

ENERGY MATTERS

Soundbite summaries of the energy news you need to know

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AMERICAN ENERGY SOCIETY

August 28, 2023

The Power Read

- **News from the Society:** Having trouble hiring? [We have deep](#) pools of talent!
- **Low-carbon:** BOEM has identified blocks for OSW off the coast of Oregon.
- **Policy:** The OEM says that the \$20B Farm Bill in debate is actually \$1.5T.
- **Climate:** The oceans are struggling under a prolonged heat dome.
- **Markets:** DoE has identified and awarded the top 19 H2 projects in the pipeline.
- **Electricity:** Grid failures are increasing, but so are VPPs.

News from the Society

- Need help hiring? **AES has deep pools of highly talented, early-career professionals seeking interesting employment opportunities.** Hiring qualified people is the main challenge for any energy transition, and the bottleneck is significant. [McKinsey](#) reports that there are about 550,000 job openings in energy. **[Contact us](#) if you are hiring and need help ...** or if you are seeking employment. *Note:* in 2021, AES editors projected a [Roaring 20s](#) employment surge in all energy sectors.

Fossil Fuels

- Oil -



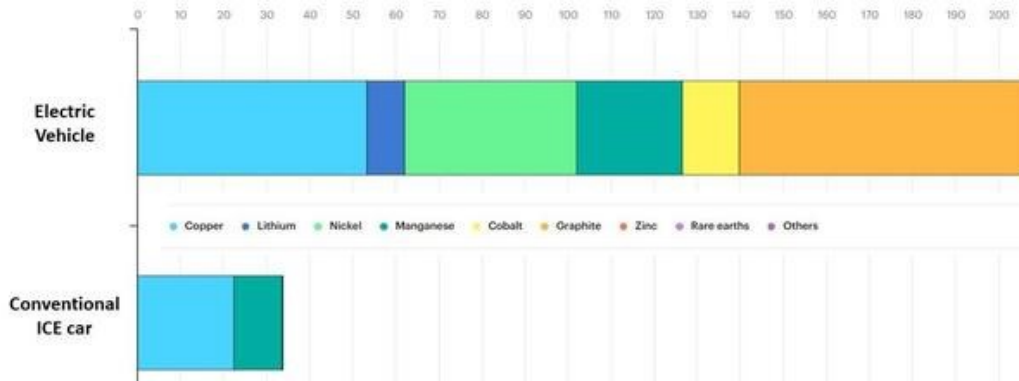
- Iraq says it wants to **increase oil production.** [Meanwhile](#), Russia NOC Lukoil has reached an agreement with the Iraq oil minister (Hayan Abdel-Ghani) to lead production efforts in Iraq's supergiant West Qurna 2 field, while China NOC National Petroleum Corporation (CNPC) will do the same in its supergiant Rumaila field.

- Natural gas -

- M2X Energy was the [first](#) private company to successfully capture waste flare methane on-site from an oil and gas operator and turn it into methanol. *Note:* The simplest alcohol ([CH₃OH](#)), methanol is used as an emission-free industrial product or fuel.

- Coal and Mining -

- Minerals used in electric cars [compared](#) with conventional ICE cars, in kg/vehicle:



- Carbon/Carbon Capture -

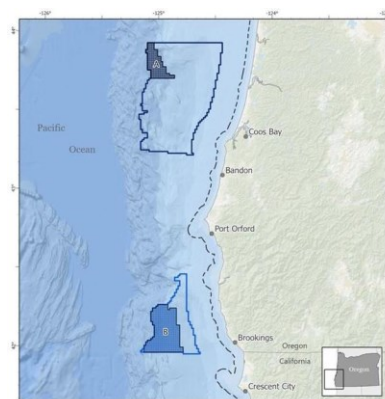
- The DoE has identified and awarded **\$1.1B** to two top-tier DAC programs, as well as \$100M to support 19 other earlier-stage feasibility and design DAC studies. The two winning DAC programs are:

- [Project Cypress](#) (Calcasieu Parish in Louisiana). This hub intends to rely on Gulf Coast Sequestration for offtake and geologic storage of captured atmospheric CO₂.
- [1PointFive DAC Hub](#) (Kleberg County in south Texas). Newly acquired by Oxy, this hub will use saline geologic CO₂ storage techniques.

