Setting New Zealand's post-2020 climate change target

Submission form

The Government is seeking views on New Zealand's post-2020 climate change contribution under the United Nations Framework Convention on Climate Change (UNFCCC).

You can have your say by making a submission using this form or using the online tool available at www.mfe.govt.nz/more/consultations.

For more information about this consultation:

- Read our Consultation on New Zealand's post-2020 international climate change contribution web page
- Read our discussion document: New Zealand's Climate Change Target: Our contribution to the new international climate change agreement

Submissions close at 5.00pm on Wednesday 3 June 2015.

Publishing and releasing submissions

All or part of any written submission (including names of submitters), may be published on the Ministry for the Environment's website www.mfe.govt.nz. Unless you clearly specify otherwise in your submission, we will consider that you have consented to website posting of both your submission and your name.

Contents of submissions may be released to the public under the Official Information Act 1982 following requests to the Ministry for the Environment (including via email). Please advise if you have any objection to the release of any information contained in a submission and, in particular, which part(s) you consider should be withheld, together with the reason(s) for withholding the information. We will take into account all such objections when responding to requests for copies of, and information on, submissions to this consultation under the Official Information Act.

The Privacy Act 1993 applies certain principles about the collection, use and disclosure of information about individuals by various agencies, including the Ministry for the Environment. It governs access by individuals to information about themselves held by agencies. Any personal information you supply to the Ministry in the course of making a submission will be used by the Ministry only in relation to the matters covered by this consultation. Please clearly indicate in your submission if you do not wish your name to be included in any summary of submissions that the Ministry may publish.

Questions to guide your feedback

Your submission may address any aspect of the discussion document, but we would appreciate you paying particular attention to the questions posed throughout and listed in this form. You may answer some or all of the questions. To ensure your point of view is clearly understood, you should explain your rationale and provide supporting evidence where appropriate.

Contact information

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Objectives for the contribution

1a. We have set the following three objectives for our contribution:

- **it is seen as a fair and ambitious contribution – both by international and domestic audiences**
- **costs and impacts on society are managed appropriately**
- **it must guide New Zealand over the long term in the global transition to a low emissions world.**

Do you agree with these objectives for our contribution?

√ Yes

☐ No

1b. What is most important to you?

LANDCARE RESEARCH ROLE

Landcare Research is one of seven Crown Research Institutes (CRIs) in New Zealand.

Our core purpose, set by the Crown, is to '*drive innovation in the management of terrestrial biodiversity and land resources'*.

We are responsible for four National Outcomes, to:

- Improve the measurement, management and **protection of New Zealand's terrestrial ecosystems and biodiversity**, including those in the conservation estate.
- Achieve the **sustainable use of land resources and their ecosystem services** across catchments and sectors.
- **Improve the measurement and mitigation of greenhouse gases from the terrestrial biosphere.**
- Increase the ability of New Zealand industries and organisations to **develop within environmental limits and meet market and community requirements.**

To achieve these outcomes, Landcare Research has been identified by the Crown as the lead CRI in the following areas:

- catchment-level ecosystems (including wetlands) and related ecosystem services
- terrestrial vertebrate pest control
- **terrestrial carbon processes and inventory, and other greenhouse gases from soil and land**
- **land cover, land-use capability and effects**, and spatial land information that integrates across sectors and scales
- **soil characterisation, processes and services**
- integrated social and biophysical research to support sustainable land resource management, including in natural and urban environments

While all of the bolded elements above are relevant to this submission, of particular relevance is our third National Outcome: *Improve the measurement and mitigation of greenhouse gases from the terrestrial biosphere.* Landcare Research is the national leader in areas of research relating to:

- better measuring and mitigating the status of terrestrial GHG emissions and removals
- developing and enhancing land-use options to mitigate net emissions and increase carbon storage.

Through our subsidiary, Enviro-Mark Solutions, Landcare Research also works actively in New Zealand and globally with businesses, local government and resource management agencies, and communities to reduce GHG emissions.

As MfE's consultation document notes, Enviro-Mark Solutions' carboNZero and CEMARS programmes provide a number of benefits to businesses systematically working to reduce their emissions and case studies of organisations and their achievements.

