

ENERGY MATTERS

Soundbite summaries of the energy news you need to know

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AMERICAN ENERGY SOCIETY

September 26, 2022

- The Power Read -

- **Natural gas:** France has the largest onshore gas shale play in Europe.
- **Coal:** China, a major producer and exporter of coal, is now importing coal from Russia.
- **Renewables:** The "hottest" energy technology in Norway is offshore wind.
- **Markets:** The top EV auto manufacturers are GM and VW; the least committed is Toyota.

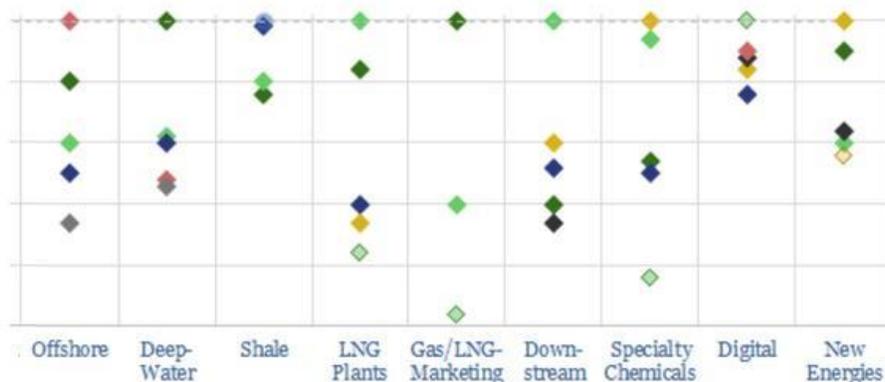
- News from the Society -

- On October 17, 2022, AES will publish the *Hydrogen SME Watch List*, a global directory of thought leaders shaping the next energy-tech revolution. [Members](#) receive the entire report for free. [Contact us](#) for more information.

- Fossil Fuels -

- Oil -

- **The top RD&D energy technologies among oil and gas super majors**, by number of patents and sector applications. (Note: the higher the grouping the more advanced the investment. For instance, "Shale" and "Digital" technologies receive more investment capital, and "Gas/LNG-Marketing" receives the least.)



- Natural gas -

- **Onshore shale natural gas basins in Europe** (all assessed basins, including those with and without capacity estimates). *Note:* the largest European shale basin is in France, though the French and the rest of the EU have banned fracking. The UK may lift its ban.



- Coal and mining -

- China is a major producer and exporter of coal; however, **Russia discounted its coal prices so much that China is now importing cheaper Russian coal and stockpiling its own.** The lowest price of coal in the region is \$210/ton from Australia's Newcastle port, but Russia's discounted price is \$150/ton. Indonesia has responded to the price war by discounting its coal prices below Russia.

- Carbon capture and removal -

- **The three largest DAC (direct air capture, aka "carbon") projects in development:**
 - "[Mammoth](#)" by Climeworks (Iceland)
 - [Occidental 1PointFive](#), by Occidental and Carbon Engineering (Texas, USA)
 - [Project Bison](#), by CarbonCapture and Frontier Carbon Solutions (Wyoming, USA)

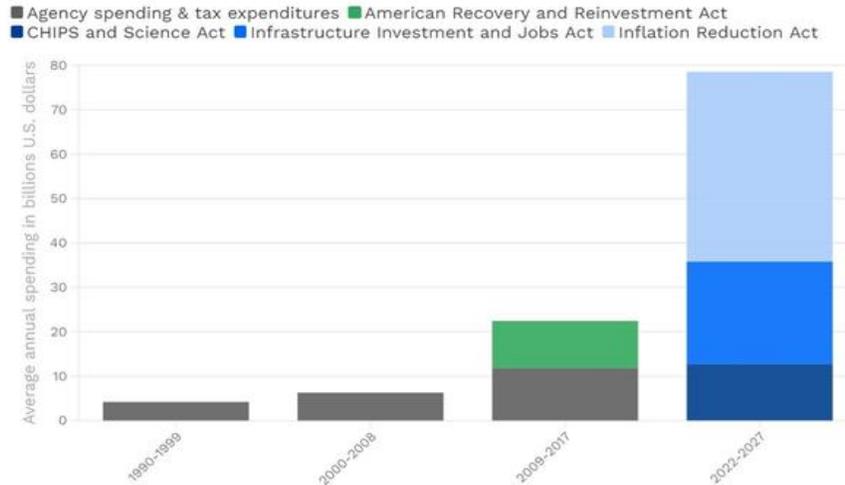
No- / Low-Carbon and Renewable Energy

- **New trends in distributed solar and residential PV:**
 - Pairing storage+solar in residential PV systems has increased 10% y/y;
 - Winter Storm Uri led to an increase in paired solar+storage systems in Texas (adoption rose 3x and 6x in regions affected most by the storm);
 - Solar+storage does best where there are net metering rules



