

Energy Matters

May 4, 2020

An official publication of



AMERICAN
ENERGY
SOCIETY

Thank you for your Membership in the American Energy Society.

News from the Society...

- During these unprecedented times, energy professionals need access to unbiased, trusted information. Therefore, **American Energy Society provides complimentary access to all its publications; and, you may share this publication with colleagues.**

- AES will launch its new website and membership model very soon! We delayed the launch because there are more important things right now than a new website.

- **Submit your application to be a (virtual) Fellow at the upcoming [SISE Summer Institute](#), co-hosted by American Energy Society.** What you need to know...

- *Focus:* Energy Infrastructure & Resiliency
- *When:* July 13 - 17, 2020 (virtual)
- *Co-host:* University of Illinois, Chicago
- *Goal:* Solutions oriented outcomes
- *Who:* Any interested energy professional
- *Cost:* Free (with paid honorarium)
- Review [past](#) SISE event recap
- [Contact us](#) if you are interested.



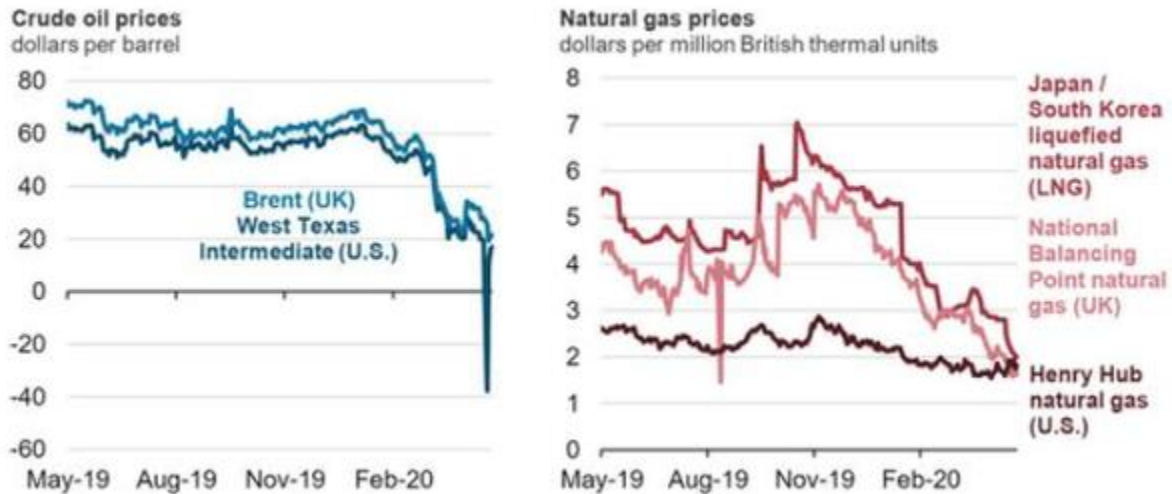
- In support of the [SISE Summer Institute](#), AES recommends this [article](#) from the United Nations SDSN about energy use in the US Midwest.

Fossil Fuels

Oil: The biggest winner in the twin supply-demand oil shock of 2020: [China](#) took advantage of low (negative) oil prices by aggressively building its strategic and commercial stockpiles. The country's imports are increasing 5% M-o-M and will likely continue to rise. **The biggest losers in the supply-demand oil shock:**

- All petro-nations that [do not have](#) diversified economies.
- Russia - was in a stronger financial position to cope with a protracted period of lower oil prices, but [not below](#) \$30/barrel.
- OPEC - assumed that it could [weather prices](#) as low as \$25/barrel ... but not lower.
- US shale producers - [especially those](#) that emphasized quantity over quality.

Natural gas: Oil markets were hit hard by the twin supply-demand shock of 2020 (*insert left*), but [natural gas markets were more stable](#) and less affected by the disruptions (*right*):



Coal: Global [coal consumption](#) in 2020, as a share of power generation:

- US: down -5%
- EU, excluding Germany: down -2%
- Germany: down -18%
- China and India: down, though the data is not reliable (roughly -6%)

