

Energy Matters

September 28, 2020

Soundbite summaries of the energy news you need to know

An official publication of ...



This issue of Energy Matters is complimentary, courtesy of AES.

Please join the Society as a Member or Friend (free)
for a subscription to this publication and many other benefits.



News from the Society

The cover of the "TOP ENERGY UNIVERSITIES 2020" report. It features a background image of a large, modern building with a glass dome, possibly a university building, surrounded by trees. The title "TOP ENERGY UNIVERSITIES 2020" is prominently displayed in large blue letters at the top. Below it, the subtitle "U.S. research universities and colleges with notable energy initiatives." is written in smaller blue text. A tagline "Where tomorrow's energy future is being shaped today." is at the bottom in a smaller, italicized font. The American Energy Society logo is visible in the top right corner of the cover image.

- **Top Energy Universities 2020**, a new report by American Energy Society. Join the Society now and receive for free the full Report, an exclusive survey of 187 leading U.S. research universities and colleges with notable energy initiatives, and a comprehensive Directory (regularly \$387). This offer is good for a limited time.

Learn more about AES Membership

(Includes a subscription to Energy Matters and many other benefits.)

BECOME A MEMBER AND RECEIVE TEU 2020 FOR FREE



Fossil Fuels

Oil: Global oil geopolitics, part II (for part I see *Energy Matters*, August 31, 2020 - [Members](#) of AES have exclusive access to the AES Energy Archives): **Skeptics doubted that the OPEC+ cartel could achieve its proposed production cuts set in May, but by August the overall compliance rate was 101%.** However, self-inflicted geopolitical turmoil continues to disrupt the cartel's overarching goal of stabilizing the sector:

- **Nigeria** is demanding an immediate pre-payment from Eni and Shell of \$1 billion for E&P in their OPL 245 oilfield even though no such agreement exists (aka, extortion).
- **Iraq** wants to extend its deadline to cut oil production from September to November.
- **Jordan** imports 10,000 barrels of oil per day from Iraq even though they agreed to follow restrictive sanctions and cut all imports from Iraq.
- **Russia** detained Deputy Energy Minister Anatoly Tikhonov for embezzlement (allegedly \$7.9 million); clearly the Deputy (and his colleagues) do not have Putin's support.
- **Libya** National Oil Corporation (NOC) unilaterally decided to *increase* its production to about 250,000 barrels per day (from 100,000 bpd) before the blockade of its oil ports and oilfields had been lifted and in spite of OPEC+ agreed cuts.

(Note: meanwhile, OPEC+ is beginning to [increase](#) production again while demand [declines](#).)

Natural Gas: Total LNG cargo exports from the US since 2016, by country destination:



Coal/Mining: The proposed Pebble Mine in Alaska (operated by Canadian-based Northern Dynasty Minerals and US subsidiary, Pebble LP) has the capacity to produce about **160,000 metric tons of gold and copper per day**, substantially [more](#) than the 35,000 break-even point.



Carbon Capture: There are seven technological sectors capable of removing significant amounts of CO₂ (AES Members have access to the special [Carbon Capture](#) report):

1. A-/Reforestation
2. Agriculture Soil Management
3. Bioenergy with CCS
4. Carbon Mineralization
5. Direct Air Capture
6. Mass Timber
7. Peatland Rewetting

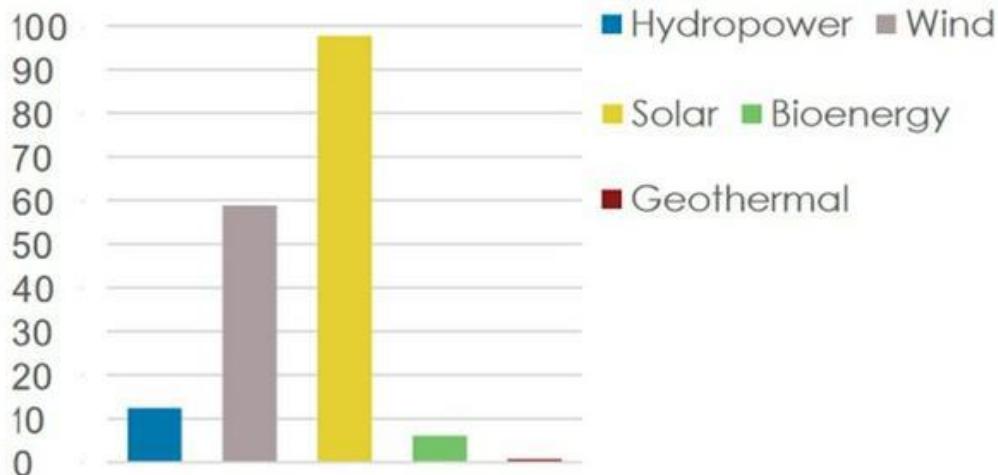


Low Carbon Energy

- Trend-spotting, [hottest renewable markets](#) in the world (by size and speed of growth):

