

Energy Matters

April 20, 2020

An official publication of



Thank you for your Membership in the American Energy Society.

During these unprecedented times, it is important for professionals to have access to unbiased, trusted information. Therefore, **all publications by American Energy Society are complimentary**. Please share this newsletter with colleagues and encourage them to [join](#) the Society.

We are also delaying the launch of our new website and membership model until the pandemic has slowed - there are more important things right now than a new website.

News from the Society...

Fellowship applications are being accepted for the [SISE Summer Institute](#).

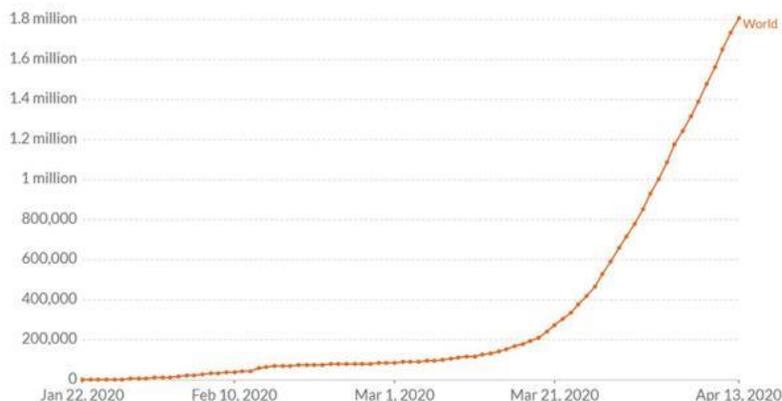
What you need to know about this AES co-hosted event:

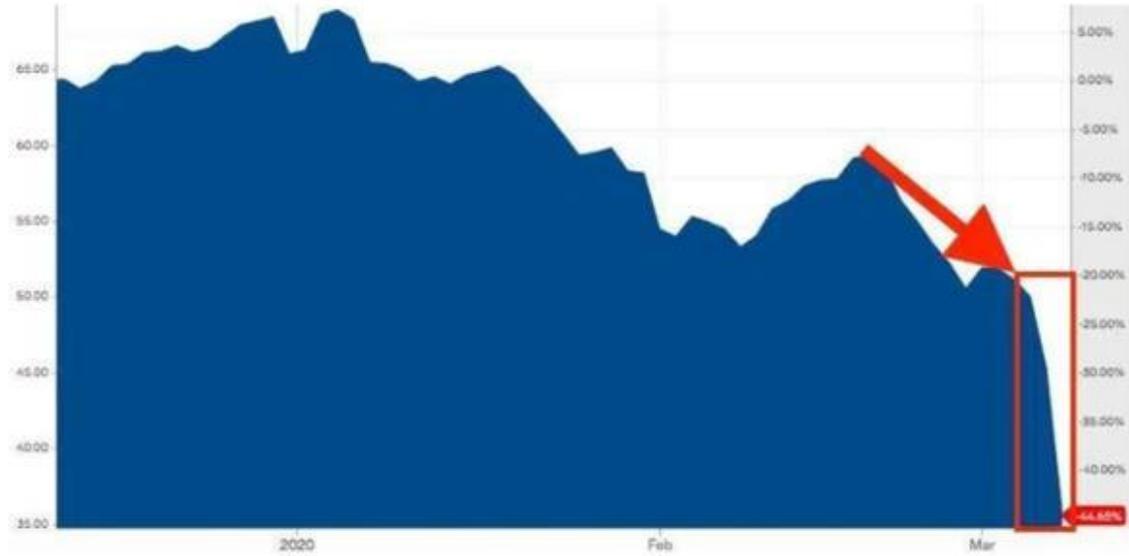
- Thematic focus: Energy & Sustainability
 - Virtual event, July 13 - 17, 2020
 - Solutions oriented outcomes
- Business and professional development
- Co-host: University of Illinois, Chicago
- Paid honorariums available
- Get to know [past](#) alumni and event recaps
- [Contact us](#) if you are interested.

Context Matters

When living in a historical moment, it is useful to remember the historian's rule of thumb: *filter everything through context*. Right now, there are two primary forces, in two slides:

- Slide 1: Confirmed COVID-19 cases, worldwide.
- Slide 2: The oil price crash and the Saudi/Russia "race to the bottom," in USD bpd.





