

# ENERGY MATTERS

Soundbite summaries of the energy news you need to know

AN OFFICIAL PUBLICATION OF



AMERICAN ENERGY SOCIETY

## October 9, 2023

### 10 things to know about the conflict in the Middle East

1. **First strike:** On Saturday, October 7, Hamas launched a surprise attack into southern Israel, which has claimed the lives of about 700 Israelis.
  2. **Alliances:** The next day, October 8, Lebanon's Iranian-backed Hezbollah militia continued the attack, firing dozens of missiles into Israeli positions.
  3. **Response:** That evening, the Israel Defense Forces began retaliatory strikes against Hamas in the Gaza Strip and also struck back against Hezbollah positions in south Lebanon.
  4. **The next conflict:** Israel is signaling that it will soon launch a ground invasion throughout Palestine and especially the Gaza Strip.
  5. **Behind the scenes:** Iran and its elite Islamic Revolutionary Guard Corps have spent decades arming and funding Hezbollah, Palestinian and Syrian militias. Israel may be facing a three- or four-front war with Tehran's regional allies including but not limited to: Hamas from the Gaza Strip; Hezbollah from south Lebanon and Syria's border with Israel; and Palestinian militants, such as Islamic Jihad, operating out of the Israeli-occupied West Bank.
  6. **Why now:** No clear cause has been identified. However, Palestinian militant groups and Iran do not like recent negotiations between Israel, Saudi Arabia, and the US. Normalized diplomatic relations between these three historic foes would dramatically shift geopolitical power in favor of Saudi Arabia and Israel.
  7. **Previous armed conflict:** In 2006, Israel and Hezbollah (the Lebanese Shiite faction) fought a brutal war.
  8. **The US response:** Ongoing political chaos slowed America's response to the Israel attacks. The US is boosting aid to Israel, but resources are strained due to commitments it has made to Ukraine in its war with Russia.
  9. **Global consequences:** Several countries, including the US, Britain, Nepal, Thailand, and France, confirmed citizens missing or dead in the assault, and oil prices have increased more than 5%, driven by fears of Middle East instability. However, some inside the Kremlin are celebrating the conflict because it will distract the West from Russia's conflict in Ukraine.
  10. **Energy geopolitics:** It will be interesting to see how this armed conflict will affect geopolitical relationships between and energy markets within China, Russia, and the core Shia Crescent (Lebanon, Jordan, Syria, Iraq, and Yemen).
- **Meanwhile ...** a 6.3 earthquake has devastated Herat, Afghanistan; the Taliban is appealing for help.

## Replay - the Power Read

- **Fossil:** 75% of 1/5th of the total global supply of oil comes from 5 US states.
- **Low-carbon:** SMRs are cheaper to build than utility-nuclear, even on a \$/kW basis.
- **Policy:** Any global energy transition will be shaped by 1.4 billion people.
- **Climate:** Natural atmospheric oxidation (aka "hydroxyl") can't offset emissions.

## News from the Society



**AES special report: [The State of OSW on the US West Coast](#).** Although offshore wind along the US West Coast has never registered anything more than a breeze, there are signs that the winds of change are fast approaching. **Members receive this new report for free.** [Contact us](#) if you are an AES Member and need help downloading the report.

## Fossil Fuels

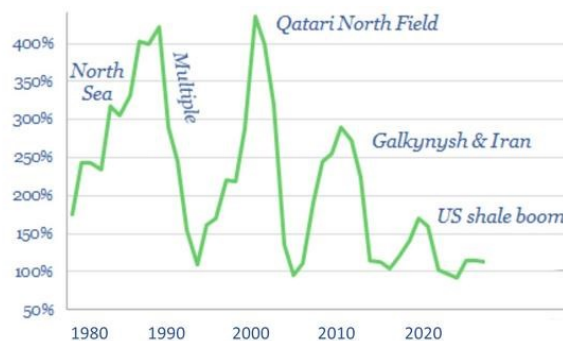
### - Oil -

- **Since 2018, the US has been the world's top oil producer**, currently at about 18 mb/d or 1/5th of the total global supply, and 75% of that total comes from five states: Texas, New Mexico, North Dakota, Alaska, and Colorado. (Note: US petroleum exports continue to set [records](#).)

