

ENERGY MATTERS

Soundbite summaries of the energy news you need to know

AN OFFICIAL PUBLICATION OF



AMERICAN ENERGY SOCIETY

July 26, 2021

- The Power Read -

- **Oil:** a chaotic week.
- **Coal:** a price-record set.
- **Electricity:** a Congress divided.
- **Policy:** China, an opportunity seized.
- **Climate:** an extreme sequence of weather events.
- **In case you missed it:** watch videos of the 11th annual [SISE conference](#), including Dr. Kimberley Miner's [keynote address](#) on our planetary tipping point.

- Fossil Fuels -

- Oil -

- This is what the global oil market looked like when the third week of July began...

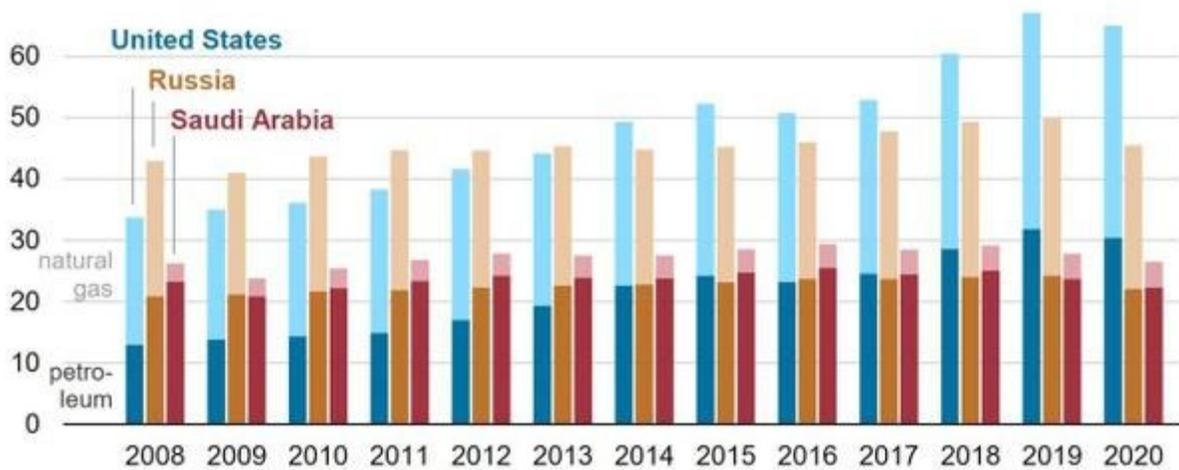
- WTI **+0.95%**
- Brent **+0.89%**
- US Rig Count **+5 to 484**
- Oil on its way to **+\$80/barrel** ([Goldman Sachs](#), etc.).

But, by the end of the week...

- OPEC+ resolved its differences
- Saudi Arabia and the UAE agreed to [allow](#) the cartel to increase production
- New global COVID cases: +100,000
- Oil markets [hiccoughed](#).

- Gas -

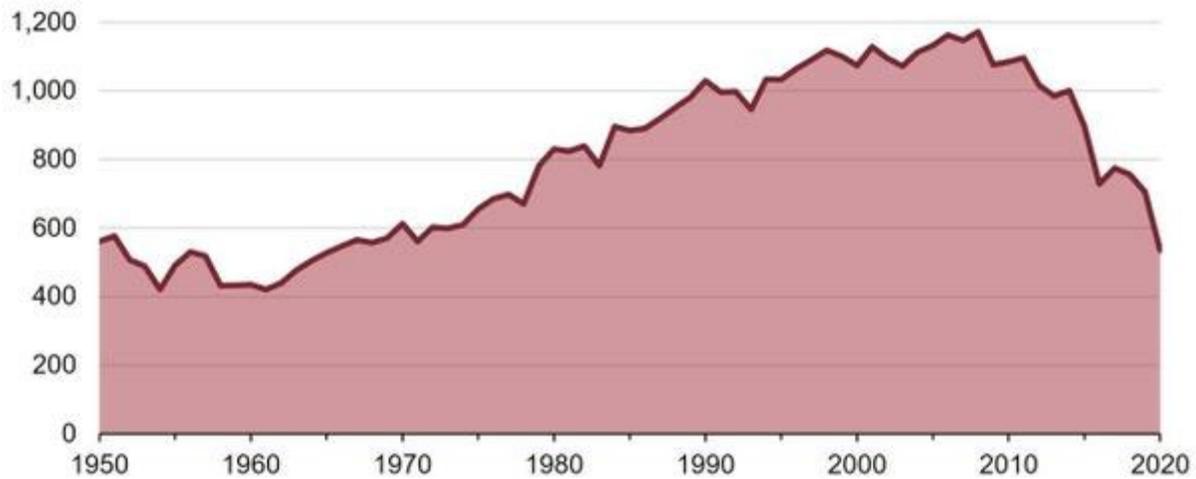
- The US continues to [lead](#) global natural gas (and oil) production (*insert: estimated O&G production in select countries, in quadrillion BTU's*).



