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CICERO
Center for International Climate Research

New figures confirm: Global fossil CO_2 emissions continue a persistent rise

Global fossil CO_2 emissions are projected to rise 1.1% in 2025, and are now 10% higher than in 2015, ten years since the Paris Agreement was adopted.

On the 13th of November, the Global Carbon Project (GCP) publishes its 20th annual analysis of trends in the global carbon cycle in the journal *Earth System Science Data Discussions*[1], including a full-year projection for 2025. This year, methodological improvements leading to a consolidated carbon budget are published in the journal *Nature*.

Global fossil CO_2 emissions[2] are expected to grow 1.1% in 2025 (with an uncertainty[3] range of 0.2% to 2.2%). This is higher than the average growth rate of 0.8% per year over the last ten years and builds on a growth of 1.1% in 2024.

"It is 10 years since the Paris Agreement was adopted, and despite progress on many fronts, fossil CO_2 emissions continue their relentless rise," said Glen Peters, a Senior Researcher at the CICERO Center for International Climate Research.

Collective progress stalls, despite positive stories in several countries

Despite growth in global fossil CO_2 emissions, emissions had a statistically significant decrease in 35 countries representing 27% of global fossil CO_2 emissions during the past decade (2015-2024). During the decade 2005-2014, only 21 countries had statistically significant decreases in emissions.

"There are many signs of positive progress at the country level, with strong growth in solar, wind, electric vehicles, batteries, and reductions in deforestation," said Peters. "While the positive progress is pushing emissions down in dozens of countries, and slowing emissions growth in many more, the changes are not sufficient to accelerate the world towards net zero emissions."

Coal, oil, and natural gas continue to grow globally

Global CO_2 emissions from coal use are projected to grow 0.8% in 2025 [-0.1% to 1.9%], reaching another record high. Coal declined the European Union (EU27) and possibly in China in 2025, but rose in the USA, India, and the Rest of the World in aggregate.

CO_2 emissions from oil use are projected to grow 1.0% in 2025 [0.3% to 1.8%], with increases in all world regions, with international aviation back to pre-COVID pandemic levels.

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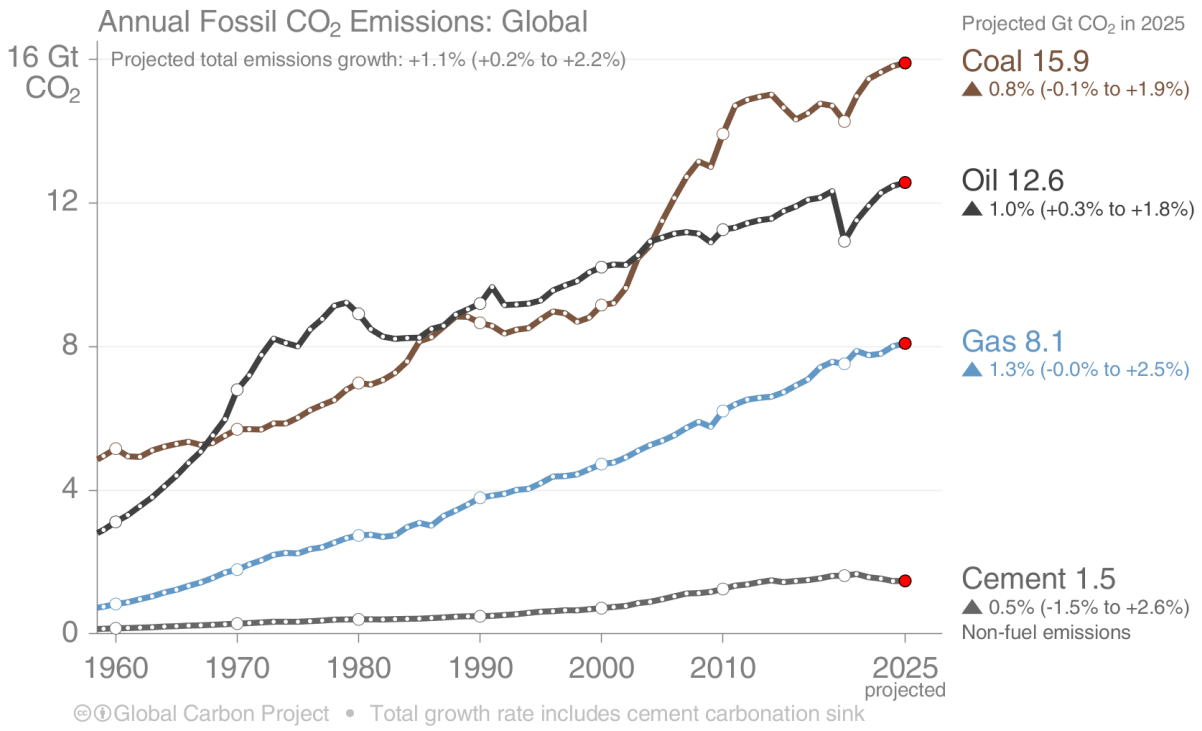
[1] The article is submitted as a discussion paper in open peer review to ensure broad community input.
[2] The global fossil CO_2 emission include CO_2 emissions from the burning of coal, oil, and gas, and in chemical processes such as the production of cement. The global total also includes the small uptake from cement carbonation.
[3] The 2024 emission projection is based on the use of monthly energy data, with the latest data between August and October, and we then make judgements about how emissions may develop for the remainder of the year.

