

ENERGY MATTERS

Soundbite summaries of the energy news you need to know

AN OFFICIAL PUBLICATION OF



AMERICAN ENERGY SOCIETY

Week of September 13, 2021

- The Power Read -

- Special report in this issue: the supply chain crisis –

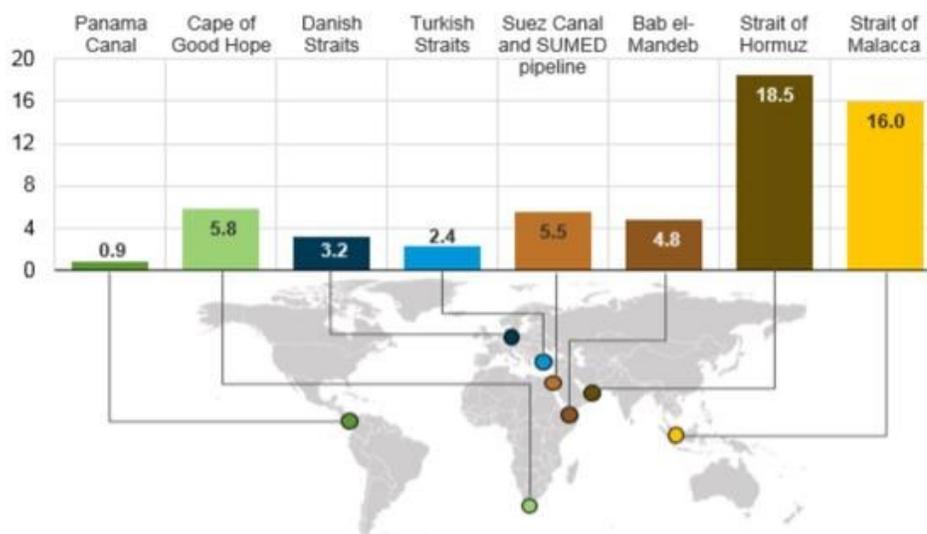
- **Oil:** Oil tankers stuck in the supply chain morass.
- **Policy:** Global diplomacy slows the global supply chain.
- **Low-carbon:** Maersk makes a chicken-or-egg bet on "clean" shipping fuel.
- **Markets:** Climate-tech investing explodes—about 1,000 unique investors participated in ~600 VC climate tech deals since Q2 2020.
- **Electricity and Power:** The top-6 energy producing states: Texas, Pennsylvania, Wyoming, Oklahoma, West Virginia, and North Dakota.

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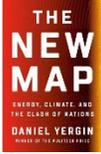
- Fossil Fuels -

- Oil -

- **Special spotlight:** [oil tankers](#) and a supply chain in crisis. (*insert: oil maritime choke points by volume/day*).



"The world economy runs on global supply chains. * But that system is now in trouble, and the troubles will increase.... At the heart of the shipping problem are more than 20 million metal containers. They carry about half of world trade— everything from electronic goods to seafood. Over the last three decades, the global system has become much more complex and highly interdependent. China has emerged as the linchpin of the whole system, home of seven of the 10 largest container ports in the world—it is either the source of manufactured goods or the assembler of components shipped in from other Asian countries."



- Dan Yergin, AES Member, Pulitzer Prize winner, [Energy Writer of the Year 2020](#), author of [The New Map](#).

* Today, 42% of all the containers arriving in the US come from China.

- Forty-four freight ships are waiting for entry into California's [two largest ports](#), Los Angeles and Long Beach, many of which are oil tankers. (Note: typically, the number of oil tankers at anchor at these two ports is between zero and one.)



- Gas -

- Natural gas, by the numbers:

- -260° F: The temperature at which natural gas becomes a liquid.
- 100 million years: When the natural gas extracted today was formed.
- 2.5 million miles: The total length of pipeline that transports natural gas across the US (enough to get to the moon and back five times).
- 33 Tcf: The amount of dry natural gas produced in the US each year (Russia produces the second most: 23 Tcf.).

- Mining, Minerals and Coal -

- Spotlight: bituminous coal:

- Bituminous coal is the most abundant coal in the US (about 48% of total production).
- Bituminous coal is used to generate electricity, and as a fuel in the steel industry.
- Bituminous coal contains 45% – 86% carbon.
- A majority (68%) of US coal fleet [retirements](#) were plants fueled by bituminous coal.
- Five states account for about 75% of total bituminous production: West Virginia (27.5%), Pennsylvania (14%), Illinois (13.5%), Kentucky (10.6%), and Indiana (9%).

