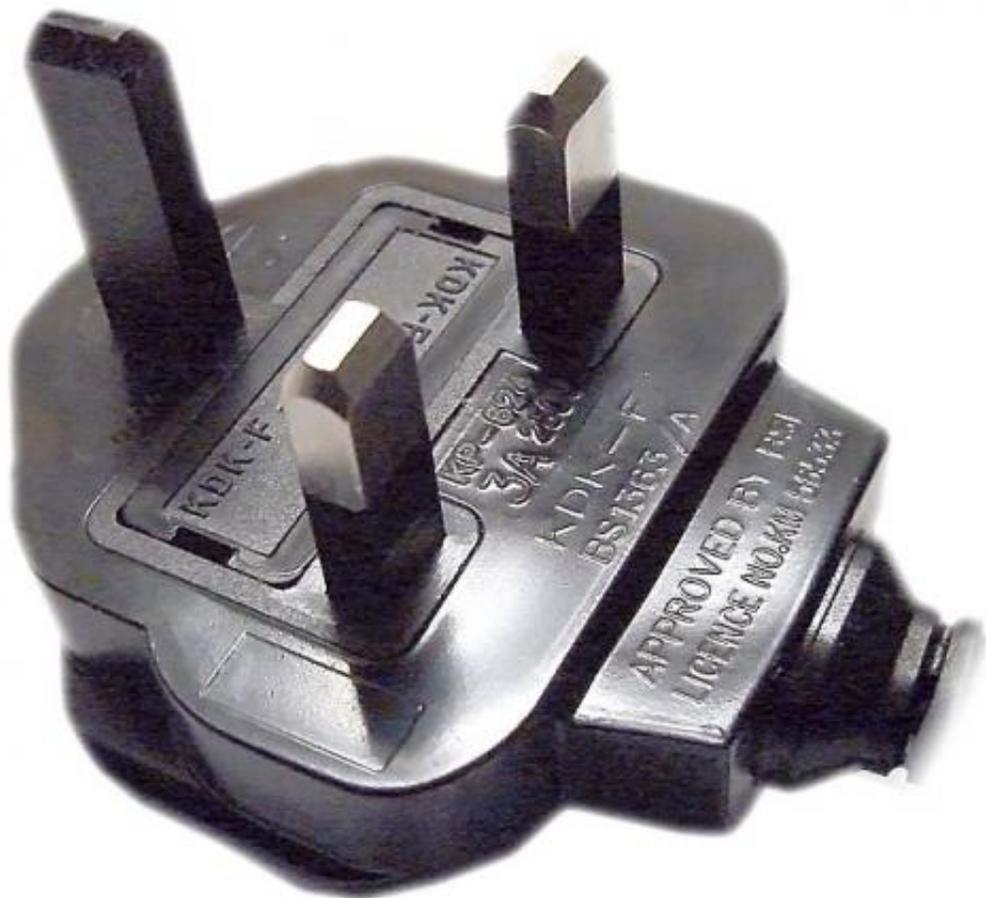


New study reveals how COVID shutdowns and restrictions affected countries' electricity use

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Credit: Wikipedia

A recent study from Oregon State University found that countries with stricter COVID-19 lockdowns and larger decreases in local travel early in the pandemic experienced steeper declines in electricity use than countries with more lax restrictions.

Researchers hope the information will help utility companies to better predict and plan for future emergency situations and extreme events so that energy supply and demand are matched.

"It's very rare that you have an event like the [pandemic](#) that affects so many places at a single time, so you can look comparatively across and see this heterogeneity in response," said study co-author Hilary Boudet, an associate professor in OSU's College of Liberal Arts. "COVID is not over, so knowing what happened initially, can we say something about the future? This is really important for electric utilities."

Boudet worked with eight researchers from Stanford University on the study, published in *iScience*.

Most utilities do not have excessive storage capacity, so they must match supply and demand at all times. Therefore, electric utilities are constantly forecasting [electricity](#) needs so they know how much supply they need to make available, Boudet said.

Unlike isolated disasters such as the Texas ice storm last winter that caused many in that state to lose power, COVID-related lockdowns occurred all over the world, allowing researchers to compare different [countries'](#) policies and better understand which factors were driving changes in electricity use.

Across the 53 countries and regions included in the study, total electricity [consumption](#) dropped by a daily average of 7.3% in April 2020.

But there was significant variation among countries. India and Italy experienced "extreme" impact, with electricity consumption dropping to 26% below normal at the end of March. (India and Italy hit their lowest points before most countries did in April.)

In April, in 23 countries and five U.S. regions, there was "severe" impact, with electricity use 11% below normal; and the remaining 14 countries, two Canadian provinces and seven U.S. regions experienced "mild" impact with use 5% below normal.

"India and Italy had some of the most restrictive policies early on, in terms of keeping people at home, but there are other places that had [restrictions](#) that didn't experience such a dramatic drop," Boudet said. "It's hard to say what is it about India and Italy specifically that led to this distinction."

The pace of recovery also varied among countries, and the speed at which some bounced back surprised Boudet. Most countries had rebounded to mostly normal levels of electricity consumption by June or July of 2020, despite the fact that lockdowns were still in place, she said.

"When everything was shut down, there was a shock to the system and a decrease in consumption, and in that early phase, it was related to government restrictions," Boudet said. "But as we moved forward, government restrictions became less tied to actual electricity consumption."

It appears that most of the decrease in consumption was due to declines in the industrial and commercial sectors, Boudet said. Some emerging studies have found that residential electricity consumption increased while people were stuck at home, but not to the extent that it offset the drop in commercial consumption, she said. Reduced local travel to retail and recreation locations, in particular, was linked to steep declines in

electricity consumption.

Researchers speculated that the local severity of COVID or the characteristics of the country's electricity system might have played a role in changes in electricity consumption. Boudet said individuals may have also responded to COVID with self-imposed restrictions on their daily activities beyond the government lockdowns.

Boudet hopes this research will help inform [policy](#) as the pandemic continues.

"If utilities could make use of what they know already of how people behave when things are shut down, they could be better informed about what will happen when things may shut down in the future because of the pandemic or other crises," she said.

More information: Elizabeth Buechler et al, Global changes in electricity consumption during COVID-19, *iScience* (2021). [DOI: 10.1016/j.isci.2021.103568](https://doi.org/10.1016/j.isci.2021.103568)

Provided by Oregon State University

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