

ENERGY MATTERS

Soundbite summaries of the energy news you need to know

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AMERICAN ENERGY SOCIETY

May 2, 2022

- The Power Read -

- **Oil:** 81% of all completed oil and gas wells are horizontal and/or directional.
- **Carbon capture:** There is still time to apply for the \$50 million 2025 Xprize.
- **Policy:** Auxin Solar's tariff petition has halted the entire US solar industry.
- **Climate:** The highest income households emit 5.6 times more greenhouse gas emissions per capita than the lowest income households.

- News from the Society -

- **AES Academic/Research Digital 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).

- **ACORE** is hosting its [Finance Forum](#) on June 7 and 8 in New York City.

- July 7–8, **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:* In 2011, 19% of all oil and gas wells were horizontal and/or directional; **in 2021, 81% of all completed oil and gas wells were horizontal and/or directional.** Meanwhile, from 2011 to 2021, the total number of oil and gas wells [decreased](#) by 66% and the total drilling length (footage) has decreased by 30%, but **oil production has more than doubled and gas production has increased 55%.**

- Gas -

- Liquid Natural Gas (LNG), [by the numbers](#):

- 3,822.8: the total amount of natural gas consumed globally each year (in billion cubic meters, or bcm).
- 20%: the total percentage of the world's natural gas consumed by the US each year (832 bcm), followed by Russia (411.4 bcm), and China (330.6 bcm).
- 51%: the percentage of the world's natural gas reserves in Russia, Iran, and Qatar, combined.
- Top-10 natural gas exporting countries (insert right).

	Russia	199,928
	United States	149,538
	Qatar	143,700
	Norway	112,951
	Australia	102,562
	Canada	70,932
	Germany	50,092
	Netherlands	39,976
	Algeria	39,459
	Nigeria	35,586

- Mining, Minerals and Coal -

- In 2015, there were three battery manufacturing gigafactories. In 2017, Tesla's gigafactory opened; today, there are 285 gigafactories globally (some under construction). However, **there has been very little increase in the mining of rare earth raw materials for the manufacture of batteries at these gigafactories.** Consequently, the price for rare earth metals have [gone up](#) significantly, and many see that trend [continuing](#). However, COVID prevention lockdowns in China are causing the largest consumer of rare earth metals to slow down — for instance, copper prices are [falling](#). *Below*: price changes for rare earths in the last five years:

- Lithium +700%
- Nickel +250%
- Cobalt +100%
- Manganese +100%
- Graphite +25%

- Carbon Capture -

- The [Carbon Removal XPrize](#), by the numbers:

- 287: total number of teams that participated in the Carbon XPrize this year.
- 1,133: total number of teams that have qualified to compete for the 2025 grand prize.
- \$50M: the grand prize for the winner in 2025; runner-ups will receive \$30M.
- *Note*: There is still time to apply for the 2025 grand prize competition.
- *Insert*: a [map](#) of all 1,133 qualifying teams and the 60 semi-finalists.



No- / Low-Carbon and Renewable Energy

- The [top-5](#) solar power producing cities in the US (*note*: the most over-achieving solar power producing city is Burlington, Vermont):

1. Honolulu
2. Las Vegas
3. San Diego
4. Albuquerque
5. San Jose

- The [most effective](#) hybrid power plants (solar and/or wind + storage) are **solar + short-duration storage**.

- Electric power generated from renewable sources [surpassed](#) nuclear generation in the US during 2021 (795 million megawatthours vs. 778 million MWh, respectively).

- The current state of [nuclear](#) generated power in the US:

- In 2021, for the second consecutive year, US nuclear electricity generation declined.
- Output from US nuclear power plants totaled 778 million megawatthours, or 1.5% less than the previous year.
- Nuclear's share of electricity generation was similar to its average share in the previous decade:19%.
- Subtractions: three nuclear reactors with a combined 3,009 MW of capacity are scheduled to retire in the coming years (Michigan's Palisades is scheduled to retire later this year, and California's Diablo Canyon is slated to retire one generating unit in 2024 and one in 2025).
- Additions: Georgia's Vogtle Unit 3 is scheduled to come online this year (1,114 MW).