- Solar: Asia (56 GW), US, Australia, Spain, Ukraine, Germany
- Wind: China (26 GW), US (9 GW)
- Hydro: China, Brazil (combined 12 GW)
- Bioenergy: China (3.3 GW), Germany, Italy, Japan, Turkey
- Geothermal: Turkey (232 MW), Indonesia (185 MW), Kenya (160 MW)

Note: The world installed 176 GW of renewable power capacity in 2019; wind and solar accounted for 90% of that total. (Insert: Renewables power capacity growth, 2019.)



- There are a number of small modular reactors in various stages of development, but it appears that **Oklo has taken an early lead**. Their small 1.5-megawatt advanced reactor recently became the [first nuclear design](#) that does not use water as a coolant to have its application [accepted](#) by the Nuclear Regulatory Commission.

- At this rate, by 2050, there will be about 78 million metric tons of solar panels that will have to be [decommissioned](#); or put another way, **the world will be generating about 6 million metric tons of new solar e-waste annually**.



- Painting wind-turbine blades [black](#) reduces bird-deaths by 70%.



Policy

- **Spotlight - Ruth Bader Ginsberg (1933 - 2020)**: a survey of energy/environmental cases while Associate Justice of the US Supreme Court:

- In 2000, Justice Ginsberg determined that plaintiffs do not have to prove harm to the environment, but instead [just prove harm to themselves](#). The ruling helped environmental groups to sue polluters; before then, anyone filing a "citizen suit" had to meet a fairly high bar to prove there is concrete "injury in fact" rather than speculative harm.
- In 2001, a [unanimous court](#) said that EPA cannot consider implementation costs when deciding on national air quality limits for smog, soot and other major pollutants.
- In 2007, established Supreme Court [precedent](#) that empowered EPA the power to regulate greenhouse gas emissions — and set up a contentious legal battle over the extent of federal authority still waged today (see Judge Barrett story below).
- In 2014, led a 6-2 majority that [upheld](#) an Obama rule limiting air pollution that floats across state lines.
- In 2020, [determined](#) that pollution that travels into waterways via groundwater can be subject to the Clean Water Act.

- **Judge Amy Barrett is considered a favorite in the race for Justice Ginsburg's seat.** Judge Barrett leans toward Constitutional originalism and textualism (similar to the conservative interpretations of the late Justice Antonin Scalia). Judge Barrett has implied that she opposes the landmark 2007 decision [Massachusetts vs. Environmental Protection Agency](#), which gave the federal government the power to regulate greenhouse gas emissions.

- **The US Senate is almost entirely focused on the Supreme Court, which means the path forward for popular energy legislation is far more complicated.** Two bills that have bipartisan support will probably stall:

- Sen. Lisa Murkowski (R-Alaska) introduced Advanced Geothermal Innovation [S.2657](#). Senators had reached a bipartisan agreement on a 15-year reduction in the use of a coolant and potent greenhouse gas.
- Sen. John Barrasso (R-Wyo.) introduced Water Infrastructure [S.3591](#) and Drinking Water Infrastructure [S.3590](#). The House passed both bills in late July and there is biennial precedent for passing similar water bills.

- **California announced that it will phase out the internal combustion engine** so that by 2035 every new car sold in California will be an emission free vehicle. AES Members have access to a true and correct PDF copy of the [Executive Order](#).

- OurEnergyPolicy is hosting a webinar about "[Decarbonization & Reliable Power](#)" on September 30.



Climate and Sustainability

- "Surface expressions" def.: **dangerous inland oil spills of an amount that typically violate state regulatory limits.** In California, there have been 12 surface expression (spills) since 1999, six of which have been actively flowing for years and three others that occurred in 2019 and are also still active (most were caused by well blowouts).



