Press release: Embargoed until 00:01 GMT on Wednesday 13 November 2024

Fossil fuel CO_2 emissions increase again in 2024

Global carbon emissions from fossil fuels have reached a record high in 2024, according to new research by the Global Carbon Project science team.

The 2024 Global Carbon Budget projects fossil carbon dioxide (CO_2) emissions of 37.4 billion tonnes, up 0.8% from 2023.

Despite the urgent need to cut emissions to slow climate change, the researchers say there is still "no sign" that the world has reached a peak in fossil CO_2 emissions.

With projected emissions from land-use change (such as deforestation) of 4.2 billion tonnes, total CO_2 emissions are projected to be 41.6 billion tonnes in 2024, up from 40.6 billion tonnes last year.

Over the last 10 years, fossil CO_2 emissions have risen while land-use change CO_2 emissions have declined on average – leaving overall emissions roughly level over that period.

This year, both fossil and land-use change CO_2 emissions are set to rise, with drought conditions exacerbating emissions from deforestation and forest degradation fires during the El Niño climate event of 2023-2024.

With over 40 billion tonnes released each year at present, the level of CO_2 in the atmosphere continues to rise – driving increasingly dangerous global warming.

The research team included the University of Exeter, the University of East Anglia (UEA), CICERO Center for International Climate Research, Ludwig-Maximilian-University Munich, Alfred-Wegener-Institut and 80 other institutions around the world.

"The impacts of climate change are becoming increasingly dramatic, yet we still see no sign that burning of fossil fuels has peaked," said Professor Pierre Friedlingstein, of Exeter's Global Systems Institute, who led the study.

"Time is running out to meet the Paris Agreement goals – and world leaders meeting at COP29 must bring about rapid and deep cuts to fossil fuel emissions to give us a chance of staying well below 2°C warming above pre-industrial levels."

Professor Corinne Le Quéré, Royal Society Research Professor at UEA's School of Environmental Sciences, said: "Despite another rise in global emissions this year, the latest data shows evidence of widespread climate action, with the growing penetration of renewables and electric cars displacing fossil fuels, and decreasing deforestation emissions in the past decades confirmed for the first time."

Dr Glen Peters, of the CICERO Center for International Climate Research in Oslo, said: "There are many signs of positive progress at the country level, and a feeling that a peak in global fossil CO_2 emissions is imminent, but the global peak remains elusive.

"Climate action is a collective problem, and while gradual emission reductions are occurring in some countries, increases continue in others.

"Progress in all countries needs to accelerate fast enough to put global emissions on a downward trajectory towards net zero."

Professor Friedlingstein added: “Until we reach net zero CO_2 emissions globally, world temperatures will continue to rise and cause increasingly severe impacts.”

Other key findings from the 2024 Global Carbon Budget include:

- Globally, emissions from different fossil fuels in 2024 are projected to increase: coal (0.2%), oil (0.9%), gas (2.4%). These contribute 41%, 32% and 21% of global fossil CO_2 emissions respectively. Given the uncertainty in the projections, it remains possible that coal emissions could decline in 2024.
- China’s emissions (32% of the global total) are projected to marginally increase by 0.2%, although the projected range includes a possible decrease in emissions.
- US emissions (13% of the global total) are projected to decrease by 0.6%.
- India’s emissions (8% of the global total) are projected to increase by 4.6%.
- European Union emissions (7% of the global total) are projected to decrease by 3.8%.
- Emissions in the rest of the world (38% of the global total) are projected to increase by 1.1%.
- International aviation and shipping (3% of the global total and counted separately from national/regional totals) are projected to increase by 7.8% in 2024, but remain below their 2019 pre-pandemic level by 3.5%.
- Globally, emissions from land-use change (such as deforestation) have decreased by 20% in the past decade but are set to rise in 2024.
- Permanent CO_2 removal through reforestation and afforestation (new forests) is offsetting about half of the permanent deforestation emissions.
- Current levels of technology-based Carbon Dioxide Removal (excluding nature-based means such as reforestation) only account for about one-millionth of the CO_2 emitted from fossil fuels.
- Atmospheric CO_2 levels are set to reach 422.5 parts per million in 2024, 2.8 parts per million above 2023, and 52% above pre-industrial levels.
- The effects of the temporary El Niño climate event also led to a reduction in carbon absorption by ecosystems on land (known as the land CO_2 “sink”) in 2023, which is projected to recover as El Niño ended by the second quarter of 2024.
- Emissions from fires in 2024 have been above the average since the beginning of the satellite record in 2003, particularly due to the extreme 2023 wildfire season in Canada (which persisted in 2024) and intense drought in Brazil.
- The land and ocean CO_2 sinks combined continued to take up around half of the total CO_2 emissions, despite being negatively impacted by climate change.

How long until we pass 1.5°C of global warming?

This study estimates the remaining “carbon budget” before the 1.5°C target is breached consistently over multiple years, not just for a single year. At the current rate of emissions, the Global Carbon Budget team estimates a 50% chance global warming will exceed 1.5°C consistently in about six years. This estimate is subject to large uncertainties, primarily due to the uncertainty of the additional warming coming from non-CO_2 agents (e.g., CH_4, N_2O, aerosols). However, it’s clear that the remaining carbon budget – and therefore the time left to meet the 1.5°C target and avoid the worst impacts of climate change – has almost run out.

The Global Carbon Budget report, produced by an international team of more than 120 scientists, provides an annual, peer-reviewed update, building on established methodologies in a fully transparent manner. The 2024 edition (the 19th annual report) will be published in the

journal *Earth System Science Data* on November 13 as a pre-print, and later as a peer-reviewed paper

Ends

Interviews:

The following speakers are available for interview (including some availability in person at COP29 in Baku): Pierre Friedlingstein, Corinne Le Quéré, Julia Pongratz, Glen Peters, Stephen Sitch, Mike O'Sullivan, Matt Jones, Philippe Ciais. To request interviews or further information, please contact the University of Exeter press office: pressoffice@exeter.ac.uk or +44 7825 770679.

Data Availability:

All material, publications, data, figures (including by country), are available under embargo on the following link:
https://drive.google.com/drive/folders/1yJ0hW9nQFih_3mmjAOKtRaMDi2mql1vo

Press conference:

Science Media Centre online news briefings will be held as follows:

- UK: Friday 8 November, 10:30 GMT. Contact: tom@sciencemediacentre.org

EVENTS AT COP 29:

- UN Press Conference & launch of Global Carbon Budget 2024. Location: Press conference 2 (Natavan), Area C. Blue Zone COP 29, 13th November. 10.30-11.00
- UNFCCC side event. Action with impact: Critical enablers for fulfilling national commitments. Location: SIDE EVENT 5, blue Zone, COP 29, 14th November. 15.00-16.30
- Coalition of Rainforest Nations Pavilion. Climate Science: The 2024 Global Carbon Budget and The Global South. Location: Coalition of Rainforest Nations Pavilion, Blue Zone, COP29, 15th November. 16.00-16.45
- IPCC Pavilion event. Reconciling anthropogenic land-use emissions. Location: Science for Climate Action Pavilion, Blue Zone COP 29, 11:00 – 12:15, Saturday 16th November

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