TUESDAY
March 29, 2022

- On this date in history, [March 29, 2022](#), wind was the second-largest source of US electricity generation (natural gas 31%; wind 19.1%; nuclear 19%; coal 17%; all other sources 14%).

- Energy Policy & Geopolitics -

- *Breaking*: The US DoE has released a Request for Information ([RFI](#)) seeking public input on a \$2.3 billion grant program to strengthen and modernize America's power grid against wildfires, extreme weather, and other natural disasters.

- *Beltway Buzz*: Congress returned from spring recess with a full calendar of hearings, most of which had to do with appropriation/budget issues. Interior's Deb Haaland, DoE's Jennifer Granholm, and EPA's Michael Regan all spoke with their respective US House panels to discuss the White House budget. Meanwhile, the House Science Committee is looking at the recent IPCC report, House Natural Resources is looking at opportunities and risks for offshore carbon storage, while the Senate Energy Committee is considering the nomination of David Applegate to head the US Geological Survey. Finally, House Foreign Relations is looking at promoting American competitiveness in global markets.

- The top-5 [most active](#) oil and gas companies operating on public lands, by percentage of total permits for any activity (exploration, drilling, mining, etc.):

1. Colt Walker (31%)
2. Anonymous - no identification available (22%)
3. Magnolia Oil & Gas (10%)
4. Aventine Investments, LLC (4%)
5. Dudley Land Co. (3%)
6. All other companies (26.5%)

- *Special insight:* It appears that **Auxin Solar's petition to the US Department of Commerce for more tariffs on imported solar panels has brought the entire US solar industry to a halt.** Auxin's petition alleges that Chinese companies are dodging US tariffs on Chinese and Taiwanese solar cells and modules by building them in Cambodia, Malaysia, Thailand, and Vietnam. The mere threat that there *might* be a tariff has hurt solar companies negotiating future contracts. AES Members have access to the [committee review of Auxin's petition](#) by the Office of the US Trade Representative.

- Energy policy around the world -

- **Russia cut off natural gas exports to Poland and Bulgaria** and threatened to do the same to other NATO member countries. Meanwhile, Kazakhstan is [concerned](#) that Russia might expand its invasion beyond Ukraine into northern Kazakh territories.

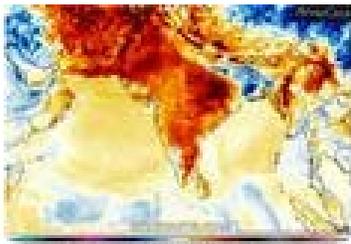
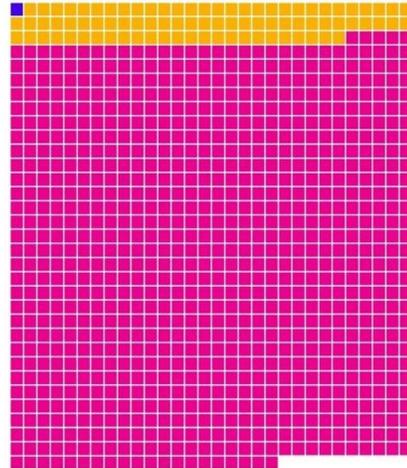
- Climate and Sustainability -

- In general, **the highest income households (wealthiest 10%) emit about 5.6 times more greenhouse gases per capita than the lowest income households (lowest 10%).** (There are differences across geography. For instance, the average household in San Francisco emits 36% less CO2 than the average household in Houston.)

- The healthcare industry is responsible for 4.4% of global [net](#) emissions.

- The [scale](#) of the carbon removal challenge:

- **Purple** is the amount of CO2 that is removed from the atmosphere using existing direct air capture plants.
- **Orange** is how much CO2 will be removed if all current plans for direct air capture plants around the world are developed
- **Pink** is how much CO2 needs to be removed in order to avoid the worst effects of climate change according to the IPCC.



