

Global carbon emissions rebound close to pre-COVID levels

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Global carbon emissions in 2021 are set to rebound close to pre-COVID levels, according to the Global Carbon Project.

Fossil carbon emissions dropped by 5.4% in 2020 amid COVID lockdowns, but the new report projects an increase of 4.9% this year (4.1% to 5.7%) to 36.4 billion tonnes.

Emissions from coal and gas use are set to grow more in 2021 than they fell in 2020, but emissions from oil use remain below 2019 levels.

For major emitters, the 2021 emissions appear to return to pre-COVID trends of decreasing CO₂ emissions for the United States and European Union and increasing CO₂ emissions for India. For China, the response to the COVID-19 pandemic has sparked further growth in CO₂ emissions, pushed by the power and industry sectors.

The research team—including the University of Exeter, the University of East Anglia (UEA), CICERO and Stanford University—say a further rise in emissions in 2022 cannot be ruled out if road transport and aviation return to pre-pandemic levels and coal use is stable.

The findings come as [world leaders](#) meet at COP26 in Glasgow to address the climate crisis and try to agree on a plan of action going forward.

"The rapid rebound in emissions as economies recover from the pandemic reinforces the need for immediate global action on [climate change](#)," said Professor Pierre Friedlingstein, of Exeter's Global Systems Institute, who led the study.

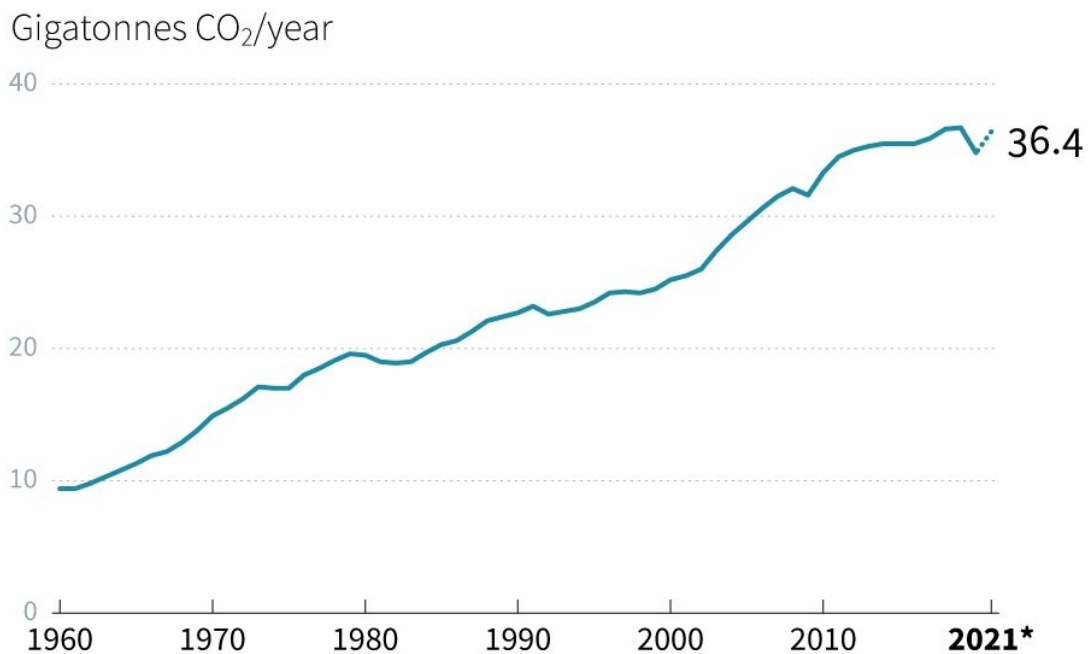
"The rebound in global fossil CO₂ emissions in 2021 reflects a return towards the pre-COVID fossil-based economy. Investments in the [green economy](#) in post-COVID recovery plans of some countries have been insufficient so far, on their own, to avoid a substantial return close to pre-COVID emissions."

Prof Corinne Le Quéré, Royal Society Research Professor at UEA's School of Environmental Sciences, contributed to this year's analysis. She said: "It will take some time to see the full effect of the COVID-related disruptions on global CO₂ emissions. A lot of progress has been made in decarbonising global energy since the Paris Agreement was adopted in 2015, plus renewables is the only energy source that continued to grow during the pandemic. New investments and strong climate policy now need to support the green economy much more systematically and push fossil fuels out of the equation."

GLOBAL FOSSIL CO₂ EMISSIONS

COP 26

Emissions are back to pre-Covid-19 pandemic levels



Source: Global Carbon Project 2021

*Projection



Chart showing the evolution of global CO₂ emissions, according to data from the

Global Carbon Project 2021.

The report—the 16th annual Global Carbon Budget—produced the following analysis on major emitters (the figures below exclude international transport, particularly aviation):

- China: Emissions are projected to rise 4% compared to 2020, reaching 5.5% above 2019—a total of 11.1 billion tonnes CO₂, 31% of global emissions.
- U.S.: Emissions are projected to rise 7.6% compared to 2020, reaching 3.7% below 2019—a total of 5.1 billion tonnes CO₂, 14% of global emissions.
- EU27: Emissions are projected to rise 7.6% compared to 2020, reaching 4.2% below 2019—a total of 2.8 billion tonnes CO₂, 7% of global emissions.
- India: Emissions are projected to rise 12.6% compared to 2020, reaching 4.4% above 2019—a total of 2.7 billion tonnes CO₂, 7% of global emissions.

For the rest of the world taken as a whole, fossil CO₂ emissions remain below 2019 levels.

Over the past decade, global CO₂ net emissions from land-use change were 4.1 billion tonnes, with 14.1 billion tonnes CO₂ emitted by deforestation and other land-use changes, and 9.9 billion tonnes CO₂ removed by regrowth of forests and soil recovery.

Removals by forests and soils have grown in the last two decades while emissions by deforestation and other land-use changes remained relatively stable, suggesting a recent decline in net emissions from land-use change, although with a large attached uncertainty.

When combining CO₂ emissions from fossil sources and net [land-use change](#), total emissions have remained relatively constant in the last decade, averaging 39.7 billion tonnes CO₂.

Based on the findings, atmospheric CO₂ concentration is projected to increase by 2.0 parts per million (ppm) in 2021 to reach 415 ppm averaged over the year, a lower growth compared to recent years due to La Niña conditions in 2021.

To have a 50% chance of limiting global warming to 1.5°C, 1.7°C and 2°C, the researchers estimate the remaining "carbon budget" has now shrunk to 420 billion tonnes, 770 billion tonnes and 1,270 billion tonnes respectively—equivalent to 11, 20 and 32 years at 2021 emissions levels.

"Reaching net zero CO₂ emissions by 2050 entails cutting global CO₂ emissions by about 1.4 billion tonnes each year on average," said Friedlingstein.

"Emissions fell by 1.9 billion tonnes in 2020—so, to achieve net zero by 2050, we must cut emissions every year by an amount comparable to that seen during COVID.

"This highlights the scale of the action that is now required, and hence the importance of the COP26 discussions."

The Global Carbon Budget annual update builds on established methodologies in a fully transparent manner. The 2021 edition is published as a preprint and is undergoing an open review in the journal *Earth System Science Data*.

More information: Global CO₂ emissions rebound to pre-COVID-19 levels, *Earth System Science Data*, 2021.

Provided by University of Exeter

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