Fossil Fuels – Oil Spotlight

- *Special report, hedging the market: Tankers are being used to store crude oil in anticipation of higher prices in the future.* (Note: The March 23, 2020, issue of *Energy Matters* noted that "as a result of the oil price war, oil supertanker charter rates (VLCCs) are skyrocketing, up 678%." (Insert: [locations](#) of individual oil-tankers, world-wide, March 2020.)



- Related, the US DoE has [negotiated contracts](#) with nine companies to store crude oil in the Strategic Petroleum Reserve; awardees can schedule return of their oil from now through March 2021, in theory, "hedging" until prices have recovered. The lease contracts are for about 23 million barrels of crude oil deposited into all four SPR sites. (Note: each of the four reserves are buried deep within the massive salt deposits that underlie the Texas and Louisiana coastline; the caverns are more secure and affordable than above-ground tanks or hard rock mines.)

The four SPR storage sites (insert):

1. Bryan Mound, Texas coast
2. Big Hill, Texas coast
3. West Hackberry, Louisiana coast
4. Bayou Choctaw, Louisiana coast



- Expected oil [demand](#), by month in 2020 (in other words, recovery could take all year):

- April, 2020: **negative** 29 million barrels per day
- May, 2020: **negative** 12 mb/d
- ...
- Dec., 2020: **negative** 2.7 mb/d

- Numerous US and Canadian companies have said they will reduce oil production, but so far **more than half of the cuts have come from just [three companies](#): Chevron, Occidental Petroleum, and ConocoPhillips.**

Low-Carbon Energy

- **Renewables.** Once upon a time, in 2019, renewable energy was [surging](#):

- About three-quarters of new global electricity generation drew on renewable energy sources (a record).
- All renewable energy sources (solar, wind, etc.) provided about one-third of the world's power (another record).
- In the Middle East, 26% of new electricity generation was renewable (another record).

- **Solar.** When the coronavirus hit China, the solar industry was immediately concerned about the disruption of its manufacturing supply chain for panels. In hindsight, that should not have been the industry's biggest concern; instead, **the industry should have been worried about declining consumption of electricity and dwindling demand for solar power.**

- **Hydrogen-as-a-fuel** is at about \$10/kg today; it starts to become economical at \$3/kg.

- **Nuclear.** The US DoE has awarded \$32 million in funding for 15 thermonuclear fusion energy projects. See the [AES website](#) for the list of all 15 projects.

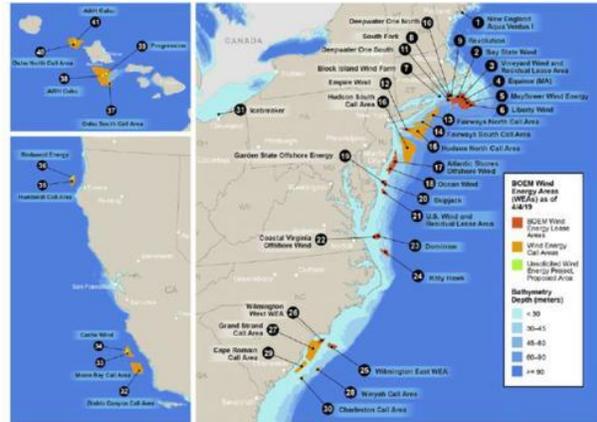
- **Carbon Capture.** Late last year, ten companies won the Carbon XPrize (\$7.5 million total) - all ten made products out of carbon dioxide. (*insert: Vodka made from CO2 by Air Co.*) However, due to travel restrictions, no one can go to Colorado for final demonstrations of their technology, so **none of the winners can collect their money.** Visit the [AES website](#) to see the ten winning companies.



- **Offshore wind-power.** Until the COVID-19 outbreak, the project development pipeline for offshore wind was robust. *Insert: 2019 proposed offshore wind projects, by location.* AES partner recommended resource - [Offshore Wind Expert Dialogue](#).

Offshore wind in 2019, by the numbers:

- 19 offshore wind projects, nearing grid-connection
- 2 offshore wind projects, demonstration-scale
- 15 projects, pre-construction planning state
- 7 projects, submitted construction plans to the BOEM for approval.