CO_2 emissions from natural gas are projected to grow 1.3% in 2025 [0.0% to 2.5%], approaching the sustained 2% per year seen before the COVID-19 pandemic and Russia's full-scale invasion of Ukraine. The growth in natural gas in 2025 is driven by China, the USA, the EU27, and the Rest of the World in aggregate.



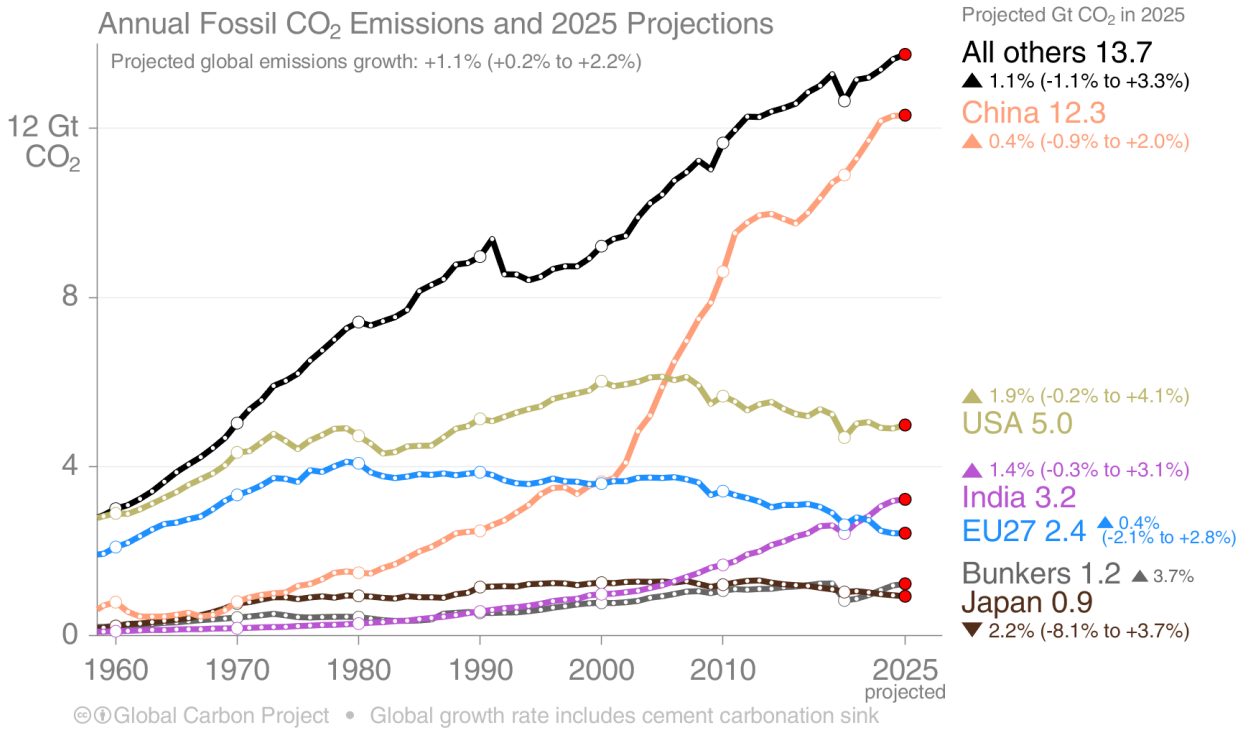
Fossil CO_2 emissions grow in the USA and the European Union

