

ENERGY MATTERS

Soundbite summaries of the energy news you need to know

AN OFFICIAL PUBLICATION OF



AMERICAN ENERGY SOCIETY

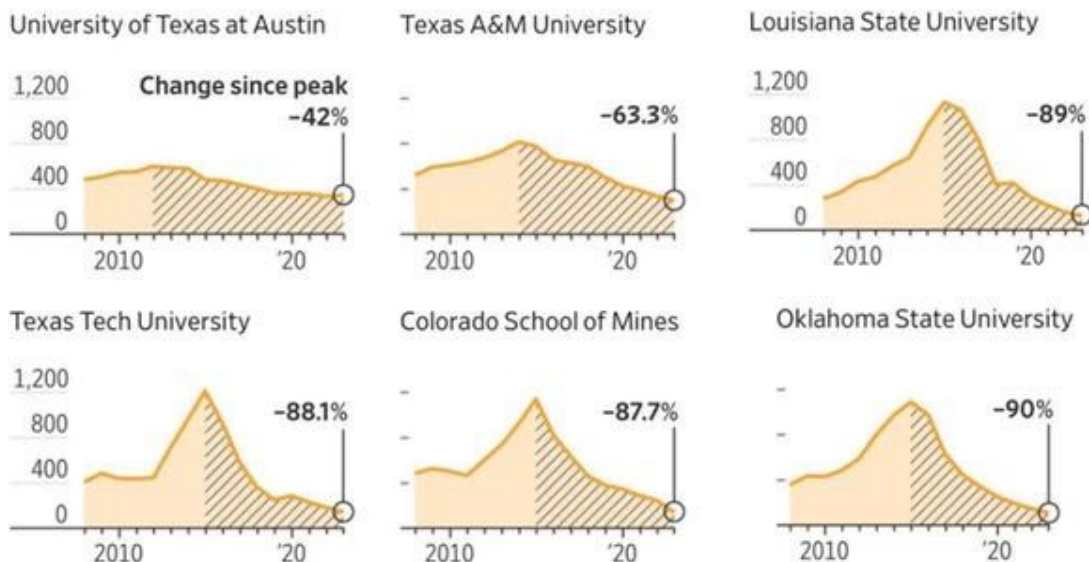
August 14, 2023

The Power Read

- **News from the Society:** Having trouble hiring? **We have** pools of talent!
- **Fossil fuels:** Brine might be more effective in some EOR operations.
- **Low-carbon:** Since passage of the IRA, private investment in domestic clean energy has been about \$270 billion—more than the last 8 years combined.
- **Policy:** The US Congress is talking about a border carbon tax.
- **Climate:** Hawaii was the victim "fire weather" (drought + high winds).
- **Markets:** Each 1,000 miles of US roads has 104 gas pumps and 22 EV ports.
- **Electricity:** Michigan consumes the most natural gas/household.

News from the Society

- Need help hiring? **AES has very large pools of highly talented, early-career professionals seeking interesting employment opportunities.** Hiring qualified people is the main challenge to 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. *Insert below:* Undergraduate enrollments in petroleum engineering, a comparison of leading US universities. (*Source:* Lloyd Heinze, Texas Tech University; Andrew Barnett, *The Wall Street Journal*.) *Note:* in 2021, AES editors projected a [Roaring 20s](#) employment surge in all energy sectors.



Fossil Fuels

- Oil -

- Research by Russian petroleum engineers has found that **brine is more effective in some EOR operations than traditional frac'ing chemicals and surfactants**. Exxon believes this new technique [increases](#) production.

- Natural gas -

- **The two US counties that produce the most natural gas are both in the Permian Basin** of West Texas ([Reeves and Webb](#) produce 77 bcf); meanwhile, the [Eagle Ford Shale](#) formation in East Texas is unusual because it produces both oil and natural gas.

- Coal and Mining -

- **The ocean floor is a significant source of hard mineral resources** (aka Rare Earth Elements), especially on the Outer Continental Shelf. Below is a list of hard minerals in the ocean floor, with REEs listed in **bold**:

- Nearshore minerals, typically at <500 ft: **titanium**, tin, **platinum**, gold, silver
- Mid-depth minerals, typically at .5 to 2 miles: phosphorous, possibly **uranium**
- Deepwater crusts, nodules, and deposits, typically at 2 to 4 miles: copper, **cobalt**, **manganese**, zinc, gold, silver, bismuth, **gallium**, **tellurium**, **scandium**, **germanium**, possibly **antimony**, **titanium**, **tellurium**, **lithium**, and **uranium**.

- Carbon/Carbon Capture -

- **Isometric is building a formal registry that lists "fully verified" credits for long-duration carbon removal**. The foundation for the registry is [Science Platform](#), a community resource that enables suppliers to input information like processes, data, and protocols.

No- / Low- Carbon and Renewable Energy

- **Private investment in domestic clean energy projects and manufacturing facilities was about \$270 billion**, which exceeds the combined clean energy investment total made over the previous eight years.

