

Annual Emissions Reduction Targets Until 2030 To Keep Within 1.5°C Global Warming (for New Zealand locations, based on data released in April 2024)

Prepared by the Nelson Tasman Climate Forum's Targets Working Group¹

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Key Points

To help meet the Paris target of no more than 1.5°C of global warming, New Zealand needs to reduce CO₂ and other long-lived (i.e. non-methane) emissions by about 8% per annum from January 2025 through 2030. For the Nelson Tasman region (indeed, for any region) to do its share, it will need to achieve reductions of this magnitude.

Emissions *per capita* and *per unit of output* will need to decline at a somewhat faster rate to compensate for growth in population and economic activity. Any delay, i.e. years with reductions less than the target rate, will necessitate larger reductions in subsequent years.

These targets are based on the estimate of the IPCC² that a 43% reduction in net emissions is required between 2019 and 2030 to meet the 1.5°C objective. This document has been updated to incorporate NZ's latest available official emissions data, released in April 2024³, which cover the period through 2022. We plan to update this document annually using latest emissions data from MFE, which is usually released in mid-April.

Objective

This document summarises the calculation of an annual reduction rate for emissions of CO₂ and other long-lived gases. We used NZ Government data and a methodology that is compatible with the Zero Carbon Act⁴ as a basis for informing discussion on regional GHG emissions reduction strategies compatible with staying within 1.5°C warming. Although 1.5°C of warming may have already been reached or exceeded, it remains the agreed international objective and the basis for emission reduction pathways and targets.

Methodology

We used the IPCC AR6 Synthesis Report as the basis for these calculations, in particular Category C1 "*Limit warming to 1.5°C (>50%) with no or limited overshoot*". This target requires a 43% reduction in net GHG emissions between 2019 and 2030⁵. Because of NZ's "split gas" approach, with a less ambitious target for methane than for other emissions, we calculated a separate reduction rate for CO₂ and other long-lived gases.

Results

The total reduction required in gross emissions of CO₂ and other long-lived gases, from 45,439 ktCO₂e in 2019 to 23,868 ktCO₂e in 2030, represents a 47% reduction, i.e. slightly more than the overall reduction of 43% to make up for lesser reductions in methane. From 2019 to 2022, NZ reduced its annual gross emissions of CO₂ and other long-lived gases by about 12%, leaving 35% to go by 2030.

To achieve this in the six years from 1 Jan 2025 to 31 Dec 2030 will require reductions of 8.3% every year.

Emissions *per capita* and *per unit of economic output* will need to decline at a somewhat faster rate to compensate for growth in population and economic activity. For example, with population growth of 1% per year, the average household would need to reduce emissions by around 9% per year.

Table 1 presents actual NZ emissions in 2019 and 2022 and targets for 2030 in tonnes of CO₂ equivalents (CO₂e), using the latest data from the Ministry for the Environment | Manatū Mō Te Taiao⁶.

¹ www.nelsontasmanclimateforum.nz. Contact: David Ayre or Jim Sinner via the Forum.

² The Intergovernmental Panel on Climate Change (IPCC) is the official United Nations body for assessing the science related to climate change.

³ <https://environment.govt.nz/publications/new-zealands-greenhouse-gas-inventory-1990-2022/>

⁴ Formally known as the Climate Change Response (Zero Carbon) Amendment Act 2019.

⁵ See <https://www.ipcc.ch/2022/04/04/ipcc-ar6-wgiii-pressrelease/> and the IPCC's [Climate Change 2023 Synthesis Report](https://www.ipcc.ch/2022/04/04/ipcc-ar6-wgiii-pressrelease/) (Figure 2.5 on p.59, Table 3.1 on p.84, and text on p.92).

⁶ Available at <https://environment.govt.nz/publications/new-zealands-greenhouse-gas-inventory-19902022/>.

Table 1. NZ emissions in 2019 and 2022 with target for 2030, in kilotonnes of CO₂ equivalent (ktCO₂e).

