

Annual Emissions Reduction Targets Until 2030 To Keep Within 1.5°C Warming (based on data released in April 2023)

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

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Key Points

To 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 7% per annum, and methane emissions by 1.5% per annum, from now (1 Jan 2024) until 2030. For the Nelson Tasman 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 slightly 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 IPCC²'s estimate that a 43% reduction in net emissions is required between 2019 and 2030. We have used NZ's emissions data through 2021 (the latest available) and assumed that there were no significant changes in CO₂ and other long-lived gas emissions in 2022 and 2023. Emissions data for 2022 are expected to be available in mid-April 2024, after which we will update our calculations.

Objective

This document summaries the calculation of annual regional greenhouse gas (GHG) emissions reduction rates to meet New Zealand's commitments under the Paris agreement, with separate rates for methane and for CO₂ and other long-lived gases. We used widely accepted data and a methodology that is compatible with the "Zero Carbon Act" as a basis for informing discussion on regional GHG emissions reduction strategies, and for developing scenarios compatible with not exceeding 1.5°C warming.

Methodology

We have 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 2030. Because of NZ's "split gas" approach, with a less ambitious target for methane than for other emissions, we have calculated the required reduction rates separately.

The total reduction required of gross emissions of CO₂ and other long-lived gases, from 46,433 ktCO₂e to 26,650 ktCO₂e per year, represents a 42.6% reduction from 2019 levels, i.e. slightly lower than the overall reduction required due to CO₂ removals (i.e. credits from sequestration) by forestry. NZ reduced its gross emissions of CO₂ and other long-lived gases by about 5.7% during 2020-21, leaving 37% more to go.

To achieve this in the seven years from 1 Jan 2024 to 31 Dec 2030 will require reductions of 6.85% every year.

Emissions *per capita* and *per unit of output* will need to decline at a slightly 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 8% per year.

Table 1 presents actual NZ emissions in 2019 and 2021, and targets for 2030. The target for CO₂ and other long-lived emissions is determined by subtraction, starting with the net emissions target for 2030 (in row A in Table 1). To this, we add the assumed amount of forestry credits (i.e. subtract the negative number) and then subtract the methane target for 2030. This gives a 2030 target of 26,514 ktCO₂e for CO₂ and other long-lived gases. The last column of Table 1 contains brief notes on how the targets were calculated, with further detail below.

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.

Table 1. NZ emissions in 2019 and 2021 with target for 2030, in kilotonnes of CO₂ equivalent (ktCO₂e).

The 2030 target for CO₂ and other long-lived (non-methane) gases is highlighted with a double border.

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	2021	2030	Comment re 2030 figures
A	NZ net emissions	56068	55746	31959	43% reduction from 2019
B	LULUCF*: Net forestry removals	-23922	-21078	-24848	For 2022-2030, assumed constant at -24848 (annual average for 2012-21)
C	Methane (CH ₄)	33557	33019	30156	10% reduction from 2019
D	CO ₂ and other Non-CH ₄	46433	43805	26650	A - B - C

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

We used the latest available data, through 2021, from the Ministry for the Environment | Manatū Mō Te Taiao³.

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 2022⁴).
- We assumed that net CO₂ removals by forestry remain constant from 2022 to 2030 at the ten-year average for the period 2012-2021.
- Finally, we have assumed that, for in 2022 and 2023, CO₂ and other non-methane GHG emissions were the same as 2021 levels (43,805 ktCO₂e).

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.
- 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.
- Furthermore, recent research suggests that the rate of warming may be faster than assumed in the IPCC pathway used in these calculations, which do not take into account the expected reduction in reflective particulate matter in the atmosphere (as burning of coal and other fossil fuels declines).

³ Available at <https://environment.govt.nz/publications/new-zealands-greenhouse-gas-inventory-1990-2021/>.

⁴ Available at <https://www.mfat.govt.nz/en/environment/climate-change/working-with-the-world/building-international-collaboration/?m=632146#search:ZW1pc3Npb25zIHJlZHVjdGlvb3R0ZXRoYW5l>