

# 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 23, 2023**

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## - The Power Read -

- **Fossil, coal:** Comparing Apple vs. the mining industry
- **Low-/no-carbon:** Transmission special report - US best practices for Eurasia.
- **Policy:** The end of the 2004 AJCA tax credit in 2021 has caused refined coal production in the US to drop to zero.
- **Markets:** Global financial markets may have slowed but climate-tech is surging.
- **Research:** Exxon's climate-warming projections in 1977 were extremely accurate.

## - News from the Society -

- **MIT Energy Conference (April 11 - 12, 2023)** has available a limited number of early-bird [tickets](#) that go on sale January 23, 2023.

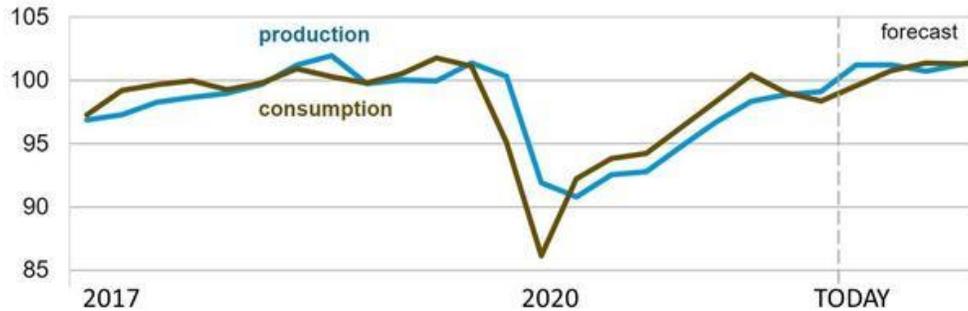
- **EnergyTech UP:** Sponsored by the DoE Office of Technology Transitions, the American-Made EnergyTech University Prize (**EnergyTech UP**) is a **collegiate competition** challenging multidisciplinary student teams to develop and present a business plan that leverages National Laboratory-developed or other high-potential energy technologies, including university-developed technologies or other technologies of interest to student competitors. Students win a share of \$370,000 in cash prizes.

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## - Fossil Fuels -

### - Oil -

- The short-term energy outlook (STEO) for **global consumption of liquid fuels (gasoline, diesel, jet fuel, etc.) will exceed 100 million barrels per day**, on average, in 2023 (for the first time since 2019), and then will continue to increase through 2023 and 2024. *Insert below:* production/consumption balance and projection, in million barrels per day.



### - Natural gas -

- **Natural gas prices will probably decrease in 2023**, in part because the Freeport LNG facility will restart very soon. On June 8, 2022, a rupture shut down Freeport LNG, which took 2 BCF per day of gas offline. However, since the gas had nowhere to go, storage inventories in the US southeast climbed about 320 BCF of volume.

### - Coal and mining -



- *An interesting comparison: **Apple vs. the mining industry.*** Most of Apple's products require critical minerals and metals that are mined. Apple's market capitalization alone – even after recent losses of nearly \$750 billion – is enough to buy the world's 50 most valuable mining companies, the next 50, and have enough left over to purchase three years of global copper mine production and all of the world's seaborne iron ore.

*Insert below:* Market value of the top-5 technology vs. top-5 mining companies.



## - Carbon capture and removal -

- **Top-5 operating carbon-capture and storage facilities** in the world, by million metric tons per year capacity. AES recommends the CCS interactive [map](#).

1. Shute Creek Gas Processing Plant, funded by Exxon (Lincoln County, Wyoming)
  2. Century Plant, funded by Occidental (Pecos County, Texas)
  3. Santos Pre-Salt Oil Basin, funded by Petrobras (Rio de Janeiro, Brazil - offshore)
  4. Gorgon CO2 Injection, funded by Chevron (Barrow Island, Western Australia)
  5. Great Plains Synfuels Plant funded by Dakota Gasification Co. (Beulah, North Dakota)
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## No- / Low-Carbon and Renewable Energy

- **Transmission**, an *AES special report*: There are thousands of new renewable energy projects proposed for Eastern Europe and Eurasia. Serbia, for example, has about 16,000 MW of wind and solar projects in queue. Each project requires an interconnection study to determine how to connect it to the transmission system operator's (TSO) network. **TSO studies are often conducted on a "first-come, first-served" basis, even for less advanced speculative projects**, which delays advanced projects and sidelines billions of investment dollars. To overcome a similar problem, PJM (the US independent system operator for the mid-Atlantic) recently abolished its FIFO system in order to spend more time on higher quality applications. TSO reviewers for Eastern Europe and Eurasia have begun drawing on [best practices](#) from PJM and other ISOs in North America to improve their queue management system and speed up their clean energy transition. *Meanwhile*, the LBNL has published a study on [rising](#) PJM interconnection costs.