Rank	Country	Total, in mb/d	% of world supply
1	US	17.77	19%
2	Saudi Arabia	12.13	13%
3	Russia	11.21	12%
4	Canada	5.76	6%
5	Iraq	4.52	5%

### - Natural gas -

- **Global gas production doubled from 1990 - 2020.** *Insert:* largest gas producing reserves/regions, by replacement reserve ratio (y) and year (x):



## - Coal and Mining -

### - Current market demand ([shortage](#)) of critical minerals:

- Lithium: Between 13 < X 42 above current supply
- Graphite: Between 8 < X < 25 more
- Cobalt: 6 < X < 21
- Nickel: 6 < X < 19
- Manganese: 3 < X < 8

## - Carbon/Carbon Capture -

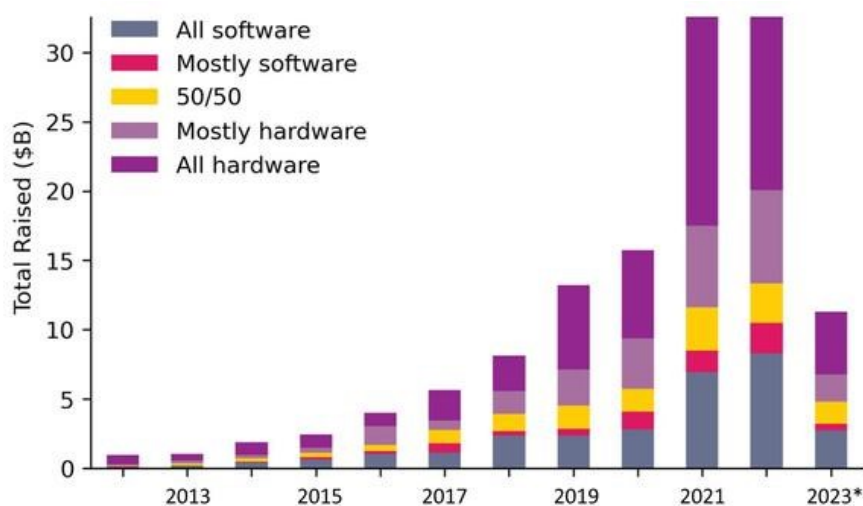
- In terms of permanently removing carbon from the air, biochar is the most effective method, especially in agriculture. (Note: biochar is a jet-black substance made by roasting plant matter, such as wood, in an oxygen-deprived environment.) AES recommends the carbon removal data source and tracker, [cdr.fyi](#).

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## No- / Low- Carbon and Renewable Energy

- Special report, [comparing the cost of construction, utility-scale nuclear reactors vs. small modular reactors on a dollar per kilowatt basis](#): Even though capital costs for small modular reactors (SMR) are usually higher than large utility-scale nuclear reactors due to the loss of economies of scale, overall construction costs are usually lower due to shorter project durations and lower interest rates, which leads to lower overall total project costs.

- There is a long-standing **debate about whether hardware- or software-based climate technologies are better candidates for venture capital funding**. [Insert](#): a comparison of total venture investments, by software vs. hardware. (Conclusion: hardware > software.)