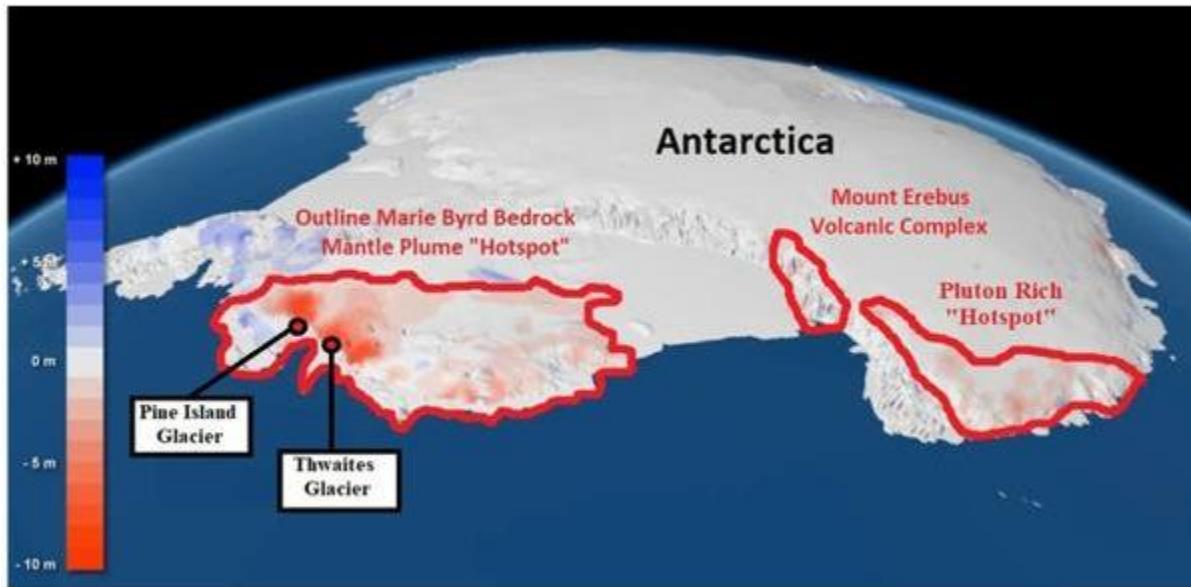
The [Cymric 1Y \(GS-5\)](#) field in Southern California, operated by [Chevron](#), is a surface expression [hot spot](#): almost 17 million gallons of oil and about 70 million gallons of wastewater have spilled since 2003 ... more than the amount of oil spilled by the Exxon Valdez. (Note: Chevron was fined \$2.7 million by the state for the Cymric field spill, but has generated \$11 million in revenues by extracting and filtering the spilled oil and reselling it.)

- **A comparison of global emissions**, by the numbers:

- The richest 1% of the global population is responsible for [more than twice](#) as much carbon pollution as the about 3.1 billion people in the poorest half of the population.
- The richest 10% account for 52% of the emissions added to the atmosphere.
- The richest 1% is responsible for 15% of emissions.

- The wildfires in California, Oregon and Washington emitted [more carbon](#) into the atmosphere than the annual emissions of the power sectors in these same states.

- Located along the coast of the Amundsen Sea in West Antarctica, the [Pine Island and Thwaites glaciers](#) are starting to break free (insert, bottom-left). For perspective, in February 2020, an iceberg broke off from the Pine Island glacier that was the size of Washington, D.C.



Research and Markets

- **Spotlight: Nikola.** The electric truck company, has been very busy recently:

- Nikola went public through a SPAC (\$NKLA).
- The stock spiked, and their market cap exceeded Ford for a brief moment.
- They signed a partnership with GM.

Then, short selling firm Hindenburg Research, released a report that Nikola has been [misleading](#) investors and shareholders:

- Claim: Nikola developed its own fully integrated powertrain technology in-house; however, Bosch provides around 85% of the parts.
- Claim: The company has booked revenues; however, it was \$30,000 for the installation of solar panels on the founder's home rooftop.
- Claim: Construction of the company's first manufacturing factory was going to start "tomorrow"; however, construction cannot begin - they don't have permits.
- Claim: The company has a verbal agreement with Anheuser-Busch to sell 'as many as' 800 hydrogen-powered beer trucks by the end of 2020; or, as few as zero by 2023.
- The highlight - a dramatic marketing [video](#) of a new Nikola semi-truck cruising down a highway; **however, the truck never drove anywhere - it was rolling downhill!**



- Lithium-iron-phosphate is becoming more popular for stationary energy storage (ESS) applications, and is [almost competitive](#) with lithium-manganese-cobalt-oxide (NMC) batteries.