- Coal, Mining and Minerals -

- Coal prices have gone above [\\$150 a metric ton](#) (a record). There are several reasons:

- Coal production in the US has fallen to its [lowest](#) level since 1965 (*insert below*).
- A heat wave in China, the world's largest coal consumer, has higher demand for coal-fired electricity (2.2 million metric tons/day, a record high).
- Warm weather in the US has pushed natural gas prices higher.



- Carbon Capture -

- The US state most aggressively pursuing carbon capture? Probably **New York**.

- Carbon to Value (C2V) [Initiative](#)
 - Carbontech Leadership [Council](#)
 - Carbon Management Research [Initiative](#)
 - Carbontech Entrepreneurial Fellowship [Program](#)
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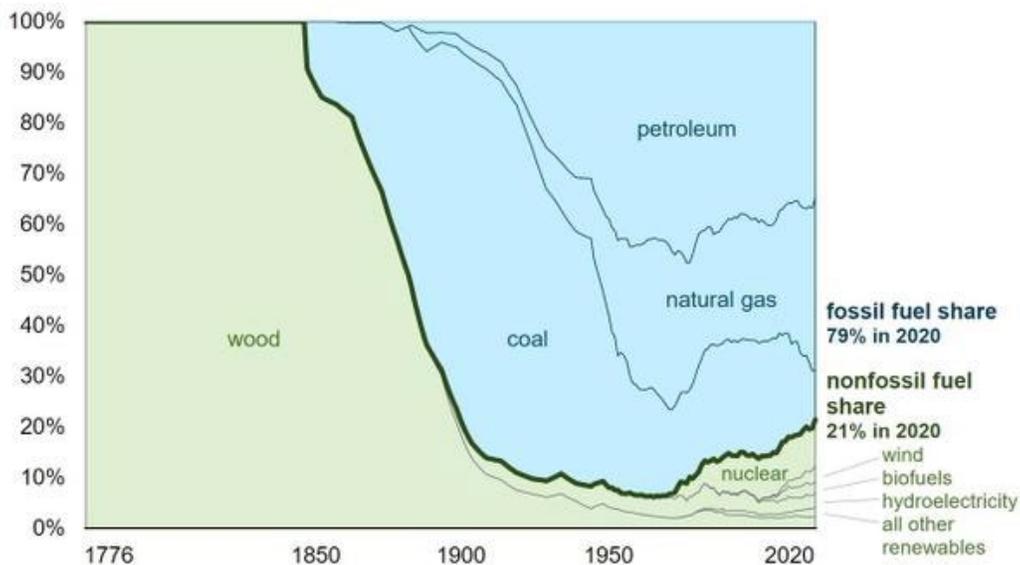
- Low-Carbon Energy -

- There are six leading studies about the pathway to achieving a high renewables electricity grid. (Note: All six arrive at somewhat similar projections for wind and solar power.) [AES Members](#) have access to all six reports:

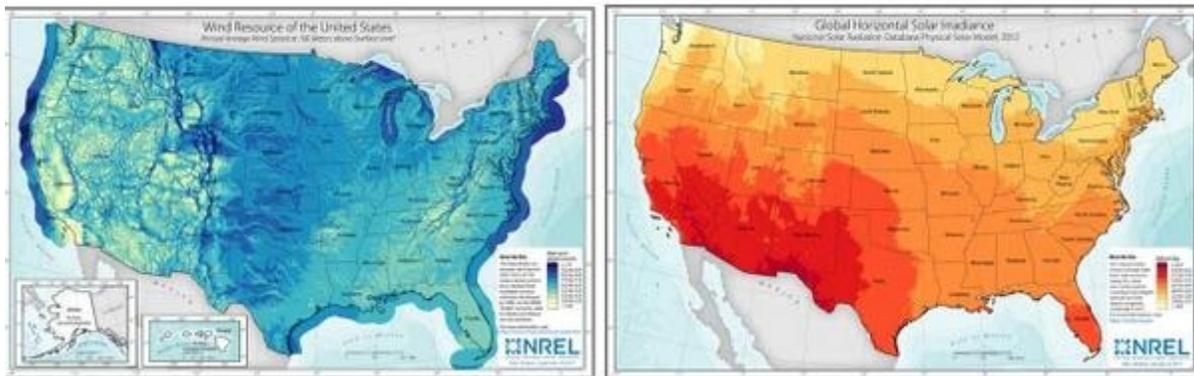
1. [UC Berkeley 2035 Report](#): 1,100 GW of wind and solar (90% of total)
2. [Electrification Futures Study](#) (NREL): 600 GW wind; 1,000 GW solar (75% of total)
3. [Interconnections Seam Study](#) (NREL): 900 GW wind and solar (63%, excludes Texas)
4. [MIT study](#): 1,200 GW wind; 1,100 GW solar (100%)
5. [Renewable Integration Impact Assessment](#) (MISO): 411 GW wind; 677 GW solar (100% for the Midwest only)
6. [ZeroByFifty](#) (Vibrant Clean Energy): 1,100 GW wind; 1,000 GW solar (100%)

[Contact us](#) if you are a Member and cannot access any of the above reports.

- Retrospective: [US energy consumption](#), from 1776–2020, by percentage of total. (Source: Sam Schurr and Bruce Netschert, [Energy in the American Economy](#), 1850–1975; Its History and Prospects.)



- Wind and solar [resources](#) in the United States (*inserts below*).



- [Critical minerals needed for clean energy technologies](#) (*insert*: shading indicates the relative importance of a mineral for each technology: high (black); moderate (grey); low (white)).

	Copper	Cobalt	Nickel	Lithium	REEs	Chromium	Zinc	PGMs	Aluminium*
Solar PV	●	○	○	○	○	○	○	○	●
Wind	●	○	●	○	●	●	●	○	●
Hydro	●	○	○	○	○	●	●	○	●
CSP	●	○	●	○	○	●	●	○	●
Bioenergy	●	○	○	○	○	○	●	○	●
Geothermal	○	○	●	○	○	●	○	○	○
Nuclear	●	○	●	○	○	●	○	○	○
Electricity networks	●	○	○	○	○	○	○	○	●
EVs and battery storage	●	●	●	●	●	○	○	○	●
Hydrogen	○	○	●	○	●	○	○	●	●