No- / Low- Carbon and Renewable Energy

- Up next for offshore wind: the Oregon Coast. Right now, BOEM is holding a 60-day [public comment](#) period about **two potential wind energy areas offshore of the southern Oregon coast**.

Related, American Energy Society will soon **publish *Winds of Change*, a special report on offshore wind along the Pacific coast**. The report includes a dataset, directory of all SMEs and stakeholder organizations, important conferences, crucial local, state, and federal policies, recommended resources, and more. Members get access to the Executive Summary and report; organization Members get the dataset. [Contact us](#) if you are a Member and would like an advanced copy of the Executive Summary and dataset.



- Related, **China is deploying [MySE 18.X-28X](#), the largest wind turbine in the world:**

- At its height, the top of the blade will be as tall as a 70-story building;
- Its wind-swept area is more than 700,000 square feet (66,052 square meters);
- It will produce enough energy for 100,000 people every year;
- Until MySE 18.X, the [H260-18MW by CSSC](#) was the world's largest wind turbine.

- *Trend-spotting* - **the [5 most important](#) battery trends:**

1. Turning LFP into LMFP: manganese (the "M" in LMFP) can be added to lithium iron phosphate (the "LFP") battery cell structure, which increases energy density.
2. Silicon at the anode: most manufacturers are focused on the cathode and don't alter the graphene anode; however, some manufacturers are adding silicon admixture to the graphene anode, which acts more like a solid-state battery.
3. Semi-solid-state batteries: some manufacturers are combining powder or gel electrolytes with the metallic lithium anode, which can improve reliability.
4. Sodium instead of lithium: battery cells that incorporate sodium are cheaper.
5. The C-rate is rising: the rate (speed) that a battery can be recharged. Compact EVs need 30 minutes to charge from 10 to 80% (rating of 1.4C); however, the Hyundai e-GMP is an example of faster recharge rates (18 minutes, or a 2.3C rating).

Note: [AES members](#) have access to *Battery Spotlight*, a state of the sector survey. [Contact us](#) if you are a Member and need assistance.

- **Save the date: October 16 and 17, 2023, Richmond, Virginia.**



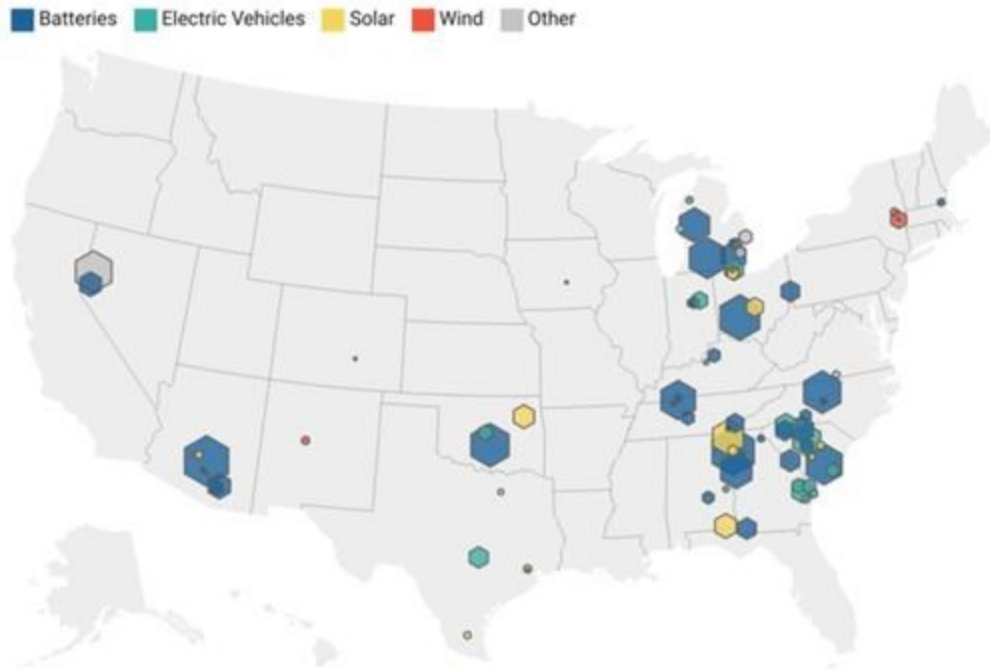
The [Virginia Clean Energy Summit](#) will host a conference on clean energy technologies, policies, and business practices that are transforming Virginia's energy sector.

