

# Energy Matters

October 26, 2020

*Soundbite summaries of the energy news you need to know*

This publication is for **Members** of ...



AMERICAN  
ENERGY  
SOCIETY

## *News from the Society*

- **Last chance:** [Download](#) **Silicon Valley Energy Ecosystem for free:** a comprehensive review and report of all 1,465 energy ventures in the Valley, including the top 253 influencers, analysis, and more!
- *In case you missed it:* [Top US Energy Universities 2020](#)
- Discover all that [AES Membership](#) has to offer - \$129/year; or, become a Friend for free. [Contact us](#) about organizational membership discounts.
- **Note:** AES will not publish during US election week.

## *Fossil Fuels*

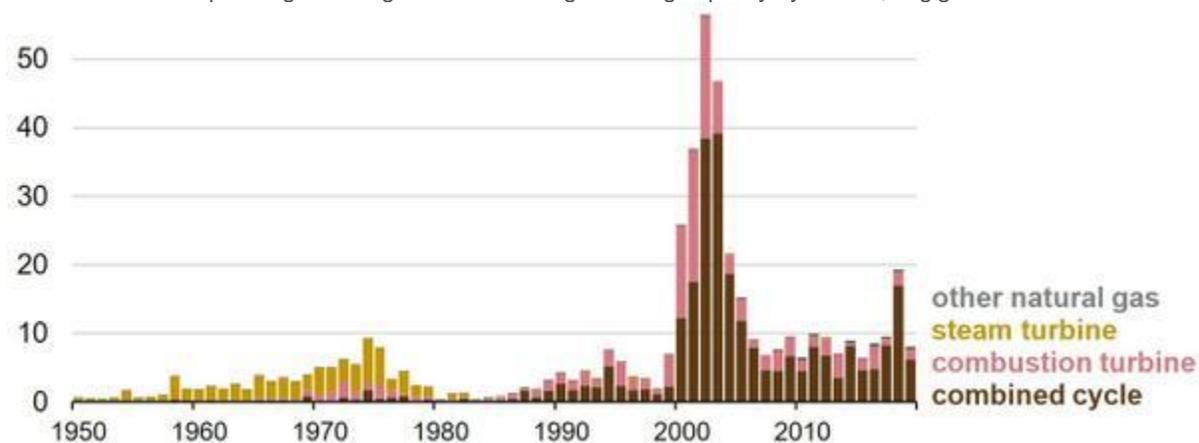
### **Oil: The economies of many oil-producing Arab nations are struggling:**

- [Kuwait](#) has a deficit of ~40% of GDP (the highest in the world).
- [Oman](#) is struggling to borrow after credit rating agencies listed its debt as junk.
- [Jordan](#) is requesting a \$2.5 bn aid package from the GCC.
- [Libya](#) is struggling with sanctions on oil exports; the most recent blockade in 2020 has cost Libya almost \$10 bn (USD).
- [Egypt and Lebanon](#) requested aid, but both were denied.
- [Saudi Arabia](#) tripled its sales tax, raised gas prices, and suspended pensions, yet its budget deficit will exceed \$110bn this year (16% of GDP).

**Related, no Arab oil producer, save tiny Qatar, can balance its budget** at the current price per barrel, around \$40 (the world-wide average [break-even price](#) is around \$50 per barrel). The minimum required bpd (USD), per country:

- Saudi Arabia: \$76 bpd
- UAE: \$69
- Bahrain: \$96
- Oman: \$87
- Algeria: \$157

**Natural Gas:** Natural gas-fired generators account for 43% of operating electricity generating capacity in the US. *Insert:* operating natural gas-fired electric generating capacity by source, in gigawatts:



**Coal:** Mining exploration budgets fell 11% year-over-year to \$8.7 billion in 2020, from \$9.8 billion in 2019; more recently, however, in 2020, the number of [active mining exploration projects](#) has increased, up 3% to 1,762 from 1,708 in 2019, as dormant mining projects are reactivated (*note: this active link is a non-partner source*).

**Carbon Capture:** [Carbon on Earth](#), by the numbers (GtC = gigatons of carbon; 1 gigaton equals 1,000,000,000 metric tons):

- Oceans store about 44,000 GtC
- Topsoil (3") stores about 2,500 GtC
- Near-surface fossil fuels hold about 78,000,000 GtC.



## Low Carbon Energy

### Spotlight: The Shovel Wars, part II

*Replay:* *The Shovel Wars*, part I reviewed the [17 rare earth minerals](#) used in a variety of energy related devices; a majority of these minerals are mined in Africa. Related, the Russian army has recently expanded military operations in Africa, and about 50 Chinese state-owned companies are developing hundreds of infrastructure projects all over the continent, and trade between China and Africa continues to increase. (*Editor's note: The archived copy of [Energy Matters](#) (released October 12, 2020) is available to [AES Members](#)*).

