Energy Prize](#) features **8 different tracks**: energy; food and land; built environment; transportation; carbon removal; oceans; industrial decarbonization, and climate management. **The deadline to apply is Friday January 13**, but AES Members can extend the deadline a few extra days. (*Note: the application is easy.*)

- Related, save the date for the **MIT Energy Conference (April 11 - 12, 2023)**; early-bird tickets go on sale January 26, 2023.

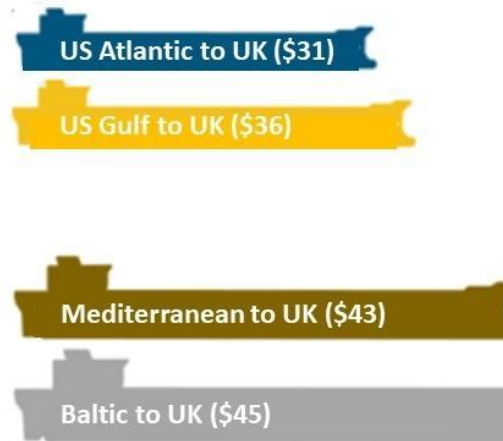
- *Attention all ".edu's":* **AES has launched a new "[Digital Subscription](#)" program for universities.** For a limited time, we are offering discounts to university libraries that subscribe in January. [Contact us](#) for more information.

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## - Fossil Fuels -

### - Oil -

- Global rates for tankers carrying refined petroleum products (like motor gasoline, diesel fuel, jet fuel, and naphtha) are very [high](#). European ports have the most expensive rates in the world and the US has the least expensive. (*Note: historically, tanker rates increase when petroleum demand is low because tankers are used as flexible floating storage; however, **Russia's invasion of Ukraine has caused record-setting rates.***) *Insert:* average monthly tanker rates in USD by thousand deadweight metric tons.



### - Natural gas -

- In US power markets, **natural gas and coal are [direct competitors](#)**. Typically, utilities shift to natural gas when prices fall below \$5/MMBtu; the market is split when prices are in the \$5-7/MMBtu range; and coal becomes economical when gas prices are at or above [\\$7/MMBtu](#).

### - Coal and mining -

- **Global coal consumption reached an all-time [high](#) in 2022** and is projected to increase slightly in 2023.

### - Carbon capture and removal -

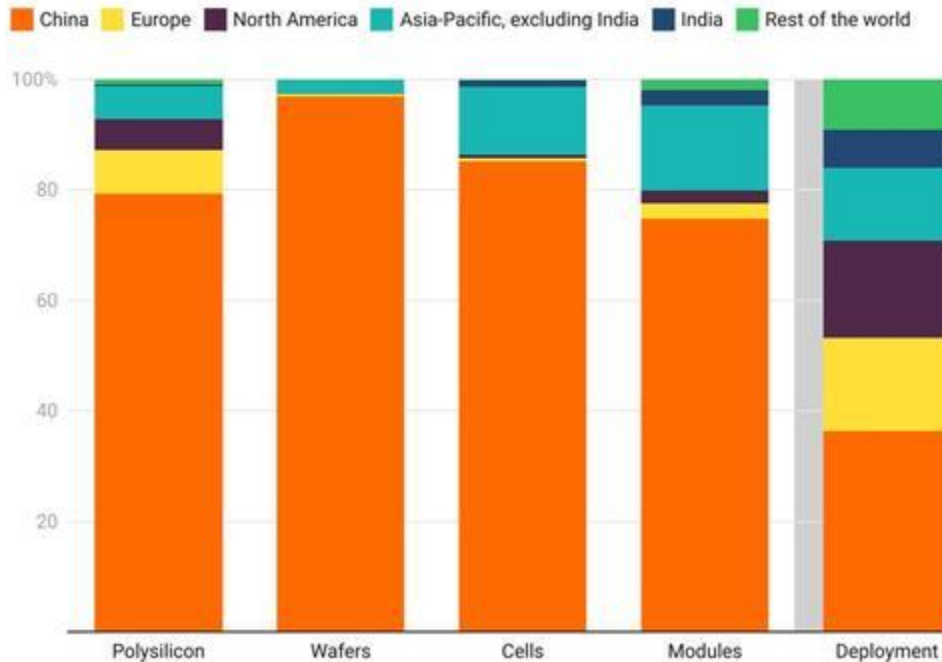
- **Current [rates](#) for sequestered carbon** (as tax credits per the IRA thru Section 45Q)
  - \$85/ton: permanently stored
  - \$60/ton: ceiling for enhanced oil recovery (EOR) or other industrial uses
  - \$180/ton: direct air capture (DAC)
  - \$130/ton: recaptured (aka "used") CO<sub>2</sub>