- **Enhanced geothermal**: drill down deep enough, [geothermal energy](#) can be produced anywhere—not just places where heat happens to be closer to the surface. Drilling technologies developed for the frac'ing boom are being used for "enhanced geothermal." (*Note*: geothermal provides less than 1% of the world's primary energy supply.) The most active geothermal development project in the US is [Utah FORGE](#).

- Scientists at the Lawrence Livermore National Laboratory created another [fusion reaction](#); the experiment in the National Ignition Facility (NIF) on July 30 achieved what's known as **fusion ignition by generating 3.15 megajoules** of energy output.

- **Proterra, the EV battery and bus manufacturer, filed for Chapter 11 bankruptcy in spite of strong product/market fit**. Proterra's downfall can be attributed in part to the failure of its EV bus division, which focused on the slow-growth national market while its key competitors (Tata, BYD, Dong Feng, Volvo, etc.) focused on rapidly growing global markets. *Editor's note*: 66,000 EV buses were sold in 2022, but Proterra sold only 199 (IEA data).



- *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 -

Congress is in its District work period until Labor Day.

- In June 2022, the commissioner of the US Bureau of Reclamation told seven states (Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming) that they must reach an agreement to reduce Colorado River water usage by 2 to 4 million acre-feet (maf). Since then, **the Commissioner has presented 6 different proposals, but the 7 states have ignored them all**, neither voting for nor against.

- The Biden administration is proposing a **new energy-efficiency rule for residential water heaters, which will also promote the adoption of heat-pumps**. If completed, the new rule will go into effect in 2029. (Note: water heaters use about 13% of total energy used in homes; heat-pumps can reduce the amount of electricity used by water heaters by about 20%, but only 1% of all homes in the US have heat pumps.)

- **The US Congress is talking about a border carbon tax** on trade that involves iron, steel, fertilizers, cement, etc. Both parties are interested because it would reduce emissions from hard-to-abate sectors, gives US manufacturing an edge over cheaply produced goods in China, and the European Union has a similar border tax that seems to be working after one full year in effect. There is talk of a **bipartisan** bill—US senators Whitehouse (D-RI) and Cassidy (R-LA)—that will be introduced in late fall or early winter.

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

- State Spotlights -

- **In all 50 states, it's cheaper to fill up an EV with electrons**, though private pay-for-use charging stations are always more expensive than charging at home. A **comparison** of extremes:

- **Washington** state: it costs about \$115 to fill a Ford F-150 pickup with gas; to cover the same distance, an electric F-150 Lightning costs about \$34 to fill—an \$80 savings.
- **Mississippi**: it costs about \$30 more to refuel an ICE Ford-150 than its electric counterpart.
- **The US Midwest**: the region has some of the lowest EV ownership rates in the US, the fewest charging stations, low gasoline prices, and electricity is dirtier than most.

- Global Spotlights -

- **Africa**: Several African countries are aggressively **developing** their oil and gas industries, led by **Ghana** with 17 projects (3 upstream, 9 midstream, and 5 downstream).

- **Asia**: On the one hand, China's cleantech revolution is **surging**; on the other hand, China's consumption of coal and other fossil fuels is also **surging**.

- **C/S America:** Brazil has passed a [law](#) that invalidates Indigenous land claims and opens Indigenous lands to mining, road-building, agriculture, and other extractive industries. (Note: the law is based on the concept of *marco temporal*, or the idea that if Indigenous communities weren't already on the land in 1988—when the Constitution was passed—they have no claim to those lands today.)

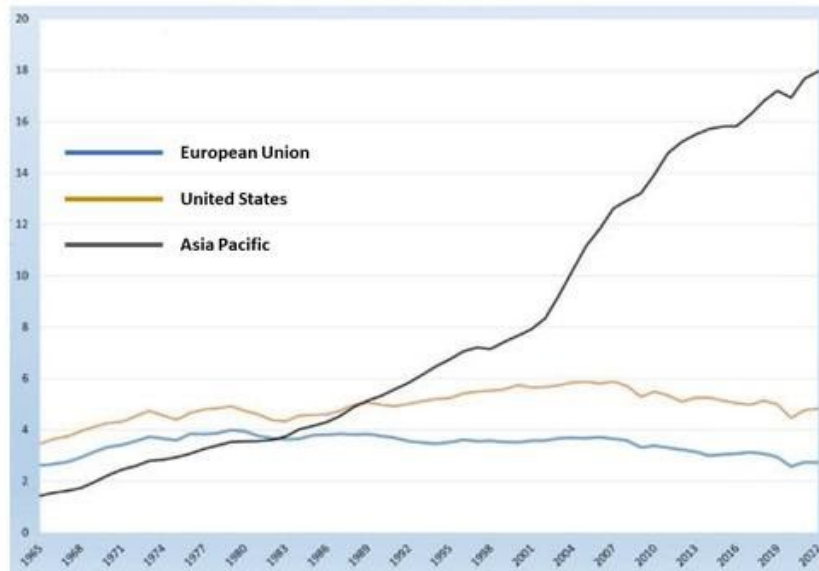
- **Europe:** Real estate investors in Stockholm, Sweden, are developing Wood City, a neighborhood that will have 7,000 offices and 2,000 homes. (Note: peer-reviewed research supports large-scale adoption of [wooden construction](#) to decrease CO2 emissions.)

