New U.S. Carbon Monitor website compares emissions among the 50 states

Tool helps to track abrupt yet temporary emissions declines during pandemic
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Brian Bell
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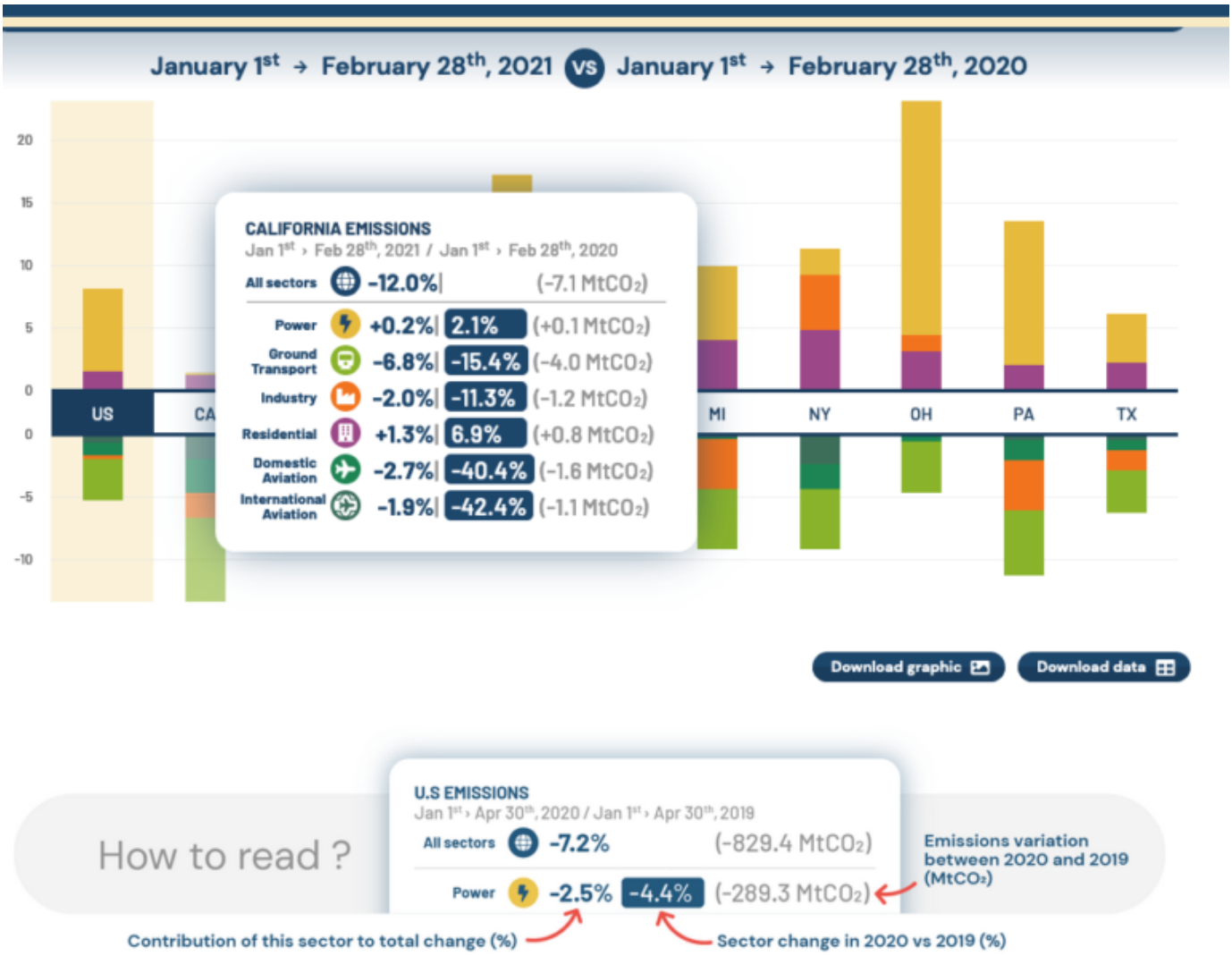

The U.S. Carbon Monitor website displays regularly updated, state-level carbon emissions information from a variety of sectors, including transportation, energy production and industry.

Picture Credit:
Steve Davis / UCI

Irvine, Calif., April 7, 2021 — Following last year's successful launch of a global carbon monitor website to track and display greenhouse gas emissions from a variety of sources, an international team led by Earth system scientists from the University of California, Irvine is unveiling this week a new data resource focused on the United States.

Near real-time, state-level emissions estimates are now available at the U.S. Carbon Monitor website to serve the academic community, policy makers, the news media and the general public. As a companion to launch of the public website, the team today also released an explanatory paper on the EarthArXiv preprint server.

"The data provided in these resources will allow us to monitor the pandemic recovery and the impact of state-level efforts to reduce fossil fuel carbon emissions going forward," said lead author Chaopeng Hong, a UCI post-doctoral scholar in Earth system science. "Our global web platform has been averaging about a thousand hits per day, and I expect this U.S.-based site will perform as well or even better."

U.S. Carbon Monitor is based on statistics from a mix of sources, including flight data from FlightRadar24 and electricity usage from the U.S. Energy Information Administration. Road transportation information comes from TomTom, the EIA and the U.S. Bureau of Transportation Statistics and Wood Mackenzie provides industry data.

The researchers calculate daily, state-level carbon dioxide emissions using datasets of hourly electricity power production, daily natural gas consumption, daily road vehicle distance traveled, daily global passenger aircraft flights and distance flown, and monthly consumption and sales of gasoline, diesel, jet fuel and natural gas used for transportation.

The group then compares differences in states' emissions and evaluates key drivers using additional data on daily temperature, gross domestic product, COVID-19 incidence rates and stringency of public health responses.

"It is particularly interesting to be doing this work now, given the disruption of activities by COVID-19," said co-author Steve Davis, UCI associate professor of Earth system science. "We have seen considerable differences in the effects of the pandemic across states, depending on the main sources of emissions and the stringency of public health measures taken in response."

Davis said the biggest decreases in emissions were during the first lockdown in March-May of 2020, occurring mostly in the transportation sector. By December, national emissions were back to 2019 levels, though still lower in about a third of states.

He added that the tool will be of great value to government officials in the future.

"We should be able to watch the effects of policies being implemented now and give policy makers quicker feedback about progress or lack of it without having to wait a year or more, which has been the common lag time of emissions reports up until now," he said.

UCI Department of Earth System Sciences and Department of Civil & Environmental Engineering researchers were joined on this project by scientists from Frances' Laboratoire des Sciences du Climat et de l'Environnement, China's Tsinghua University, Columbia University in New York and the Chinese Academy of Sciences.

Davis will introduce the new website and data resource in a Distinctive Voices seminar hosted by the National Academies of Science today at 6 p.m. PST. Registration for "Carbon in the time of COVID – Online Zoom Event" is free and open to the public.

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