- **Energy efficiency**: Energy efficiency technologies have reduced energy consumption in the US by an average of 16% each year for the last 40 years. AES Members have access to an energy efficiency impact [report](#).

- **EVs**: Forum Mobility, the electric-trucking-as-a-service startup, raised \$400M to build charging depots and make electric trucks available to freight haulers serving California's busiest ports. AES Members have access to the spotlight on [Forum Mobility](#) in April, 2022.



- **Hydropower I**: California and Oregon are [demolishing](#) four hydroelectric dams on the lower Klamath River, the largest dam removal project in the world.

- **Hydropower II**: Pumped storage (the "sleeping giant") has [support](#) from World Wildlife Fund, Union of Concerned Scientists, nine hydropower organizations....

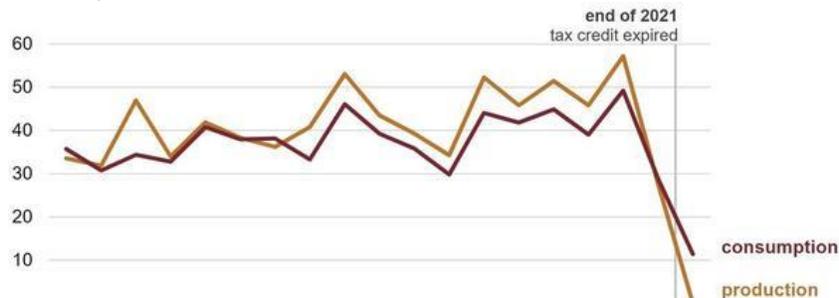
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## - Energy Policy & Geopolitics -

### - Beltway Buzz -

(The next Congressional session is January 24 thru February 2)

- The refined coal production tax [credit](#) (created by the American Jobs Creation [Act](#) of 2004) expired, which caused **refined coal production in the US to drop to nearly zero**. *Insert: US refined coal production and consumption, 2017 - 2022, in million short tons.*



- On its first energy action, the US House voted 331-97 to [ban the sale of oil from the Strategic Petroleum Reserve to China](#) or Chinese-influenced subsidiaries; Democrats support the Republican-led measure.

- The US Treasury announced that it will not enforce any embargo on Russian oil and that any country can buy any amount of Russian oil at any price. [But, no US banks, insurance, or maritime service companies will be involved](#). Among other countries, India is finding it difficult to find substitutes for Western insurance, finance and maritime services.

### - State Spotlight -

- In her first official action in office, Massachusetts Gov. Maura Healey (D) issued an [executive order](#) establishing the state's Office of Climate Innovation and Resiliency.

- Washington state will hold its first [cap-and-invest](#) auction in February.

- It would be an exaggeration to say that Georgia governor Brian Kemp is concerned about climate change, but the Republican [supports](#) the energy transition.

### - Global -



- **Europe:** Police in riot gear began evicting climate activists from a condemned village in western **Germany** so that it can be demolished for the [expansion](#) of a coal mine. One of the detained protestors was Greta Thunberg.

- **C/S America:** The oil industry in **Venezuela** has collapsed and may never recover. In 1998, production peaked at 3.1 million barrels of oil per day, but today the country produces about 693,000 bpd. To rebuild, the industry will need hundreds of billions of dollars, a surge of skilled labor, and crucial equipment upgrades. Making the challenge harder, 75% of Venezuela's reserves are a very sour extra-heavy grade, a dirty form of petroleum that does not flow when extracted. Energy supermajors TotalEnergies and Equinor have exited Venezuela, but President Biden [approved](#) Chevron's [request](#) to resume drilling.

- **Africa:** KoBold Metals, a US exploration company that uses artificial intelligence and machine learning to identify battery metal deposits, is being used at the [Mingomba mine](#) in **Zambia**. (KoBold's investors

include Gates, Bezos, Michael Bloomberg, Jack Ma, and Richard Branson.) It is not clear if Zambia will benefit. The copper mining industry is one of Zambia's biggest sources of revenue (42% of all government revenue), yet more than half of the population earns about \$1.90 USD a day.