- Policy -

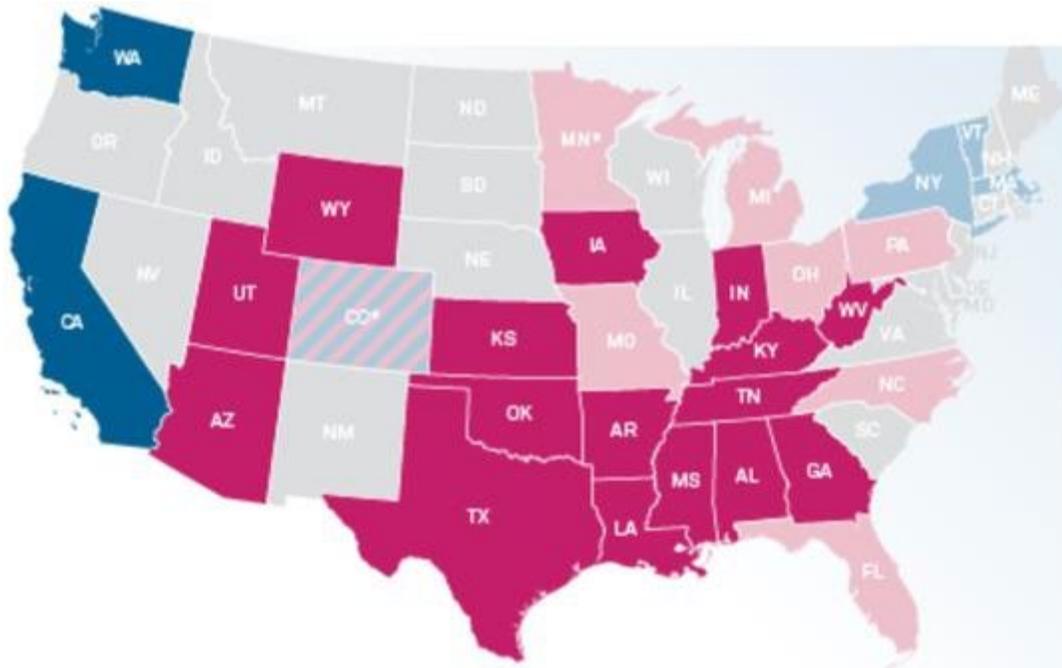
- The American Jobs Plan proposed by President Biden, [originally](#) for 10-years and \$2 trillion, is **now at about \$579 billion**. Meanwhile, Senate Energy & Natural Resources Committee Chairman Joe Manchin (D-WV) has introduced a [separate](#) 423-page draft energy infrastructure bill.

- The US Congress voted to [restore environmental regulations](#) to limit the amount of methane that leaks from US oil and gas production facilities, reversing a Trump-era rollback for the greenhouse gas.

- State-level Energy Policy -

- Solar farm developer Allco Renewable Energy Ltd and its owner [Thomas Melone](#) filed suit asking a Massachusetts federal court to [reject the federal government's approval of Vineyard Wind](#), the country's first commercial-scale offshore wind project (800 MW).

- On the one hand, **16 states have passed legislation to prohibit any restrictions on the use of natural gas** (and seven are considering similar legislation). On the other hand, **six states have passed legislation that restricts the use of natural gas**. (Note: five of the six states with restrictions are also among the nation's [largest consumers of natural gas](#)).



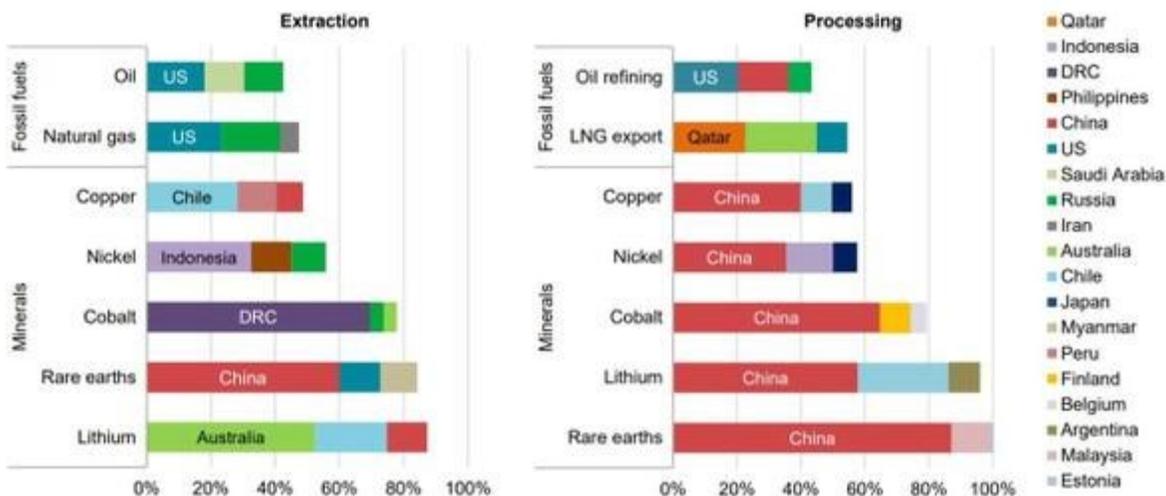
- Energy policy around the world -

- Germany and the US have officially resolved years of political wrangling by striking a deal over the controversial [Nord Stream 2 pipeline](#), which will deliver natural gas to Germany from Russia. A few thoughts to consider:

- The agreement expands the influence of Russia in Eastern Europe.
- The project was already 90% complete, so it might have been unnecessarily antagonistic to block its completion.
- Perhaps it is better to have a "calculated decision" than no agreement.

