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Carbon emissions see rapid rebound following COVID pandemic dip

As major climate summit gets under way, the latest data underscore countries' dangerous dependence on fossil fuels.

- [Jeff Tollefson](#)
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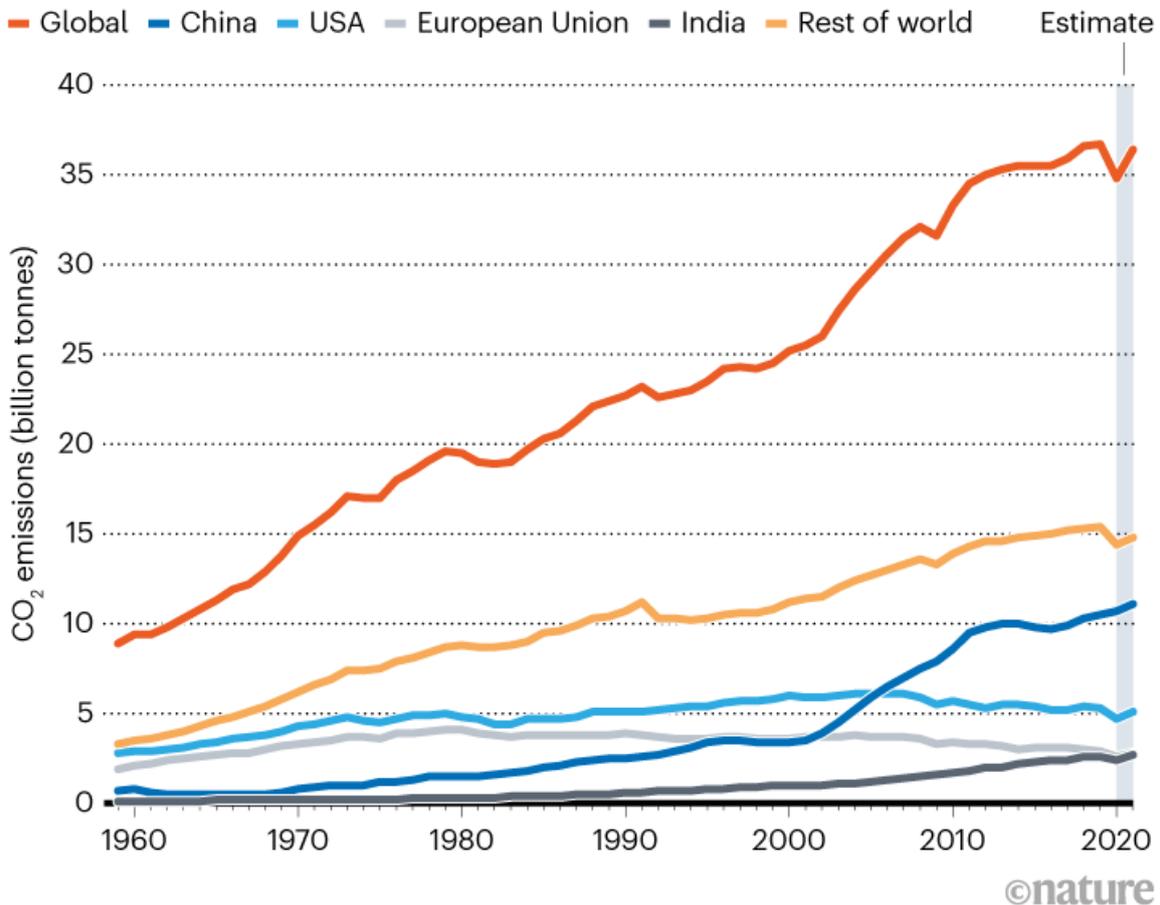
China is a large consumer of coal, which is used to run power stations such as this one in Shanghai. Credit: Hector Retamal/AFP via Getty

The abrupt decline in global carbon dioxide emissions during the COVID-19 pandemic, caused by government-mandated lockdowns, will be all but erased by the end of this year, a consortium of scientists reports this week. It predicts that carbon emissions from burning fossil fuels will rise to 36.4 billion tonnes — an increase of 4.9% — in 2021 compared with last year (see ‘Pandemic rebound’). That’s a faster recovery than many scientists expected. The rapid rebound, driven in part by the increasing demand for coal in China and India, suggests that emissions will begin to rise anew next year without substantial government efforts to bend the curve, the researchers warn.