- **Asia:** Prime Minister Narendra Modi's government has publicly stated three primary goals:

- 1. commit to a green energy transition
- 2. increase abundant, affordable power and electricity.
- 3. economic growth (current GDP is \$3.2T, with a target of \$5T by 2030).
- *Note:* **India** coal subsidies are nine times [more](#) than its clean energy subsidies.

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## - Climate and Sustainability -

- *Special from AES editors:* **2023 could be the peak year for global emissions**, though that will depend on 4 primary signals...

1. How quickly can [new public money](#) (especially in the US, China and Europe) get distributed in support of rapid deployment of low-emission solutions?
2. Will EVs continue to replace ICEs, and will [heat pumps](#) replace oil or gas furnaces in buildings and homes?
3. Will [renewables](#) become an equal participant in the tug-of-war between coal and natural gas.
4. The world is gradually shifting toward lower emissions. Though unwanted, a [slowing economy](#)—especially in China, the US, and Europe, which rank as the world's first, second and fourth largest emitters, respectively—would allow the broader energy transition to catch up to the world's voracious demand for more energy.

- **Anaerobic "digesters" are the [best way](#) to prevent methane emissions** because they cut gas in organic waste; however, there is no known way to remove methane once emitted.

- **The US experienced 18 weather and climate [disasters](#) in 2022** (tied with 2011 and 2017 for the most extreme events in a single year).

- Extinction Rebellion climate activists have glued themselves to the roof of subway cars, broken windows at Barclays headquarters, and sprayed graffiti on the offices of news outlets.

But **ER has pledged to halt public acts of disruption** as its New Year's resolution. On the other hand, [Just Stop Oil](#) said they will continue with disruptive practices.

- It turns out, **Exxon's climate-warming projections in 1977 had an average "skill score" of 66% to 78%**, which is significantly more accurate than the "skill score" projections by NASA and leading environmental scientists like Jim Hansen. AES Members have access to a [peer-reviewed study](#) of Exxon's climate models.

- There is no identifiable relationship between urban density, nature, and sustainability. In other words, contrary to conventional wisdom, **cities are not necessarily good for climate health**. AES [Members](#) have access to the peer reviewed research.

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## - Research and Markets -

- Global financial markets slowed down considerably in 2022, but not for climate-tech. **The total number of climate-tech deals in 2022 increased 40% compared with 2021**, which was also a very strong year for climate tech. (However, total amount of funding for climate-tech in 2022 decreased 3%.)

- According to AES data, **the hottest (aka "oversaturated") climate-tech sectors** are, in order: alternative proteins, EV charging, batteries, and emissions & sustainability reporting.

- **Russia's invasion of Ukraine caused a 10% increase in global commodity prices** (livestock, farming/agriculture, metals, etc.).

- **There is just one operating lithium plant in the US** – the [Silver Peak facility](#) on the western edge of Nevada. Industries like EV producers (Ford, etc.) are desperate. As a result, the US DoE agreed to a [conditional loan](#) of up to \$700 million for Australian lithium company Ioneer to develop the Rhyolite Ridge Lithium-Boron Project in Esmeralda County, Nevada. When fully operational, the site will produce enough lithium for 400,000 electric vehicles.

- Related, **Climeworks AG, a Swiss company that operates the largest direct air capture (DAC) plant in the world, is expanding into the US** to take advantage of funds from the Inflation Reduction Act.

- The reaction of aluminum and gallium with water has been known since the 1970s, and videos of it are easy to find online. But a new study at UC Santa Cruz shows that an easily produced composite of gallium and aluminum creates aluminum nanoparticles that react rapidly with water at room temperature to yield large amounts of hydrogen. "We don't need any energy input, and it bubbles hydrogen like crazy. I've never seen anything like it." - UCSC Chemistry Professor Scott Oliver. **AES Members and Friends have access to the [peer reviewed research](#).**

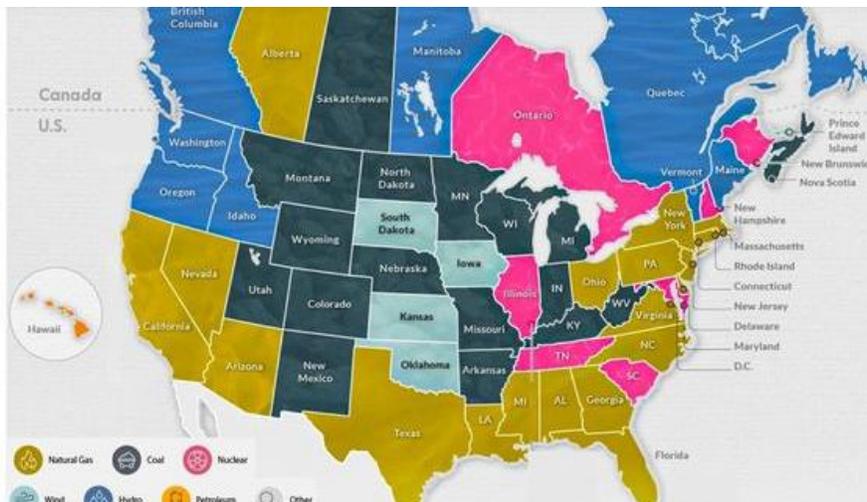
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## - Electricity & Power -