#### - [Top-4 metals and minerals for solar power:](#)

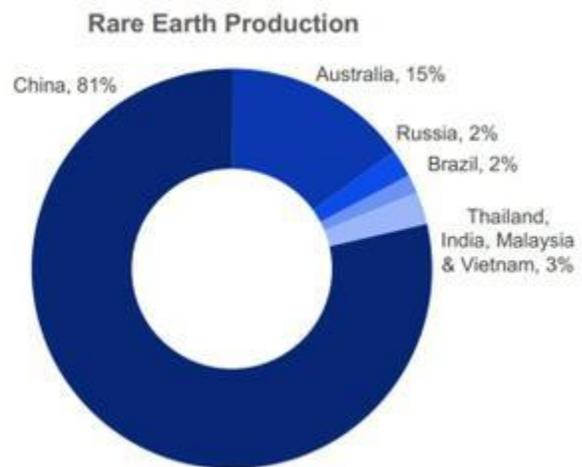
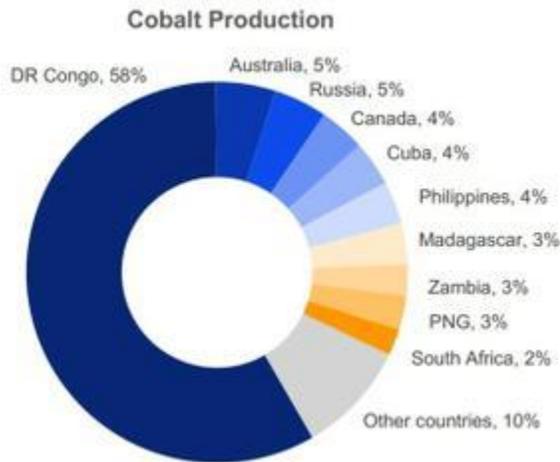
- **Copper:** Used in the wiring of solar panels, one of the largest copper mines in the world is in Australia (7.8 million tons) and the largest in the US is the Morenci mine in Arizona.
- **Silicon:** An abundant material, silicon comes from sand and quartz-rich rocks and is used in the production of photovoltaic cells.
- **Silver:** An excellent conductor of electric current, silver is used on the front and back of crystalline solar cells.
- **Zinc:** New photovoltaic technology uses zinc oxide to achieve higher solar-cell efficiency.

*Note:* [Other](#) minerals used for solar include: arsenic, gallium, germanium, indium, and tellurium.

#### - [Top 4 metals and minerals for battery storage:](#)

- **Cobalt:** Used in rechargeable battery electrodes (61% of all cobalt in the US is imported).
- **Graphite:** Serves as an electrode in many lithium batteries.
- **Lithium:** The critical metal in most batteries, lithium ions move from the negative electrode through an electrolyte to the positive electrode during discharge and back when charging (51% of all lithium in the US is imported).
- **Manganese:** Serves as an electrode in many lithium batteries (100% of all manganese is from foreign sources).

- Production of **cobalt vs. all other rare earth metals and minerals**, a regional comparison:



- Uranium consumed by nuclear power plants in the US: [91% is imported](#).

- New Energy Nexus is launching [Accelerate Energy Series 2020](#) for communities to discuss the state of the clean energy ecosystem.



## Policy

- Loans made by the US Federal Reserve through its [Main Street Lending Program](#) for financially distressed oil and gas companies doubled in September to \$181.6 million — about 15% of the program's new lending — from \$83 million.

- The US Department of Energy has requested from Congress an [additional ten-year, \\$1.4 billion appropriation to support the development of small modular reactors by NuScale Power](#). (Recently, two utilities in Utah cancelled their pilot agreement to test NuScales reactors.)

- After a very long delay, **NASA finally re-started the fifth National Climate Assessment**. By law, Congress and the White House are supposed to receive a report no less than every four years on the state of climate change and its impacts on humanity and the natural world. The first step: NASA is [seeking authors](#) to work on the project. (Note: AES can recommend [Members](#) of the Society to supplement their formal application.)

- The US State and Treasury Departments widened the scope of [sanctions](#) against the Nord Stream 2 natural gas pipeline and warned companies that they will face sanctions if they do not wind down activities within 30 days. There is only about 150 km of Nord Stream 2 pipeline remaining (6% of total) to be laid.



- President Trump made [unprecedented use of presidential powers](#) and abruptly reversed his previous reversal of his initial decision that originally denied California's request for disaster aid. The state will now receive funding to recover from the summer's deadly wildfires.

- Recommended resource: An improved cost-assessment [methodology](#) for carbon abatement, including policy recommendations.



## Climate and Sustainability

- **About 25% of the Pantanal wetland has burned in wildfires.** There were 2,534 recorded fires in the Pantanal between January and June; between January and June 2019, there were 981 fires. (Note: the Pantanal is world's largest and most biodiverse wetland, about the size of Greece, and stretches over parts of Brazil, Paraguay and Bolivia.



- It's **pollution season** in northern India. About this time every year farmers in the region intentionally set fire to cultivated fields to prepare the land for the next crop. It is especially bad for cities like the capital New Delhi, where smog from the burning crop fields, vehicular emissions, power plants, construction sites, and smoke from Diwali firecrackers combine to create a toxic cloud that lingers until spring.

- *Recommended resource:* A new interactive global map shows how **methane emissions** vary over space and time (note: watch the increase of greenhouse gas emissions in China).