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## No- / Low-Carbon and Renewable Energy

- **Fusion:** For the first time, a fusion reaction produced more energy than it took to ignite it. This happened at the National Ignition Facility at the Lawrence Livermore National Lab. *Editor's note:* this is not a commercial prototype; this was a successful [scientific demonstration](#) that needs a decade (or two) of engineering before it can serve as a viable fuel to power the electricity grid.

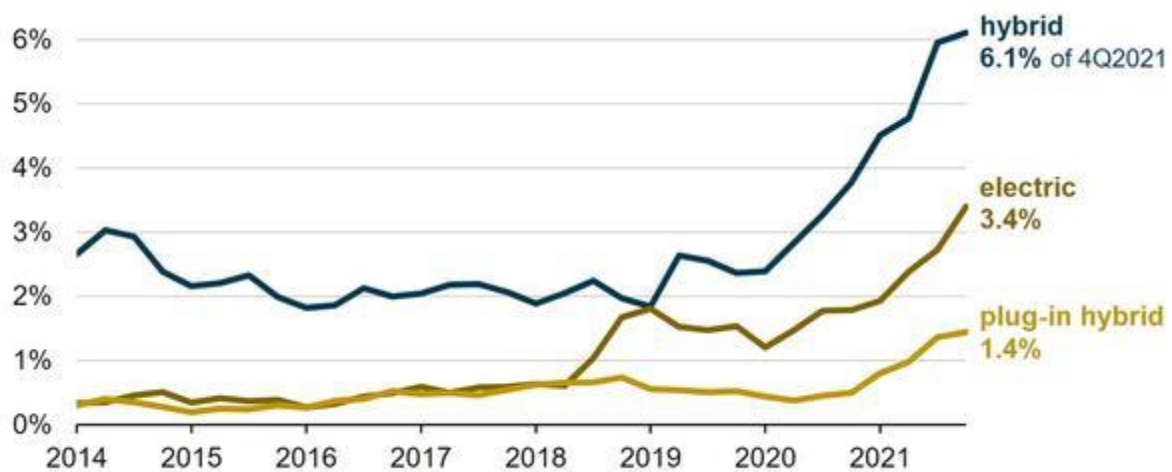
- **Solar:** China has deployed about 1/3 of global solar photovoltaic capacity but controls a much [larger share](#) of the solar supply chain. *Insert: solar PV manufacturing capacity and solar deployment by country and region, 2021:*



- **Nuclear:** 2022 was a very good year...

- The EU updated its taxonomy to include "nuclear" as a green technology (private investment can now include nuclear power as an environmentally sustainable economic project).
- At COP27 in Egypt, delegates agreed that nuclear was technology-neutral and an acceptable option for countries to decarbonize their grids.
- The US DoE will provide \$6 billion in [credits](#) to preserve the existing fleet of nuclear power reactors.

- **Electric Vehicles:** Total sales of EVs and hybrids remained about the same between 2014 thru 2020, but **the percentage of total non-ICE light-vehicle sales [doubled](#) in 2021 and then doubled again last year**. About 11% of light-duty vehicle sales in the US is either hybrid, plug-in hybrid, or EV. *Insert: light-duty vehicle sales, by powertrain and year.*



## - Energy Policy & Geopolitics -

### - Beltway Buzz -

- Congress and the US federal government are busy; here are a few agencies to watch:

