

## What does the IPCC say about the remaining CO<sub>2</sub> budgets?

The United Nations Intergovernmental Panel on Climate Change (IPCC) published the following figures in its Sixth Assessment Report Working Group I 2021 ([IPCC AR6 WG I](#), cf. Table SPM.2 and Table 5.8):

Warming	Estimated remaining carbon budgets			Scenario variation	Geophysical uncertainties			
				Non-CO <sub>2</sub> scenario variation	Non-CO <sub>2</sub> forcing and response uncertainty	Historical temperature uncertainty	ZEC uncertainty	Recent emissions uncertainty
<i>Probabilities:</i>	50%	67%	83%					
[°C]	[GtCO <sub>2</sub> from 2020 on]				[GtCO <sub>2</sub> ]			
1.5	500	400	300	±220	±220	±550	±420	±20
1.6	650	550	400					
1.7	850	700	550					
1.8	1000	850	650					

Global CO<sub>2</sub> emissions were around 42 Gt in 2018 and around 43 Gt in 2019 (source: [Global Carbon Project](#)).

In the 'Summary for Policymakers' the IPCC writes:

**“D.1.1** (...) there is a near-linear relationship between cumulative anthropogenic CO<sub>2</sub> emissions and the global warming they cause. Each 1000 GtCO<sub>2</sub> of cumulative CO<sub>2</sub> emissions is assessed to *likely* cause a 0.27°C to 0.63°C increase in global surface temperature with a best estimate of 0.45°C. (...) This quantity is referred to as the transient climate response to cumulative CO<sub>2</sub> emissions (TCRE). This relationship implies that reaching net zero anthropogenic CO<sub>2</sub> emissions is a requirement to stabilize human-induced global temperature increase at any level, but that limiting global temperature increase to a specific level would imply limiting cumulative CO<sub>2</sub> emissions to within a carbon budget.“

**“D.1.2** (...) Remaining carbon budgets have been estimated for several global temperature limits and various levels of probability, based on the estimated value of TCRE and its uncertainty, estimates of historical warming, variations in projected warming from non-CO<sub>2</sub> emissions, climate system feedbacks such as emissions from thawing permafrost, and the global surface temperature change after global anthropogenic CO<sub>2</sub> emissions reach net zero.“