The 2030 target for CO₂ and other long-lived (non-methane) gases is in row D, in bold italics.

Note: Net emissions (A) = Methane emissions (C) + CO₂ and other long-lived gases (D) less removals by forestry (B); therefore, the target for CO₂ and other long-lived gases (D) = A-B-C.

		2019	2022	2030	Comment re 2030 figures
A	NZ net emissions	62992	59157	35905	43% reduction from 2019
B	Emissions from LULUCF*	-21595	-19239	-22987	For 2023-2030, assumed constant at -22987 (annual average for 2013-22)
C	Methane (CH ₄) emissions	39148	38339	35024	10% reduction from 33507 in 2017
D	CO ₂ and other Non-CH ₄	45439	40056	23868	A - B - C

*LULUCF = Land use, Land use change, and Forestry, a category for emissions and removals (i.e. sequestration) of CO₂ and other gases from the atmosphere that are recognised for emissions accounting under IPCC rules. Negative numbers indicate net removals (i.e. credits).

The target for CO₂ and other long-lived emissions (in Table 1, row D, column 2030) is determined by subtraction, starting with the net emissions target for 2030 (in row A). We account for the assumed amount of forestry credits in 2030 (i.e. subtract the negative number in row B) and then subtract the methane target for 2030. This gives a 2030 target of 23,868 ktCO₂e for CO₂ and other long-lived gases (i.e. all GHGs other than methane). The last column of Table 1 contains brief notes on how the targets were calculated, with further detail below.

Our assumptions are as follows:

- We treated all CH₄ as biogenic, as less than 0.3% of CH₄ is non-biogenic in New Zealand.
- We assume NZ keeps its current target of reducing biogenic CH₄ emissions by 10 percent below 2017 levels by 2030 (as stated in “Aotearoa New Zealand’s Methane Emissions Reduction Plan Summary Version” published by the Ministry of Foreign Affairs and Trade | Manatū Aorere in 2022⁷). On a straight-line basis, this translates to a 1.5% annual reduction from 2025 through 2030.
- We assumed that net CO₂ removals by forestry remain constant from 2023 to 2030 at the ten-year average for the period 2013-2022. Forestry activity is hard to predict, responding to market prices for farm products and timber as well as government policy, so we decided to use the most recent 10-year average to estimate future forestry credits.
- Finally, we have assumed that, for 2023 and 2024, CO₂ and other non-methane GHG emissions were the same as 2022 levels (40,056 ktCO₂e), because data for these years are not yet reported.

Reservations and Limitations

- In the IPCC’s AR6 Category C1 scenario, the 43% reduction target has only “at least a 50% probability of success”, i.e. of keeping warming to less than 1.5°C. Steeper reductions would be needed to provide greater certainty.
- Our calculations are based on an equal per capita allocation of the world’s remaining carbon budget. An equitable allocation would require New Zealand and other developed countries, who have emitted most of the carbon that is causing global warming, to reduce by more than 43% by 2030⁸.
- Remaining below 1.5°C of warming does not mean that harmful effects of climate change will be averted. Existing warming is already causing severe and costly loss and damage. Even greater loss and damage will be experienced with 1.5°C of warming.
- Recent research⁹ suggests that the rate of warming may be faster than assumed in the IPCC pathways, e.g. due to less particulate matter in the atmosphere as burning of fossil fuels declines.

⁷ Available at <https://www.mfat.govt.nz/assets/Climate-Change-Programme-images/Aotearoa-New-Zealands-Methane-Emissions-Reduction-Action-Plan-Full-Version.pdf>

⁸ See <https://climateactiontracker.org/countries/new-zealand/policies-action/> and [Oxfam-NZ-Briefing-A-Fair-2030-Target-for-Aotearoa.pdf](#)

⁹ See e.g. James Hansen et al. (2023): <https://mailchi.mp/caa/how-we-know-that-global-warming-is-accelerating-and-that-the-goal-of-the-paris-agreement-is-dead>