“This is a reality check,” says Corinne Le Quéré, a climate scientist at the University of East Anglia in Norwich, UK, and a member of the Global Carbon Project, which presented the report this week at the United Nations climate summit in Glasgow, UK, [where nations are debating the pledges](#) they will make to curb greenhouse-gas emissions. “I’m expecting that it will really hit home with the negotiators and make it very obvious that action is needed.”

PANDEMIC REBOUND

After a drop of more than 5% during the first year of the COVID-19 pandemic, global carbon emissions will rebound in 2021, researchers predict. Among nations that are the largest emitters, the strongest growth compared with pre-pandemic levels is projected for China and India.



Source: Global Carbon Project

The report also provides new estimates of emissions released from land-use change, for instance, when a forest is cut down to make way for a pasture, or when a pasture is allowed to regrow forest. Although fossil-fuel emissions have been rising, the consortium estimates that cumulative carbon emissions have been relatively level during the past decade, after accounting for a gradual decline in emissions from land-use change. But taking land-use trends into consideration comes with

fairly high uncertainty, warns Julia Pongratz, a geographer at the University of Munich, Germany, who worked on the report. “It is too early to judge if the trend in land-use emissions is robust,” Pongratz says.

Carbon emissions from fossil fuels fell by 5.4% in 2020, as pandemic restrictions shut down restaurants and factories, grounded planes and closed borders, the Global Carbon Project estimates. A second consortium, Carbon Monitor, which formed in 2020 to track daily carbon emissions around the globe, [estimated a slightly larger drop](#). Most scientists expected emissions to rebound to some extent, but questions remained, including by how much and at what rate they would recover, and whether governments would ramp up investments in green energy as they sought to stimulate struggling economies.

“What we’ve seen is that the demand that’s bouncing back now has been met largely by fossil fuels,” says Steven Davis, an Earth systems scientist at the University of California, Irvine, and a member of Carbon Monitor. And because oil demand is still lower than before the pandemic, owing to reduced use of road and air transportation, scientists expect emissions to increase as more countries lift pandemic restrictions and economies recover during the next year.

‘Tough lift’

The Glasgow summit — the 26th UN Climate Change Conference of the Parties (COP26) — has already produced several important new pledges at national, corporate and global levels. For example, India has committed to hitting net-zero emissions by 2070 and has established milestones for progress along the way. Some 105 countries have committed to reducing emissions of methane, a powerful greenhouse gas that is second only to carbon dioxide in its ability to cause global warming, and more than 130 have committed to eliminating deforestation, a major source of greenhouse gases, by 2030.

The UN Intergovernmental Panel on Climate Change has estimated that the world would need to roughly halve their emissions by 2030 to remain on track to achieve the most aggressive goal in the 2015 Paris climate agreement — limiting warming to 1.5 °C above pre-industrial levels. But even with considerable progress at COP26, Davis calls the goal a “tough lift”. The use of renewable-energy technologies such as wind turbines, solar panels and batteries is increasing, but he fears it could be 5–10 years before they are widespread enough to cover future electricity demand and to begin replacing fossil fuels.



COP26 climate summit: A scientists' guide to a momentous meeting

The report analysed trends independently for the United States, the European Union, India and China — which are among the largest emitters of greenhouse gases — and found that emissions are generally returning to their pre-pandemic levels. In the United States and the European Union, where fossil-fuel use was decreasing before the pandemic, carbon dioxide emissions are projected to rise sharply in 2021 but remain around 4% below their 2019 levels. India's carbon emissions are projected to increase by 12.6% this year, to 2.7 billion tonnes, which is around 7% of the

global total and roughly equivalent to the emissions of the European Union.

The world's largest emitter, China, saw a resurgence in coal consumption owing to government efforts to stimulate the economy during the pandemic. Overall, the report projects that the country's fossil-fuel emissions will rise by 4% this year, to 11.1 billion tonnes, which is 5.5% above the pre-pandemic level.