- The biggest [battery](#) in the world is the integrated system in **California**. For most of the year, the batteries help stabilize the grid, but this summer the system helped California get through its most extreme September heat and greatest power demand in history.

- *Insert (below):* **US federal [spending](#) on clean energy** (broadly conceived), by administration/decade. *Note:* spending/expenditure data unavailable for 2018-2021.



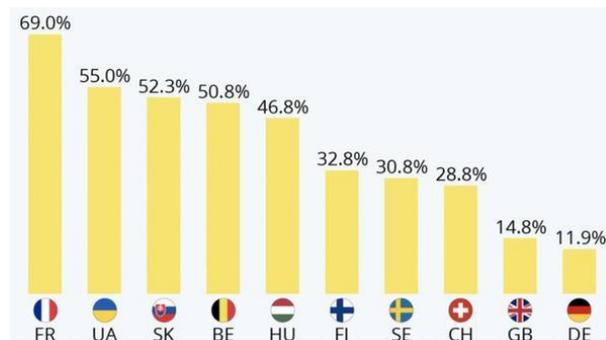
- **The top 5 "hottest" RD&D energy technologies in [Norway](#)** (95 total projects assessed; evaluations include CVC investments, projects by clusters, etc.)

1. Offshore wind
2. CCUS
3. Hydrogen (production/distribution)
4. Batteries/Storage
5. Geothermal

- **Related, the 6 "hottest" energy-tech topics in the US** (according to [AES data](#)):

1. CCUS (holding steady)
2. Offshore wind—West coast (holding steady)
3. Storage (surging)
4. Natural gas (holding steady)
5. Hydrogen (holding steady)
6. Small modular nuclear reactors (fading)

- **France has 58 operating nuclear reactors, but the country may [nationalize](#) the entire sector due to substantial financial losses.** *Insert (below):* gross electricity production by [nuclear](#) power, by EU Member states.



- Energy Policy & Geopolitics -

- Beltway buzz -

- There are **more** new renewable energy projects under NEPA review (National Energy Policy Act) than fossil fuel projects. However, all projects (renewable and fossil) are stuck in a time-consuming permit review queue (most of these project proposals are for midstream and transmission infrastructure). The applications have to successfully navigate lengthy procedural hurdles, onerous bureaucratic rules, redundant and conflicting federal regulatory requirements, and constant environmental and legal challenges. Consider, for instance, that a NEPA environmental impact review, just one of many steps, takes about **four** years to complete and usually costs millions of dollars in legal fees.

- The US Senate, which has sole authority over all treaties, just (finally!) voted in favor of the 2016 Kigali Amendment to the 1987 Montreal Protocol. **The Kigali Amendment phases out a class of super-polluting HFC chemicals used in air conditioners and refrigerators.** More than 130 countries signed on to the amendment. *Note:* despite the Kigali Amendment, HFC emissions have been **increasing** as a result of substantial unreported production.

- The US DoE Office of Fossil Energy, which was in charge of developing more effective ways of producing hydrocarbons, is now the **Office of Fossil Energy and Carbon Management** and is also responsible for helping to clean up the industry.

- **The Biden Administration uses \$52/ton** as its "Social Cost of Carbon." A comparison of SCC by presidential administrations:

- Obama administration: \$51/ton
- Trump administration: \$1/ton
- Biden administration: \$52/ton (*approved as per the [decision](#) of the SCOTUS*)

- Related, a recent peer-reviewed paper has determined that **the more accurate social cost of carbon is triple** the Biden Administration's estimates.