- Warming climates have expanded the range of **warm and brackish waters along the Atlantic Coast, allowing Vibrio bacteria to flourish and spread.** Vibrio has many species — more than 70 — but only about a dozen make people sick. *V. vulnificus* is its most deadly strain, killing one of every five people who contract it. For the remaining 80%, its toxins attack flesh, turning infected sores into gaping wounds.

- **Phoenix set a US record** for 144 days of temperatures over 100 degrees in a single calendar year; it also set a record for 50 days of 110 degrees or more.



## Research and Markets

- **Featured project development opportunities:**

- **Southwest Virginia:** Project Oasis is seeking to develop data-centers.
- **New York City:** The New York Power Authority (NYPA) is seeking solutions to support the transition of seven natural gas fired 'peaker' plants (six located in NYC and one on Long Island, 461 megawatts total capacity) to clean energy technologies, including battery storage. Contact [Susan Craig](#) at the NYPA for more information.
- **Uzbekistan:** Proposals to develop a planning and networking model for a national electricity transmission grid.
- **Tajikistan:** Proposals to develop planning and training for electricity network modeling.
- **Kazakhstan:** The national grid (KEGOC) is seeking digital substation technologies.
- **Central Asia:** Proposals to develop a model for grid planning, networking and training.
- The US Department of Energy is sponsoring **American-Made Challenges** - opportunities for energy innovation and manufacturing.
- **US DoE Loan Programs:** The LPO has more than \$40 billion in loans and loan guarantees to help deploy large-scale energy infrastructure projects in the US.

- **Major M&A activity among oil producers** since the pandemic and Saudi/Russian oil-price wars in March, 2020:

- [ConocoPhillips](#) bought Concho Resources to create the largest independent O&G company (combined oil production in the Permian almost equivalent to Chevron)
- [Pioneer Natural Resources](#) acquired Parsley Energy (Note: Pioneer CEO Scott Sheffield is the father of Parsley co-founder and Chairman Bryan Sheffield)
- [Chevron](#) acquired Noble Energy
- Devon Energy and WPX Energy [merged](#).

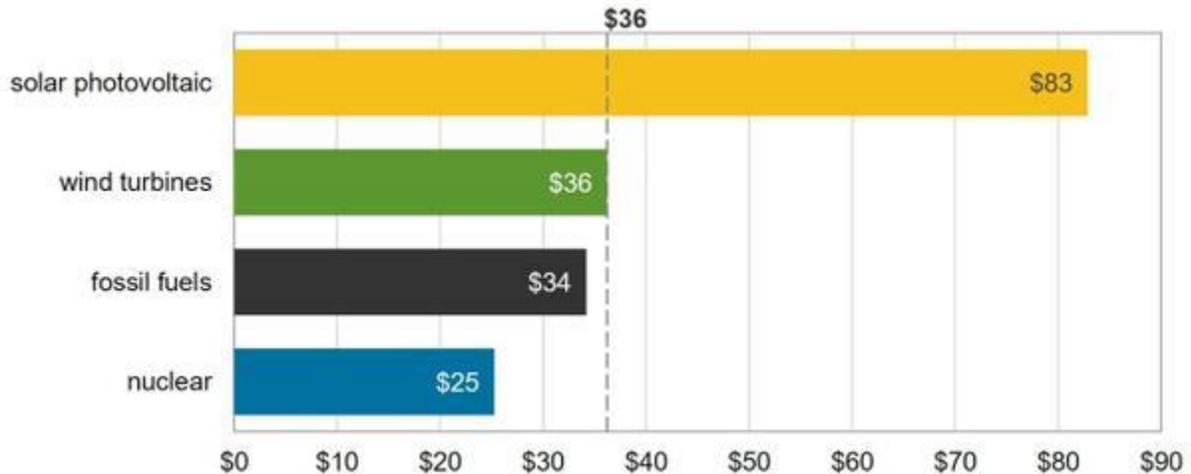
- Bioengineering the two enzymes PETase and MHETase creates **a super-enzyme mixture that can break down and recycle common plastics** like polyethylene terephthalate (PET) used in single-use drinks bottles, carpets, and clothing.

- Don't miss [Energy Week](#) at Duke University, Mon., Nov. 9 - Thurs., Nov. 12, 2020.



## Electricity, Power and Efficiency

- A survey of wholesale prices that generators receive for electricity, by technology (note: the average across all technologies is \$36/megawatthour; all in USD per megawatthours):



- Countries in Asia and Africa that are *not* members of the Organization for Economic Cooperation and Development (including China and India) consist of two-thirds of the world population; **these regions account for 44% of primary energy consumed** by the electric sector.

- Household electricity use in the US rose 10% during the outbreak of the COVID pandemic (Q2 2020).



## Quotes: The Future Today

"We have to rethink these old ways of doing things." - Outgoing California ISO President and CEO Steve Berberich

"BP is setting out the most significant strategic pivot as yet among the majors." - UBS analyst, Jon Rigby.

"In thinking about the climate 25 years from now, California's politicians aren't thinking about how to keep the lights on today." - Wall Street Journal Editorial, "*Wildfire Power Eclipse*"