But the report is not all doom and gloom. Le Quéré sees hope in the data: some 23 countries, whose emissions account for around one-quarter of the global total, curbed fossil-fuel emissions while expanding their economies over the course of more than a decade before the pandemic. "We have the technology and we know what to do," she says. "It's really an issue of decision-making and implementation."

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'Reality check': Global CO₂ emissions shooting back to record levels

Fossil fuels are surging in post-pandemic recovery as scientists warn 1.5C emission limits will be reached in 11 years



Smoke billows from an unauthorised steel factory in Inner Mongolia, China. Photograph: Kevin Frayer/Getty Images

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Global carbon emissions are shooting back to the record level seen before the coronavirus pandemic levels, new analysis has shown. Scientists said the finding is a “reality check” for the world’s nations gathered at the **Cop26** climate summit.

The emissions driving the climate crisis reached their highest ever levels in 2019, before global coronavirus lockdowns saw them fall by 5.4%. However, fossil fuel burning has surged faster than expected in 2021, the international research team said, in stark contrast to the rapid cuts needed to tackle global heating.

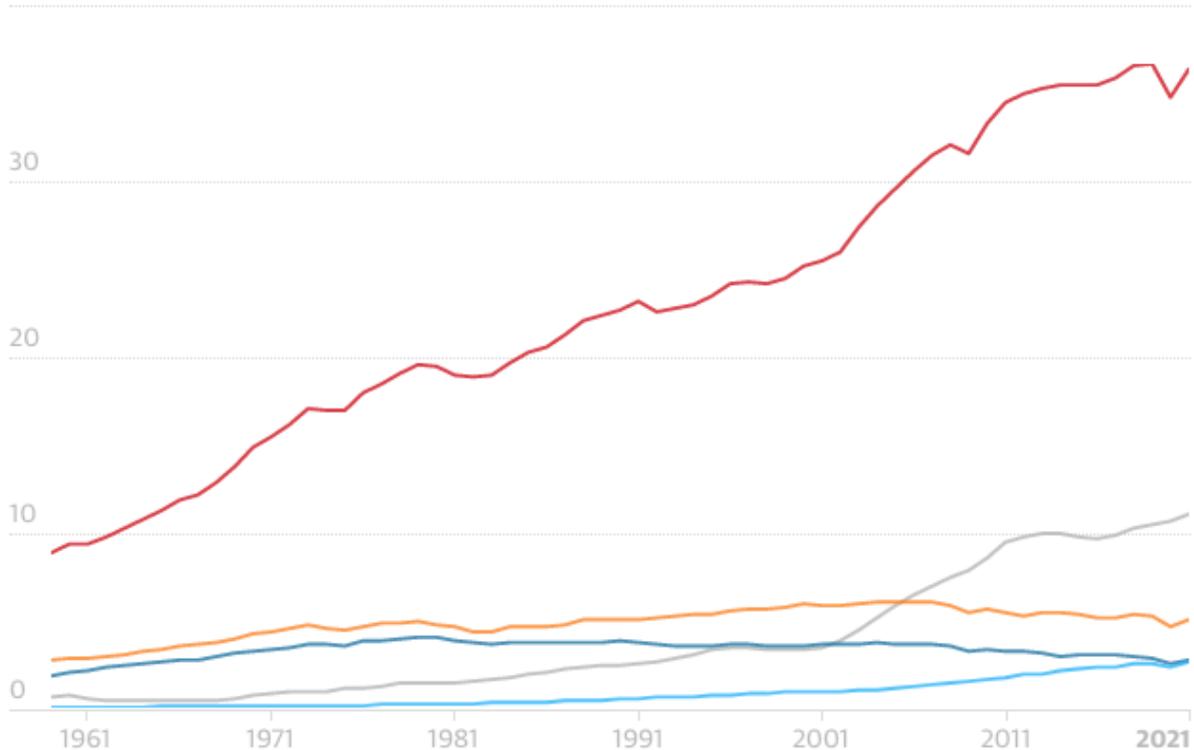
The data shows world leaders have failed to build back greener, with just a **small proportion of pandemic spending** going to sustainable sectors. But the scientists said hopes of keeping global heating to 1.5C remain alive if **Cop26** leads to rapid global action.