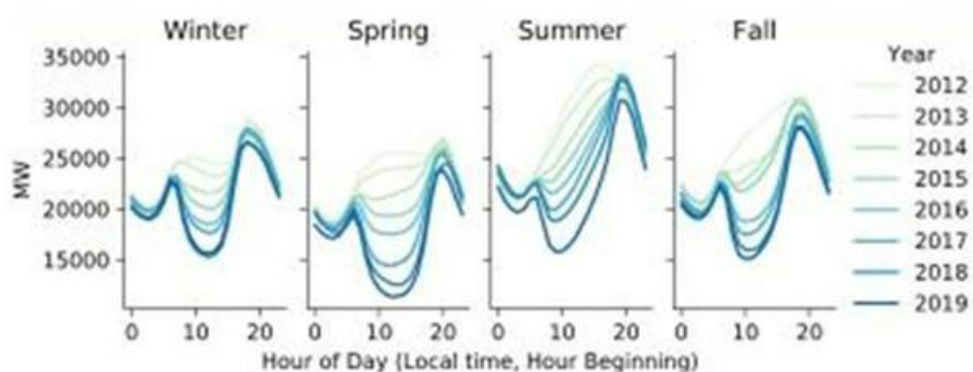
Carbon Capture: At the end of 2019, there were 51 large-scale [carbon-capture/utilization/storage](#) facilities globally: 19 in operation, four under construction and 28 in various stages of development. If all were fully operational, **these 51 facilities would have an estimated capture capacity of around 96 million tons of CO₂ per year.**

Low-Carbon Energy

- [Overall energy usage, 2018 vs. 2019](#), by the numbers:

- Overall usage declined by 1%, Y-o-Y
- Wind energy increased by 10%
- Solar energy increased by 8%
- Note: Coal usage decreased by 14%

- A comparison of [solar power use](#) in California, by season, year and average net load (*insert*). **Note the "duck" curve in each season.**



- **Spotlight: biomass in Europe:**

- More than 40% of the EUs "renewable energy" is generated by burning [biomass](#) (crooked trees, treetops, sawdust, etc., which is pressed into pellets and heat-dried in kilns).
- About two-thirds of all biomass in Europe [comes from the US](#); the largest individual supplier of biomass-fired power for the EU is the Drax Group in the US, which is the source of about 1/4 of the world's biomass wood pellets.
- In 2010, the US exported about 500,000 metric tons of biomass to Europe; in 2018, the US Southeast exported 6.5 million metric tons.
- Enviva (in Maryland), is the world's largest biomass pellet producer (*Note: in spite of the downturn of electricity consumption due to COVID-19, Enviva exports are increasing.*)
- *Editor's note:* some experts think biomass is the [wrong solution](#) to the right problem.



Nuclear: The US DoE is calling for **immediate support of the US nuclear industry**. AES Members have access to the DoE [report](#), which calls for:

- Strengthening the uranium mining and conversion industries;
- Promoting civil nuclear RD&D investment in new technologies;
- Providing whole-of-government support of the entire industry.

Policy

Spotlight: the US EPA

- **22 states and several major cities filed seven separate [amicus briefs](#) to challenge EPA's Affordable Clean Energy rule.** A survey of all the briefs filed against ACE:

- A coalition of major utilities take issue with the rule that allows individual plants to make their own emission improvements, rather than a sector-wide fuel shifting strategy (like Obama's [Clean Power Plan](#)).
- Solar and wind interests, which argue that the ACE rule would achieve only "trivial" carbon pollution reductions.
- Coal companies and conservative interests argue — much as they did with the CPP — that EPA cannot regulate greenhouse gases from power plants at all.
- In a narrow challenge, the Biogenic CO2 Coalition argues that EPA wrongly disqualified biomass co-firing as a way to reduce greenhouse gas emissions at coal plants.

EPA's response is due June 16; the D.C. Circuit Court will hear oral arguments this fall.

- **A judge [threw out a lawsuit](#) filed against the EPA by environmental groups to stop the Pebble Mine project in Bristol Bay, Alaska.** The Army Corps of Engineers will continue to review the permit application.

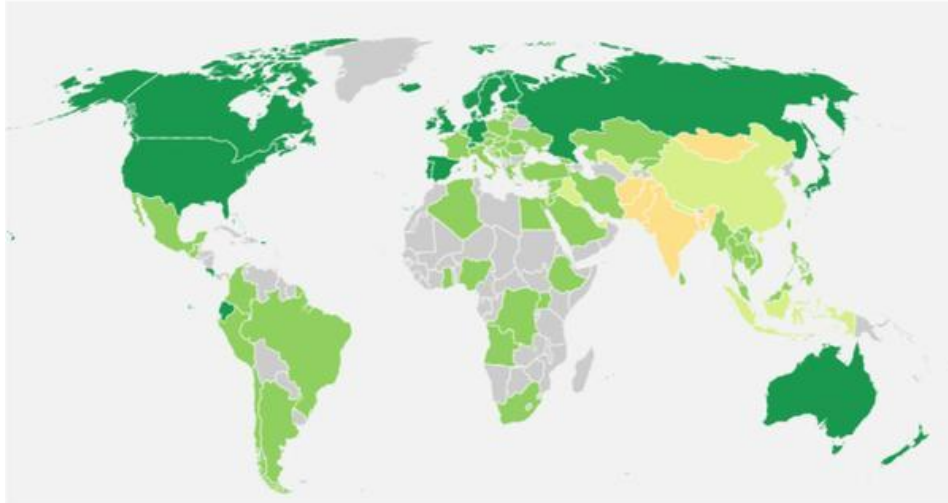
- **EPA is reviewing the [chemicals that have been banned](#) by the Toxic Substances Control Act**, including formaldehyde and six phthalates that are found in plastic. *Note: the EPA will ignore carcinogens and other cancer-related issues as outside the scope of the Agency.*