- New research has found that **offshore wind platforms** [support the growth](#) of coral reefs.

- Special report: [Concrete](#) could literally be described as the building block of the modern world, but **concrete also has a serious emissions problem. Several companies are working on new manufacturing technologies that reduce the industry's emissions:**

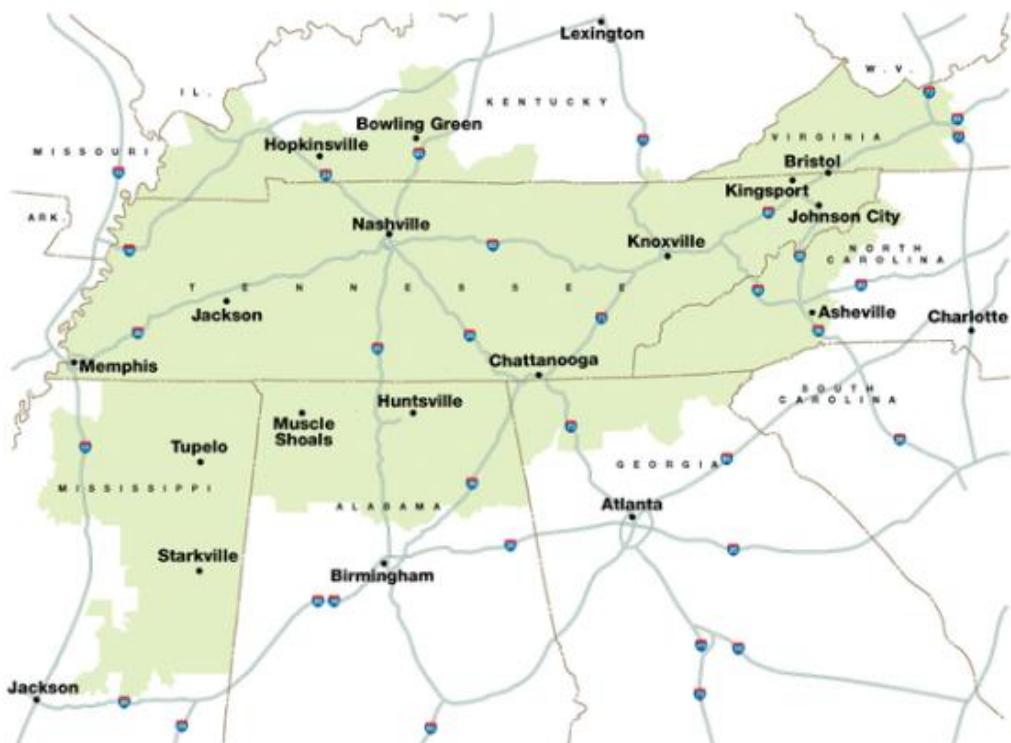
- [Central Concrete](#) (San Jose, Calif.)
- [CarbonCure Technologies](#) (Halifax, Nova Scotia)
- [Blue Planet](#) (Los Gatos, Calif.)
- [Solidia Technologies](#) (Piscataway, N.J.)
- [Concrete Sustainability Hub](#) (Massachusetts Institute of Technology)
- [BioMason](#) (Durham, N.C.)
- [LafargeHolcim](#) (Switzerland)