- 12 climate-tech companies to [watch](#):

Geothermal: [Fervo Energy](#)

Renewables: Ørsted / ReNew (tie)

Steel: [H2 Green Steel](#)

Fusion: [Commonwealth Fusion Systems](#)

Nuclear: [NuScale](#)

EVs: BYD

Batteries: GEM

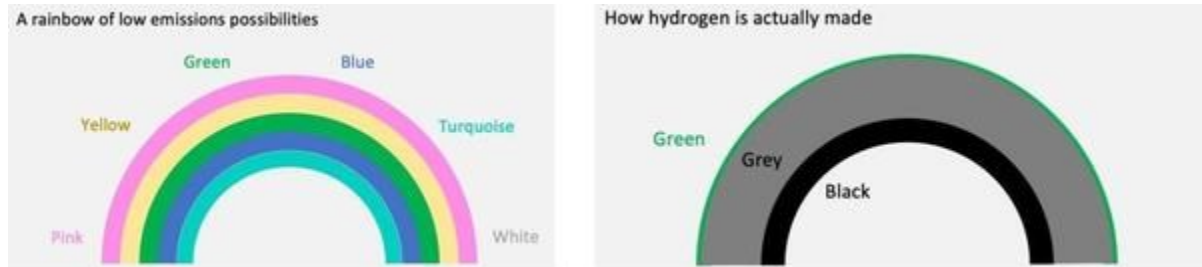
Food/Ag: [NotCo](#)

Chemicals: [Twelve](#)

Storage: [Form Energy](#)

CCUS: [Climeworks](#)

- The hydrogen market, a [comparison](#) of future projections (*left*) vs. today's reality (*right*):



## - Energy Policy & Geopolitics -

### - Beltway Buzz -

- Rep. Kevin McCarthy (R-CA, 20th) is no longer Speaker of the US House of Representatives. **His removal raises questions about the future of bipartisan energy initiatives**, even those few that seemed viable, like permitting, which McCarthy supported (One potential successor, Rep. Garret Graves of Louisiana, also supports the issue).

- **The US Supreme Court will soon set [Loper Bright Enterprises v. Raimondo](#) for oral arguments.** At issue is a National Oceanic and Atmospheric Administration (NOAA) rule that requires Atlantic herring vessels to pay for and carry federal monitors on board to collect fishery management data. The Court will limit its consideration of Loper to one issue: whether to [overturn](#) the [Chevron doctrine](#) which grants federal agencies the authority to interpret a regulatory statute that they must also enforce. AES Members have access to the Energy Today issues, *Oyez! Oyez!* The Four Most Important Energy SCOTUS Cases of [2023](#), [2022](#), and [2021](#).

- On the one hand, **the Biden administration will hold no offshore oil and gas lease sales next year**; on the other hand, the Administration has determined that there will be 3 lease sales in 2025. (Note: since 1992, there are usually around 11 lease sales each year.)

- The California legislature approved [SB 253](#), a bill that requires any business with annual revenues of \$1 billion or more that does business within the state to report all of its greenhouse gas emissions (Scope 3), not just those directly attributed to its operations (Scope 1 and 2).

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

## - Global Spotlight -

- *Trend-spotting special: A global energy transition will be shaped by four groupings of approximately 1.4 billion people: China, India, Africa, and Southeast Asia* (excluding China and India). People from these four regions currently consume a fraction of the energy used by the fully economically developed world. These 1.4 billion people are at different stages of development:

- **China:** nearing the end of its 20-years of massive economic growth and will now work through growing pains.
- **India:** Growth momentum with substantial demand for energy; however, India's path of steady growth will be different from China, with less emphasis on energy-intensive industry, exports, and property development.
- **Southeast Asia** (excluding China and India): some countries are nearly developed, and some more closely resemble the early stages of development in India.
- **Africa:** Nearly all 54 countries in pan-Africa are in a pre-growth economic stage of development and need to break free from western and Chinese influence. There are many uncertainties in this region; however, one thing is undeniably clear -- Africa is resource-rich but cash-poor and will have to use its competitive advantages rather than trade them away, even if when the west and China object.