- The **Environmental Protection Agency** will distribute billions of dollars from both the IRA and 2021's bipartisan infrastructure law; meanwhile, it must also finish new rules to curb pollution from power plants, vehicles, and the oil and gas sector.
- The **Energy Department** will also distribute billions of dollars from both laws.
- The **Treasury Department** will exempt leased electric vehicles from the IRA made-in-America manufacturing requirement; Senator Manchin is not happy with the loophole allowed by the White House.
- The **US House of Representatives** will be on hold while the Republican party that controls the Chamber holds committee elections that it postponed in order to select a Speaker.
- The **Securities and Exchange Commission** is racing to finalize policies that address threats climate change poses to the global financial system

- In March 2022, when oil prices were highest (~\$124/barrel), the Biden Administration began selling crude from the nation's Strategic Petroleum Reserve; then, on December 16, 2022, the US DoE put out a [request to purchase](#) crude at much lower market prices. **The US government appears to have hedged the market and made about \$4 billion in profit.** AES Members have access to a true and correct PDF copy of the [request to purchase](#).

- Per the AIM Act, the US EPA will **prohibit the manufacture and importation of products that use or contain banned HFCs** (like special canisters that hold HFCs used in aerosols, or refrigerators that use HFCs for air conditioning).

- In the recent US Interior Department auction, **Hilcorp Alaska submitted the only bid for oil and gas drilling rights** off the coast of Alaska. This was the first federal auction in the region in more than five years.

### - State Spotlight -

- **The Maryland General Assembly passed the [Climate Solutions Now Act](#)** by a veto-proof majority, which mandates an economy-wide end to carbon emissions by midcentury. It is perhaps the [most aggressive](#) state "climate change law" in the US.

- **The California PUC unanimously voted to [cut](#) payments for excess solar production sent to the grid by 75%, from \$0.30 per kWh to \$0.08 per kWh** (effective on April 15, 2023). In that same meeting, the CPUC also voted unanimously that clean renewable hydrogen could be blended into the natural gas system and used as a fuel by hard-to-electrify industries (SoCal Gas will proceed with an initial phase of its Angeles Link hydrogen/gas project).

### - Global -

- **Europe:** It took only one year for **Germany to [reduce](#) its share of Russian gas**; in 2022, 20% of Germany's gas came from Russia; in 2021 it was 55%). Now, Germany's primary supplier is **Norway**.

- **Africa:** The energy- and climate-tech startup ecosystem in Africa is growing ([+206% y/y](#) invested capital), mostly in Nigeria, Morocco, Tunisia, Egypt, and South Africa; however, **the fastest growing energy- and climate-tech ecosystem in Africa is Kenya**.

- **Asia:** China had been [reducing](#) emissions the last few years, but now coal consumption is growing, which means emissions are beginning to [increase](#).

- **C/S America:** Decarbonization policy objectives in the US and Europe have led to particularly **high demand for biofuels from Brazil**. If current trends do not change, there will be a 56% global shortage of biodiesel, renewable diesel, and biojet fuel (as well as vegetable oil, waste, and residue oils and fats). *Editor's note:* Brazil's [government](#) has implemented a number of programs (like deforestation, see "climate" below) to take advantage of higher prices.

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## - Climate and Sustainability -



- Once upon a time, aluminum producers all over the world would plunge long wooden sticks into bubbling pots of molten aluminum to stop the "anode effect," a dangerous chemical reaction that released toxic perfluorocarbons (PFC gases are called "*immortal*"). By the 1990s, most producers in the industry replaced the sticks with a more effective automated system. However, **aluminum producers in China continue to use the "stick" method to stop the anode effect.**

*Note:* China produces more than half of the world's aluminum.

- **The most active [deforestation](#) efforts in the world are in West Africa and Indonesia;** clear cutting of forests in these regions supports the production of cocoa for chocolate, coffee, and palm oil.

- **[Make Sunsets](#) sells balloons filled with 10 grams of sulfur for \$10.** The company will then float the balloon into the atmosphere and release the sulfur particles as a "carbon offset" in order to combat climate change by deflecting sunlight. (*Editor's note:* this is probably a very bad idea.)



- **The Colorado River is so [low](#) on water** that seven states must find alternative water sources. Upper Basin states — Colorado, Wyoming, Utah and New Mexico — accuse Arizona, Southern California, and Nevada in the Lower Basin of using more than their share; meanwhile, 30 federally-recognized Native American nations also use water from the Colorado River and would like to participate in negotiations on how remaining water will be apportioned.

