

ENERGY MATTERS

Soundbite summaries of the energy news you need to know

AN OFFICIAL PUBLICATION OF



AMERICAN ENERGY SOCIETY

February 20, 2023

- The Power Read -

- **Mining:** The average American consumes about 3 million pounds of minerals, metals, and fuels in a lifetime.
- **Low-/no-carbon:** Climate tech venture capital funds broke records in 2022.
- **Policy:** Congress has begun its annual appropriations process for funding government agencies.
- **Markets:** It takes five tablespoons of petroleum to get one tomato from Spanish farm to London table.
- **Editor's note:** An interesting market event is happening right now ... oil prices are rising but natural gas prices are declining. Demand, rather than supply, is the driving force, and the primary causes are weather and COVID. Globally, Americans and Europeans are using less gas to heat their homes, while demand for oil is increasing in both OECD and non-OECD countries, and also in China.

- News from the Society -



- Electricity's expiration date is immediate, and the "use by" date of electrons is "now." That's why battery storage is often called the holy grail for renewable energy, because it balances the intermittent production of power over time. Visit our [homepage](#) to download a free copy of **Battery Spotlight**, a landscape view of the sector in the US.

- Energy and sustainability companies are hiring! [Contact us](#) if you would like to talk about new professional opportunities.

- Fossil Fuels -

- Oil -

- Oil and gas industry profits **increased** from an average of \$1.5 trillion in recent years to about \$4 trillion in 2022. The six biggest international oil majors (Exxon, Chevron, BP, Shell, Equinor, and TotalEnergies) earned \$219 billion in net profits for 2022, a record high.

- Natural gas -

- When adjusted for inflation, US natural gas prices are at a **30-year-low**. For instance, Henry Hub gas prices have dropped to about \$2.50 per million British thermal units (MMBtu), down from \$6/MMBtu in the middle of December and \$9/MMBtu in August 2022.

- Coal and mining -

- Over a lifetime, the average American will consume about **3 million pounds** of minerals, metals, and fuels. This already high number will be exacerbated by the clean energy transition. (For comparison, electric cars need 6 times the mineral inputs of a conventional ICE car, and an offshore wind plant requires 13 times more mineral resources than a similarly sized gas-fired plant.)

- Carbon capture and removal -

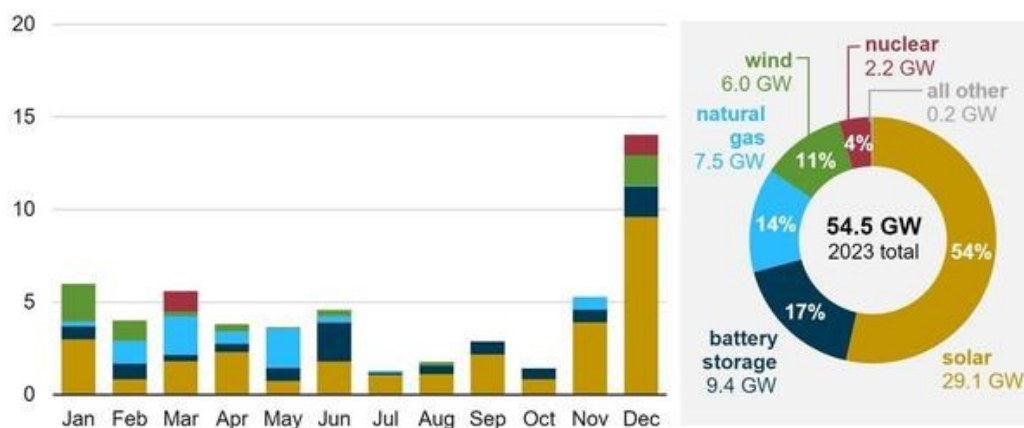
- Of the 2 billion tons of CO₂ removed every year, 99.9% comes from land-based solutions like reforestation and soil carbon. The other 0.1% is engineered approaches like DAC and BECCS. To stay below 2°C of warming, engineering solutions must grow at least 1,300 times by 2050. [AES Members](#) have access to *The State of Carbon Dioxide Removal*.