In the United States (13% of global emissions), emissions in 2025 are projected to grow 1.9% (-0.2% to 4.1%). Strong growth in coal emissions (7.5%) is the main cause of the increase, with weaker growth in oil (1.1%) and gas (1.1%).

"A colder start to the year after a mild 2024 led to greater heating requirements, while higher natural gas prices resulting largely from increased liquefied natural gas (LNG) export capacity led to more coal being used in power generation. These were compounded by an increase in total demand for electricity," said Robbie Andrew, Senior Researcher at CICERO.

In the EU27 (6% of global emissions), emissions in 2025 are projected to grow 0.4% (-2.1% to 2.8%). Given the uncertainty, this increase should not be overinterpreted. A small decline in coal (0.3%) is offset by growth in oil (0.6%) and gas (0.9%).

"While coal use continues to decline and solar power expands, weather related low hydropower and wind generation have led to an increase in electricity generation from natural gas. In addition, a relatively cold February led to increased use of natural gas for space heating," said Andrew.



Too early to predict peak fossil CO_2 emissions in China

In China (32% of global emissions), emissions in 2025 are projected to grow 0.4% (-0.9% to 2.0%). The uncertainty range includes also declining emissions, with full data in 2026 required to confirm the change in emissions. Emissions from coal use are projected to grow slightly (0.3%) though the uncertainty makes it almost as likely to have gone slightly down. There is stronger growth in oil (2.1%) and gas (1.3%) but moderate compared to earlier years, and cement continues to decline (2.8%).

“There is no clear peak in Chinese fossil CO_2 emissions in 2025, with emissions growth essentially indistinguishable from zero,” said Jan Ivar Korsbakken, Senior Researcher at CICERO, who makes the projections for Chinese emissions. “Weak growth in many industries pushed energy demand growth down, and strong growth in renewables was able to both absorb all growth in electricity demand and displace some coal power. Oil and gas both grew, though at a moderate pace. The outlook going forward is highly uncertain due to policy changes that reduce economic incentives for renewable power, and due to expected growth in the use of coal to produce chemical feedstocks.”