- Featured (link in Chinese): [China has passed legislation to strengthen “high quality” development of its rare earth industry in Baotou](#), the rare-earth capital of the world. (Note: Baotou is to rare earth elements and minerals as Houston is to oil and gas or Silicon Valley to technology.)

- Mining and production of rare earth elements is more geographically [concentrated](#) than it is for oil or natural gas. (Insert: the share of the top-3 producing countries, by selected minerals and fossil fuels.)



- Seventeen **national, provincial or state governments** are **phasing out** the internal combustion engine passenger car (*insert - darker blue signifies the ambition of the policy.*)



- JOIN -

- Did you know that Organization Members (partners) receive all AES datasets and many other special benefits? [Contact us](#) for information about Organization Membership.

- Climate and Sustainability -

- [Flooding](#) in Germany, Belgium, and the Netherlands, severe droughts in Brazil and [Madagascar](#), and extreme heat in Pakistan (126°) and the Pacific Northwest (116° in Portland; 108° in Seattle; 121° in British Columbia) have led **climate scientists to reevaluate existing models**, from "[positive feedback loops](#)" to "[planetary wave resonance](#)."

- Same day and city, different surface temperatures (*insert: Milan, July 1, 2021*).



- Britain's weather service issued its first-ever Amber Extreme Heat [warning](#).

- It takes about **2.5 gallons of water to grow one tomato**; tomatoes make up [15%](#) of all vegetable production worldwide. (Note: 130 million tons of tomatoes are grown each year.)



- Research and Markets -

- The US DoE launched the [Long Duration Storage Shot](#), which sets a goal to reduce the cost of grid-scale long duration energy storage by 90% within the decade. *Context:* in 2011, the US DoE launched the [SunShot Initiative](#) to reduce the total costs of solar energy by 75% and make solar energy cost-competitive with other forms of energy (without subsidies) by the end of the decade. On September 12, 2017, the DoE announced that SunShot successfully met the utility-scale solar cost target of \$0.06/kWh three years earlier than expected.

- It is about **five times more expensive to recycle the materials in lithium-based batteries** (high-grade copper, aluminum, cobalt, nickel, graphite, manganese, and some rare earths) than to mine or manufacture these battery materials. Consequently, only a few companies are focusing on recycling lithium-based batteries, like [Redwood Materials](#).

- **Dataiku has developed a number of interesting [AI applications for energy](#)**, including ESG investing, optimizing renewables to weather patterns, and biodiversity of farmlands.

- **Tesla has signed a deal with BHP**, the world's largest [nickel](#) miner, in order to secure the resource for battery production.

- Related, there is **new research on biodegradable batteries**. Scientists in Sweden have developed a battery from [Aerogel](#), a wood pulp-based product. Also, [EMPA](#) (Swiss Federal Laboratories), have created a biodegradable battery. Using an off-the-shelf 3D printer, EMPA creates a "secret sauce" mixture of cellulose nanofibers, cellulose nanocrystals, carbon black, graphite, and activated carbon that is liquefied with glycerin, alcohol, and a bit of table salt.

- **When oil prices are lower than projected, oil tanker ship speeds [slow down](#) by about 25%**; the opposite is true when prices are higher than projected.



- Electricity, Power, Efficiency and the Grid -

- Comparing "business as usual" projections in 2005 to what actually happened in 2020, **carbon emissions in the power sector were less than half of what was projected**, and 42% lower than 2005 levels. AES suggests reading the "[halfway to zero](#)" report. Several other notable factors:

- demand was 24% less than projected
- renewables were 79% more than projected
- natural gas was 112% more than projected
- coal and oil were 70% less than projected

- To help prevent wildfires, **PG&E has budgeted between \$15 and \$30 billion to [bury](#) 10,000 miles of power lines** ... about 10% of its total lines.