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## - Climate and Sustainability -

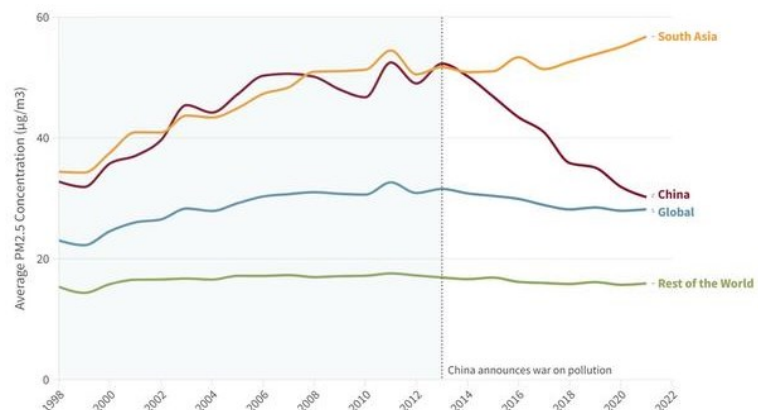
- "[Atmospheric oxidation capacity](#)", *noun*, def: the natural rate at which the atmosphere can clean itself of gas emissions. The Earth's "sticky" ozone pulls cleaner air down from the stratosphere and mixes it into the Earth's troposphere, which dilutes pollution. This entire process is driven by atmospheric hydroxyl (OH), which negates thousands of different types of molecules, including carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), methane (CH<sub>4</sub>), sulfur dioxide (SO<sub>2</sub>), and ethane (C<sub>2</sub>H<sub>6</sub>). However, **ozone pollution from the Earth outnumbers the total amount of hydroxyl by 10X**. In other words, chemical emissions overwhelm natural atmospheric reactions.

- **Some fracked oil and gas wells use about 40 million gallons of water.** Since 2011, the total amount of water used by mega-fracking projects has increased 7-fold, or about 1.5 trillion gallons of aquifer-sourced water.

- **There are still about 500 uncontained wild fires in Canada.**

- **Concrete producers in Australia add about 83,000 tons of [used coffee grounds](#) to the construction material each year, which offsets industrial emissions and lowers landfill methane.**

- Total global pollution (PM<sub>2.5</sub>) has remained steady (flat) for a number of years, almost entirely due to **China's "[war on pollution](#)," which reduced its annual contributions by 42%.**



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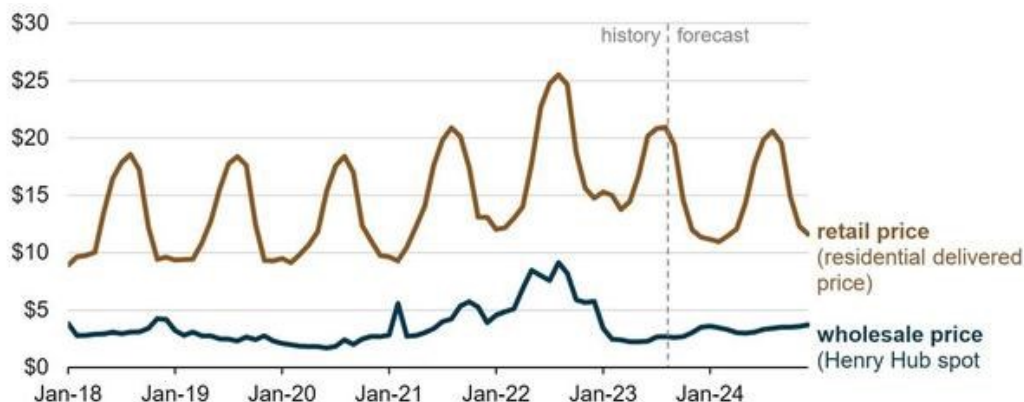
## - Research, Development and Markets -