- Carbon Capture -

- In September 2020, **Shopify purchased 1,000 tons of carbon removal from Charm**; Shopify's carbon is now permanently sequestered in geologic storage and the company has signed an expanded agreement to remove an additional 3,000 tons CO₂e by the end of 2023.

- Low-Carbon Energy -

- Maersk ordered **8 new ships** (\$1.4 billion, or 12% more than standard vessels) from Hyundai Heavy Industries that will have the capacity to **travel on green methanol as well as traditional fuel**. Meanwhile, Yara Intl (in Norway) now operates a **zero-emission autonomous cargo ship**. Note: Until recently, the shipping industry had a chicken-or-egg dilemma (i.e., no one was building ships that use clean fuel because there was no clean shipping fuel available; and, no one was producing clean shipping fuels because there was no demand).



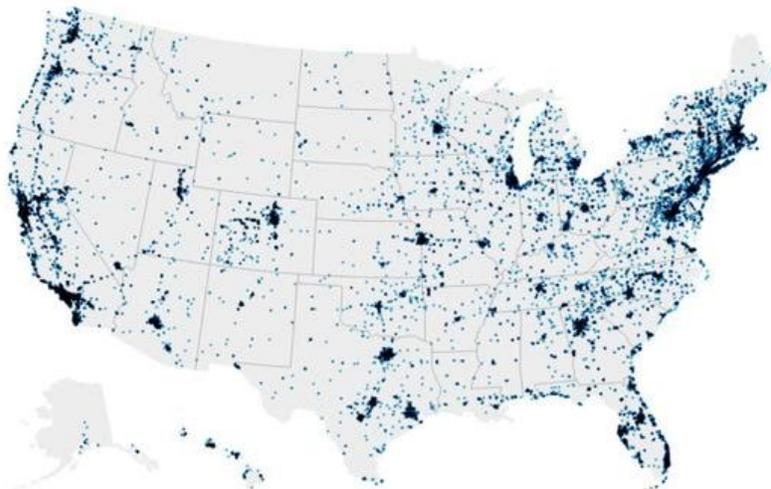
- The state of **wind energy**:

- Wind energy output accounts for 8% of US electricity supply; it provides more than 20% in 10 states.
- Turbines continue to get larger; in 2010, no turbines had blades larger than 115 meters in diameter; now 91% of all newly installed blades are larger.
- The average installed cost of wind projects is \$1,460/kW (about the same cost for the last three years). Wind energy prices are ~\$20/MWh in the interior "wind belt" of the US; it is about \$33/MWh for the US.
- Only about 80 megawatts of a total 32 gigawatts (0.25%) of installed offshore wind capacity is floating.

- Levelized **cost** comparison of solar generated energy:

- Residential solar: ~\$0.15 - \$0.22 / kWh
- Community solar: ~\$0.07 - \$0.17 / kWh
- Utility scale solar: ~\$0.03 - \$0.04 / kWh

- **The US has about 43,000 public EV charging stations** and 106,000 public chargers, but very few in rural areas.



- Policy -

- *Trend-spotting special: Keep an eye on Capitol Hill this Fall – it's going to be a wild ride.* It is still uncertain if Congress will pass either the bipartisan infrastructure deal or Democrats' reconciliation bill, but many AES Member policy experts were skeptical that Biden's budget would get even this far.

- **Democrats** have added a few energy-related rules and regulations to Biden's proposed \$3.5 trillion budget resolution, including:
 - a border adjustment import [fee](#)
 - a methane emissions fee
 - a clean electricity standard
- **Republicans** are leading the markup process in the US House Natural Resources Committee; last week, the Committee marked up (aka "critiqued") 40 of the roughly 150 amendments added to the budget bill, many of which were added by Republicans themselves (Democrats call this method of marking up the bill a "Republican war of attrition."). Republicans on the committee are trying to cut the provision that would create the Civilian Conservation Corps and delete all royalties paid for hardrock mining ... and, of course, the entire bill itself.

Meanwhile, **the Biden administration is going to issue rules about [methane emissions](#) from existing wells.** These methane rules are separate and unrelated to the Obama Clean Power Plan and Trump's Affordable Clean Energy Act. In other words, if passed, the new methane rules will be the Biden administration's signature climate policy.

- Some of the causes of the supply chain crisis:

- COVID forced a partial shutdown of one of the world's largest ports in China.
- A major US railroad suspended all container movements from the US West Coast due to a backlog in Chicago.
- Factories in Vietnam, primary suppliers to China, have shut down due to a COVID surge.
- Chinese factories have shut down to contain the delta variant.

