

ENERGY MATTERS

Soundbite summaries of the energy news you need to know

AN OFFICIAL PUBLICATION OF



AMERICAN ENERGY SOCIETY

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- The Power Read -

- **Oil:** The market hinges on one number: if and how often global oil demand has increased 1.4 million barrels per day.
- **Solar:** The US DoE has a new SunShot goal: 60% cost reduction in 10 years.
- **Power:** The total amount of power generated in the US decreased by 5% last year - the largest decline on record.
- **Electricity:** The DoE is offering \$8 billion in loans for transmission infrastructure.
- **Markets:** There is a mismatch between the world's climate ambitions and the availability of necessary minerals for clean energy technologies.

- News from the Society -

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- Fossil Fuels -

- **Oil:** According to many AES expert thought leaders, the current oil demand rebound in the US, China, and Europe will outweigh lower demand due to horrific COVID conditions in India and Brazil. But, the general macro-direction of **the market appears to hinge on one number: if and how often global oil demand has increases 1.4 million barrels per day** will likely determine if a supercycle (\$80 to \$100 per barrel) will follow. *Note:* the [EIA forecasts](#) a mostly balanced market during the second half of 2021, while the [IEA projects](#) much stronger demand in the same period.

+1.4
million boe

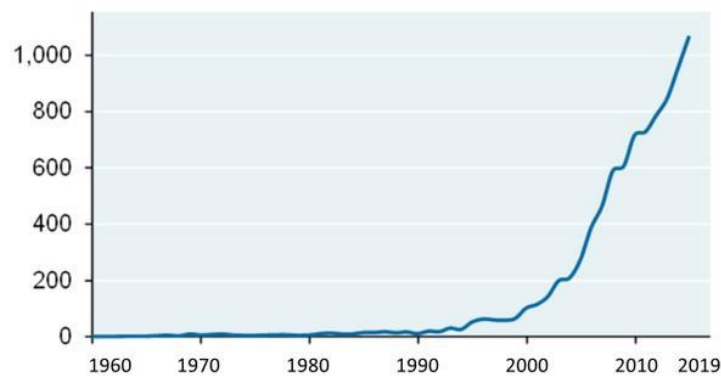
- **Gas:** A comparison of [CO2 emissions](#) in US shale regions, by barrel of oil equivalent:

1. Appalachian Basin (7.1 kg of CO2 boe - one of lowest; in global top-quartile)
2. Haynesville Shale (7.5 kg of CO2 - fast growing region)
3. Niobara Basin (10.6 kg)
4. Permian Basin (10.9 kg)
5. Eagle Ford (11 kg)
6. Bakken (20.7 kg of CO2 per boe - one of the highest emission rates in the world)

- **Coal:** A sample of countries that publicly announced plans to reduce use of coal as a fuel source ... and then [increased consumption](#):

- [Japan](#) has increased coal consumption since the 2011 Fukushima nuclear disaster.
- [Mexico](#) is scrambling to shore up its energy security in the face of an economic downturn.
- [Canada](#) is looking to coal to fill the economic holes left by the demise of its oil sands. The first to expand is the Grassy Mountains Mine.
- [Australia's](#) coal consumption is on pace to increase 2.6% in 2021.
- [United States](#) coal consumption will increase 2% this year.
- [India](#) still relies on "king coal."
- [China](#) is adding more coal than the rest of the world combined.

- **Carbon Capture:** *Image below - academic papers on carbon capture, by number published per year.* (*Note:* in the same period, carbon capture and storage facilities have stored just 0.1% of global CO2 emissions.) Source: PubMed. 2020.

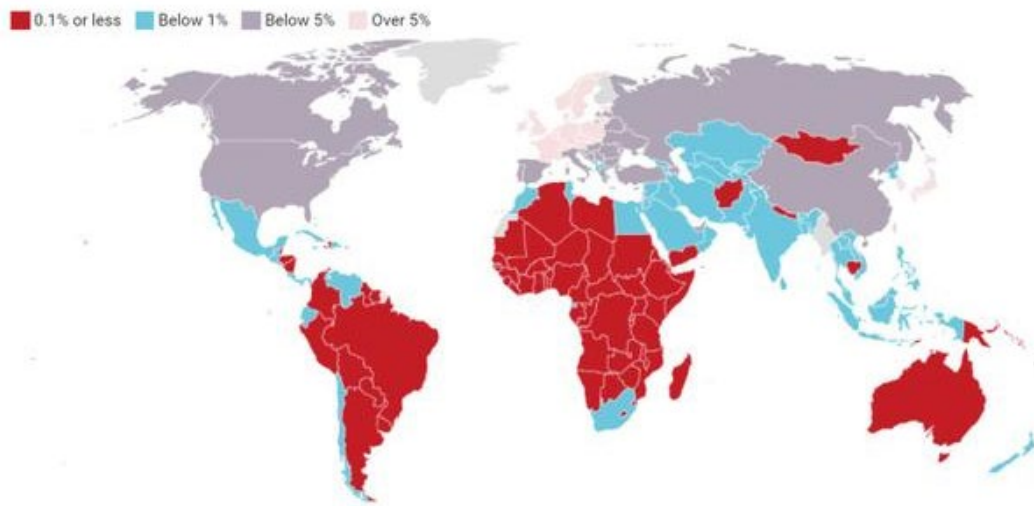


- Low-Carbon Energy -

- Under President Biden, the Department of Energy has a [new SunShot solar price goal](#): **cut large-scale solar costs by 60%** in the next decade, up from a target 50% reduction goal set before Trump took office. It is estimated that R&D, and especially deployment, will have to advance five times faster than the current pace to achieve this new goal.

