



## **Agricultural emissions and warming in Aotearoa New Zealand to 2050: Insights from the science**

### **Frequently asked questions**

#### **Q: What did DairyNZ, Beef + Lamb NZ and Federated Farmers ask experts to do?**

A: We commissioned climate change experts at University of Oxford and Cranfield University to prepare a report that reviewed the current legislated methane targets to 2050 under the Climate Change Response (Zero Carbon) Amendment Act of 2019 (CCRA) in New Zealand and analyse what these targets, if achieved, would mean for the New Zealand economy's overall contribution to global warming.

We also asked them to look at the contribution of the main gases emitted in New Zealand, based on warming to date, and run some scenarios on what reductions in methane would be required for it to add no additional warming.

We believe an accurate picture of the warming impact of biogenic methane is highly relevant to the target review, which requires greater transparency and understanding to best inform New Zealand's contribution towards limiting the impacts of climate change.

#### **Q: Why did we commission climate change experts to do the report?**

A: The report's authors are leading international climate change science experts.

Myles Allen is Professor of Geosystem Science in the School of Geography and the Environment and Department of Physics at the University of Oxford, and he is Director of the Oxford Net Zero initiative. He was the Coordinating Lead Author on the Intergovernmental Panel on Climate Change (IPCC)'s Special Report on 1.5 degrees, having served on the IPCC's 3rd, 4th and 5th Assessments, including the Synthesis Report Core Writing Team in 2014.

Michelle Cain is a senior lecturer in Environmental Data Analytics at Cranfield University, and currently holds a United Kingdom Research and Innovation Future Leaders Fellowship on non-CO<sub>2</sub> climate mitigation. She is a co-lead for the UN Food and Agriculture Administration's Technical Advisory Group on Methane.

Jessica Zionts, has an MSc from University of Oxford and previously worked as a researcher at the World Resources Institute. She is currently a Doctoral student at the University of Oxford.

Miyabi Barth completed an MPhys from University of Oxford before becoming a researcher on this report, providing the modelling and analysis of results.

**Q: Why is the Climate Change Commission reviewing the legislated targets?**

A: The Commission must provide advice to the Government every five years on the next emissions budget period, including on review of the 2050 targets. As a result of the review, the Commission will provide advice on whether any changes should be made to New Zealand's legislated 2050 target or parts of the target.

These could be changes to what the target is, what gases, emissions and removals it applies to, when the target (or its components) must be met by, and how much can be met by domestic removals or offshore mitigation.

**Q: What are the timeframes to review the targets?**

A: The Commission called for evidence to inform its analysis and draft advice to Government. DairyNZ, Beef + Lamb NZ and Federated Farmers have submitted a report commissioned from climate change experts at University of Oxford and Cranfield University as evidence to the Climate Change Commission to consider for the review.

The Commission is due to deliver final advice to the Minister of Climate Change by 31 December 2024. There will be opportunities to have your say during the review process in 2024, including after the Commission releases its draft advice.

**Q: What are New Zealand's current legislated emissions reduction targets?**

A: Under the Climate Change Response Act, New Zealand's domestic target has three components:

1. Net zero emissions of all greenhouse gases other than biogenic methane by and beyond 2050.
2. 10% reduction below 2017 biogenic methane emissions by 2030.
3. 24-47% reduction below 2017 biogenic methane emissions by and beyond 2050.

The 'net zero' component of the long-lived gas targets means the Government can decide how to get to 2050 via a combination of gross reductions (fewer greenhouse gas emissions) and removals (capturing carbon dioxide by natural or artificial means).

The two biogenic methane components are gross targets rather than net targets, meaning efforts need to be focused on reducing the amount of biogenic methane added to the atmosphere.

**Q: What were the key findings of the report?**

A. The research found that a 47% reduction in methane by 2050 would see methane offset all of the expected additional warming from carbon dioxide and nitrous oxide between 2022 and 2050, bringing New Zealand's economy wide cumulative warming back to 2022 levels by 2050.

A 24% reduction in methane by 2050 would see methane offset all additional warming from carbon dioxide and nitrous oxide between 2027 and 2050, bringing New Zealand's economy wide cumulative warming back to 2027 levels by 2050.

This compares to the rest of the world that is effectively aiming to peak their global warming around 2050, by which time New Zealand would already have peaked (in the 2030s) and started reducing its contribution to global warming, returning back to 2022 or 2027 levels of warming.

We believe this research shows that the Climate Change Commission should recommend a review of the methane targets. These targets should be reviewed based on a warming approach. This would be a transparent way of determining the level of methane reductions that needs to be made.

As a result of this research, we also recommend that the Government start to report on annual warming as well as emissions so that the public can better understand the different impact the main gases are having on warming.

**Q: Do the report's findings present what New Zealand's greenhouse gas targets should be?**

A: The key purpose of the research was not to recommend targets, but rather to look at the current methane targets to determine how they relate to warming impacts thus serving as evidence to inform the Commission's review process.

The report shows that if other countries meet their existing emissions reduction commitments then a 15% reduction in methane by 2050 would see New Zealand methane contribute no additional warming from a 2020 baseline level, but if countries significantly increased their current levels of ambition a reduction of up to 27% reduction may be required to not add additional warming from 2020 levels.

These scenarios are still highly ambitious as methane would add no further warming from 2020 levels, compared to carbon dioxide and nitrous oxide that would continue adding further new warming until they reach net zero in 2050.

**Q: Why is the 'no additional warming' range reached by the report different to 0.3% reductions per year (or 10% by 2050)?**

A: There is a 20-year lag between emissions cuts and temperature impacts after cuts in methane emissions are made. A 0.3% reduction in methane per year from a certain date will see warming from methane stabilise. This has been extrapolated out by some to be a 10% reduction by 2050.

But if you are wanting to contribute no additional warming from a particular date, it is necessary to offset the warming that occurs before the lag effect runs out. That means slightly more than 10% reductions may be necessary. A key factor is the base period from which no additional warming is desired to take effect.

The researchers used 2020 as the base period for measuring no additional warming of methane. This is an ambitious timeframe, and well beyond what is being asked of CO<sub>2</sub>, which only currently needs to get to no additional warming from 2050.

**Q: What will the sector be doing for farmers between now and the Government's final decisions on the target review in 2025?**

A: We believe that the report is a helpful addition to the landscape, providing the Climate Change Commission and government with significant new science to take a warming approach. The review provides an opportunity to make sure the targets are equitable for all sectors of our economy. We know that not all gases behave the same way in terms of their impact on warming.

The report reinforces that the warming impact of short-lived vs long-lived gases should be front and centre of our policy response.

We will continue to advocate for a revised emissions reduction target to be informed by the latest science.

This means using appropriate measurements that account for different warming potential of short-lived gasses which allow policy decisions around burden sharing to take place transparently, and on a level playing field.

**Q: Agriculture has been the main contributor to warming to date in New Zealand. Shouldn't it therefore do more?**

The authors of the Oxford/Cranfield report did not take a position on what different sectors in New Zealand should do, noting that this depends on much broader considerations than only their contributions to past and ongoing warming, including capacity to act and role in New Zealand's society and economy. They note that other countries have not generally taken account of previous warming, known as 'historical responsibility', in setting targets.

In most developed countries, carbon dioxide has been the main contributor to warming to date and a target of achieving no additional warming by 2050 has been deemed sufficient. This means CO<sub>2</sub> (the dominant gas for most countries) can continue adding new warming until 2050 when net zero is reached.

Contributing no additional warming from today is making a far more significant contribution to tackling climate change than only getting to no additional warming from 2050.