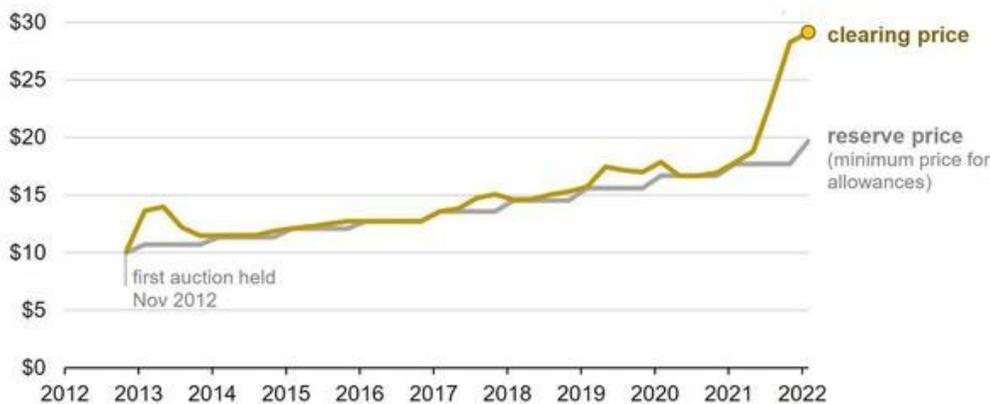
- India and Pakistan set record [high](#) temperatures for March (in the 100s °F) and then again for April (120s °F).

The hottest months in this region are always May and June.

- Research and Markets -

- It appears that **blending ammonia with a small amount of dimethyl ether (DME) will produce a liquid fuel with combustion properties very similar to gasoline** but with fewer emissions. [AES Members](#) have access to the peer reviewed research.

- **Emissions credits in the joint California-Quebec allowance auction set a record, selling for \$29.15 per metric ton of carbon dioxide equivalent**, or nearly \$10 per metric ton [above](#) the clearing price and the all-time highest market price. (Note: emissions credits sold in this market can be used to comply with California's cap-and-trade program, which covers nearly all sources of emissions within the state, including electric utilities, industrial facilities, and distributors of natural gas and gasoline.) *Insert:* quarterly California cap-and-trade auction prices, in dollars per metric ton of CO2 equivalent.



- Spotlight gasoline prices:

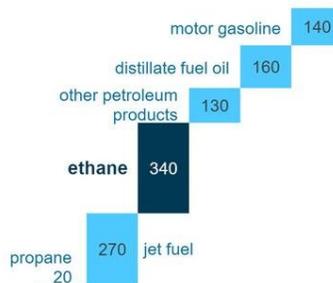
- The average retail gasoline prices is \$4.17/gallon.
- The 2008 record of \$4.10 adjusted for inflation is closer to \$5.35 in today's dollars.
- Prices in some states are higher than the 2008 record; for instance, the average price of gasoline in California is \$5.44/gallon.

- Most electric vehicle engines (including all Teslas) use a 400-volt architecture, but the **Porsche Taycan uses an 800-volt architecture**; it has poor range but extremely fast re-charging efficiencies.

- **The Swedish Parliament has flipped emission strategies and is considering a decarbonization plan on the consumer side.**

- NDB has unveiled a **prototype battery** that uses a layer of **synthetic diamonds surrounding radioactive isotopes from nuclear waste to generate electricity.**