- *Breaking news: President Joe Biden selected [Willie Phillips](#) of the DC Public Service Commission to be the next FERC commissioner.*

- *Featured insight:* The Obama administration introduced the first estimated [social cost](#) of greenhouse gas emissions. Originally, estimated costs of emissions were used for rule-making by the EPA, but now estimated social costs of GHGs are used for permitting, procedures, insurance risk, PUC rate-making, and legislation (e.g. in Minnesota and [Colorado](#)). Below, **a comparison of social costs of greenhouse gas emissions, by presidential administration** (thank you [SME](#) and AES Member Brittany Bolen at Sidley):

Social Cost - GHG	<u>Obama Admin.</u>	<u>Trump Admin.</u>	<u>Biden Admin.</u>
Carbon	\$43 per ton	\$7 per ton	\$51 per ton
Methane	\$1,400 per ton	\$184 per ton	\$1,500 per ton
Nitrous Oxide	\$18,000 per ton	\$2,820 per ton	\$18,000 per ton

- Spotlight COP26 -

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- At the risk of oversimplifying a complex and challenging global agenda, the entire COP26 conference (Nov. 1 - 12) will **focus almost entirely on [Article 6](#) from the Paris climate agreement.** Article 6 promotes voluntary international co-operation on climate action; it presents the possibility of trading emissions reductions between countries and could provide the foundation for an international carbon market.

- Climate and Sustainability -

- *Featured primary source:* The US Government Accountability Office (GAO) found that since the 1960s, federal regulators have allowed oil and gas producers in the Gulf to [leave 18,000 miles of pipeline](#) on the seafloor without cleanup or removal.

- [Disruptive weather events](#) in the Gulf of Mexico, like Hurricane Ida, can damage crucial US energy infrastructure. Indeed, the Hurricane caused a number of oil spills, including a sizable [oil spill](#) from an offshore drilling platform about two miles south of Port Fourchon, Louisiana. *Insert:* map of energy infrastructure in the path of Hurricane Ida.



- **One week after landfall on Louisiana's coast**, Entergy restored power to half of the roughly million customers who lost power; meanwhile, Ida halted about 80% of the Gulf's oil and gas production.

- **The last leaded gasoline producer, Algiers Refinery, has closed.** (*Note:* in 2002, there were more than 100 countries producing leaded gasoline.)

- Research and Markets -

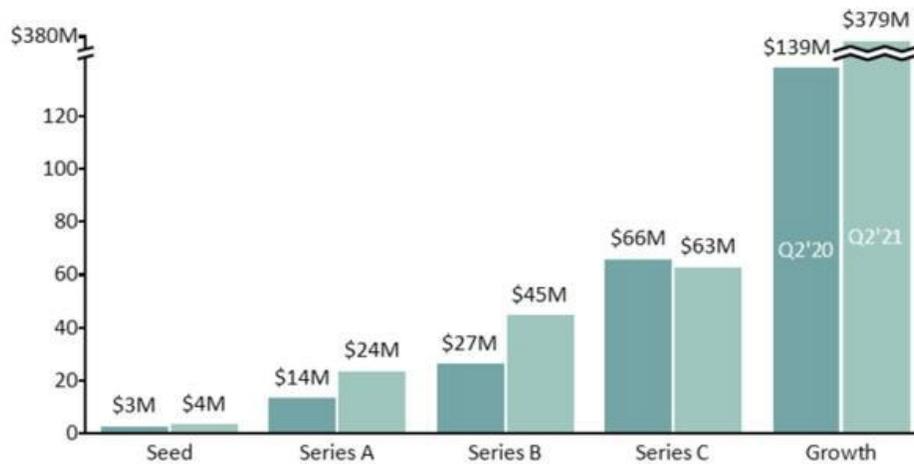
- **Freight rates have spiked** —a single container of goods that pre-pandemic cost \$1,500 to ship from Shanghai to Los Angeles costs as much as \$30,000 today. (Prices throughout the energy supply-chain are passed on.)

- *Supply-chain crisis, continued:* **3D printing is surging in energy and circular economy:**

- [Icon](#), an Austin, Texas-based startup, raised a [\\$207M Series B](#) to advance 3D home manufacturing; the company built the [world's first 3D-printed neighborhood](#) in Mexico.
- Oakland, CA-based [Mighty Buildings](#) [printed a neighborhood](#) in the Coachella Valley.
- [Inkbit](#), an MIT-spinout based in Boston, raised a [\\$30M Series B](#) to bring 3D printing to Air Force bases and produce trucks and [auto parts](#).
- [Fabric8Labs](#), based in San Diego, raised a [\\$19M Series A](#) to advance its metal printing technique that reduces the cost and amount of heat required to print metals at room temperature using water and salt.

