

# ENERGY MATTERS

Soundbite summaries of the energy news you need to know

AN OFFICIAL PUBLICATION OF



AMERICAN ENERGY SOCIETY

## February 19, 2024

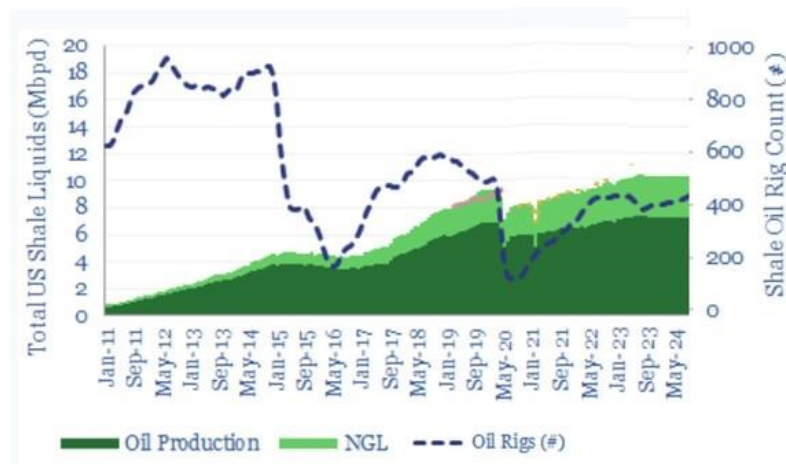
### - The Power Read -

- **Natural gas:** Spotlight on pipelines and the midstream.
- **Coal:** Global thermal coal markets are receding, but met-coal is growing.
- **Renewables:** Solar is growing rapidly in 2024.
- **Policy:** Conflicting policies, especially in the US and UK, lead to competing outcomes.

### - Fossil Fuels -

#### - Oil -

- **E&P and midstream innovations in unconventional shale plays have increased productivity substantially** (aka fewer rigs but more hydrocarbons). *Insert below:* A comparison of rig count vs O&G production rates, by basin (Permian, Bakken and Eagle Ford) as a function of total operating rigs, drilling productivity, completion rates, well productivity, and type curves.





## - Carbon capture and removal -

- It appears that the models for land-based CDR (CO2 removal) used by the IPCC overestimate the amount of emissions reduced. The current models do not account for land use change and societal needs, like food production, which means many CDR methods are not as effective as assumed. [AES Members](#) have access to the peer-reviewed summary.

---

## - No- / Low-Carbon and Renewable Energy -



- China's advantage in solar panel production stems from lower costs in materials, electricity, and labor, resulting in a 44% [price difference](#) compared to the US. The US lags significantly behind China in every stage of the solar manufacturing process, from polysilicon production to solar panel assembly. The primary building block for 97% of the world's solar panels is high-purity silicon, or polysilicon. Making polysilicon is the first step in the solar manufacturing process and is the

most energy- and capital-intensive because of the high temperatures and expensive equipment required. Until around 2005, polysilicon manufacturing was dominated by companies from the US, Europe and Japan. With China's huge expansion and investment into solar, that has flipped. In 2023, about 91% of polysilicon for solar panels was produced in China.

- Developers and power plant owners will add 62.8 gigawatts (GW) of new utility-scale electric-generating capacity in 2024; solar will account for the [largest share of new electricity-generating capacity](#) (+58%), followed by battery storage (+23%).

- In general, when a machine or technology (like a building or vehicle) shifts from fossil fuel to electricity, the total amount of energy consumed is cut in half and total emissions drops about 80% (for instance, the typical emissions break-even point for EVs is about 15,000 to 20,000 miles), but the total amount of electricity used will [increase](#) by 3x.

- The Chiefs vs. 49ers Super Bowl LVIII at Allegiant Stadium was powered [entirely](#) by renewable energy.

---

## - Energy Policy & Geopolitics -

### - Beltway buzz -



- There are currently three competing policies regarding the built environment, and they do not align. For example, to qualify for and comply with the Infrastructure Investment and Jobs Act (IIJA), which offers federal funding for building materials that have lower emissions, US manufacturers can [either](#) produce less construction materials or they can import supplies from other countries regardless of the emissions. Meanwhile, the IRA and Bipartisan Infrastructure

Laws are primarily focused on stimulating manufacturing and construction, with low emissions or not.

