

ENERGY MATTERS

Soundbite summaries of the energy news you need to know

AN OFFICIAL PUBLICATION OF



AMERICAN ENERGY SOCIETY

May 16, 2022

- The Power Read -

- **Oil:** Saudi Arabia and the United Arab Emirates are holding spare oil.
- **Policy: *Special report* - the chaos in global energy geopolitics.**
- **No-/low-carbon energy: *Spotlight* - battery materials.**
- **Research:** The US DoE will provide \$2.3B to support carbon mitigation RD&D.
- **Markets:** TotalEnergies and Duke Energy won the second offshore wind auction.

- News from the Society -

Academic/Research Subject Librarian of the Year Award

Nominate a deserving candidate for the American Energy Society Subject Librarian of the Year. The winner, announced at the [ALA conference](#) in June, receives an all-expenses paid personal day of their choice (some restrictions apply).



- The ACORE [Finance Forum](#) returns to New York on June 7-8, 2022, a conference on the renewable energy transaction landscape, managing risks, and approaching deals.

[Contact us](#) for special AES discounts.

- July 7–8, the American Energy Society co-hosts the 12th annual SISE Conference: [Celebrating the Prosumer](#), in partnership with the University of Illinois, Chicago, and Argonne National Laboratory.

- Fossil Fuels -

- Oil -

- *Special insight:* Saudi Arabia and the United Arab Emirates have [spare capacity](#) and could immediately increase output to help offset supply losses from the embargo on Russian crude oil. The two Gulf OPEC producers hold about 1.8 million barrels per day of "short-order" spare capacity, equal to almost 2% of world demand. Or, Saudi Arabia, the UAE, Iraq and Kuwait together have about 4 million bpd of spare capacity that can be brought onto the market within a 3-6 month period. (*Note:* the European Union imports about 3.5 million barrels of crude oil and refined products from Russia; that's about half of Russia's total oil and product exports and about a quarter of the EU's oil imports.)

<u>mb/d</u>	Sustainable <u>Capacity</u>	Short-Order <u>Spare</u>	90-Day <u>Spare</u>
Saudi Arabia	12.2	1.2	2.1
UAE	4.1	0.6	1.2
Iraq	4.8	0.3	0.6
Kuwait	2.8	0.1	0.2

* Excludes Iran

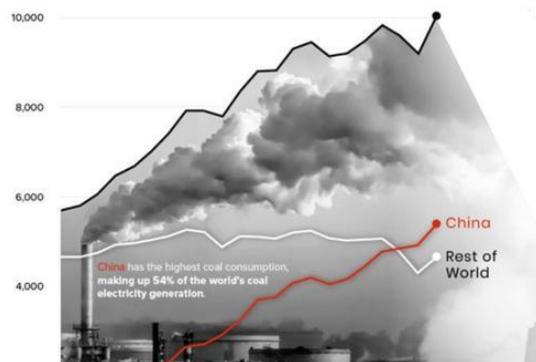
- Gas -

- [Top-5](#) LNG importing countries:

1. China (10.3 billion cubic feet per day)
2. Japan (9.8 bcf/d)
3. South Korea (6 bcf/d)
4. India (3 bcf/d)
5. Taiwan (2.4 bcf/d)

- Mining, Minerals and Coal -

- [Coal](#) power generation rose by 9% in 2021 to 10,042 TWh, marking the biggest percentage increase since 1985. *Insert:* Coal electricity generation, in terawatt hours.



- Carbon Capture -



- One method of carbon dioxide removal (CDR) that is [gaining traction](#) is **kelp farming**. The idea is to grow kelp on massive, floating, offshore arrays, then sink the kelp — along with the carbon it sequesters — into the deep ocean. The more kelp grown and sunk, the greater the impact. However, non-native species, like kelp (and any other freeloaders), [compete](#) for resources with native species, and local ocean chemistry could change, further impacting the balance of native and non-native species.