- 60%
cost reduction
in 10 years

- Estimated [share of land](#) required to generate a region's required energy by solar (*insert*):

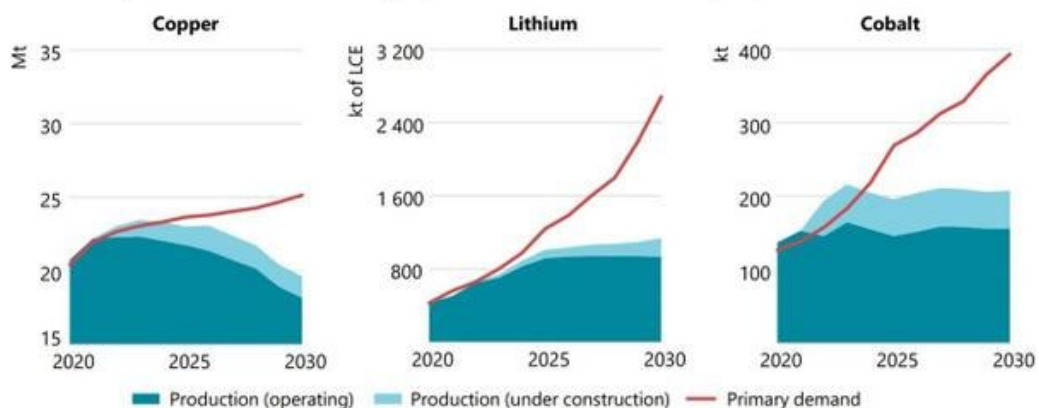


- New research finds that [wind energy cost reductions](#) have accelerated in recent years — much faster than previously predicted by most forecasters and experts, and faster than historical rates of decline.

- The levelized cost of energy (LCOE) of [onshore wind](#) in the US now averages \$35/MWh, with power sales agreements often signed at below \$20/MWh.

- There is a mismatch between the world's climate ambitions and the availability of critical minerals for clean energy technologies (like electric vehicles and wind turbines), including [copper](#), lithium, nickel, cobalt and rare earth elements. AES Members have access to the [special report](#).

A comparison of mineral supply and climate ambitious, by actual vs. ambitions



- Policy -

- Among many announcements on Earth Day, **the White House published a comprehensive [list of the administration's proposals](#).**

- Critical for President Biden's plan to transition the US to a low carbon economy are "storage" technologies that allow for greater use of intermittent power sources like wind and solar. However, **most current US and global energy policy objectives [benefit China](#):**

- China controls 80% of total global output of critical minerals like lithium, graphite, cobalt, and nickel, and half the cobalt reserves in the Democratic Republic of the Congo.
- China has the largest minerals processing industry in the world: 60% of all refined lithium; 65% of nickel; more than 80 percent of cobalt; and 100% of spherical graphite.
- China leads in battery assembly/manufacturing facilities. Of the 180 facilities in the world, 130 are in China (there are 10 in the US).
- About half of all lithium-ion batteries are recycled in China (and South Korea recycles 20%, the second largest recycling program in the world).

- **The US will update its hydrofluorocarbons (HFC) rules with a new a regulatory approach known as "cap and replace" that will phase out these harmful chemicals by 2022.** The new rule has not yet been published in the Federal Register, so AES Members have access to a [draft](#) of the rule and supporting materials.

- Wyoming legislators have created a \$1.2 million public fund to support [lawsuits against other states that block imports of Wyoming coal](#). The first states Wyoming has targeted for lawsuits are Washington, Colorado, and Oregon.

- **The Pentagon uses the [DCAT climate assessment tool](#) to identify DoD installations most vulnerable to climate hazards.** AES Members have access to an [unclassified overview](#) of the data and trends identified by the DCAT assessment tool.

- **The United Nations is using "[Gross Ecosystem Product](#)" to measure the contributions of "nature" to gross national product (GNP).**

- Climate and Sustainability -

- **The 2019 US Annual Greenhouse Gas [Inventory](#)** by the US EPA; summary below:

- GHGs decreased by 1.7% in 2019, partly reversing a 3% increase in 2018.
- The US emitted a gross total of 6,558.3 million metric tons of CO2 equivalent from all sources, and a net total of 5,769.1 million metric tons.
- Overall, fossil fuel combustion emissions were down 2.7% year-over-year, driven by an 8.4% reduction in the electricity sector.
- Annual methane emissions from the natural gas distribution system declined 69% from 1990 to 2019 (while natural gas utility companies added 788,000 miles of pipelines).
- The transportation sector, the largest source of GHG emissions in the US, increased only slightly, by 0.03%. *Note:* transportation activities accounted for 37.5% of all CO2 emissions in the US.