Energy Policy & Geopolitics

- **Beltway Buzz** -

- There is a lot of attention on the [one year anniversary](#) of the IRA, but **the most important topic on The Hill right now is the [\\$20B Farm Bill](#). The total financial commitment is quite a bit larger; indeed, the Congressional Budget Office (CBO) estimated that the 2023 Farm Bill will have a price tag of over \$1.5 trillion.** The Farm [Omnibus Bill](#), generally considered every five years, determines policy and funding levels for agriculture, food assistance programs, natural resources, and other aspects of food and agriculture under the USDA. Current debate is focused on reducing spending, especially programs involving conservation and soil.

- Speaking of the one year anniversary of the IRA, the new centers of the energy boom are: Pensacola, FL, Cartersville, GA, Greensboro, NC, and Ridgeville, SC. *Insert below:* [map](#) of **IRA investments in energy-related manufacturing projects since August 16, 2022** (the passage of the legislation), by region and sub-sector.



- **Wilson Sonsini** has updated its **Clean Energy and Climate Solutions Federal Funding [database](#)**, including new funding opportunity announcements (FOAs).

- State Spotlight: Texas -

- Starting September 1, drivers of electric vehicles in Texas will have to pay an [extra](#) \$200 per year annual registration fee, an existing registration fee of \$50.75, and a new purchase fee of \$400. State lawmakers say the funds are needed to replace federal and state road construction and repair taxes. However, the state gas tax hasn't changed since 1991 and at \$.20/gal, Texas has one of the lowest gas taxes in the country. The average driver pays \$88/year in car-related taxes.

- Public Utility Commission of Texas [approved](#) two virtual power plants that consist of Tesla Powerwall batteries. Eventually, six more participants will be added, forming a 7.2 MW Aggregate Distributed Energy Resources (ADER) virtual power plant run by ERCOT.

- Texas Railroad Commission approved [expansion](#) of the South Texas San Miguel coal mine.

- Global Spotlights -



- **Asia:** Among megacities (cities with 10,000,000 or more people), [Jakarta, Indonesia](#), now has the worst air pollution in the world, a toxic combination of vehicle exhaust, coal-fired power emissions and a long bout of dry weather. (Previous record holders were Beijing and [Mexico City](#).)

- **MENA:** In response to an unprecedented heat wave (reaching 50°C or 122°F), the Islamic Republic of Iran [shut down](#) all banks, schools, universities, public offices and some private companies for two days in order to protect its electricity grid, which is often unstable.

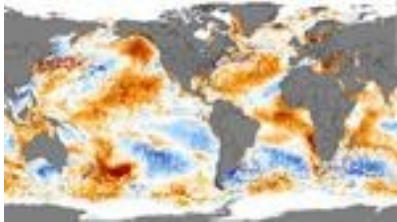
- **Australia:** In 2018, Australia excluded Chinese company Huawei from participating in its 5G network; then, in 2020, Australia called for an international investigation into the origins of Covid-19. China countered by reducing Australian imports of energy-related commodities like coal and Rare Earth Elements for three consecutive years.

- **Europe:** Russia's Luna-25 spacecraft spun out of control and [crashed](#) into the moon while on a mission to mine rare earth metals and minerals.