LANDCARE RESEARCH INTEREST IN NATIONAL TARGETS

Given our organisational outcomes and focus, the Government's proposal to establish Greenhouse Gas (GHG) emissions reduction targets for New Zealand is directly relevant to the operations of Landcare Research.

Our role as a national provider of independent, authoritative science advice to inform policy, regulation and land management practices, is also highly relevant. In that role, Landcare Research is looking to ensure that New Zealand sets targets that:

- are credible and defensible from a science-based perspective
- support New Zealand's ability to operate with high integrity on the world-stage, including in the diplomatic, trade and science spheres
- deliver meaningful emissions reductions targets to support global efforts

- reduce the impacts of climate change on New Zealand's native ecosystems, productive landscapes, valued biodiversity and taonga species, and in urban areas
- build on existing programmes, schemes and incentives to enable New Zealand sectors, businesses, local government and communities to reduce their greenhouse gas emissions
- effectively manage risks to New Zealand businesses and exporters; and
- help New Zealand transition effectively to a lower-carbon, more resilient economy.

We also consider that such emissions reduction targets will underpin a credible 'licence to operate' in New Zealand communities and offshore markets for a large number of domestic and global companies.

KEY ELEMENTS OF NZ'S CLIMATE CHANGE POLICY & PROGRAMMES

Into the future, Landcare Research will continue to lead national research to mitigate GHG emissions by supporting New Zealand efforts in improving the accuracy of the National Agricultural GHG Inventory, forestry sequestration measurements, and soil carbon stock changes.

Accurate science and reductions in uncertainty in our National Inventory are critical to ensure that New Zealand's reporting on any target set is defensible to international scrutiny and review. We encourage ongoing investment in methodology improvements to ensure New Zealand can maintain integrity on the world stage. Ongoing investment in research to reduce or mitigate GHGs must also be a critical element of New Zealand's climate change response package.

We also make a valuable contribution to developing technologies and strategies to mitigate GHG emissions in support of New Zealand's sustainable economic growth. We contribute substantially to research projects within the NZ Agricultural Greenhouse Gas Research Centre seeking to mitigate on-farm emissions and better understand changes in soil carbon. We also lead a soil carbon research project under the Global Partnership in Livestock Emissions Research.

Through our subsidiary, Enviro-Mark Solutions Ltd, we work actively in New Zealand and globally with businesses, local government and resource management agencies, and with communities to measure, manage and reduce GHG emissions. As MfE's consultation document notes, Enviro-Mark Solutions' carboNZero programme provides a number of benefits to businesses systematically working to reduce their emissions.

We encourage new climate change policy and programme settings to build on and leverage earlier investment by "NZ Inc" in local (globally-leading) schemes such as carboNZero, rather than reinvent the wheel or invest in offshore capability or programmes. New Zealand can and should capitalise on its position as a global leader in emissions reductions measurement, monitoring, verification and certification. It is notable that organisations in other countries, especially the UK, have adopted our CEMARS programme, and discussions are taking place about potential mutual recognition across country borders.

Landcare Research's science underpinned the development of the Permanent Forest Sinks Initiative (PFSI). We consider this continues to be an important initiative in New Zealand's climate change toolbox, and we remain ready to apply our research capabilities to expand its scope and adoption.

We also remain ready through our carboNZero programme and wider research activity to support the business community to identify cost-effective ways to move to a low-carbon economy, and to verify and market GHG reduction achievements credibly and from a science-based perspective.

What would be a fair contribution for New Zealand?

2. What do you think the nature of New Zealand's emissions and economy means for the level of target that we set?

Climate change confronts mankind with an unprecedented challenge. As a developed economy, New Zealand has benefited from economic growth with little concern historically for increasing GHG emissions. While our high proportion of non-CO_2 emissions from agriculture does make us unusual among developed countries, this is not an excuse for inaction. New Zealand has the 3rd highest per capita GHG emissions in the world, and New Zealand emissions are estimated to increase three-fold over 1990 levels by 2030.

Climate projections show New Zealand will face significant negative impacts from climate change. We are, after all, a primarily biologically-based economy highly dependent on water availability, rainfall, and a temperate climate. The costs of recent droughts alone on the economy highlight the potential costs to New Zealand of global inaction on climate change.

