

# ENERGY MATTERS

Soundbite summaries of the energy news you need to know

AN OFFICIAL PUBLICATION OF



AMERICAN ENERGY SOCIETY

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## - The Power Read -

- **Policy I:** President Biden signed the Inflation Reduction Act (IRA) into law.
- **Policy II:** The IRA provides \$369B in incentives for climate and energy activities.
- **Policy III:** Don't forget the \$3.5B from the Bipartisan Infrastructure Law for DAC hubs.
- **Policy IV:** Poli-Sci 101 - When food and/or energy prices spike, there's a 75% chance that country will have a change in government.
- **Policy V:** Texas O&G companies have increased exports to Western Europe by 25%.




## - News from the Society -

- *Sneak peek:* AES will soon publish the **Hydrogen SME Watch List**, a global directory of thought leaders shaping the next energy-tech revolution. [Contact us](#) for more information.

## - Fossil Fuels -

### - Oil -

- Global demand for oil (and gas) is substantial right now. Production metrics are very present (aka "market") oriented, whereas "proven reserves" are future oriented (aka "potential"). **The top-5 regions in the world with the greatest proven reserves:**

Country	PROVEN RESERVES (total barrels)	Daily Production (barrels/day)	Notes
1. Venezuela 	303 billion	2 million	Perpetual economic/political freefall.
2. Saudi Arabia 	266 billion	12 million	15.7% of the world's total reserves.
3. Canada 	169 billion	5 million	10% of the world's total reserves.
4. Iran 	157 billion	5 million	Sanctions cap total exports.
5. Iraq 	149 billion	4.5 million	Most dependent upon oil revenue.

The rest: Russia (6); Kuwait (7); UAE (8); United States (9); Libya and Nigeria (10-tie)

## - Natural gas -

- The [Qatari North Field](#) is currently one of the most important energy regions in the world. It produces 20% of all global LNG (or about 4% of world energy) with an additional 50MT/year of LNG in development.

## - Coal and Mining-



- Spotlight on [mining of elements and metals essential to an energy transition](#), from rare earths like [yttrium](#) to common minerals like [copper](#):

- There are 10,586 active mines in the world.
- There are 4,790 mining projects currently under construction (or +8% Y/Y).
- The largest mine is La Escondida, a copper mine in the Atacama Desert in Northern Chile; however, current global demand for copper could sustain 20 additional mines the size of La Escondida. (Note: **copper is arguably the most essential metal for an energy transition**; see [Energy Today](#) for an article on the importance of copper.)

## - Carbon Capture -

- Though the IRA just passed, it's the Bipartisan Infrastructure Law that authorizes the US DoE to spend **\$3.5B to build four direct air capture hubs** across the US. Once deployed, the Regional DAC Hubs [program](#) (the official title) will remove about four million tons of CO<sub>2</sub> every year, 400 times the world's current capacity. AES Members have access to a [white paper](#) on the Regional DAC Hubs program.

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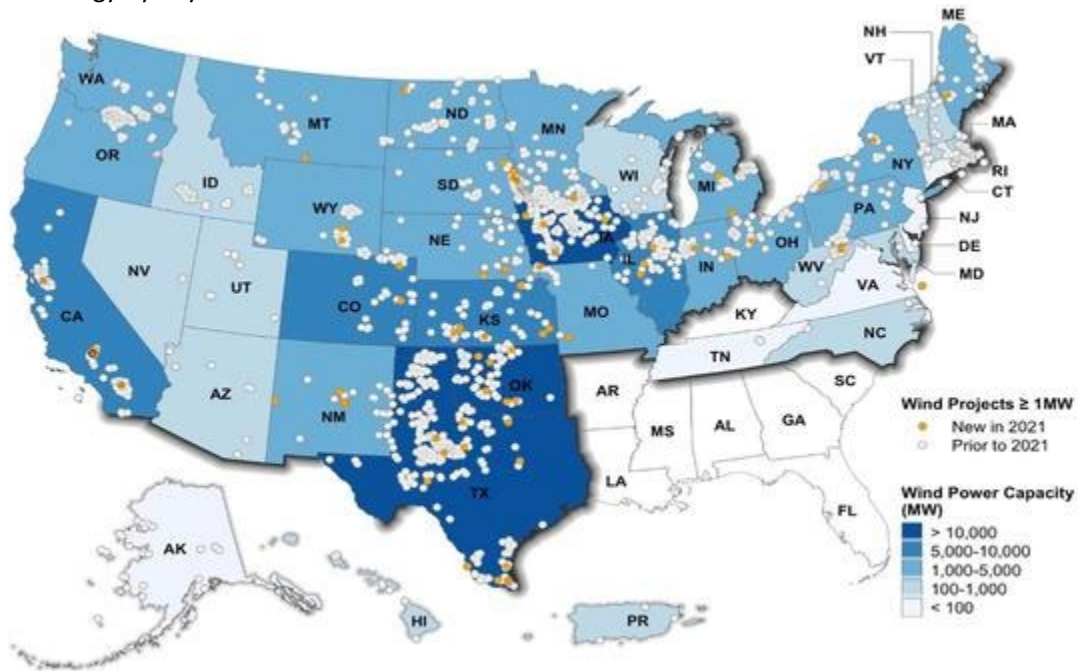
## No- / Low-Carbon and Renewable Energy