- AES applauds the publication of [Energy Policy for Peace](#), by Daniel Kammen, Hisashi Yoshikawa, and Kensuke Yamaguchi.

- Climate and Sustainability -



- **Ocean temperatures in the North Sea are about 5°C (9°F) [above](#) normal.** Scientists are closely monitoring kelp (which stores carbon), fish, oysters, and coral for [die-off](#).

- Related, toxic algae blooms (due to Earth's overheating) that occur in large [lakes](#) are **now happening in [oceans](#)**, with similar consequences.

- Schools are also being closely monitored. **Dilapidated school buildings across the US, in both rural and urban areas, do not have adequate HVAC/AC systems to keep students safe;** a recent government report estimates that 41% of all schools have [urgent](#) building systems needs. The Renew America's Schools funding program has received \$5.5B in requests, but has only allocated \$178M out of a total \$500M available.

- **Methane emission levels have been increasing since 2006 and accelerating since 2013.** AES [Members](#) have access to the peer reviewed research. [Contact us](#) if you are a Member and need assistance.

- **Chocolate cocoa bean shells are being used as [biochar](#).** (Note: biochar is any heated organic waste that can be used to capture CO2).

- Suncor, Canada's largest integrated oil company, has replaced its chief sustainability officer role with a senior vice president for strategy, sustainability and corporate development and its DEI indigenous relations is being passed off to the chief legal officer. **Suncor's actions are [consistent](#) with trends throughout the oil and gas sector.**

- Research, Development and Markets -

- *Special insight:* The Inflation Reduction Act is pushing existing solar technology up against its theoretical efficiency limits. Crystalline solar cells currently dominate global solar markets, but **new companies are betting that perovskites offer a more efficient, flexible, and cheaper alternative.** The perovskite revolution is not without its detractors, though. Sizeable achievements are needed to take perovskites from labs to commercial viability. AES editors recommend an NREL podcast, "[Factor This!](#)."

- DoE awarded \$33 million to 19 industry- and university-led [hydrogen-related research projects](#) that will advance cutting-edge technology solutions to make hydrogen a more available and affordable fuel for electricity generation, industrial decarbonization, and transportation. (In case you are a [Member](#) and missed it, the AES special report, [H2 Influencers](#), offers a comprehensive analysis and directory of Hydrogen subject matter experts.) A few of the 19 DoE winners include:

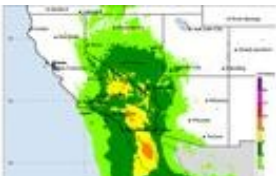
- NCSU - air separation for H2 production (\$1.5M)
- [PARC](#), Palo Alto - biomass to H2 (\$1.5M)
- Ratheon - air separation (\$1.55M)
- University of Buffalo - O2/N2 separation (\$1.75M)
- Ohio State University - methane pyrolysis (\$1.875M)
- MIT - CO2 free CH4 (\$1.875M)
- Stanford & Rice - H2 and CO2 from natural gas (\$1.875M)
- [UCLA](#) - natural gas to H2 (\$1.85M)
- [University of Wyoming & LANL](#) - water and methane (\$1.0M)
- Colorado School of Mines - H2 pipeline steel (\$1.875M)
- SWRI - H2 transport using NG pipelines (\$1.875M)
- GTI - H2 storage (\$1.75M)
- [University of North Dakota](#) - subsurface H2 storage (\$1.875M)
- [University of Texas, Austin](#) - H2 storage in Permian salt caverns (\$1.85M)
- VaTech - H2 storage in Appalachia (\$1.875M)

- Used cooking oil (or UCO) can also be used to make jet fuel. **The largest global [supplier](#) of UCO is ... China.**

- Apparently, hydrogen comes in blue, green, grey, purple and now ... [white](#), which refers to hydrogen found naturally in the Earth's crust.