- Climate and Sustainability -



- **Fire weather** — drought followed by high-winds — caused the wildfires on the island of Maui (and to a lesser extent Hawai'i); the historic town of Lahaina has had substantial damage and fatalities.

- **Global CO2 emissions from energy set a new record in 2022**, [increasing](#) 0.9% to a new high of 34.2 billion metric tons. Although emissions from OECD countries are declining, non-OECD nations, particularly in the Asia-Pacific region, are seeing a sharp rise due to economic growth and increased energy consumption. Insert: regional CO2 emissions from 1965 to 2022, by billion metric tons per year.



- The US Air Force has detected [unsafe levels](#) of a likely carcinogen at underground launch control centers at a Montana nuclear missile base where 217 people have reported cancer diagnoses, 33 of whom with non-Hodgkins lymphoma. (For context, there are about 403 cancer cases reported per 100,000 people, and about 21,000 people have spent extended time at the Montana base.) A new nuclear waste cleanup effort has been ordered.

- During Ocean Race 2022-23, yacht sailors scooped up **18 times more microplastic particles** than during the last race in 2017-18.

- The oceans are also the [hottest](#) they've ever been.

- Research, Development and Markets -

- **Notice of Funding Opportunity (NOFO): \$7 billion Solar for All competition.** This [competition](#) will award up to 60 grants to states, territories, Tribal governments, municipalities, and eligible nonprofits to expand solar investment for low-income and disadvantaged communities. (Note: EPA will not fund individual projects under this competition.) Applications are due September 26, 2023.

- **Global energy, water, and food prices are rising**, in part because extreme weather (heat) and geopolitical events (the war in Ukraine) have disrupted labor, transportation, and supply chains.

- **Fossil fuel markets are surging.** For instance, Chevron set an oil production [record](#) in the Permian, Russia is generating [record](#) fossil-fuel profits, and Qatar is about to [increase](#) natural gas production.

- **For every 1,000 miles of US roads, there are 104 gas pumps compared with 22 EV charging ports:**



To match the frequency of gas pumps/mile, the US needs to add about 1,000,000+ EV charging ports. (Note: Massachusetts has the highest density of EV charging stations/mile.)

Electricity, Power, and Efficiency

- The electricity sector is divided over the **administration's climate proposal that will require power plants to cut emissions 90% by 2040 or shut down**; investor-owned utilities and power cooperatives are preparing to come out hard against the proposal.

- **Homes in the Midwest consume 34% more natural gas than the national average**, and old homes (built before 1950) consume about 25 MMBTU more than newer homes. Note: though Michigan is the 11th coldest state in the US, its oldest homes consume the most natural gas (72.7 MMBtu), in part because about 27% of all older homes in Michigan do not have insulation.

- Table below: a comparison of levelized cost of electricity in the US, by technology Note: [LCOE](#) is the average cost of generating a unit of electricity, taking into account construction, operation, and maintenance costs; it does not include the cost of supplemental technologies. For instance, coupling lithium-ion batteries with intermittent energy technologies, such as wind and solar, raises costs by \$6-\$39/MWh.

Technology	U.S. Levelized Cost of Electricity	
	Minimum	Maximum
Onshore wind	\$24	\$75
Solar PV (utility scale)	\$24	\$96
Gas combined cycle	\$39	\$101
Onshore wind + 4-hour lithium storage	\$42	\$114
Solar PV (utility scale) + 4-hour lithium storage	\$46	\$102
Geothermal*	\$61	\$102
Coal*	\$68	\$166
Offshore wind	\$72	\$140
Gas peaking	\$115	\$221
Nuclear*	\$141	\$221

University Spotlight

- Save the date: the **Dartmouth** School of Engineering is hosting its 27th annual [Career Fair](#) on September. 26.

- AES recommends a **Boston University** [podcast](#) with Nobel Prize-winner, Shuji Nakamura, about technology-dependent lifestyles that have exacerbated the global climate crisis and the role that energy innovations play in solving this challenge.

- AES applauds Social, Ecological, and Technological Infrastructure Systems ([SETS](#)) for Urban Resilience, a joint project between **Arizona State University, Georgia State University, Barnard College, The New School, and the US Forest Service**, to develop an urban resilience conceptual framework for cities to test and deploy in San Juan (PR), Atlanta, New York, and Phoenix.

- **Colorado State University** has announced a partnership with Marvel Fusion to construct a \$150 million [laser research facility](#).

- For unrestricted benefits and services, become a [Member](#) of the Energy Society. (Please share this issue with colleagues and encourage them to join as [Friends](#) for free.)

Quotes

From [Climatoonist](#)



- Bulletin Board -

Reach 135,000+ readers with your message.

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


- **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.
-

- Gratitude -

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

**WILSON
SONSINI**

Honeywell

 **Women's
Energy
Network™**




orrick



CLEARPATH



BHP



sunrun

Sigler

Schneider
 **Electric**

Contact Information

[The American Energy Society](#)

[AES LinkedIn Group](#)

[AES introductory video](#)

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