- **Spotlight, Biofuels.** According to the Kansas City Federal Reserve — which monitors business activity throughout the Midwest — the oil price wars are putting **biofuel companies out of business**. Indeed, about 4 billion gallons of ethanol production has been idled since March 1 due to lack of demand. The sector in Iowa is in worse shape; for instance, POET, the largest ethanol producer in the US, is stopping production at three ethanol plants, which in total had a capacity to produce 330 million gallons a year.

Policy

- **Featured: Saudi Arabia and Russia have struck a deal with the rest of the OPEC+ petro-nations to cut production** by 9.7 million barrels a day in May and June, the deepest cut ever agreed to by the world's oil producers. After that, participating members can increase production.

- **Retrospective:** In December 2014, the US imposed sanctions on Russia; then, a few months later, the EU imposed more sanctions. Though unintended, these sanctions forced Moscow to cut its external debt, build budget surpluses and foreign currency reserves, and lower corporate debt. In short, Russia became more financially self-sufficient. Fast forward to **March, 2020 - Moscow decides that is financially strong enough to engage in a two-front price war** with Saudi Arabia and American shale producers. However, no one involved anticipated the severity of the coronavirus epidemic and unprecedented decline in demand.

- **Review: Recent stimulus or relief legislation passed by Congress** (thank you AES expert Member [Stephen Bolotin](#)):

1. [\\$8.3 billion](#) in supplemental appropriations to support federal agencies responding to the COVID-19 pandemic (i.e. Homeland Security, HHS, USDA, DOE, ...)
2. [\\$130 billion](#) to bolster the healthcare system, supplemental nutrition, the uninsured, etc.
3. [\\$2 trillion](#) for the CARES Act.

- **When Congress returns from its scheduled recess, it will consider additional relief bills:**

- \$760 billion for infrastructure (water, broadband, cybersecurity, community health, etc.), *though this bill is already getting scaled back.*
- "Moving America Forward" - already 1,440 pages in the Congressional Record.
- CARES Act 2.0 - another \$250 billion for small businesses and loan forgiveness.

- In 2017, the D.C. Circuit Court struck down a portion of an EPA rule that required users of HFCs to switch to newer substances that do not harm the ozone layer; but that same Circuit Court upheld other provisions of the same rule, including requiring that anyone still using older ozone-depleting substances to switch to the newer, safer chemicals. However, in 2018 the EPA said the split ruling was "confusing" and therefore stopped enforcing the entire rule, even the provisions upheld by the Circuit Court. **The DC Circuit Court decided that there was a "fundamental flaw" with the EPA's logic to dismiss the entire ruling, and then immediately reinstated all regulatory requirements for non-HFC ozone-depleting chemicals.**

- *Special report:* Methane emissions [rose](#) significantly in 2019, and also accelerated at an unprecedented rate in 2007 and in 2014. **Scientists have not been able to identify the exact cause (or causes) of these increases.**

2002	3.29	2011	4.89
2003	4.66	2012	4.98
2004	-4.83	2013	5.71
2005	0.28	2014	12.72
2006	1.92	2015	10.06
2007	7.90	2016	7.02
2008	6.51	2017	7.02
2009	4.64	2018	8.29
2010	5.24	2019	11.54

- As of March 31, 2020, all energy-related CO2 emissions were on pace to [fall](#) 7.5% y-o-y.

- One of the biggest challenges to making future projections of potentially catastrophic loss of global biodiversity is the inherent **uncertainty of models, trend-lines, and snapshots of the future**. AES Members have access to a peer-reviewed [summary](#) of climate-modeling.

- On the other hand, from 2014 to 2017, about 75% of all coral reefs on Earth underwent heat-induced bleaching during a **global ocean heatwave**. (Note: "[bleached](#)" coral, triggered by environmental changes, has lost its color and is likely to die.)