- **Occidental Petroleum is [buying](#) Carbon Engineering**, a company it has been closely working with since 2019 on direct air capture (DAC) technology, for \$1.1 billion. See the above section "[Carbon/Carbon Capture](#)" for a related story about [1Point5 DAC Hub](#).

Electricity, Power, and Efficiency



- Though CAISO is still [calculating](#) the impact of August 20 Hurricane Hilary on solar power production, total solar power declined as expected but not as much as anticipated and production returned to near-full capacity the next day.

- In terms of short- and long-duration energy storage, **the technology that is least likely to contribute to global warming is [closed-loop pumped hydropower](#)**. Other considered storage technologies include: compressed air, utility-scale lithium-ion battery systems, utility-scale lead-acid batteries, and vanadium redox flow batteries. AES applauds the research conducted by [NREL](#). AES [Members](#) have access to [Battery Spotlight](#) special report by the numbers.

- Green Mountain Power (GMP), a Vermont electric utility, [DIY'ed](#) its own decentralized virtual power plant (VPP) using 4,000 interconnected Tesla Powerwalls for its service area of about 270,000 customers.

- A [sample](#) of severe power outages and their causes in 2022 and 2023:

January 25, 2022 - Kazakhstan: drought and boom in cryptocurrency mining.

May 21 - Canada, Ontario and Quebec: Derecho peak winds of 120 mph.

June 13-14 - US, Great Lakes: peak winds of 95 mph, then a heat wave.

October 4 - Bangladesh: technical malfunction followed by an inability to import fuel.

October 22-present - Ukraine and Moldova: air and missile attacks by Russian forces.

November 4 - US, Washington state: 80 mph winds for one week.

December 3 - US, North Carolina: gunfire at two substations.

January 23, 2023 - Pakistan: chronic grid failure.

March 1 - Argentina: heatwave and then fire near the Atucha Nuclear Power Plant.

March 14 - US, SF Bay Area: strong rain and wind storm.

April 5 - Canada, Montreal-metro: major ice storm.

9 April - South Africa: vandalized high voltage power lines and pylons.

8 May - Botswana: load-shedding in response to chronic failure of the grid.

29 July - US, Washington, DC: heatwave followed by a severe storm.

16 August - Iran: chronic grid failure and heat dome.



- AES applauds the [policy brief](#) by longtime AES Friend [Tyler Norris](#), *Beyond FERC Order 2023*, from the new **Duke** Nicholas Institute for Energy.

- University Spotlight -

- **Dartmouth** School of Engineering is hosting its [Career Fair](#) on September 26.

- The Center for Midstream Management and Science at **Lamar University** has, through an RFP process, awarded seven [research grants](#), including but not limited to support for:

- tracers for pipeline leak detection
- thermoplastic composite pipe support pads to prevent corrosion
- LNG pipeline risk assessment of flow-induced vibrations and severe weather
- catalog of flora and fauna microbes in upstream, midstream, and downstream hydrocarbon systems.

- AES applauds the Energy Research [Institute](#) at **Montana State University**, including a rather interesting energy biotechnology program.

- The **University of Cincinnati** now offers a Master of Engineering [degree](#) in Sustainable Energy, a one-year interdisciplinary program that combines technical knowledge, policy analysis, and practical applications.

- The Energy Transition Initiative, with an associated affiliation with the **University of Virginia**, offers a large collection of [reports](#) on energy research and policy analysis.

And finally...



- AES would like to wish the Electric Power Research [Center](#) at **Iowa State University** a very happy 60th birthday.

- Quotes -



Climate scientist James Hansen, reflecting on his presentation to the US Senate in [1988](#) when he warned the world that the planet was getting warmer.

"We are headed wittingly into the new reality — we knew it was coming."

"I feel a deep sense of disappointment that we scientists did not communicate more clearly ... and that we did not elect leaders capable of a more intelligent response."

"We are damned fools. We have to taste it to believe it."

- Bulletin Board -

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- AES applauds the relatively 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.
 - **Unearth** 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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- Gratitude -

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