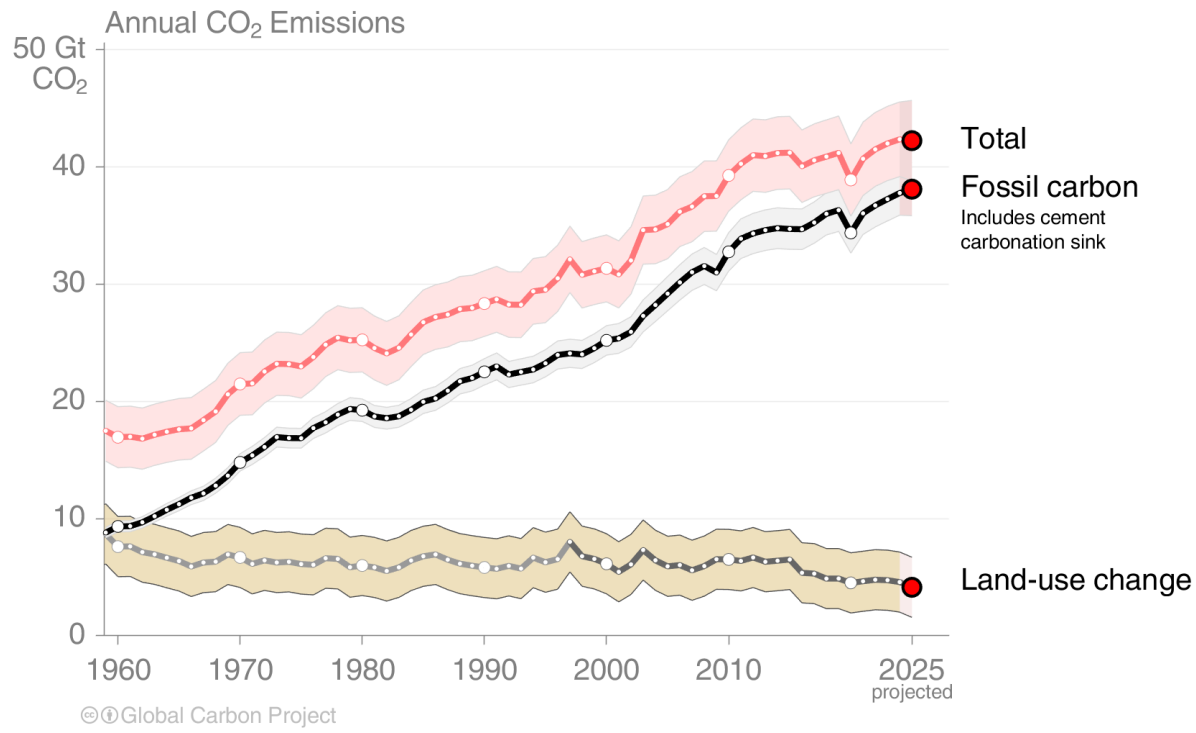
In India (8% of global emissions), emissions are projected to grow 1.4% (-0.3% to 3.1%). The growth in coal (1.7%) is much lower than previous years, with oil use essentially flat (0.1%), a large increase in cement (10%) and a decline in gas (6.4%) but from a low level.

“An early monsoon with the highest-ever May rainfall substantially reduced cooling requirements in May and June, the hottest months of the year. Combined with strong growth in renewables, particularly solar power, this has led to very low growth in coal consumption in 2025,” said Andrew.

Projected emissions in Japan, provided this year for the first time, are for a decrease of -2.2% (-8.1% to 3.7%). Decreases are expected in coal (3.1%), oil (0.8%), gas (2.7%), and cement (3%).

“The decrease in Japanese emissions builds on continuing trends in the reactivation of nuclear power plants and the expansion of solar power generation, along with weak growth in the economy”, said Taro Kunimitsu, Senior Researcher at CICERO, working on the projections for Japan.

International aviation is projected to grow 6.8% in 2025, while international shipping is projected to be flat. Aviation is growing both in the passenger segment - where demand continues to rise - and in the cargo segment, which saw a downturn in 2022-23 with the tight economic conditions following the pandemic and Russia’s full-scale invasion of Ukraine.



CO_2 emissions from land-use change lower in the past decade

Global net CO_2 emissions from land-use change (LUC[4]) averaged 5.0 $GtCO_2$ per year for the past decade (2015-2024) with a preliminary projection for 2025 of 4.1 $GtCO_2$, marking the end of El Niño conditions in 2023-2024.

Total CO_2 emissions combine estimates of fossil CO_2 emissions and CO_2 emissions from land-use change.

[4] Net CO_2 emissions from land-use change refer to emissions, but also removals, from activities such as deforestation, re/afforestation, and wood harvest and regrowth. They exclude CO_2 fluxes from vegetation in response to changing CO_2 concentration and climate conditions.