It is clearly in our national interest to encourage other nations to commit to strong GHG mitigation targets by actively contributing to agreements to limit global emissions. New Zealand's goal should be to achieve a global GHG reduction that would be necessary to limit global warming to no more than 2°C. This requires that global emissions must be reduced by 40–70% by 2050 compared with 2010 levels.

Landcare Research recommends a target that addresses the principles we have set out above.

We therefore recommend a target to reduce national emissions by 30–40% below 1990 levels by 2030, which aligns to the commitments of EU countries (30–40% below 1990 levels by 2030); Russia (25% below 1990 levels by 2030), US (26–28% below 2005 by 2025) and Canada (30% below 2005 levels by 2030). These targets are also within the range proposed in *The New Climate Economy Report* (2014) that aims to assist governments, businesses and society make better-informed decisions on how to achieve economic prosperity and development while also addressing climate change. [*Better Growth; Better Climate: The New Climate Economy Report; The Synthesis Report, September 2014, The Global Commission on the Economy and Climate]*

Although it is difficult to reduce agricultural emissions without reducing productivity, land use and soil management methods do exist that sequester carbon into soils, increasing soil productivity while offsetting or part-offsetting CO_2 emissions. There are other sectors where reductions could also be strengthened (e.g. transport through optimising both fuel mixes and logistics operations).

Increasing participation in the PFSI scheme will also increase sequestration and contribute to the offsetting of emissions. Co-benefits may be achieved, such as land stabilisation and improved freshwater quality, honey production and biodiversity protection. Importantly, there are already schemes in existence (e.g. carboNZero) that help businesses to reduce their carbon footprint through certified off-setting. Increasing the uptake of such schemes would make a material difference to many sectors.

How will our contribution affect New Zealanders?

3. What level of cost is appropriate for New Zealand to reduce it greenhouse gas emissions? For example, what do you think would be a reasonable impact on annual household consumption?

The net cost of reducing emissions must be compared with the cost of inaction. Robust analysis is needed that compares the potential costs of reducing GHG emissions (e.g. reductions in income and therefore consumption less the economic benefits of greater energy-use efficiency) versus potential costs from increasing impacts of climate change. The latter includes the direct costs of climate change impacts (e.g. increased flooding and droughts), indirect costs (e.g. increased insurance premiums to cover larger expected losses), and potential loss of export income resulting from trade sanctions should global markets view New Zealand as not doing our fair share.

The "Social Cost of Carbon" (SCC) is used to estimate the monetised damages associated with an incremental increase in carbon emissions. This economic metric is intended to include (but is not limited to) changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services.

In the absence of New Zealand-specific estimates, we propose use of the IPCC SCC mean global estimate of at least $\$70/tCO_2e$ for 2030 to compare with the consumption losses presented in the MfE discussion document (and supporting modelling by both Landcare Research and Infometrics).

Using this comparison suggests that the estimated impacts to New Zealand's economy for achieving the climate change reduction target are typically *lower* than the benefits of doing so. Therefore, New Zealand should be willing to reduce its emissions by at least 30% below 1990 levels.

4. Of the opportunities for New Zealand to reduce its emissions (as outlined on page 15 of the discussion document), which do you think are the most likely to occur, or be most important for New Zealand?

In the absence of direct incentives or disincentives put in place by government, GHG emissions from the agriculture, transport, and energy sectors will continue to grow in New Zealand. There are a number of technologies, programmes (such as carboNZero) and opportunities available to reduce emissions, but their uptake will largely depend on the policy settings at national and regional levels.

Agriculture: New Zealand's farm GHG emissions intensity has decreased annually at approximately 1% due to increased efficiency, and there is the potential for a further annual 1.5% decrease by additional technological options. New inhibitors may reduce methane emissions from animals by 30–90% between 2020 and 2050, if early research results are confirmed (http://www.nzagrc.org.nz/conference.html).

Other environmental limitations (e.g. water quantity and quality) are likely to limit the degree to which further agricultural intensification is advisable or possible, creating other incentives for reducing on-farm emissions.

If there were an international price in place on agricultural GHG emissions, New Zealand products (which have a comparatively low GHG intensity) should enjoy a competitive advantage. (http://www.grassland.org.nz/publications/nzgrassland_publication_172.pdf).