Special report - free for Members of AES

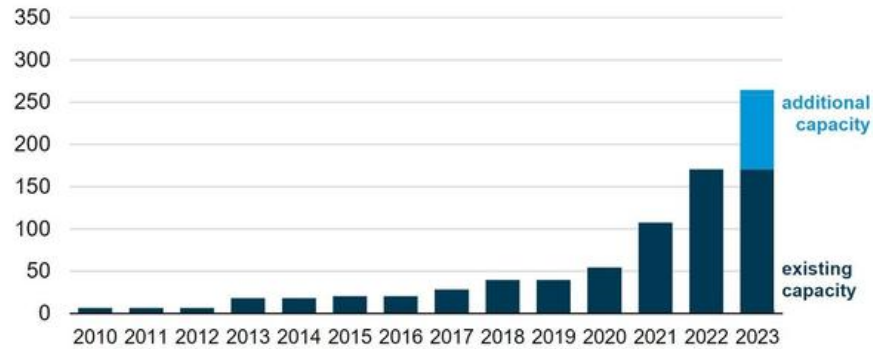
Don't miss! **Battery Spotlight** is a landscape view of the sector in the US by AES. Battery storage is often called the holy grail for renewable energy — gain insight into the state of the sector by visiting our [homepage](#) to download **Battery Spotlight** for free.

No- / Low-Carbon and Renewable Energy

- Developers plan to **add** 54.5 gigawatts (GW) of new utility scale electric generating capacity to the US power grid this year; **more than half of this capacity will be solar power** (54%), followed by battery storage (17%). *Insert: US planned additions (2023), in gigawatts (GW).*

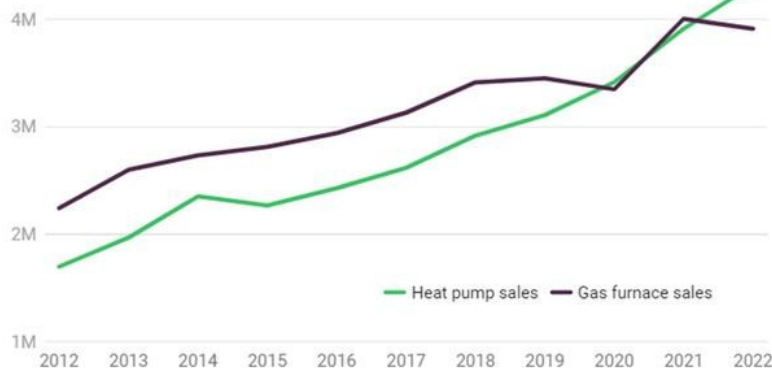


- **US production capacity of renewable diesel will [increase](#) significantly this year.** There are at least two primary reasons for the increase: 1) rising state and federal renewable fuel targets, and 2) IRA extended biomass-based diesel tax credits through 2024. Note: renewable diesel is a fuel that is chemically equivalent to petroleum diesel and nearly identical in its performance characteristics. The same is not true of biodiesel, which is chemically different from petroleum diesel. *Insert:* annual and expected US renewable diesel production capacity, 2010 - 2023, in thousand barrels per day. (Thank you AES Member Will Herr of SUNY-ESF for [insight](#) into biodiesel.)



- Venture capital funds [broke a record](#) in 2022 for the largest amount of capital raised (\$151B) in any prior full year, led in the main by **135 new climate tech funds**; there is about \$300B of venture climate tech "dry powder" ready to deploy.

- **In 2022, sale of heat pumps exceeded gas furnaces in the US** (*insert*):



- Energy Policy & Geopolitics -

- Beltway Buzz -

[Neither the US House nor the Senate are in session this week.](#)

- Probably the most important legislative event is happening now — **Congress is beginning its annual appropriations process for funding government agencies** through Fiscal Year 2024. All agencies, including the Department of Energy, will be involved.