- China's coal fleet has surpassed 1,000 GW of electric generating capacity ... about the same size as the entire US electricity supply (natural gas, coal, oil, nuclear, and renewables combined).



- Between 2000 and 2019, there were about 1,141 investments by Chinese lenders to African governments, **about \$153 billion (USD) for development of [electricity generating projects](#)** (includes infrastructure).

- FERC (the Federal Energy Regulatory Commission) is often ignored, overlooked, underappreciated, and always in desperate need of attention. For instance, the commission often lacked a quorum for much of the last five years and is currently waiting for nominations from the White House to fill two of five empty seats. **Consequently, there is a campaign in the US House of Representatives to bring attention to the needs of FERC using Stallion's 2019 hit, *Hot Girls Summer*.** (*Editor's warning: there are so many levels of "wrong" with this strategy of using [Hot Girls Summer](#) it's hard to know where to begin - the music video starts at 0:58).*



- Cybersecurity -

- In response to the Colonial Pipeline hack, **the US House of Representatives approved a pair of legislative proposals ([HR 3119](#) and [HR 2931](#)) to strengthen cybersecurity and protect critical energy infrastructure.** The first expands the US DoE cybersecurity responsibilities and the second provides funding to support information sharing between government and industry. (*Note: in most cases, AES only reports on legislation that is successfully signed into law; however, it is very likely these two bills will receive bipartisan Senate approval and support from President Biden.*)

- Member Bulletin Board -



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- CELF has published an [article](#) about corporate ESG initiatives to help prepare the youngest generation for the future workforce.
- [Ally](#) has launched a new, interactive user platform.
- University of Maine is hosting [AFloat 2021](#) (offshore wind), Sept. 8 - 9, 2021.
- [Pivot2021](#) for Geothermal just happened. Revisit the program for archived recordings.
- [Cleantech Forum Europe](#) is happening 5-8 October 2021.
- Student Energy has launched [Solutions Movement](#).

- JOBS -

- **Berkeley Lab's Building Technology and Urban Systems (BTUS)** division invites applications for the Art Rosenfeld Building Science Postdoctoral [Fellowship](#) to support fundamental scientific and technological advances in building technology research. Deadline to apply is July 30, 2021.
- **Cushman & Wakefield** is seeking a [Global Sustainability & Energy Manager](#).
- **Cummings Group** in Los Angeles is seeking an [Energy Project Manager](#).
- **McCarthy Buildings Co.** (Phoenix) is seeking a [Renewable Energy - Manager](#).
- **Schneider Electric** is seeking a [Client Development Manager, Cleantech & Carbon Advisory](#) (00745Z)
- **ClearPath** is seeking to hire a [Program Director](#) for their Carbon Capture Policy team, and a [Policy Analyst](#) for their Economics, Finance and Power Markets team.
- **WindBorne** is hiring for a meteorologist, business development, and [field operations](#).
- **Tesla** has [internships](#) (Fall, 2021) for Energy Engineers to work in "Power Systems".

- Quotes -

Thinking about climate science...

"Current actions are not commensurate with the threat we face."

- Philip Duffy, executive director of the Woodwell Climate Research Center

"The German language has no words, I think, for the devastation."

- German Chancellor Angela Merkel

"Climate scientists tend to be overly conservative."

- Michael Wehner, Lawrence Berkeley National Laboratory

"We know that many assumptions [in the IPCC report] are not realistic or feasible."

- Daniela Jacob, director of the Climate Service Center Germany, on a survey of technologies designed to reduce or utilize carbon.

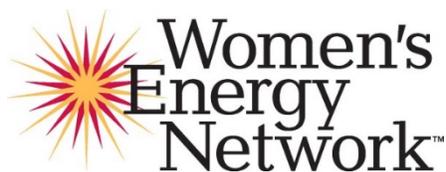
- Gratitude -

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