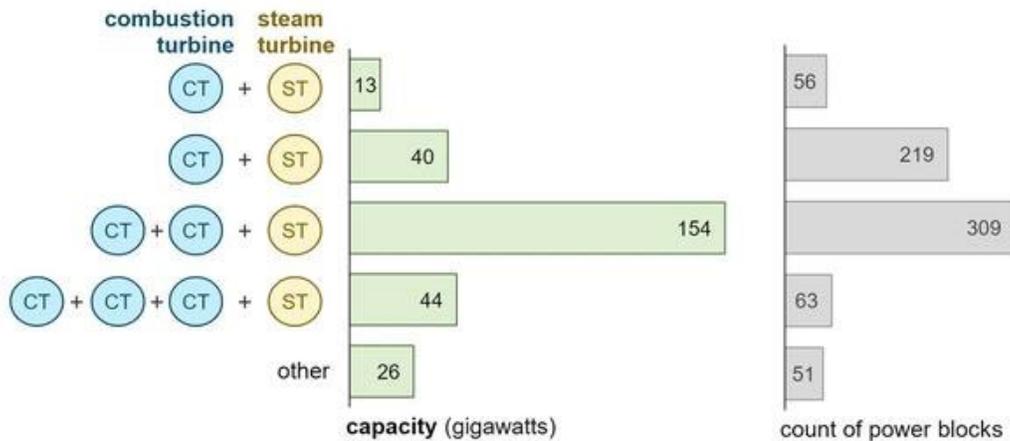
- **Consumption of ethane has grown every year since 2010** in the US and is the fastest growing of all petroleum products. *Note:* ethane is mainly used to produce ethylene, a feedstock to make plastics.



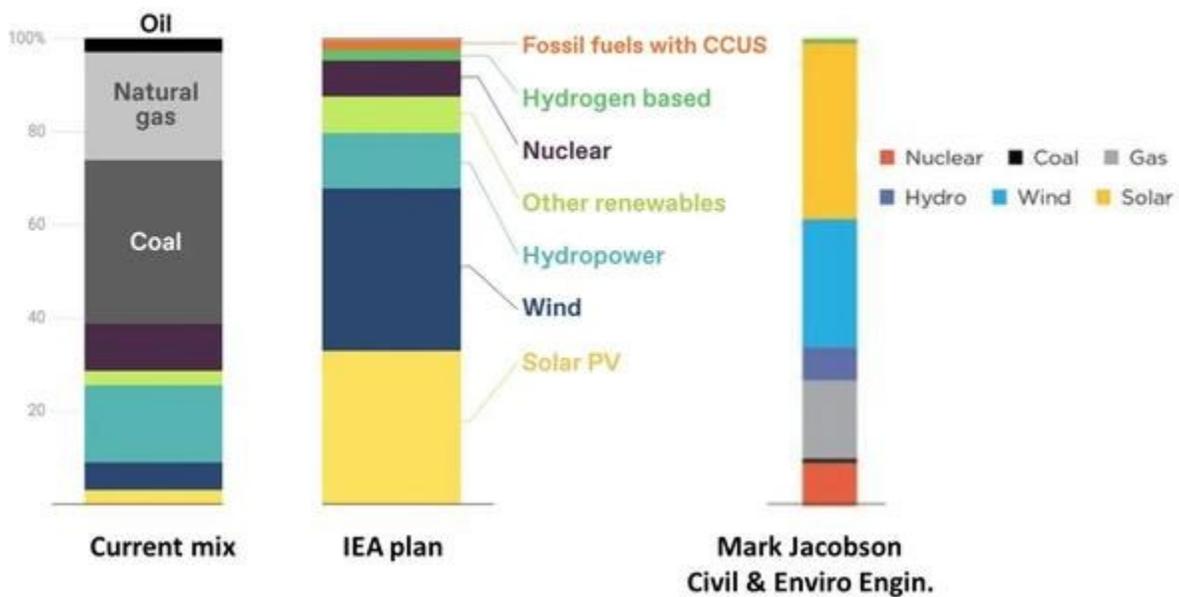
- Electricity, Power, Efficiency, and the Grid -

- Natural gas is the most prevalent energy source used for electricity generation in the US. Of the 491 gigawatts (GW) of natural gas-fired electric-generating capacity, [more than half](#) (280 GW) are combined-cycle systems that include both steam turbines and combustion turbines. *Insert: the predominant configuration for combined-cycle systems involves two combustion turbines and one steam turbine (2x1).*