- **California recently passed about 40 energy, climate, and sustainability bills into law. For instance:**

- [AB 1279](#): Establishes in law a net carbon neutrality target for California by 2045 and directs the California Air Resources Board to implement strategies that enable carbon dioxide removal and carbon capture utilization and storage technologies as part of the effort to achieve that goal.
- [SB 905](#): Creates a program for carbon capture removal utilization and storage that has a variety of policy and regulatory components to enable these projects and technologies to be deployed in California.

- Global energy politics -

- **OPEC members are about 1.4 million bpd behind** the cartel's quota and will remain below production projections for the next few months. *Note:* Nigeria (OPEC) and Russia (OPEC+) are the least productive, respectively.

- Climate and Sustainability -

- This **is usually** the peak of the extreme storm season, but until recently, it had been exceptionally quiet. **And then, major storms arrived in [Alaska](#), [Puerto Rico and Dominican Republic](#), [Pakistan](#), [Japan](#), [Florida](#), and ... [Canada](#).**

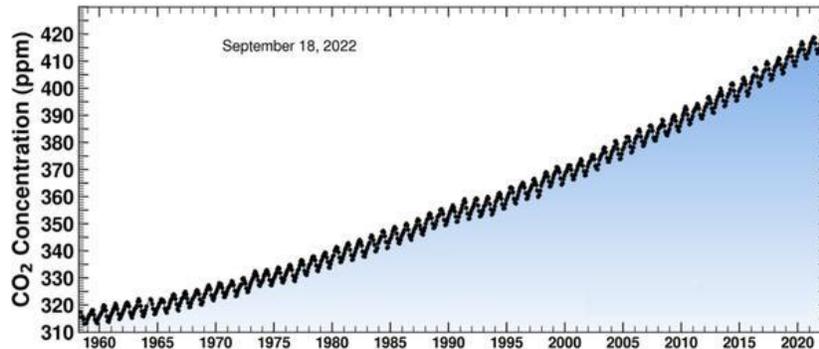
- **About one third of all tree species are near [extinction](#)** (or about 17,500 unique tree species are endangered). For context, that is about double the number of all threatened tetrapods (mammals, birds, amphibians, and reptiles).

- **The 3 most [sustainable](#) universities** (as measured by 17 "impact" areas):

- University of California, Irvine (US)
- Université de Sherbrooke (Canada)
- National Taiwan Normal University (Taiwan)

- A graduate student in Environmental Psychology at Colorado State University is conducting a **study on climate impact messaging and needs volunteers to fill out a very short online [survey](#)** about household appliances.

- **Recent measurement of [CO2](#) concentration at the Mauna Loa Observatory:**



- Research and Markets -

- **OPEC is on pace to collectively earn \$842 billion in revenues from oil exports in 2022, the [most](#) for the group since 2014**; annual revenues will be nearly 50% higher in 2022 than in 2021 (all adjusted for inflation).

- In the last five years, **the US has exported more liquefied natural gas (LNG) than any other country and has [more](#) export capacity than any other country.** *Note:* The US began exporting LNG in February 2016.

- Of the top 10 auto manufacturers, **Toyota is the [least](#) committed to EVs** (less than 1% of total sales); GM and Volkswagen are the most committed.

- **Railroads are about four times [more](#) fuel efficient than long-haul trucks and six times [more](#) fuel efficient than large shipping vessels**, all things equal.

- **Piezoelectric composite fibers [produce](#) electrical energy** through the piezoelectric effect of movement, allowing energy harvesting technologies to recycle energy wasted or consumed in everyday life.



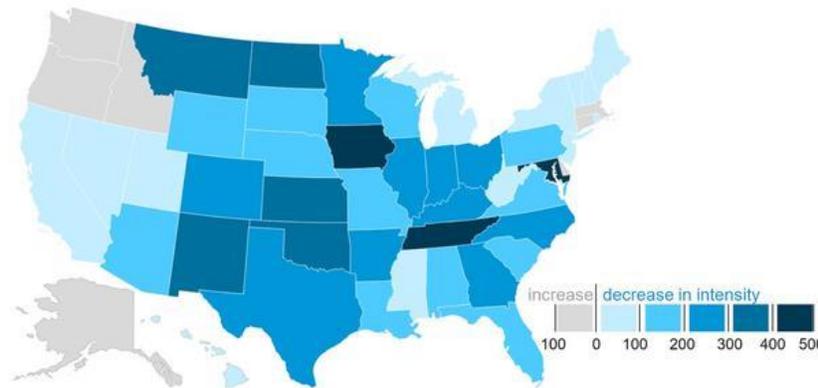
- **Patagonia founder Yvon Chouinard has [given control](#) of all voting stock of the company to a trust and a nonprofit**, with all future profits donated to fight climate change.