- Developers of utility-scale solar photovoltaics (PV) [planned to install](#) 17.8 gigawatts of capacity in 2022; however, **in the first six months of this year, only 4.2 GW of that capacity came online**, which means the PV industry probably will not reach its goals this year. The primary reasons for the lack of production: the Auxin Solar [tariff](#) controversy and the [broken](#) global supply chain.

- **The market for small modular nuclear reactors continues to grow:** The Tennessee Valley Authority signed for two SMRs; and, Dow Chemical is partnering with X-Energy to develop process heat generation SMR technologies. (Note: the previous issue of [Energy Matters](#) spotlighted SMRs - Members have access to the archives as well as other benefits, like the [Energy Today](#) special issue about the Tennessee Valley Authority.)

- **Spotlight on [wind energy](#) in the US** (*insert - map of US wind farms*):

- Wind energy generates 9% of the total US electricity supply;
- Wind power capacity grew in 2021 with 13.4 GW of new additions (or about 32% of all newly added generation capacity);
- About 250 GW of wind-generated energy is unused and needs transmission interconnections;
- The average levelized cost of wind energy is \$32/MWh, which is about the same cost to produce energy by any other source.



- **The 10 states that received the most US DoE [funding/grants](#) for energy efficiency and renewable energy (in 2020):**

- |                                 |                                |
|---------------------------------|--------------------------------|
| 1. California (\$160,400,000)   | 6. Texas (\$39,900,000)        |
| 2. New York (\$82,100,000)      | 7. Pennsylvania (\$39,600,000) |
| 3. Illinois (\$50,200,000)      | 8. Ohio (\$35,900,000)         |
| 4. Michigan (\$47,000,000)      | 9. Colorado (\$32,400,000)     |
| 5. Massachusetts (\$43,100,000) | 10. Minnesota (\$26,300,000)   |

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## - Energy Policy & Geopolitics -

### - [Spotlight on the Inflation Reduction Act](#) -

- **Summary:** The US House of Representatives passed the Senate's version of the **Inflation Reduction Act of 2022** on a vote of 220-207 without any changes to the text, and President Biden signed the bill into law.

- **A [sample](#) of climate and energy provisions in the [Inflation Reduction Act](#) of 2022:**

- \$9B for consumer-/home-energy rebates;
- \$7,500 tax credit for consumers buying new electric vehicles (total car sales capped);
- \$4,000 tax credit for consumers buying used electric vehicles (total car sales capped);
- \$30B to support manufacturing of solar panels, wind turbines, etc., in the US;
- \$10B tax credit to build facilities that make EVs, wind turbines, solar panels, etc.;
- 10-year extension of tax credits for wind and solar;

- \$30B in grants and loans to support transitions to clean energy (broadly conceived);
- \$6B in incentives to reduce emissions from chemical, steel, and cement plants;
- \$3B in climate justice grants to address disproportionate risks to pollution;
- \$27B to support deployment of technology that reduces emissions, with special emphasis on disadvantaged communities;
- \$20B to support climate-smart agriculture practices;
- \$1B to expand manufacturing of clean, heavy-duty vehicles;
- \$5B to protect healthy, fire-resilient forests.

**Note:** Wilson Sonsini has published a new and comprehensive Clean Energy & Climate Solutions Federal Funding [Database](#) as well as a [white paper](#), Federal Funding Opportunities for Scaling Climate Solutions.

### - Beltway Buzz -

- **The IRA authorizes the federal government to spend approximately \$369B;** however, accountants at the US OMB estimate that tax credits and incentives in the bill could incentivize between \$750B (low) to \$1.2T (high) in capital investments and consumer spending.

- Although no Republicans voted for the IRA, [AES expert members](#) have identified **a number of Republicans in the House and Senate who privately supported the legislation.** However, polls show that Republicans have stronger popular support in the upcoming off-year November election if they oppose certain provisions in the bill. "The historical likelihood that the President's party will lose the House is precisely what drove the majority's urgency to act in both instances. Democrats realized this was their last best chance to pass whatever policies they could find consensus on, certainly during the Biden administration, perhaps for the next decade. You win elections to achieve power, and while in power you do what you can, while you can." (courtesy of [Liam Donovan](#), Principal at Bracewell).