Forestry: Planting new forests removes CO_2 from the atmosphere, although there is an opportunity cost for the use of the land. However, plantation forests have to pay for the cost of the CO_2 emitted when the forest is harvested. The current ETS settings are not encouraging the growth of forestry, because the returns to landowners are not particularly attractive. This appears to be due to

insufficient demand for NZUs (possibly as a result of the 2-for-1 approach?). However, there are tracts of erosion-prone land that would benefit from permanent conversion to forest cover (e.g. via the PFSI). Continuation and expansion of the Afforestation Grant Scheme (AGS) would therefore create an opportunity to offset emissions in the short term, and we welcome recent Budget announcements which will support extension of the AGS.

New Zealand's Permanent Forest Sink Initiative (PFSI) is world-leading in its defensibility, permanence and ability to claim co-benefits. However, New Zealand Units from the PFSI need to be distinguishable from those in the ETS, and transaction costs must be minimised to incentivise landowner participation. Consideration must be given to 'whole-farm' GHG accounting so that landowners can use their own permanent forests as offsets for their own emissions. Again, there should be a reward in the cost-structure of participation for owners who wish to connect their own emissions with their own permanent mitigations.

Transport: Transport emissions are the most rapidly growing part of New Zealand's emissions profile. To reduce our overall emissions, it will be necessary to halt and then reverse the growth in transport emissions.

Progress is continuously being made in vehicle engine efficiency, and hybrid electric-internal combustion engine cars have been on the market for several years. As New Zealand has a relatively old vehicle fleet, it will take a long time for the average efficiency to improve at the normal rate of vehicle replacement. There is some scope for following some other developed countires and providing incentives or regulations to increase uptake of more efficient vehicles and to set minimum fuel efficiency standards.

Electric vehicles generally have more efficient engines than internal combustion engines. Add to this New Zealand's high proportion of renewable energy, and there is excellent potential to reduce transport emissions by converting the fleet to electric vehicles. However,as this would require the development of national infrastructure for recharging batteries, this may be a longer-term solution.

A significant shift to electric vehicles, not just in the domestic fleet but also in freight and rail, will have a range of co-benefits to the economy and the environment. For example, innovation opportunities for New Zealand's high-value manufacturing sector will increase globally as technology is needed to support the transition. Fewer oil tankers coming to New Zealand should mean less risk of costly oil spills and fewer fuel tankers on our roads will have spin off benefits for infrastructure.

Some biofuels are already produced from waste products (e.g. whey, tallow) and these can be mixed in small amounts (~5–10%) with fossil fuels for use in standard engines. Higher biofuel proportions are possible, but these require specially adapted engines. A study by Hall and Jack (2009) investigated the possibility of large scale forestry (0.8–4.9 million ha afforested) for biofuel production. For the largest scenario, 768 PJ pa of biomass energy would be produced. Even allowing for a conversion efficiency of 35%, this would be enough to replace our current liquid fuel use.

[Hall P, Jack M 2009. Bioenergy Options for New Zealand: Large Scale Bioenergy from Forestry. Scion.https://www.niwa.co.nz/sites/niwa.co.nz/files/imported/__data/assets/pdf_file/0007/95668/Large-scale-forestry-for-bioenergy.pdf]

While private vehicles may be the most practical option for people living in remote locations, some of our major cities suffer serious congestion problems. Increasing the availability of public transport in major centres would reduce both congestion and GHG emissions (as well as improve local air quality). When new housing developments are built, due attention must be paid to providing efficient means of transport and suitable transportation routes to avoid creating future problems.

One method to reduce fuel demand that does not require any new technology (although it is likely to be unpopular) would be to reduce the open road speed limit. For example, lowering the speed

limit from 100 to 80 km/h would reduce the emissions/km by ~14% (http://www.ce.nl/publicatie/why_slower_is_better/948).

If we assume 50% of road traffic is on the open road, then this could reduce emissions by ~7% (or ~1% of total emissions). We would expect co-benefits from fewer road fatalities.

Electricity: New Zealand's electricity production is around 80% renewable, which is high by international standards. It is therefore important to prevent electricity GHG emissions from growing while meeting increased demand. Fortunately, there is still a large amount of untapped renewable energy potential, including geothermal, solar, and wind in New Zealand.