Electricity, Power and Efficiency

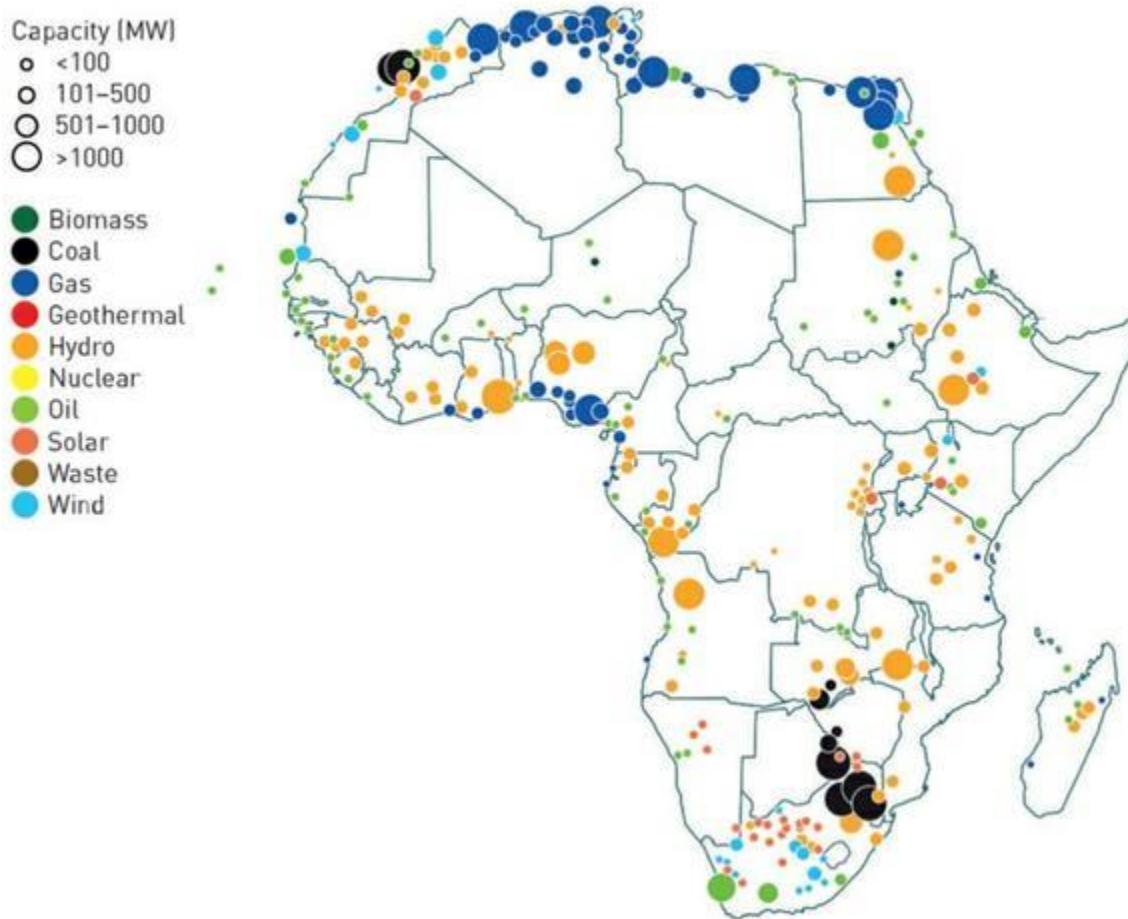
- **Spotlight - Tennessee Valley Authority:**

- The TVA was formed in 1933 during the Great Depression to provide electricity to rural communities, as a regional economic development agency, and to help modernize the region's economy and society.
- There are 153 municipalities and power coops in seven different states that buy and distribute TVA generated electricity.



- The TVA is installing its first grid-scale, battery energy storage system; the [Vonore](#) Battery Energy Storage System will use lithium-ion batteries to store 40 megawatt-hours of energy - enough electricity for 10,000 homes for three hours.
- TVA's largest customer is Memphis Light Gas & Water, but they are currently soliciting alternative proposals from other power suppliers to see if they can get a [better deal](#) than the one they have had with the TVA for the past 81 years.

- Electricity power plants in Africa, by fuel type:



- The US Federal Energy Regulatory Commission issued a Notice of Inquiry (NOI) to investigate bulk power system (BPS) equipment sourced from Cuba, Iran, North Korea, Venezuela, and especially, China and Russia, and has blacklisted any technology made by Huawei and ZTE Corp. AES Members have access to a true and correct PDF copy of the FERC [Notice](#).

- **Cybersecurity spotlight:** There are literally millions of transmitters and more than 200 large electric transformers throughout the US bulk electric grid that [do not have any cyber-defense](#) and cannot detect a counterfeit or backdoor cyberattack.



Quotes: Enthusiasms

- "It's the Kim Kardashian of the automotive world: it's famous for being famous. It really doesn't do very much." - Hindenburg Research Report, on the Nikkola e-truck company.

"Our main concern is production *and* the safety of our workers *and* operations ... *and* to prevent anyone from politicizing the oil sector." - Libya National Oil Company chairman Mustafa Sanalla, in response to a series of mistakes that forced NOC to stop production.

"Who's gonna stop a mine that can produce 160 to 180,000 metric tons of deposits per day -- this mine will last more than 200 years." - Northern Dynasty Minerals CEO Ronald Thiessen.