- Related, in the last 60 years, **whenever food and/or energy prices spike (or there is a shortage), there is probably a 75% chance that a country will also have a change in government,** whether in the form of a new party taking power or a new government by revolution.

### - Meanwhile ... -

- **Boston announced that it will ban fossil fuels from new building projects and large-scale renovations** — heating, cooling, and cooking must be electric. The battle between "natural gas" vs. "electrify everything" is [heating up](#) ... each provides roughly 40 percent of the US market.

- **California announced its pathway to achieve ambitious offshore wind goals:**

- Step 1: Governor authorized opening of the West Coast for development ([completed](#)).
- Step 2: The US Bureau of Ocean Energy Management published a sale notice for offshore wind leases ([completed](#)).
- Step 3: California Energy Commission (CEC) published a report on offshore wind goals ([completed](#)).
- Step 4: The CEC is writing a strategic plan ([pending](#)).
- *Note:* The entire process is an official requirement of [Assembly Bill 525](#).

- Russia's invasion of Ukraine scrambled the world's energy markets. In response, **Texas** oil and gas companies accepted the "call to arms" and increased oil and gas exports to Western Europe by **25%.** **What happens next?** Consider, last winter Texas struggled with an energy crisis, while Europe will no doubt experience similar conditions this winter. *What if Texas also has severe winter storms again?* The next issue of *Energy Today* addresses this dilemma.

- Russia is waging a two-front war in Ukraine, and it appears that "energy as a weapon" is more effective than its military. For instance, Russia cut the Nord Stream flow to as little as 20% of normal levels, sending prices up seven to eight times higher for all European customers (or the equivalent of \$380/barrel of oil). The effectiveness of "energy as a weapon" will depend on the one thing that neither Putin nor European leaders can control: the severity and length of the winter. (Contributions in part by AES expert Members [Dan Yergin](#) and Michael Stoppard).

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## - Climate and Sustainability -

- A comparison of total global vs. US emissions, as a percentage by economic sector:

<u>Economic sector</u>	<u>Global</u>	<u>US</u>
Electricity and heat/AC production	25%	25%
Agriculture, forestry and other land uses	24%	10%
Industry	21%	23%
Transportation	14%	29%
Buildings	13%	13%

- **Top-5 most severe weather events in the US** between 1980 - present, as measured by total number of utility poles damaged (courtesy of [Energy Futures Initiative](#)):

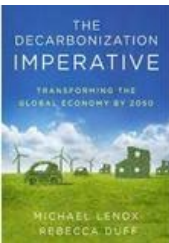
1. Ida (2021): 30,000+ poles
2. Katrina (2005): 17,000+ poles
3. Laura (2020): 14,000+ poles
4. Rita (2005): 11,000+ poles
5. Gustav (2008): 11,000+ poles

- It appears that **rainwater and snow anywhere in the world often contain traces of PFAS** per- and poly-fluoroalkyl substances (aka 'forever chemicals' that don't decompose).



- **The next UN climate chief (or, the UNFCC Executive Secretary) will be [Simon Stiell](#)**, the environment minister of Grenada (a surprise appointment).

- **For the first time, scientists have named a heat wave; the first is called "[Zoe](#)."**



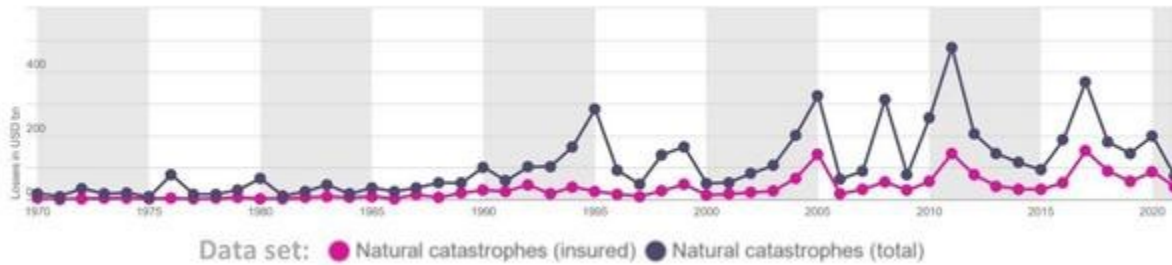
- Spotlight on [The Decarbonizing Imperative](#), by Michael Lennox and Rebecca Duff. The two economists look at the transformation of the global economy.

- **The Tennessee Valley Authority has been granted a 10-year permit to truck contaminated coal ash** through south Memphis and [dump](#) it in a landfill.

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## - Research and Markets -

- **A comparison of payouts for damages caused by severe weather, insurance vs. total.** *Note:* a significant proportion of global post-event recovery funding comes from a combination of insurance, government, and NGO payouts. (Sources: Swiss RE and [Aeolus](#).)