- **Five oil-state governors have asked (again) that the EPA [waive](#) biofuel blending requirements.** Meanwhile, the governors of Iowa, Minnesota, Nebraska and South Dakota wrote (again) to the EPA asking that biofuel blending requirements be [increased](#).

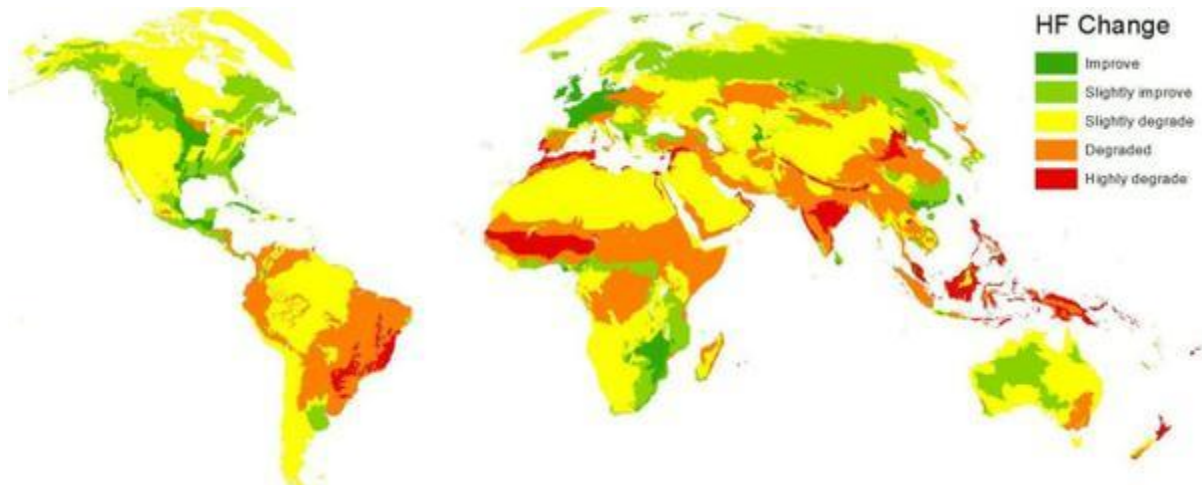
- *Beltway Buzz*: There is a lot of talk of providing financial support for struggling oil and gas companies. So far, the White House has jettisoned plans to buy oil for the Strategic Petroleum Reserve, nixed an idea to eliminate royalty payments for energy produced on federal lands, and dropped a discussion of paying oil companies not to produce oil. The most recent idea: **the US Treasury Department will lend money to struggling oil producers — and take partial ownership stakes in the companies while also requiring them to reduce their output.**

Climate and Sustainability

- *Featured story*: **Approximate air pollution levels in 2020**, by PM 2.5, insert. (Note: as a [comparison](#), 21 cities in India and 47 in China were rated "dangerous" in 2019. **Green** = Good; **Yellow** = Unhealthy; **Red** = Dangerous)



- Related, **approximate human footprint impact**, insert. **Green** = improving; **Red** = Degraded



- So, which is it...? Predictions from different sources:

- Global CO2 emissions are on track to [decline 5.5% in 2020](#).
- All energy-related CO2 emissions are on pace to [fall 7.5% in 2020](#).
- Global CO2 emissions are on track to [plunge 8% this year](#).

- *Note*: climate scientists estimate that emissions need to be cut by 7.6% every year to reverse the effects of the changing climate.

Research and Markets

- *Featured research:* **A new membrane filtration technique reduces the amount of time it takes to extract lithium from the earth**, taking the process from months and years to hours. The new technique has been tested in the Lithium Triangle, a region of the Andes bordering Argentina, Bolivia and Chile, which holds roughly half of the world's lithium reserves. Preliminary studies have shown that the team's technology has a lithium recovery rate of approximately 90%, significantly higher than the current 30% recovery rate. AES Members have access to peer-reviewed [research](#) about the technique.