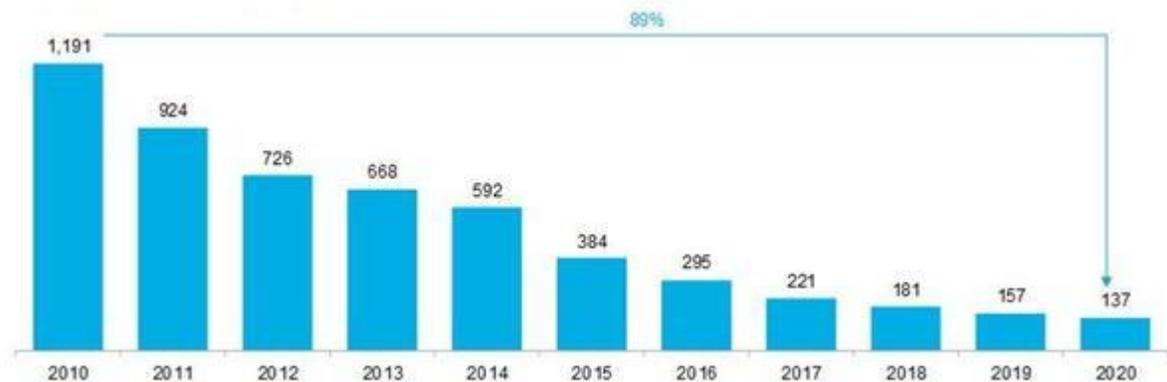
No- / Low-Carbon and Renewable Energy

Spotlight: battery materials

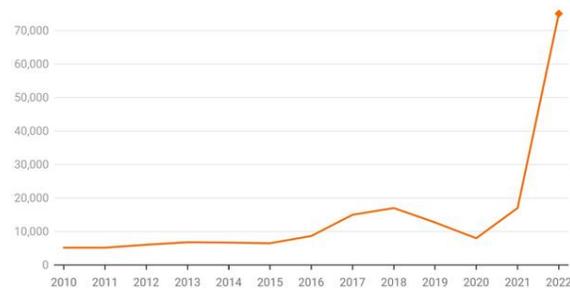
- *Special report:* If preliminary results hold, **American Rare Earths has control of what might be the [two largest rare earth sites in the US](#)** ... by a wide margin. The salt-and-pepper rocks in Arizona and Nevada have an unusually high presence of several "rare earth" elements — Neodymium, Dysprosium, Praseodymium, and Terbium — which are essential for making the magnets that go into things like electric vehicle motors and wind turbines. These elements are more resistant to demagnetization that occurs at high temperatures or vibrations, such as during the operation of an EV motor, power turbine, or drone rotor. (*Note:* the current US leader in terms of production is [MP Materials](#), which owns the only operating rare-earth mine in Mountain Pass, California, and is responsible for producing 15% of the mineral content consumed in the global market.

- Related, **AES recommends the [lithium survey summary report](#)** (per AES Member [Allyson Gaarder](#)) and the report [Building Lithium Valley](#) (per New Energy Nexus).

- *Insert:* **Battery pack prices through 2020** (all in \$/kWh):



- However, since 2021 **lithium prices have gone up significantly**. (*Insert right:* the price of battery-grade lithium carbonate per metric ton, in USD).



- Energy Policy & Geopolitics -

Special report: the chaos of energy geopolitics



- **The European Commission proposed an oil embargo on Russian crude oil and refined products**—this is the sixth sanction package discussed by the EU. However, the crude oil embargo won't come into effect for six months, and the refined product embargo won't come into effect until the end of this year. (*Note:* the European Union imports about 3.5 million barrels of crude oil and refined products from Russia; that's about half of Russia's total oil and product exports and about a quarter of the EU's oil imports.) The six-month period is supposed to help EU members find alternative suppliers.

- **OPEC+** (including Russia): the cartel announced that it would not increase its production totals, which means no additional oil for Europe will come from the Middle East.
 - **Germany:** the government reversed its opposition and has now confirmed that Berlin would support a European Union ban on Russian oil imports.
 - **China:** COVID lockdowns have cut demand by about 1M b/d.
 - **Nigeria and Angola:** force majeure and operational breakdowns at export terminals cut exports.
 - **Portugal and Angola:** Galp Energia (Portugal) is [selling](#) its upstream operations (Angola).
 - **Libya:** The NOC for Libya [warned](#) the two parties warring for control of the government that they must cease-fire so oil can be exported immediately (crude from the Bu Attifel reservoir in Libya requires continuous heating or else it solidifies in tanks and pipelines due to high wax content). Also, a portion of Libya's key midstream infrastructure broke down, which cut 550,000 b/d from global supply.
 - **South Africa:** Strikes and other civil [disruptions](#) forced mining companies to truck coal to ports rather than use the railway network.
 - **China:** Beijing announced that it will slow exports and begin [stockpiling](#) Rare Earth Elements and Metals (*note:* about 87% of the REEM market is controlled by China.) The US Congress responded by introducing new bills to [prohibit](#) purchase of REEMs from China.
 - **United States:** In the last month, 318 solar projects around the US have been put on hold or have been cancelled — more than one-third of the utility-scale solar development pipeline. In March, Auxin Solar (San Jose) asked the US Commerce Department to launch an investigation into whether Chinese solar products were skirting tariffs by being illegally funneled through other Asian countries on their way to the US. In response to the petition of this one company, the Commerce Department began investigating the allegations, which has driven up prices for solar parts and frozen all imports of panels and components from Cambodia, Malaysia, Thailand, and Vietnam that provide 82% of all solar modules used in the US. (Thank you SMEs at [Chapman University](#).)
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- Climate and Sustainability -