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## - Research and Markets -

- **Special summaries of energy market forecasts by 5 global investment firms and access to 10 others** (for AES Members only - [join](#) for access):

1. [Goldman Sachs](#): Markets remain precariously balanced because pandemic constraints and tight supply chains offset tight energy markets. The great unknown: China.
2. [J.P. Morgan](#): Markets will outperform the economy; energy crisis will not be harsh because sustainability efforts are a secondary priority.
3. [Morgan Stanley](#): 2022 turbulence causes 2023 hangover; energy markets will be frustrating, transitional, and resilient.
4. [BlackRock](#): "The Great Moderation" (4 decades of stable activity) is over and instability is more the norm in part because the energy-transition to net-zero is causing supply/demand mismatches.
5. [HSBC](#): Global governments are capably managing the energy transition by investing in short run fossil fuels but long term climate mitigation and adaptation solutions.

- [Bank of America](#)
- [Barclays](#)
- [Citi](#)
- [Credit Suisse](#)
- [BNP Paribas](#)
- [Deutsche Bank](#)
- [Apollo Global Management, Inc.](#)
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- [Fidelity Int'l](#)
- [Lazard](#)

- Related, Dan Yergin says that oil prices could reach [\\$120/barrel](#) in 2023 and hedge fund manager Andurand thinks it could hit [\\$140](#), but Credit Suisse says that oil prices could drop to [\\$63/barrel](#). It seems that oil price forecasts are almost entirely dependent upon a single variable: **if China gets control of its COVID outbreak demand will increase significantly.**

- [Form Energy](#) is building an iron-air long-duration battery manufacturing plant in Weirton, West Virginia; Breakthrough Energy is the lead investment group and the West Virginia state government has provided substantial public financial support.

- Related, the Energy Discovery, Education, Learning & Technology Accelerator ([DELTA Lab](#)) in Wise County, Virginia, is seeking researchers who want to test new energy technologies (such as exploration for Rare Earths) or business development planners with new ways to use previously mined lands.

- [Title Leader](#) is a new automated title-search resource designed for energy project developers.

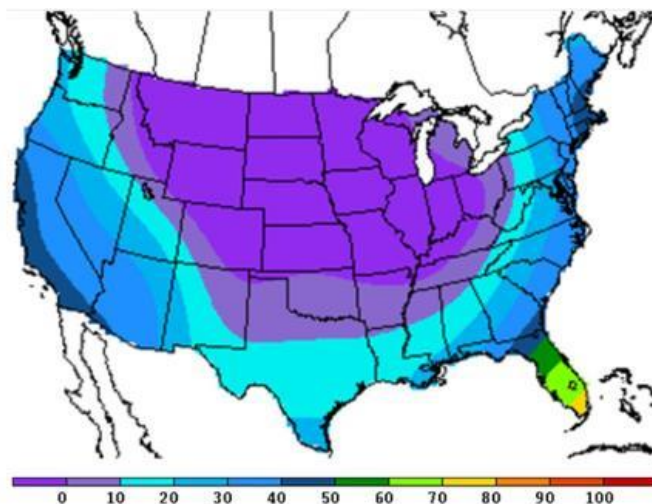


- **The world's first hydrogen fuel-cell urban train** rolled off the assembly line at the Chengdu CRRC production base in Xinjin, China. The "Fuxing" is capable of 160 km/hr.

*Editor's note: As always, no compensation of any kind was exchanged for any of the above content.)*

## - Electricity & Power -

- US federal agencies FERC and NERC have determined that **the bulk power system was [not ready](#) with adequate fuel reserve margins for Winter Storm Elliott** on December 23, 2022. (*Insert: low temperatures on December 23, 2022.*)





- There is a significant **shortage of transformers throughout the US**, and inventories of replacement parts is also insufficient. Indeed, it takes about 20 to 39 months for a utility to procure equipment or parts. (Note: a majority of transformer manufacturing is done outside of the US.) AES Members have access to a true and correct [PDF copy](#) of a letter sent to federal regulators by the US power industry about the transformer crisis.