- *Featured research II:* Lithium is a reactive element that tends to break down other elements around it. Every cycle of a lithium-sulfur battery — the process of charging and discharging it — can cause mossy, needle-like deposits to form on the lithium-metal anode, the negative electrode of the battery. This starts a reaction that can lead to the battery's overall degradation. By **adding an *in situ* artificial layer containing tellurium on top of lithium metal, a lithium-sulfur battery can last [four times longer](#).**

- **Gasoline demand is [down](#) 40% from mid-March through mid-April;** distillate consumption declined by 20% over the same period.

- **EV sales are not declining as fast as gasoline-powered cars;** however, global sales of electric vehicles have [declined](#) 43% M/M this year (EV sales in China will face their third consecutive year of decline).

- **The US state with the fastest growing EV market? [Colorado](#).**

- **Retrospective: comparing hybrid car sales in 2004 and 2005:**



- Honda Accord (1,000 to nearly 17,000)
- Honda Civic (doubled sales from about 13,000 to nearly 26,000)
- Toyota Highlander (0 to nearly 18,000)
- Ford models (about 3,000 to nearly 20,000)
- Lexus RX400h (0 to more than 20,000)
- **Toyota Prius sets the pace ... from 5,000 in 2003, to 50,000 in 2004, to more 100,000 in 2005 ...** which inspired the inappropriate South Park episode "[Smug Alert](#)".

Electricity, Power and Efficiency

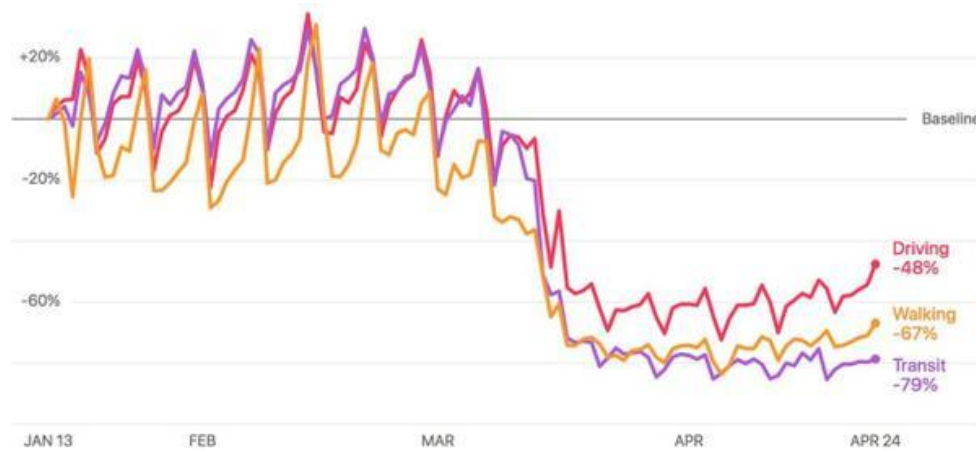
- **A random survey of [average daily energy use](#) in 2020:**

- Italy: daily energy use has fallen temporarily by as much as 40%.
- New York City: demand is down by as much as 25%.
- Wuhan, China: daily energy use has bounced back and is now down by just 5%.

- **More than two-thirds of the energy produced in the US is "[rejected](#)"** - energy that could be used for a purposeful activity, like making electricity or transport but instead gets released as unused heat.

- And another historical moment ... in 2019, for the first time since 1957, **energy production [exceeded](#) energy consumption in the US;** in other words, energy production in 2019 grew 5.7%, and energy consumption decreased by 0.9%. The US is on pace to set the same record again in 2020.

- [Public transportation](#) use in the US in 2020, as a rate of change (*insert*):



- *Cybersecurity spotlight*: [National origins](#) of successful cyberattacks, percentage of the total:

- China 28%
- Russia 27%
- North Korea 12%
- Iran 11%
- US 4%
- All others 18%

Features

Quotes: The supply/demand one-two punch to the oil industry.

"There is huge interest to 'do something' to help. But it all sounds good until step two."

- Anonymous energy official in the oil refinery sector, on the various ways Congress and the President have considered helping the O&G sector.

"I saw massive gas flaring in the fields in the Eastern Province. They went pedal to the metal and pumped out as much as possible. It lit up like a Christmas tree."

- Samir Madani, founder of TankerTrackers.com, on satellite images of oil producing regions in Saudi Arabia.

- "Perhaps they don't know that hand sanitizer and personal protective equipment come from hydrocarbons synthesized by their arch-villain Exxon Mobil."

- Editorial by the WSJ, on activists criticizing the O&G sector during the COVID-19 pandemic.

- "Reports of the death of the oil industry are greatly exaggerated."

- Adapted from Mark Twain by Amy Harder of Axios.