- **Nurdle:**

A bead of pure plastic, the basic building block of almost all plastic products, is made from natural gas or oil, shipped to factories around the world, and then melted and poured into molds (you are probably reading this issue of *Energy Matters* on a device that is part nurdle).

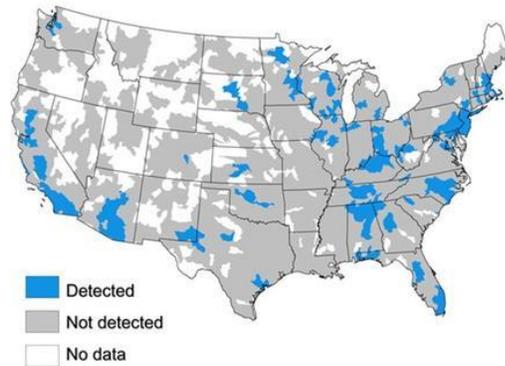
- An estimated 200,000 metric tons of nurdles make their way into oceans annually.
- Nurdle beads are extremely small and light, around 20 milligrams each.
- Under current conditions, about 10 trillion nurdles (+/- 1T) enter marine ecosystems around the world each year.
- Many fish species and seabirds eat nurdles.
- Nurdles are the second-largest source of ocean microplastics after tire dust.

- A [call for papers](#) about the relationship between the changing climate and infectious disease (thank you AES SME, [Kenny Yeh](#) at MRIGlobal).

- Parts of Texas [already](#) have triple digit temperatures and uncontained wildfires.

- A bit more than [90%](#) of the Great Barrier Coral Reef is bleached and much of it is [probably](#) dead.

- *Insert right:* **Hydrological regions in the US with detectable PFAS** (*note: PFASs are widely used, long lasting [per- and polyfluoroalkyl substance](#) chemicals that break down very slowly over time and may be linked to harmful health effects in humans and animals).*



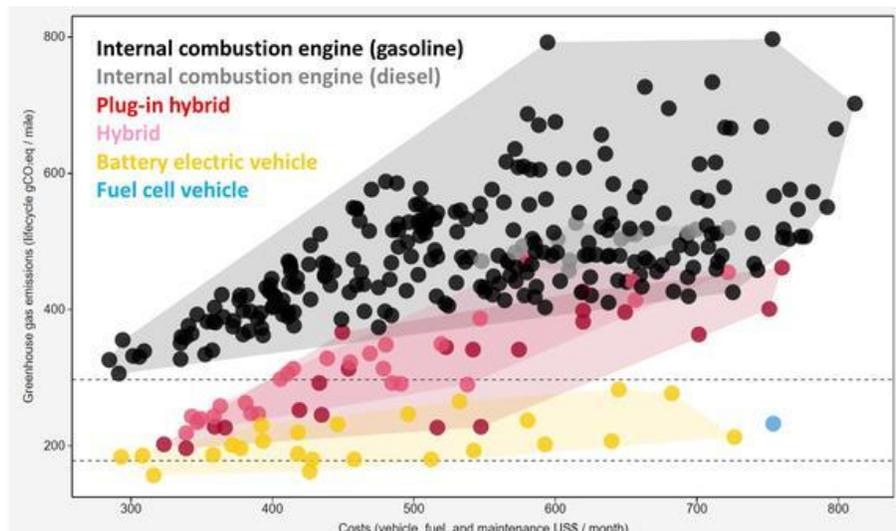
- Stanford received a **\$1.1 billion** gift from John and Ann Doerr to launch the Stanford Doerr School of Sustainability, the first new school at the university in 70 years.

- Research and Markets -

- **The US DoE will provide \$2.3 billion in support of carbon mitigation RD&D.** According to the Notice of Intent (NOI), funding will accelerate geologic carbon storage projects that can permanently store at least 50 million metric tons of captured CO₂.