- Researchers of SK On and Dankook University of South Korea have [improved lithium-ion conductivity](#) — increased battery cell output and reduced charge time — by adjusting lithium lanthanum zirconium oxide (LLZO) additives.
- Electrolyzer innovator and manufacturer **Electric Hydrogen, valued at \$1 billion**, is hydrogen's first [unicorn](#). *Note:* AES was one of the first to cover the rise of [Electric Hydrogen](#).
- **None of the Group of 20 largest industrialized countries are meeting their climate pledges**, and in general broad public support and funding is beginning to recede. Meanwhile, private investments have only contributed 20% of their expected total.
- **Since 2020, construction costs for solar photovoltaic systems, wind turbines, and natural gas-fired electricity generators all [declined](#) in the US** (falling 18% for natural gas-fired generators, by 5% for wind turbines, and by 6% for solar photovoltaic systems), in spite of inflation.
- California trucks and trains burn about 3.5 billion gallons of diesel per year. Five years ago, petroleum supplied 85% of diesel; however, in the first quarter of 2023, [less than half](#) the state's diesel came from petroleum. At this rate, there will be no petroleum diesel used in the state by 2030. **Most California diesel is now made from animal fat, corn oil, soybean oil, or used cooking oil.**
- **Washington State just surpassed California as the state with the highest gasoline price**, \$4.98 per gallon in Washington is \$0.13/gal. higher than California at \$4.85/gal.

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## - Electricity, Power, and Efficiency -

- The December 2022 winter storm Elliot eventually took about 1/4th of the US electricity market capacity [offline](#).
- [Viking Link](#), the world's longest subsea HVDC (high voltage, direct current) interconnector cable (765 km long) is nearly complete and will soon connect the electricity systems of the UK and Denmark.
- It appears that system-wide emergency text messaging about the immediate need to reduce electricity consumption **yields about 5% of instantaneous demand [reduction](#)** at any given moment.
- **Average natural gas wholesale prices have been declining, but these lower prices have [not](#) translated into lower retail electricity prices** for US residential consumers.



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## - University Spotlight -

- [Schatz Energy Research Center](#) at the new **Cal Poly Humboldt** is doing advanced work on OSW as well as bioenergy, micro- and off-grids, etc.
- The School of Public Policy at **Oregon State University** is conducting advanced research on OSW; meanwhile, the [Wallace Energy Systems & Renewables Facility](#) (WESRF) is one of the largest power labs in the US, and host of the [Pacific Marine Energy Center](#).
- Not to be out done, the [Energy and Sustainable Materials cluster](#) at the **University of Oregon** works very closely with its Chemistry and Physics departments.
- AES applauds [Pomona Ventures](#), a student-run organization interested in impact investment, from the **Claremont Colleges: Pomona, Claremont McKenna, Scripps, Pitzer, and Harvey Mudd**.
- The Electric Power Innovation for a Carbon-free Society ([EPICS](#)) Center in the Ralph O'Connor Sustainable Energy Institute (ROSEI) at **Johns Hopkins University** is developing computing, economic, engineering, and policy tools for utilities.

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## - Bulletin Board -

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- [Nextcorps](#) received \$4.5 million from the National Science Foundation to support innovation in deep tech.
  - Geoff Duncan at [Ubiquitous Energy](#) published "A Diversified Approach to Renewable Energy in Construction"
  - [Centrus](#) is beginning first-of-a-kind production of High-Assay Low-Enriched Uranium (HALEU) two months ahead of schedule at the American Centrifuge Plant in Piketon, Ohio.
  - AES applauds the 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.
  - **Uearth** 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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## - Quotes -

### OSW Headwinds and Tailwinds

"Every OSW development project is a very big deal and should be celebrated as such."

- Boyd Rabin, Vice President of policy, Environmental League of Massachusetts

"We can go further when we work together."

Connecticut Governor, Ned Lamont, on the collaborative OSW development agreement signed by New England states

"When it comes to offshore wind, I'm always nervous and always optimistic."

Amber Hewitt, a senior director at the National Wildlife Federation

"OSW is facing unprecedented economic headwinds that include record inflation, supply chain disruptions, and sharp interest rate hikes."

Avangrid press release

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