- Indian companies are [exchanging](#) US dollars for Asian currencies so that they can buy Russian oil, gas, and coal imports.

- Washington (state) has the highest percentage of US households preparing at least one [hot meal](#) each day (Maine is second); Louisiana prepares the fewest hot meals each day (Alabama is second-least).

- [Navigator Ventures](#) is developing what will be the largest CO2 project in the world.

- The deep ocean seabed [contains](#) two types of rare earth elements: polymetallic nodules (which typically contain manganese, nickel, copper, cobalt and smaller amounts of other REMs) and sea-floor hydrothermal vents (which pump out REMs dissolved in hot fluids). *Note:* [Oceaneering](#) manufactures mobile robotics for use in the deep seabed.

- About 1/4th of all public EV chargers in the US are [broken](#) or don't work.

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## - Electricity & Power -

- About [22% of electricity](#) in the US is generated from renewable sources (such as hydropower, wind, and solar) and is on pace to reach 24% in 2023. *Note:* renewables accounted for 20% of electricity generation both in 2020 and in 2021.

- Related, the electric utility industry will spend about \$170-\$180 billion on [renewable energy](#) capital projects in 2022.

- About 50% of grid congestion (aka "[disruptions](#)") in the US happens during only 5% of the hours in a day; most of these disruptions are not caused by weather-related events (like a polar vortex, severe storms, etc.).

- In forty US states, 80%+ of households have air conditioning; in thirty-two states, 90%+ have air conditioning; and in thirteen states, 95%+ have air conditioning. Overall, [90% of all US households have air conditioning](#).

- As Russia reduces its gas supply to Europe, [countries](#) are imposing air conditioning (and heating) restrictions and climate guerillas are shutting off storefront lights.

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## - Universities in the Spotlight -

- **Oxford Institute for Energy Studies'** new publication [Oil Market Volatility](#) assesses bullish and bearish narratives.
- Researchers at the **University of New South Wales** have developed a "[night-time solar](#)" technology that can deliver power in the dark.
- **North Carolina A&T** was awarded a \$23.7 million grant for clean energy workforce training as part of the EDA's [Good Jobs Challenge](#).
- The [CAES Lab](#) at **Boise State** is doing atomic microscopy of radioactive materials.
- **UNC Charlotte** is part of the [NREL](#) program that is helping 12 new remote and island communities join the journey to energy resilience.
- SEI at **Georgia Tech** is accepting nominations for the James G. Campbell Fellowship that supports graduate students studying renewable energy. For more information, send an email to: [comments@energy.gatech.edu](mailto:comments@energy.gatech.edu).
- **George Washington University** [SustainableGW](#) is an interdisciplinary initiative that brings together contributions from 11 different schools.
- The Wagner Institute for Sustainable Energy Research (aka "[WISER](#)") at **IIT** focuses on building a sustainable electrical grid, energy integration, and urban development.
- The Center for Midstream Management and Science at **Lamar University** has awarded ten research grants that will provide [seed capital](#) to support the transfer of research to the midstream industry.
- Researchers at **UCSB** have developed a [roadmap](#) for South Africa to meet its low-/no-carbon commitments. (South Africa has a population of 315 million people and uses about the same amount of electricity as California ... which has 1/10th its population.)

## - Quotes -

[With friends like these who needs enemies?](#)

"The biggest political malpractice over the last 30 years was buying into the Econ 101 notion that government shouldn't pick technology."

- Jason Grumet, founder and president of the Bipartisan Policy Center, criticizing the IRA for providing investment incentives rather than picking specific technologies to support

"I am not going to be steamrolled into a bunch of fossil fuel giveaways just because Manchin cut a deal in a closed room with Chuck Schumer. He doesn't get to run the show...."

- Rep. Jared Huffman (D-CA), on vowing to fight the IRA that his party passed by opposing all requests for federal permits

"Some of the provisions [in the IRA] will affect energy independence, increase gas prices, and hurt job opportunities."

- Henry Cuellar (D-TX), Member of the US House of Representatives

"The level of investment you're getting from this bill is not adequate."

- Julian Brave NoiseCat, a climate and Indigenous advocate

## - Bulletin Board -

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

- **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.
- Andersen Corporation, manufacturer of windows and doors, and **Ubiquitous Energy**, a leader in transparent solar technology, have entered into an [agreement](#) to jointly develop energy generating window and door products.
- **Orrick** has a recorded [webinar](#) on the Inflation Reduction Act, with emphasis on hydrogen.
- **Drone Deploy** will be attending the RE+ Solar Power International [Conference](#) in Anaheim, California, on September 19.
- **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.
- If you have [data](#) but not the talent or staff to make it valuable, please consider the **proSkale** platform— it helps organizations manage and invest their data ... like cash.

## - In case you missed it -



[Energy Today](#) "You Say You Want a Revolution?"



## - Gratitude -

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