- CarbonSafe Initiative (phases III, III.5 and IV): [\\$2.25B](#)
- CarbonSafe Initiative (phase II): [\\$45M](#)
- Carbon Management FOA: [\\$46M](#)

- *Insert:* **A comparison of greenhouse gas emissions (lifecycle gCO₂e/mile) over costs (vehicle + fuel + maintenance US\$ / month):**



- The [value](#) of energy trade between the US, Mexico, and Canada has reached all-time highs (by the combined value of total energy imports and exports between the countries).

- The US Department of the Interior held its [second offshore wind auction](#) for two leases covering 110k acres in the Carolina Long Bay area, off the coast of North and South Carolina. TotalEnergies and Duke

Energy bid a combined \$315M to secure the leases and a 20% credit for committing to workforce training and building a domestic supply chain. (Note: In the [first auction](#), in February 2022, six companies paid about \$4.4 billion to lease tracts in area OCS-0539, east-southeast of Barnegat Light, NJ. (Note: in contrast, the DoI [cancelled](#) all remaining oil and gas offshore auctions for the year.)

<u>Provisional Auction II Winner</u>	<u>Lease Area (acres)</u>	<u>Bid</u>
TotalEnergies Renewables	OCS-A 0545 (54,937)	\$160,000,000
Duke Energy Renewables Wind	OCS-A 0546 (55,154)	\$155,000,000

- Related, **Bulgaria and Romania are exploring offshore wind opportunities** that could support Europe and Eurasia's energy security. Joint-venture [negotiations](#) between the two countries began in 2020, but now have greater support.

- Electricity, Power, Efficiency, and the Grid -

- **The US has almost 200 gigawatts of electric generating capacity (or, 18%) that functionally [switches fuels/technologies](#)** (such as between natural gas, wind, and steam coal); as opposed to 371 GW of capacity (33% of the total) that is entirely dependent upon a single-source technology (such as a hydroelectric dam or a nuclear reactor). The remaining sources have the capacity to switch but generally do not.

- **The US DoE plans to launch a solicitation this year to [buy capacity](#) on proposed transmission lines**, a move designed to support investment in transmission development projects by giving them increased financial certainty. To receive funding, a transmission project must carry at least 1,000 MW, or 500 MW if they are upgrades to existing facilities, and be operating before 2028. The US DoE plans a second solicitation from its [\\$2.5B](#) Transmission Facilitation Program, or TFP, in early 2023 for capacity contracts, loans, public-private partnerships and support for certain microgrids.

- Due to an intense spring heat wave, **India's power demand [rose](#) to its highest on record** at 135 billion KWh, triggering widespread power cuts across the country as supply fell short of demand by 2.4 billion KWh.

- **Finland was importing 10% of its electricity from Russia, but Russia has [suspended](#) the trade.**

- Cybersecurity Spotlight -

- **Costa Rica has declared a [state of emergency](#)** after ransomware hackers crippled computer networks across multiple energy systems and the Finance Ministry.

- Meanwhile, **there is [greater coordination](#) between Russian military and cyber-attacks**; often within hours of a missile strike, hackers will attack a similar targets, indicating the two groups have overlapping objectives.

- Universities in the Spotlight -

- **The Rice Alliance Clean Energy Accelerator is accepting applications** for its [Class 2 cohort](#); the deadline to submit is Tuesday, May 31 at 11:59 PM CDT.

- May 31, 2022, Rice University's Carbon Hub will hold its [Annual Meeting](#), featuring discussions with industry and academia on decarbonization.

- **The European Institute of Innovation and Technology (EIT)** is hosting the [Innovation Capacity Building for Higher Education](#), a joint EIT Community activity that helps higher education institutions become regional engines of innovation.

- Quotes - Committing to inaction

"Our hands are very tied."

- US Commerce Secretary Gina Raimondo, on Auxin Solar tariff complaint filed against China

"We need to make sure that we have sufficient new resources in place ... before we let some of these retirements go. Otherwise, we are putting ourselves potentially at risk."

- Mark Rothleder, the chief operating officer of the California Independent System Operator, warning grid operators of electricity shortages when switching to renewables

"It is technically impossible to reroute natural gas flows to Europe via Ukraine under the current Russian flow scheme."

- Russia's gas giant Gazprom

- Bulletin Board -

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- **ClearPath** is looking for either an upcoming graduate or undergraduate with relevant experience to join its [policy](#) team as a 2022-2023 Policy Fellow. The fellow will work to advance the entire suite of clean energy technologies.

- **Ubiquitous Energy**, a manufacturer of transparent solar products, has a new [partnership](#) with Citrine Informatics, an artificial intelligence service provider for materials development.

- 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.

- [Free eBook](#), *Ground Robots for Autonomous Operations in Oil & Gas*.

- Gratitude -

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