- There is strong evidence that since 1977 Exxon knew about the dangers of burning fossil fuels, and that since 2017 about 23 state attorneys general have filed suit against Exxon; however, not a single case has made it to trial. The procedural battles might soon end when **the Supreme Court reviews [Suncor v. Boulder County](#)**. **The court will either hear the case or send it back to state courts.** Either outcome would validate lawsuits that states, cities, and counties have brought against fossil fuel companies. *Note: [AES Members](#) have access to the *Energy Today* issue, "The Three Most Important Energy and Environment Cases in Supreme Court History."*

- **The Inflation Reduction Act defines "clean hydrogen" as involving no more than 4 kilograms of carbon emissions for every kilogram of hydrogen that is produced.** Hydrogen projects that meet this standard will qualify for an IRA tax credit.

- State Spotlights -

- **Michigan:** The state of Michigan is providing Ford with about \$1 billion and a waiver of property taxes to help the auto manufacturer [build](#) a lithium iron phosphate EV battery plant in Marshall, Michigan.

- **Tennessee:** Related, Ford officially [broke ground](#) at BlueOval City, in Western Tennessee. The manufacturing facility, which will produce 2 million EVs/year and create 6,000 new jobs, will be the company's largest, most advanced auto production complex in its 119-year history.

- **Ohio:** Related, the new Ultium Cells electric vehicle battery factory built by General Motors and LG Energy Solution in Lordstown, Ohio, has [reinvigorated](#) industrial development, increased land prices, and attracted millions in other investments, like development of warehouses, utilities, and the service industry.

- **Nevada:** The US DoE Loan Programs Office has offered a [conditional loan](#) of \$2 billion to Redwood Materials to build a battery materials recycling facility in McCarren, Nevada.

- Global Spotlights -

- **Europe.** The European Commission proposed the REPowerEU Plan, which was inspired by four goals ([AES Members](#) have access to a true and correct copy of the Plan):

1. Respond to energy insecurity and hardships caused by Russia's invasion of Ukraine.
2. Reduce the EU's dependence on Russian fossil fuels.
3. Address the climate crisis.
4. Match the US investment in recent legislation (IRA, Bipartisan, the CHIPS Act, etc.)

- **Africa.** Cyril Ramaphosa, president of South Africa, declared that nationwide electricity blackouts have created a "[state of emergency](#)." However, the President's plans to tackle the energy crisis is facilitating corruption and flawed energy policies. (*Note: Eskom, South Africa's primary utility generates approximately 95% of its electricity and the CEO just survived an assassination attempt with cyanide-laced coffee.*)

- **Asia.** The top 3 nations that generate the [most geothermal](#) power in the world, by total megawatts generated:

1. United States
2. Indonesia
3. Philippines

- **C/S America.** Another massive oil reserve was discovered in Guyana. [New wells](#) in the Stabroek Block include Fangtooth-1, Sailfin-1, and Yarrow-1. (*Note: in the last five years, about 11% of all crude oil discovered globally has been found in Guyana.*)

- Climate and Sustainability -



- On February 3, a **Norfolk Southern train carrying hazardous chemicals derailed in Ohio**, sending vinyl chloride, a human carcinogen, and other chemicals into the ground and air. It could become the [worst](#) environmental disaster in US history.

- Though correlation and causation are unclear, **whales are dying on US beaches at an unprecedented rate** at the same time the US is investing in the development of offshore wind. Indeed, in the last three months, [15 whales](#) have washed ashore along the Greater Atlantic coastline. However, federal regulators and scientists from the Bureau of Ocean Energy Management (BOEM) have determined that there is no evidence that wind development activities — such as sonic mapping of the ocean floor and increased ship traffic — contributes to or affects the safety of whales. Federal scientists say the number of humpback whales close to US shorelines is increasing, potentially leading to more whales being struck by ships or entangled in fishing gear.

- **The US Federal Reserve Bank has completed its study of the six biggest banks and their ability to respond to a variety of climate crisis events.** The goal of the Fed is to turn this six-bank pilot into a supervisory tool. AES Members have access to the US Federal Reserve (PDF) [study](#).