- **Featured: The world has made progress cutting CO2 emissions, but it urgently needs to cut methane emissions.** AES Members have access to [peer reviewed research](#).

- Emissions are slowing in Western nations, but **global CO2 emissions rose from 32 billion tons in 2009 to 37 billion in 2019** (Source: The Global Carbon Project).

- The Brazilian Amazon is [now releasing more CO2](#) than it absorbs.

- Research and Markets -

- The Advanced Structures & Composites Center at the University of Maine has built or repaired 23 bridges with its composite **3-D printed "Bridge in A Backpack" system**.

- **1t.org** launched a "[1 trillion trees](#)" campaign.

- **TeraWatt Infrastructure "unstealthed" and is preparing to build a massive charging network for EV fleets in 18 states.** [Neha Palmer](#), former head of Google energy strategy, raised more than \$100 million from Keyframe and Cyrus Capital. Note: there are two other US companies in the EV charging infrastructure sector — EVgo, with about 30,000 chargers including about 800 fast chargers, and ChargePoint, with more than 18,000 chargers including about 150 fast chargers. The latter two firms have both gone public via reverse mergers with special-purpose acquisition companies (SPACs).

- **Honeywell successfully tested its cloud-based, closed-loop, hardware agnostic machine learning [Forge Energy Optimization system](#)** at Hamdan Bin Mohammed Smart University (HBMSU) in Dubai, United Arab Emirates.

- [Salesforce](#) notified its thousands of suppliers that all future procurement contracts will require **science-based targets to reduce their greenhouse gas emissions. There will be financial penalties for those that don't.**

- Electricity, Power, Efficiency and the Grid -

- **In 2020, energy production in the US fell to 96 quadrillion BTUs (quads), down more than 5% from 2019; in absolute terms, this annual [decrease](#) is the largest on record.**

- Featured: The US DoE made **\$8.25 billion in federal loans available to upgrade and expand the country's [electric grid](#)**, including \$3.25 billion for western states and \$2 billion earmarked for tribal lands. To be eligible, innovative projects must avoid, reduce, or sequester greenhouse or air pollutant emissions.

- To reach President Biden's reduction targets, **the electricity sector must cut an additional 1.2 gigatons of emissions.** That would mean 1,500 terawatt hours of electricity generation would have to be [provided](#) by cleaner sources (if consumption stays flat, and proportionately more if the number of electric vehicles increases).



- **22 high-voltage shovel-ready transmission projects are ready to begin construction**; these [22 projects](#) would add 8,000 miles, 42,000 MW of transfer capacity, and 60,000 MW of power to the grid, with emphasis on new renewable capacity. (Note: the lines are a mix of alternating and direct currents (AC/DC), with DC generally used for lines that are longer or at least partially underground or underwater.) *Insert: map of proposed projects.*

- [Global Power System Transformation \(G-PST\) Consortium](#), which the US just joined, is focused on **improving grid reliability, resilience and security around the world.**

Cybersecurity Spotlight

- Colonial Pipeline, which carries 45 percent of the fuel supplies for the eastern US, was the victim of a cyberattack which affected some of its IT systems and had to shut down operations for a short period. The incident was a [ransomware attack](#). Note: AES expert member [Joe Weiss](#) offers that **the most harmful and probably most common cyber attacks across all energy sectors are usually directed at [control systems](#)**, "the system of systems." When a control system is compromised, it impacts everything else.

- Member Bulletin Board -

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- May 19 and 27, June 23 - "[The Energy Transition](#): Gearing Up for Smarter Utility and Industrial Power Grids," hosted by Siemens.
- **May 24 - 26: ARPA-e [virtual Energy Innovation Summit](#).**
- In a new report, [JP Morgan](#) has identified the companies that will reach their net-zero and/or negative carbon goals ahead of schedule.
- **June 22 - 25, 9am - 2pm (PST), H4X Labs Deep-Tech free [virtual conference](#).**
- [Salesforce](#) may not be the first company policy to press suppliers on climate — but it may be the first one with teeth.
- Women in Cleantech & Sustainability launched the [WCS Scholarship](#). Apply by June 1.

- Quotes -

It's going to be a messy transition

"The global oil market is in terminal decline and any price rally is a dead cat bounce." - Andy Hall, Financial Times

"If the last 20 years have taught us anything, never bet against any solar cost goals as too ambitious." - Ravi Manghani, head of solar research at Wood Mackenzie

"There is a mismatch between the world's climate ambitions and the availability of critical minerals that are essential to realizing those ambitions." - Dr Fatih Birol, IEA Executive Director

- Gratitude -

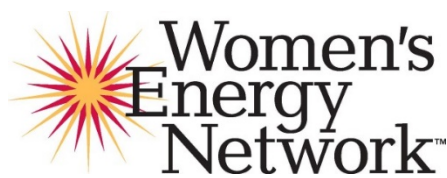
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