- In 2019, sustainable packaging was a popular issue, but **now, during the pandemic, consumers [prefer](#) more hygiene-focused "single-use" plastic bags.**

- The previous issue of [Energy Matters](#) noted that the world is drowning in trash. Related, **AES Members have access to a recommended peer-reviewed abstract, "[Urban waste to energy recovery assessment simulations for developing countries.](#)"**

Research and Markets

- *Featured story:* Oil prices have been in a steep decline since March 9, yet stock prices for European oil majors (Shell, Total, Equinor, and ENI) have been increasing. Throughout the price crash, the Saudi Sovereign Wealth Fund [acquired](#) \$1 billion share of stock in said European oil majors, and then the Saudi's and Russia agreed to cut production. As a consequence, **the Saudi Sovereign Wealth Fund may have generated \$500 million in profits when Saudi Arabia and Russia agreed to cut production in order to restore order to the market.**

- *Featured research:* **In carbon storage experiments tied to geothermal power plants in Iceland, 90% of injected carbon dioxide (CO2) [transformed into minerals](#) in just two years.** Standard carbon storage

methods can take thousands of years to do the same.

- The Soil & Water Outcomes Fund, a division of Cargill (the global commodities trader), is paying American farmers to capture carbon in their fields. **Cargill's Fund will then sell these environmental captured carbon "credits" to polluters** such as cities and companies.

The US DoE has announced new awards:

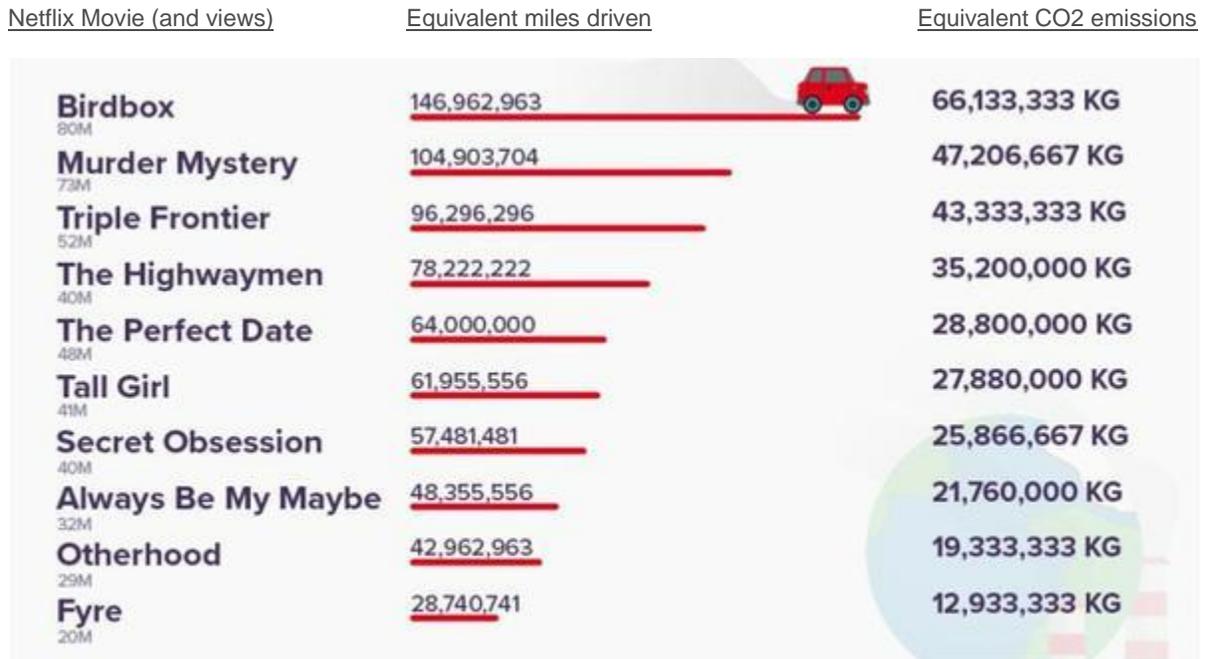
- \$14 million in funding for RD&D of "[Advanced Coal Processing Technologies](#)" or coal-derived products like building materials and infrastructure components.
- \$22 million for RD&D on efforts to [capture carbon dioxide](#) directly from ambient air.
- \$38 million in funding to support development of new [turbines for tidal and riverines](#).

- During the Depression in the 1930s, [the price of oil dropped](#) to about 13 cents per barrel.