- **Climate tech investing is surging** (AES Members have access to [Empowering Impact](#), a study of all energy- and climate-tech incubators in the US). *Insert below:* climate tech VC deal size by stage, Q2'20 vs. Q2'21, in \$M.

- In H1'2021, global investors closed as many [climate-focused funds](#) as during the previous five years combined.
- In the first half of 2021, climate tech startups raised ~\$16b in ~250 deals.
- Series A deals in Q2'21 doubled in average size from Q2'20.
- Mobility sector deals are the largest on average, about half of all the climate tech investments.



- Nike is planning to use a [bioplastic material](#) called AirCarbon to make their next generation of sneaker soles.



- Members of the American Energy Society can join the [Clean Energy Federal Credit Union](#). [Contact us](#) for more information.

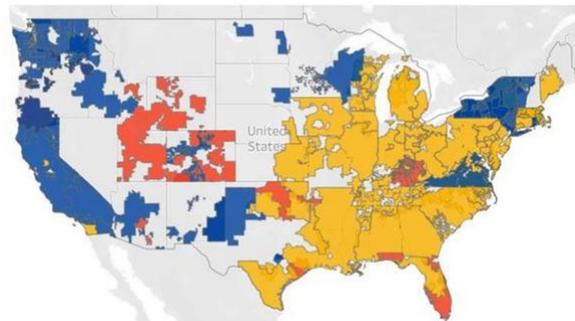
- Electricity, Power, Efficiency, and the Grid -

- The top-6 primary [energy-producing states](#) in the US, or the source of about 55% of all primary energy production:

1. Texas
2. Pennsylvania
3. Wyoming
4. Oklahoma
5. West Virginia
6. North Dakota

- Britain fired up [two coal units](#) at one of its power plants to help keep up with energy supply demands and rising natural gas prices.

- SEPA has re-released a new-and-improved [carbon-tracker interactive map](#) that provides deeper insight into national grid carbon-reduction targets, datasets, and progress.



- Cybersecurity Spotlight -

- AES recommends a white paper from EPRI: [Preparing for the 2030 Energy System: Why We Need a New Cyber Security Vision](#), a roadmap that identifies meaningful actions that enable cyber security to migrate to intrinsic security while accommodating legacy systems.

- Bulletin Board -

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- *Featured event:* [ClimateWeekNYC](#).
- The winners of the Global Energy Prize - the three [laureates](#): Russian scientists Zinifer Ismagilov and Suleyman Alakhverdiev and Yi Cui from Stanford University.
- **A few ESG/climate-related recommended resources:**
 - Event: [Climate Week NYC](#)
 - Fin-tech service: [Bank for Good](#)
 - Report: [The Role of Critical Minerals in Clean Energy Transitions](#), by the IEA
 - Technical Manual: STARS - a **higher education campus sustainability rating system**, [technical manual](#), and implementation guide.

Hot Energy Jobs

[Contact us](#) to post a job, find qualified candidates, or fill difficult positions.

In case you missed it, see the special *Energy Today* issue: [Hot Jobs Market](#).

- Breakthrough Energy Ventures is looking for a [Senior Director of Project Finance](#).
- [H&M](#) is looking for early-stage entrepreneurs working on innovations that can bring “radical change” to the apparel industry.
- American Council for an Energy-Efficient Economy is seeking a [Communications Manager](#) (DC preferred; salary range: \$67,500 - \$84,000).
- [Fervo Energy](#) is hiring, from policy to geophysics.
- Assistant, Associate or Full [Professor](#) - Energy and Environmental Economics and Policy, **University of Chicago**.
- Ontario [Research Chair](#) in Sustainable Energy at the **University of Waterloo**.
- Tenure Track Faculty Position in [Mining Engineering](#) at **Penn State**.
- [Senior Strategy and Policy Officer for Energy](#), Asian Infrastructure Investment Bank.

- Quotes -

The human side of the [supply-chain crisis](#)...

“Unrelenting consumer demand.”

- Gene Seroka, the head of the Port of Los Angeles, on the primary cause of the supply-chain crisis

“Container traffic is tough to book, with many delays at the other end, and costs are still way too high. The holiday traffic in retail goods will only make things worse.”

- James Reinis, AES SME and 40-year supply chain veteran

"The rapid development of global supply chains has been a major engine for the more than doubling of global GDP over the last three decades ... but now the systems is choked up."

- [Daniel Yergin](#), vice chairman of IHS Markit, Pulitzer Prize winner, and author of *The New Map: Energy, Climate, and the Clash of Nations*

- Gratitude -

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