- Related, **the Midwest and South-Central US are most at-risk of electricity shortages** during peak energy usage times.



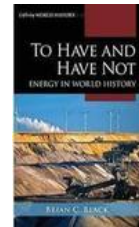
- There have been a record number of **attacks on utility substations** throughout the US by domestic terrorists. Recent attacks include ...

- On Christmas day, three substations in and around Tacoma, Washington, were “vandalized” (14,000 outages).
- A few days later, there were similar attacks elsewhere in Washington and in Oregon and North Carolina.
- On December 5, 2022, shots were fired at two Duke Energy substations that knocked out power to 45,000 people in Moore County, NC (45,000 homes had outages).
- **The states that have had the most attacks on utility substations in 2022: Texas, Montana, Florida, and Washington.**

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## - Universities in the Spotlight -

- Brian Black of Penn State - Altoona, has published a new book, [To Have and Have Not: Energy in World History](#).



- The Graduate Program of Environmental Policy and Management and the Institute for the Environment at **UC Davis** are launching the Environmental Justice Apprenticeship [Program](#).

- *Save the date*: The **RIT REMADE** Circular Economy Tech [Summit](#), March 20 and 21, 2023.

- Fluence Analytics, a **Tulane University** spin-out, has developed a [chemical recycling method](#) (as opposed to mechanical recycling) that breaks down waste plastic into feedstock.

- CISTAR at **Purdue University** is inviting undergraduates to participate in the Research Experience and Mentoring Program (REM) at one of the National Society of Black Engineers (NSBE) Summer Engineering Experience for Kids (SEEK) program ([May 22-June 30, 2023](#)).

- Sustainable Bioproducts and Biofuels Research Lab at **University of Georgia** is applying a [circular systems framework](#) to convert feedstock into biomaterials, bioproducts, and biofuels.

- **Appalachian State University** has installed the [highest elevation](#) weather station in the world (27,000 feet, on Mt. Everest).

- Researchers at **West Virginia University** and **University of Cologne** have co-published a [new paper](#), 'Introduction' In: Globalization, Environmental Law, and Sustainable Development in the Global South.

- The Environmental Resilience Institute at **Indiana University - Bloomington**, hosted a [virtual workshop](#) on climate-related challenges related to water equality and resilience.

## - Quotes -

*"The best-laid plans of mice and men often go awry..."*

"He doesn't realize if he wants an immediate 5% increase (in production), I'd have to call up all the service contractors. They're going to charge me 30 to 40% more; it's going to take a year to build new equipment; it's going to take two years to start showing results. By that time, you may go through an oil price collapse."

- Pioneer Natural Resources CEO Scott Sheffield, responding to White House energy advisor calling shale drillers "un-American" for refusing to boost oil production

"If China gets over COVID... then you add a lot of demand to the market."

- Dan Yergin forecasting oil prices in 2023

"There will be multiple lessons learned from last week's polar vortex that will inform future winter preparations."

- NERC CEO Jim Robb on the bulk power system lacking adequate fuel reserve margins in advance of Winter Storm Elliott

## - Bulletin Board -

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- **Honeywell Building Technologies** is hiring a [Solution Consultant Manager](#) and a [Sustainability Break Through Initiative Leader](#) (GM).

- Since presenting an innovative concept for carbon-absorbing buildings at COP27, Skidmore, Owings, and Merrill (SOM) is now a [net-zero](#) emissions business globally.

- **Clearpath** has completed a white paper that examines the development of wind power in [Iowa](#), the #2 wind state in the US. The study highlights proponents and advocates of the industry and its plans to expand in the future.

- **Unearth** is a dynamic Mobile GIS that connects assets, data, and field teams for critical infrastructure providers. Start your [free](#) trial today.

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

- **Orrick** has a recorded [webinar](#) on the Inflation Reduction Act, with emphasis on hydrogen.

- **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.



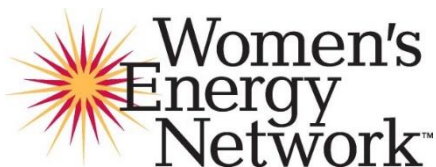
- Gratitude -

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