- Charm uses plants to capture CO₂ by [converting](#) biomass into a stable liquid that can be pumped deep underground. *Individuals can purchase the carbon sequestration service for about \$50/month. Note: Charm has already sequestered more than 5,000 tons of CO₂.*

- Electricity & Power -

- **The carbon intensity of US power generation is [falling](#)** (-18% in the last 5 years), mainly due to a shift away from coal and toward natural gas and renewables. However, seven states have increased the carbon intensity of their electricity supply (light grey). *Insert: change in carbon intensity of power generation, by state (2016-2020), in pounds of CO₂ per megawatt hour.*



- About **24% of US utility-scale electricity generation comes from [renewable sources](#)**. (For comparison, it was about 21% for the same time period last year.)

- **In 2020, energy consumption [declined](#) by a record 7.5% in the US**, mostly as a result of the pandemic. The states that had the largest declines tended to have significantly less energy used in transportation. Also of interest:

- Alaska was the only state where energy consumption increased in 2020;
- In Hawaii, energy consumption dropped 24%, the largest decline of any state;
- In all states except Hawaii and Alaska, more motor gasoline is consumed than jet fuel.

- **Even if the grid were entirely fueled by coal, 31% [less energy](#) would be needed to charge EVs than to fuel gasoline cars.**

- *Recommended resource: Google's Environmental Insights Explorer (EIE) [collects](#) building data for over 4,000 new cities and regions globally.*

- Universities in the Spotlight -

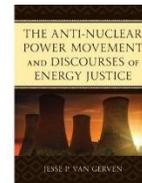
- The American Nuclear Society honored [five](#) students from **Boise State**.

- Researchers at **West Virginia University** have studied how oil and natural gas activities have [altered](#) the region's landscape.

- The **MIT** Energy Initiative recently released the [Future of Energy Storage](#) study.

- Breakthrough Electrolytes for Energy Storage ([BEES](#)) is an EFRC at **Case Western Reserve** that specializes in energy storage system power densities.

- Spotlight: Second Chance Books from [Energy Today ... Energy Justice](#), by Jesse Van Gerven (**Butler University**).



- Quotes -

But what does that mean...?

"Our world is addicted to fossil fuels. It's time for an intervention."

- UN Secretary-General Antonio Guterres

"The new [US DoE] Office of Fossil Energy and Carbon Management has a very long list of policy priorities.... In the near- and mid-term they will support development of technologies for fossil fuels, and long-term goals will focus on technologies that reduce emissions."

- Daniel Bresette, executive director for the Environmental and Energy Study Institute

"The pre-war situation with abundant, cheap fossil fuels is not coming back."

- European Commission Vice President Frans Timmermans

- Bulletin Board -

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- **Honeywell's Sustainable Building Technologies** (SBT) is hiring for a global [Senior Director Solutions Architect](#).

- [RSVP](#) to virtually attend the **Breakthrough Institute** conference, Ecomodernism 2022: Deregulating Abundance, on Oct 3 - 4.

- On Oct. 18 and 26 and Nov. 3, **AASHE** will host "The Urgency of Now," a global conference on sustainability solutions in higher education. [Contact us](#) for a discount code or a special rate for a full conference pass.

- Don't miss the **Climate Partnership [Playbook](#) by the State of Green (Denmark)**.

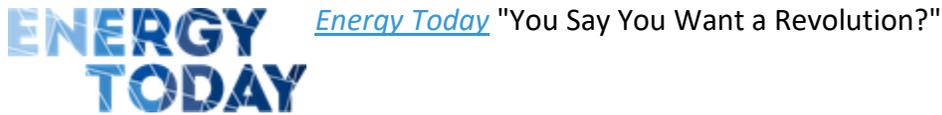
- **Clearpath** has completed a white paper that examines the development of wind power in [Iowa](#), the #2 wind state in the US. The study highlights proponents and advocates of the industry and its plans to expand in the future.

- **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.
- 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 -



- Gratitude -

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