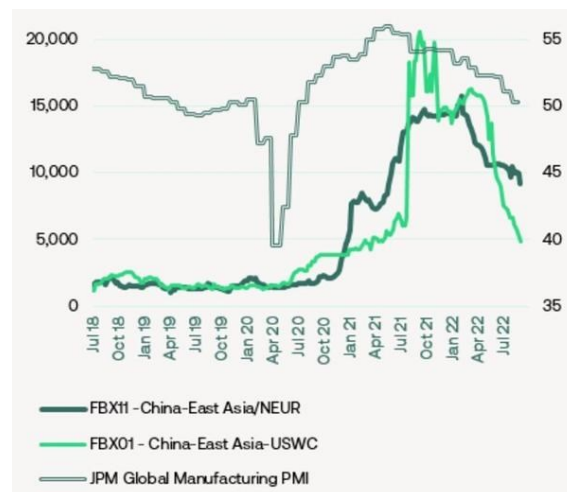
- **The Super Bowl featured quite a few ads for EVs and none for ICEs.** Jeep went to the extreme, advertising its new all-EV even though it is [not yet available](#).

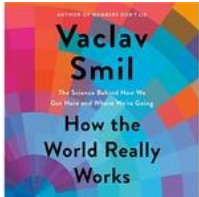
- **To save the Great Salt Lake**, the first proposed solution was a pipeline to the Pacific Ocean, then someone suggested nuclear-assisted groundwater mining. The [newest idea](#) is to thin nearby forests, though a recent report concludes that this is also a bad idea.

- Research and Markets -

- **The term "energy transition" means something very different for the [Global South](#)** than for the northern hemisphere. For many in the developing world, “energy transition” means moving from wood and waste to liquefied petroleum gas, rather than adopting cleaner sources of energy.

- It appears the supply chain crisis has subsided; for instance, **oil freight rates are [declining](#), though average container charter rates are still 400%+ higher** than at the start of the pandemic. *Insert:* a comparison of global freight rate average prices.





- In [How The World Really Works](#), Vaclav Smil ([AES Energy Writer of the Year 2019](#)) argues that the **"four pillars of modern civilization"** are: **cement, steel, plastics, and ammonia** (for fertilizer), each of which is heavily dependent on fossil fuels.

- Related, **it takes five tablespoons of petroleum** (which includes but is not limited to fertilizer and transportation) to get one tomato from a farm in Spain to a table in London.

- The National Science Foundation (**NSF**) **seeks to increase the scale and pace of turning discoveries from academic research** into tangible solutions that benefit the public. This is the primary aim of the "[Accelerating Research Translation](#)" (ART) program. The NSF anticipates making 10 awards of up to \$6,000,000 per award for a duration of 4 years. Thank you AES Member Micah Russo for the insight.

- Electricity & Power -

- **A new SaaS industry supports a more interactive and self-supporting grid.** For example:

- [Octopus Energy](#) - a flexible demand rewards program for residential homes.
- [Sonnen](#) - a network of residential batteries that creates a virtual power plant.
- [OhmConnect](#) - a notification system that rewards homeowners if they reduce energy consumption when the grid needs help.

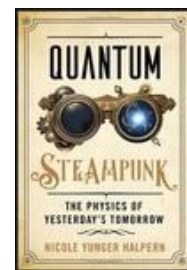
- The LA Department of Water and Power (LADWP) is [converting the Scattergood power plant from gas-fired to green hydrogen](#) (fuel produced from water, where renewable electricity splits H₂O molecules into hydrogen and oxygen atoms).

- **An ice storm caused an electricity blackout in Austin, Texas**, again. At the [peak](#) of the outages, about 170,000 homes and businesses — nearly a third of utility customers in Austin — had no electricity, and in many cases, no heat.

- In Massachusetts and New Hampshire, **electricity prices are so high that it can cost [more](#) to recharge an EV than to purchase a full tank of gasoline** for an ICE automobile.