The **Global Carbon Project (GCP) report** shows emissions from coal and gas jumping this year by more than they fell in 2020. Oil use is also rising in 2021, but more slowly because transport activity remains below normal.

Global fossil fuel emissions have rebounded to pre-pandemic levels

■ Global ■ China ■ EU27 ■ India ■ US

40 Billion tonnes CO₂



Guardian graphic. Source: Friedlingstein et al. Earth System Science Data, 2021. Note: 2021 is an estimate

Unlike most countries, emissions in the world's biggest polluter, China, actually rose slightly during the pandemic in 2020 and are expected to rise another 4% in 2021. **India** has very low emissions per person but will see CO₂ rise 12.6% in 2021, almost double the fall in 2020.

The US and EU27 will also see sharp rises of 7.6% in 2021, but remain on a longer term trend of slowly declining emissions. Renewables were the only energy source that continued to grow during the pandemic.

The scientists said 2022 could set a new record for global emissions, depending on whether the expected increased in oil consumption, as travel recovers further, is offset by reversal of the surge in coal burning seen in 2021.

The world's "carbon budget" is the total emissions allowed to retain a 50% chance of keeping global temperature rise below 1.5C, but analysis shows this will be blown in 11 years if the current rate of emissions continues.

"What is surprising is that [the rebound in emissions] happened so quickly, in spite of the fact that much of the global economy has not yet recovered," said Prof Corinne Le Quéré, at the University of East Anglia, UK, and one of the analysis team. "This is really a reality check."

"However, we do not yet see the effect of the climate policy decisions that will be taken at Cop26 in Glasgow, which could be really a gamechanger," she said. "1.5C is still alive. The decrease in emissions needed is very large indeed, but feasible with concerted action."

Glen Peters, at the Centre for International Climate Research in Oslo, Norway, said: "Many of us were [expecting] a recovery spread out over a few years, as opposed to a big hit in 2021." He said Covid recovery funding had been too "dirty", with not enough low-carbon investment. "If we continue on the current trajectory, then that may push emissions in 2022 up."

Prof Pierre Friedlingstein, at the University of Exeter, UK, said: "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 the importance of Cop26."

The 196 nations at the **Cop26 summit are charged** with pushing national pledges to cut emissions towards that needed for 1.5C, with **India's new commitment to net zero** a notable advance. But the \$100bn promised by rich nations to poorer nations has yet to be delivered. Voluntary international pacts to **end deforestation, cut methane emissions** and make **green technology the cheapest option** have been announced. But global heating will only stop when emissions reach net zero.

The GCP report was produced by almost 100 scientists from 70 organisations across the world and, based on the figures to date, calculated that CO₂ emissions from fossil fuels will rise by between 4.1% and 5.7% in 2021, compared with a fall of 5.4% in 2020. That fall is bigger than seen after the global financial crisis in 2008 (1.2%) and the collapse of the Soviet Union (3.1%).

Emissions will have to be reduced by even greater amounts to hit net zero by 2050. But Le Quéré said: “We know what to do: move out of coal, electrify transport, and reforest.” She said a quarter of emissions come from countries that had been steadily decreasing emissions while growing their economies, including the UK, Germany, the US, Japan and Mexico.

“The key message is to resist the temptation to be discouraged by our latest findings,” she said. “The commitments being put in place at Cop26 are really important. It’s important that the countries agree on what they’re going to do and then, of course, plan for immediate implementation.”

The surge in emissions in 2021 resulted from Covid recovery packages largely funding existing, polluting industries including steel, cement and construction, particularly in **China**, Peters said: “China is, on the one hand, making extremely good progress, deploying solar and wind and electric vehicles. On the other hand, its economic recovery packages tend to go back to the old way of doing things. But there’s another 70% of global emissions that are not from China as well.”

Whether 2022 sees a new record for global emissions depends on whether the burst of coal burning seen during the pandemic recovery was a temporary “sugar hit” or continues, he said.