- **Insert: the primary sources of electricity, by states and provinces in North America.**

A few interesting observations:

- Only Hawaii relies entirely on oil to generate electricity.
- Washington has the most hydroelectric generating capacity in the US, but 60% of Canada relies on hydro.
- Illinois is the top nuclear-energy producer.



- "Electrify everything" means that in the US, about 65% of all homes will need [rewiring](#) because most houses aren't wired to handle the load from electric heating, cooking, dryers, along with solar panels and vehicle chargers. (Note: there are about 80,000 new unfilled electrician jobs each year.)

- In the US, it costs about 4 times [more](#) to heat a building than cool it. In other words, **32% of all energy consumed by commercial buildings is used for heating.**

- AES recommends [the 2022 Standard Scenarios](#) by NREL, a study of 70 possible power system futures in the US.

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### - On the move... -



- Legendary **Barbara Burger**, a "recent graduate" from Chevron where she ended her time with the company as the Vice President of Innovation and President of Chevron Technology Ventures (December 2021), and is on to her next chapter - no doubt it will involve big challenges in the energy transition, equity, and access to education.

- **Dr. Evelyn N. Wang** is the [new director](#) of ARPA-e.

- Longtime **Southern Company CEO Tom Fanning will step down as CEO**, effective March 31, 2023. (Thank you Mr. Fanning for your contribution to [Energy Today](#).)

- **Wilson Sonsini** opened an office in Boston: One Boston Place, 201 Washington St. #2000.

- **Cathy McMorris Rodgers** (R-WA), Chair of the House Energy and Commerce Committee (the oldest committee in the US House of Representatives) has selected the nine new members to serve on the House Energy and Commerce Committee. The members are:

Randy Weber (R-TX)  
Rick Allen (R-GA)  
Troy Balderson (R-OH)  
Russ Fulcher (R-ID)

August Pfluger (R-TX)  
Diana Harshbarger (R-TN)  
Mariannette Miller-Meeke (R-IA)  
Kat Cammack (R-FL)  
Jay Obernolte (R-CA)

*Committee Democrats include:*  
Frank Pallone (Ranking Member)  
Anna Eshoo (D-CA)

Diana DeGette (D-CO)  
Doris Matsui (D-CA)  
John Sarbanes (D-MA)

### - University spotlight -

- AES recommends the [recorded sessions](#) from the Satellite Data for Energy Analysis and Policy Conference hosted by **UW-Madison Energy Analysis and Policy** (EAP).

- **University of Iowa** Press has just published [Tending Iowa's Land: Pathways to a Sustainable Future](#), edited by Cornelia Mutel.

- **NC State** and **University of South Carolina** are collaborating with the IBM Quantum team to study how [quantum computing](#) will help energy, finance, chemistry, materials science, optimization and machine learning.

- **Northeastern University** Center for Renewable Energy Technology is developing [fuel cells](#) for advanced rechargeable batteries.

- AES applauds the Methods for Systems Analysis Laboratory at **Villanova** and the NSF Industry/University Cooperative Research Center on Energy-Smart Electronic Systems ([ES2](#)), in partnership with **Georgia Tech**, **Binghamton**, **University of Texas Arlington**, and **Vishwakarma Institute of Technology**.

## - Quotes -

[The culture wars now involve natural gas...](#)

Responding to an RMI peer-reviewed [study](#) that 12.7% of cases of childhood asthma in the US could be due to gas stoves in the home...

"We need to be talking about regulating gas stoves, whether that's drastically improving emissions or banning gas stoves entirely. And I think we ought to keep that possibility of a ban in mind, because it's a powerful tool in our tool belt and it's a real possibility here."

- US Consumer Product Safety Commissioner Richard Trumka

"The federal government has no business telling American families how to cook their dinner."

- Senator Joe Manchin (D-WV)

## - Bulletin Board -

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- **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 -

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