Total CO_2 emissions (fossil plus LUC) grew 0.3% per year in the last decade (2014-2024), compared to 1.9% the previous decade (2005-2014). The rise in fossil CO_2 emissions is compensated by the decline in land-use change CO_2 emissions.

Total CO_2 emissions were 42.4 $GtCO_2$ in 2024, with a slightly lower preliminary estimate of 42.1 $GtCO_2$ in 2025, with large uncertainty precluding additional interpretation.

A reanalysis of the land and ocean sinks better captures climate feedbacks

"The atmospheric increase in CO_2 concentrations was a record in 2024 of 3.7 parts per million, suggesting a potential collapse in the land sink. As the El Niño has receded, the land sink and atmospheric CO_2 increase are projected to return to expectations in 2025," said Peters.

Atmospheric CO_2 concentrations have increased on average 2.6 parts per million (ppm) per year in the last ten years, increasing a record 3.7 ppm in 2024, but an increase of 2.3ppm expected in 2025.

The concentration of CO_2 in the atmosphere is set to reach 426 ppm in 2025, with 8 ppm of the increase since 1960 due to climate feedbacks.

The land and ocean CO_2 sink are 25% and 7% smaller, respectively, than they would have been without the effects of climate change and variability, on average for the 2015-2024 period.

The ocean CO_2 sink has been stagnant since 2016, largely in response to climate variability modulating the growing sink trend but further affected by the ocean heatwave of 2023-2024 in the Northern Hemisphere.

The land CO_2 sink has been relatively stagnant since 2000, largely in response to climate variability and climate change offsetting the CO_2-induced growth. After a significantly weaker land sink in 2024 due to the 2023-2024 El Niño conditions, the preliminary estimate for 2025 suggests a full recovery of pre-El Niño levels.

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"The land sink now appears relatively stagnant for the last quarter of a century, despite rapidly growing CO_2 concentrations", says Kjetil Aas, Senior Researcher at CICERO. "This is the result of increasing effects of climate change and variability which has made the land sink 25% lower in the last decade than it would have been without these effects."

Facts about the Global Carbon Project: The Global Carbon Project is an international research project within the Future Earth research initiative on global sustainability, and a research partner of the World Climate Research Programme. It aims to develop a complete picture of the global carbon cycle, including both its biophysical and human dimensions together with the interactions and feedbacks between them. The Global Carbon Budget 2025 is the 20th edition of the annual update that started in 2006.

Interviews with CICERO researchers

- Glen Peters (glen.peters@cicero.oslo.no, +47 9289 1638 – email preferred)
- Robbie Andrew (robbie.andrew@cicero.oslo.no, +47 2200 4769)
- Jan Ivar Korsbakken (China) (jan.ivar.korsbakken@cicero.oslo.no, +47 2200 4718)
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- Friedlingstein et al. (2025) Global Carbon Budget 2025. *Earth System Science Data Discussion* (preprint available after embargo)
- Friedlingstein et al. (2025), Emerging climate impact on carbon sinks in a consolidated carbon budget, *Nature*, https://www.nature.com/articles/s41586-025-09802-5 Accelerated Article Preview (AAP) published on 12 November 2025 at 16:00 (London time).

Press events

- UK: Tuesday 11 November, 10:00 GMT. Science Media Centre online news briefings. Contact: smc@sciencemediacentre.org
- UN Press Conference & launch of Global Carbon Budget 2025. UNFCCC press conference at COP30 in Belém, Brazil. Location: Press Conference 2, Area D. Date & time: 13 November 2025, 10:00-10:30 (Brasilia time) / 13:00-13:30 (GMT).

Access to material:

- Prior to embargo: https://drive.google.com/drive/u/1/folders/1leL34aF-U-JOfgkGcOXgm4tKzyz2FK5Y
- Data and figures (after embargo): https://globalcarbonbudget.org/
- Fossil CO_2 data by country and fuel, 1750-2024: https://zenodo.org/records/17417124