- University spotlight -

- [Quantum Steampunk: The Physics of Yesterday's Tomorrow](#), by Nicole Yunger Halpern (University of Maryland) ... Winner of the PROSE Award (for best book of 2022 in popular science and mathematics) and named one of "the best science books coming your way," by New Scientist.



- If at all possible, do not miss **CMU Energy Week** (March 21 - 24, 2023). This year the conference will focus on decarbonization of the industrial sector. [Register now](#).

- **Featured: Columbia University is launching the new [Climate School](#).**

- **Ohio State University** hosts the [EmPOWERment](#) program that supports interdisciplinary research, training and specialization in sustainable energy systems.

- The Midwest Industrial Assessment Center (IAC) at the **University of Missouri** was named the [2022 Center of the Year](#) by the US DoE.

- ND Energy at the **University of Notre Dame** conducts [research on six themes](#): Energy Conversion and Efficiency, Smart Distribution and Storage, Sustainable Bio/Fossil Fuels, Sustainable and Secure Nuclear, Transformative Solar, and Transformative Wind.
- AES applauds "[The Clean Energy Transition: Policies and Politics for a Zero-Carbon World](#)," by Daniel Fiorino, Director of the Center for Environmental Policy at **American University**.
- **Georgia Tech** engineers have developed a more compact flow battery cell configuration that [reduces](#) the size of the cell by 75%.
- **UC Irvine** and national lab researchers [developed](#) a cobalt-free cathode for lithium-ion batteries.
- REpowering Schools at **JMU**, with **NREL**, are offering \$6,000 [grants](#) to support small wind energy projects.
- The 2023 **MIT** Energy Conference [tickets](#) are available to purchase. In addition to student tickets and general admission tickets, the conference now offers [VIP tickets](#) which will grant participants exclusive access to the Speaker Reception and Dinner, as well as other unique 1-on-1 networking opportunities with speakers and other VIPs.

- Quotes - What transition?

- "World oil demand growth is picking up after a marked slowdown in the second half of 2022 and a year-on-year contraction in the fourth quarter. China accounts for nearly half the 2 mb/d projected increase this year."
- IEA oil market [report](#)
- "Guyana is poised to become the next great oil producing region."
- Rystad Energy oil [report](#), on another major oil discovery in the Fangtooth-1 Stabroek Block
- "We're not seeing it."
- Katie Mehnert, CEO, Ally Energy

- Bulletin Board -

Reach 135,000+ readers with your message.

Members of AES can post an announcement for free! [Contact us](#) for more information.

- *Featured*: Get ready for the **Bifrost Summit** ([March 6-9, 2023](#)), a 4-day program organized by Nordic Innovation House.
- **Honeywell Building Technologies** is hiring a [Solution Consultant Manager](#) and a [Sustainability Break Through Initiative Leader](#) (GM).
- The **CCIA** 7th annual [Mining Cleantech Challenge](#) is coming up in April, 2023. The application is now open and will close on March 6, 2023.
- The 2023 [Spring Coal Forum](#), hosted by the **ACC**, takes place March 7 - 9, 2023, at the Hyatt Regency Clearwater Beach, Florida.

- **OurEnergyPolicy** hosts many [forums](#), including one on oil and gas (Hilton, Houston).
- **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.

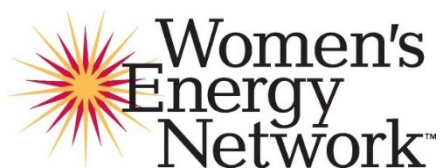
- Gratitude -

AES would like to recognize our sponsors – our catalysts for change.
For more information about the many benefits of sponsorship [contact AES](#).





Honeywell



CLEARPATH

SUNRUN

**FORTESCUE
FUTURE
INDUSTRIES**



Contact information

[The American Energy Society](#)

[AES LinkedIn Group](#)

[AES introductory video](#)

[Contact the editors](#) about the Society or this issue of *Energy Matters*.



**AMERICAN
ENERGY
SOCIETY**