- Congress is about to restore the full value of the Sec. 174 R&D tax deduction. When it passes, the bill would restore immediate expensing for domestic R&D for tax years 2022 through 2025. The House of Representatives passed the bill with overwhelming bipartisan support, and now it moves to the Senate for approval (which is likely) and then the President will sign it into law.

- A number of states are [introducing bills](#) that use setbacks, restrictive covenants, and preexisting agriculture ordinances and zoning laws to raise costs on renewable energy projects or make them harder to build: Colorado, Iowa, Kansas, Tennessee, Maryland and Virginia (solar), Connecticut, Nebraska, Vermont, and Indiana (decibel limits). *Note:* most of these states are red (Republican) or purple (split party), but some red states remain [pro-business](#) regardless of the type of energy, like Texas, Florida, and Wyoming, as well as blue states like New York and Maine.

### - Global energy politics -

- **Europe:** High electricity prices in Europe have created [market conditions](#) in which countries are manufacturing less and importing more energy-intensive goods from abroad because it is now more expensive to produce products like steel, aluminum and concrete domestically.

- **Asia:** After the 2011 Fukushima meltdown, [Japan](#) suspended operations at all of its remaining 48 nuclear power reactors and relied almost exclusively on imported natural gas to replace the lost electricity generation. In 2015, Japan allowed its first nuclear power reactor to resume operations; as of December 2022, 11 gigawatts (GW) of **Japan's nuclear capacity has returned to service, which has reduced LNG imports, but only by a little.**

- **South America:** Over the last five years, Uruguay has [increased](#) the share of wind generated electricity from 1% of the national total to 34%.

- **Africa:** The [largest](#) producer of mined cobalt (a key component of lithium-ion batteries) is the Democratic Republic of Congo, which mines about two-thirds of the world's total supply. Nigeria-based Africa Finance Corp (AFC) just raised capital to build the first cobalt refinery on the continent; China currently refines 75% of the world's cobalt.

---

### - Climate, Sustainability, and Resiliency -



- Foods like chocolate, coffee, wine (especially champagne), avocados, oysters, and salmon are especially [sensitive](#) to changes in the climate and are straining to adapt.

- Five tropical cyclones in the past 9 years have hit wind speeds far above the category 5 threshold (greater than 157 miles or 253 kilometers per hour), which means there is a need for a new category 6 storm. AES Members and subscribing universities have access to the peer-reviewed research.

- Most Earth System models (computer-based simulations) **underestimate the effects of drought on stomatal conductance** (or, the way plants exchange carbon, water, and energy with the atmosphere). [AES Members](#) and subscribing universities have access to the peer-reviewed research.

- The Environmental Defense Fund and Google are developing [MethaneSat](#), a tool that measures **methane emissions**, a gas that is 80X more harmful to the ozone than CO2.

- **The three most frequently tested geoengineering techniques:**

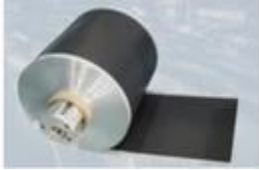
- Injecting chemicals in the ocean.
- Spraying saltwater into clouds.
- Injecting reflective particles into the sky.

- Save the date: [San Francisco Climate Week](#), April 21 – 27.

---

## - Research and Markets -

### Spotlight: next-gen battery storage



- The groundbreaking [dry electrode](#) method for manufacturing batteries is **today's hottest energy technology**. (See also the most recent issue of [Energy Today](#), about the energy-tech hype curve, and *Battery Spotlight*, a series of infographics published by AES ([Members](#) have access).

#### Benefits of dry electrodes:

- Potential lower manufacturing costs.
- Better performance.
- More sustainable solvent-free and lower-carbon footprint.

#### Challenges confronting the technology:

- Need for better electrode slurries.
- Need for rheologists. Rheology is the study of the flow and deformation of materials.
- Better solvents. Traditionally, solvents are used to combine everything into a slurry and make sure the mixtures are homogenous (aka well-mixed). The solvents used are transient, meaning they are used in the coating stage but ultimately dried and removed and not included in the final coating product.

#### Large auto and battery makers investing in dry electrode RD&D:

- PowerCo (Volkswagen's battery arm) - testing roller presses and powder coaters.
- Tesla acquired Maxwell - tech based on a PTFE binder.
- Vinfast/Toyota/TDK/ATL - joint venture
- LG Chem - stealth work but active.
- ACC (Automotive Cells Company) - recently posted a job description.

#### Dry electrode start-ups:

- AM Batteries (Massachusetts), backed by TDK Ventures.
- LiCAP (California), has a number of patents.
- Inition (Oxford, UK), testing a thicker dry electrode.
- Intecells (Michigan, USA), 3D printing electrode materials.