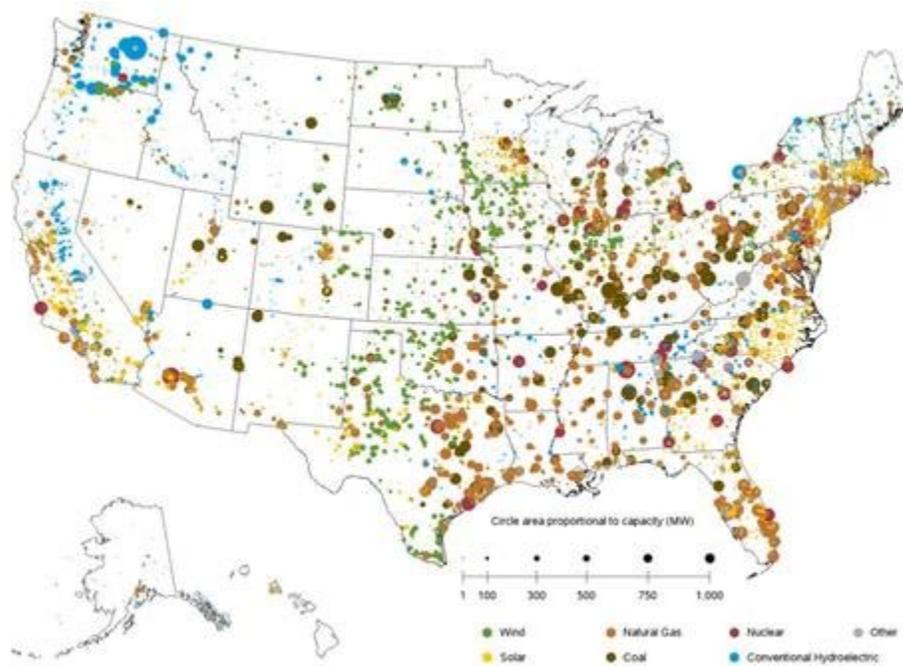
Natural gas combined-cycle capacity and count by configuration



- Pundits offer [many](#) proposed pathways to a zero-emission electricity grid. *Insert: a comparison of the current electricity grid (left), the [IEA's version](#) of a clean power grid (middle), and the 100% renewables' plan by [Mark Jacobson](#), professor of Civil & Environmental Engineering at Stanford University (right).*



- A [map](#) inventory of all generators of utility-scale electricity in the US:



- Cybersecurity Spotlight -

- According to the FBI, five US energy companies and 18 others in defense and energy infrastructure have been [experiencing](#) “abnormal reconnaissance scanning” from Russian-linked IP addresses.

- Universities in the Spotlight -

- May 2, 1:30 - 4:30 (Kroon Hall, 3rd Floor): **Yale** Center for Natural Carbon Capture is hosting a symposium, "[Natural Carbon Capture](#) - Perspectives from Industry and Academia".

- Jim Williams at **USF** has developed a new [roadmap](#) to net-zero carbon emissions.

- AES recognizes the new Student Sustainability [Center](#) at **Portland State University**.

- **RIT's Golisano Institute for Sustainability** offers a [Sustainable Systems MS degree](#), a comprehensive and interdisciplinary approach to sustainability science.

- **LSU Center for Energy Studies** published [2022 Gulf Coast Energy Outlook](#) (GCEO), a comprehensive overview of the Gulf Coast region’s energy industry for the upcoming year.

- Quotes -

Absolutely positively maybe

"President Biden remains absolutely committed to not moving forward with additional drilling on public lands."

– White House Climate Adviser Gina McCarthy

"President Putin is responsible for bringing war back to Europe... We will target strategic sectors of the Russian economy by blocking their access to key technologies and markets."

– European Commission President Ursula von der Leyen

"When things get hot, states always deviate from the policy that's supposed to be in place. They talk a lot about options, but in terms of action, they always put the money in the same place: firefighting."

– Vibrant Planet Chief Scientist Hugh Safford, on Western state policies and funding to combat drought and wildfires

- 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.

- The CEO of **Ubiquitous**, Susan Stone, joins BNN Bloomberg to discuss their [coating](#) that lets windows capture solar energy with no loss of visible light.

- 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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