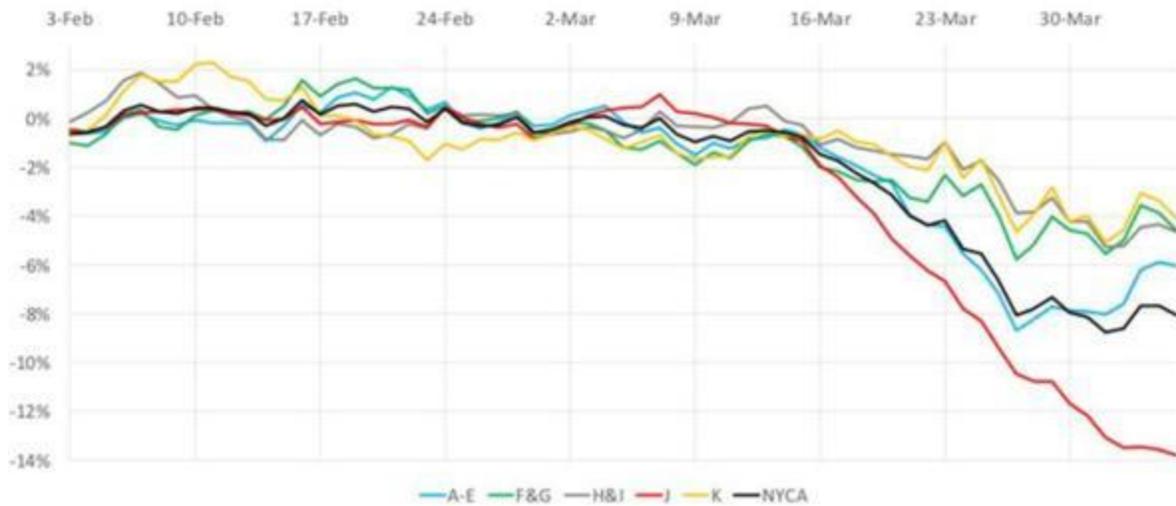
- Until the coronavirus hit, the energy sector was creating jobs at twice the rate of the national economy. No one knows the rates now, but the nation's largest source of energy jobs — **the energy efficiency sector — is experiencing [mass layoffs](#) as utility and state programs shut down**. Unemployment across the fossil fuels is also surging, as it is in the cleantech sector, too - especially in Southern California.

Electricity, Power and Efficiency

- The US usually consumes about 100 quadrillion BTUs per year, but by sheltering in place, the US has reduced consumption by about 15 quadrillion BTU. On the other hand, in response to shelter-in-place, internet traffic is surging (video-conferencing, streaming shows, online classes). Data centers and server-farms are energy-intensive; collectively, these buildings account for approximately 2% of the total US electricity use. Also, consider the popularity of stay-at-home entertainment - **the most popular Netflix [movies](#) right now, and emissions associated with each.** (note: the Netflix documentary [Tiger King](#) just surged to more than 35 million views):



- **The impact of COVID-19 on energy use in New York state**, by utility/region and weekly average in February and March, 2020 (*insert*):



Cybersecurity spotlight



With about 80% to 85% of all energy professionals working from home right now, cyberterrorists are waging brute-force **attacks on home routers that are not properly secured**. Once inside, they [change DNS settings](#) to accept malware that allows access to sensitive internal corporate data, employee credentials, and third-party infrastructure.

Quotes – the Good, Bad and Ugly.

- **"We have identified 77 promising small-molecule drug compounds that could now be experimentally tested."**

- IBM press release on its consortium with 12 other supercomputing partners, including the Lawrence Livermore and Argonne National Labs, NASA, MIT and Rensselaer Polytechnic. The consortium screened about 8,000 compounds and identified 77 that are worthy of more experimental tests.

"Five hours."

- Bloom Energy CEO K. R. Sridhar, when California Governor Gavin Newsom asked Bloom Energy how long it would take if it could repurpose old ventilators to get them back into working order when the original manufacturer said it would take five months. (Note: Bloom Energy is now reorienting its manufacturing lines in California and in Delaware to mass produce the ventilators.)

And the bad and ugly ...

"At the end of the day, a family is a family. When confronted with a challenging situation, two parents come out and that sense of band-of-brothers prevails."

- Abdulaziz bin Salman bin Abdulaziz Al Saud, Saudi Arabia Minister for Energy Affairs, describing the clash between Saudi Arabia and Russia.