---

## - Electricity & Power -



- Although cryptocurrency mining started in the US about a decade ago, the activity began to [expand rapidly](#) in 2019. Annual electricity to mine cryptocurrencies **was projected to be about 0.6% of total electricity consumption in the US, but the true amount might be closer to 2.3% of the total.**

- Last year, NP15 batteries were able to earn between \$78.29/MWh and \$80.53 (April and August, respectively) of arbitrage in the day-ahead market. However, this winter natural gas prices are lower, hydropower in the West is at peak, and the Midwest is significantly warmer and sunnier, which means [NP15 batters](#) can only capture \$12.63/MWh to \$14.50/MWh in the day-ahead arbitrage markets.

- Last year, Mammoth Mountain in California had 397 inches of snow; at the same time this year, Mammoth has about 160 inches. Although comparing this year to the extremes of last year may be unfair, this year's low snow accumulation raises concerns about hydropower capacity, water management, and wildfires.

- Last year, 21% more heat pumps were sold in the US than natural gas furnaces, the [widest](#) gap on record.

- The National Association of Energy Service Companies (NAESCO) is hosting a [Federal Market Workshop on February 29](#) at the National Housing Center in Washington, DC. This one-day event brings together federal government officials, energy service companies, and suppliers to discuss energy efficiency and infrastructure in federal markets.

---

## - Universities in the Spotlight -

- The political environment's impact on midstream planning, a [free webinar](#) on April 2 at 2:00 pm CT, hosted by the Center for Midstream Management and Science at **Lamar University**.

- AES recommends: "[Producing Transportation Fuels, Electrical Power, and Chemicals in a Circular Bioeconomy](#)," *The Bridge* (National Academy of Engineering); 6.25.2023, pp. 41-45, by Tim Donohue, **University of Wisconsin, Madison**.

- University of Ottawa engineers and partners have **manufactured the first back-contact micrometric photovoltaic cells**. The cells, about the thickness of two strands of hair, have significant [advantages](#) over conventional solar technologies, like reducing electrode-induced shadowing by 95% and lowering energy production costs by up to three times. AES Members have access to the peer-reviewed research.

- The Alliance Clean Energy Accelerator at **Rice University** will be accepting [applications](#) for its Class 4 cohort on March 4

---

## - Quotes -

*If you are going to say it, why not overstate it?*

"Carbon capture technology is a complete falsehood."  
— Fortescue Metals Chairman

"As it sits right now, if countries can't get natural gas, they will definitely shift toward coal."  
— Ademiju Allen, senior analyst at Rystad Energy, on the impact of the Biden administration's decision to pause LNG



“I’m confident that the collective expertise and commitment of FERC will lead us to equitable and forward-thinking transmission solutions that will stand the test of time.”

— FERC Chairman Willie Phillips

---

## - Bulletin Board -

Reach 135,000+ readers with your message.

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

- Don't miss the [Bifrost Summit 2024](#) - Innovations for a Sustainable Future, March 4-8.
- **Orrick** has published its [2024 Offshore Wind Report](#). The report is an update on the current OSW market and trends in 20+ key jurisdictions with some forward looking analysis.
- **ClearPath** has excellent [primer resources](#) on Ag-Tech, CCUS, Water-Tech, Industrial Fuel...
- **Honeywell's Sustainable Building Technologies** (SBT) is hiring for a global [Senior Director Solutions Architect](#).
- **Ubiquitous Energy**, a leader in transparent solar technology, is [developing](#) energy generating windows and door products.
- **Sunrun**, a residential solar and battery storage installer in the US, has partnered with Ford to launch a new [home electric vehicle \(EV\) charger](#) 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](#).

Much thanks to our sponsors and partners:

**WILSON  
SONSINI**

**Honeywell**

 **Women's  
Energy  
Network™**



**CONSULATE GENERAL  
OF DENMARK**  
Silicon Valley

  
orrick

 **NORDIC  
INNOVATION  
HOUSE** SILICON VALLEY

CLEARPATH  FIRE2FISSION

**Schneider**  
Electric

 **ubiquitous**  
ENERGY

**BHP**

 **Dominion**  
Energy®

 **SAORADH™**  
ENTERPRISE  
PARTNERS

  
**nextcorps**

 **GEOHERMAL**  
**RISING** POWERING OUR  
RENEWABLE FUTURE.

---

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**