Reducing demand by increasing energy efficiency reduces not only the energy wasted at the point of use, but also the transmission losses associated with supplying that energy. More distributed (local) supply is a partial answer. However, as all power generation plants have a long lifetime, it will be important to set carefully relevant policy, regulation and price-based measures to discourage the creation of a new fossil fuel generation that could 'lock in' high emissions for decades.

Summary

5. How should New Zealand take into account the future uncertainties of technologies and costs when setting its target?

- Consider both the negative impacts and costs of delaying emission reductions (as well as considering the costs of taking action).
- Investments in carbon intensive technologies will expose New Zealand to future increases in fuel and emission costs, and possible trade barriers.
- Technologies can be more cost-effective over time (e.g. solar panels), but there are risks in delaying technological uptake. Currently, about 5,500 homes have solar panels installed and this number is increasing rapidly.

A thorough review of the pros and cons and cost-benefit analysis of technologies currently available and in the pipeline is warranted to understand the economic benefits that could accrue and the technological innovations needed to achieve science-based targets such as 30% reduction by 2030. Such a review is also needed for better informed decision making.

We note that no such information was available in the discussion document.

Other comments

6. Is there any further information you wish the Government to consider? Please explain.

Since its inception in 1992, Landcare Research has been a leader in national collaborative research on greenhouse gases and a major contributor to improved measurements and mitigation of greenhouse gases and soil carbon from the terrestrial biosphere.

Landcare Research's Statement of Core Purpose (Outcome 3) focuses on the following impacts: i) Status of terrestrial GHG emissions and removal and, ii) Land-use options to mitigate net emissions and increase carbon storage.

Our goal is to provide improved estimates of carbon storage and GHG emissions, and to reduce uncertainty in our national inventories in the face of increasing agricultural intensification and the future likelihood (IPCC, AR5 2014) of dangerous climatic change (Outcome 3). This research has resulted in improved accuracy and lowering of New Zealand's GHG emission estimates (using Tier 2 country-specific emission factors) for agricultural emission estimates leading to improved New Zealand's emission intensity.

As just one example, recent research (Saggar et al. 2015) using hill-country-specific emission factors indicated that nitrous oxide emissions in hilly land were 52% lower than current inventory estimates. When included into the National GHG Inventory, this would further reduce the nitrous oxide inventory and improve the GHG emissions intensity for sheep-, beef- and deer-grazed hill land pastures. We have also been instrumental in building capacity not only for New Zealand, but also in developing countries (e.g. for Chile and other Latin American countries, in developing their national GHG inventory programmes).

[*Saggar S, DL Giltrap, Davidson R, Gibson R, DeKlein CAM, Rollo M, Ettema P, Rys G (2015) Estimating direct N2O emissions from sheep, beef and deer grazed pastures in New Zealand hill country; accounting for the effect of land slope on the N2O emission factors from urine and dung. Agriculture Ecosystems & Environment 205: 70 – 78*.]

Landcare Research is working actively with the primary sector in supporting sustainable economic growth, improved resource management decisions and better community outcomes. We are well positioned to support the land-based environmental science needs of New Zealand's green economy into the future (*Royal Society of New Zealand Highlights of 2014; Green Economy for New Zealand (Gerry Carrington, Geoff Austin, Sea Rotmann, Ralph Sims, Janet Stephenson, John Boys, Les Oxley, Anne Salmond).*

We consider that in the absence of cost-effective mitigation technologies in the agriculture sector, as well as dairy conversion and a greater proportion of forest land reaching harvest, New Zealand may require additional carbon credits for a short period to meet our future commitments.

But

- New Zealand agricultural GHG emissions intensity has decreased annually at approximately 1% due to increased efficiency, and there is potential for a further annual 1.5% decrease by additional technological options. New inhibitors may reduce methane emissions from animals by 30–90% between 2020 and 2050 (http://www.nzagrc.org.nz/conference.html).
- New Zealand has the third highest per capita GHG emissions in the world (MfE 2015)
- A number of programmes in New Zealand exist to support both emissions reductions (e.g. carboNZero) and offsets (PFSI, AGS) and these can be expanded to support economy-wide GHG emissions reductions.
- In its Fifth Assessment Report (IPCC, AR5 2014) the Intergovernmental Panel on Climate Change (IPCC) warns that delaying emission reductions means that greater (and more rapid and costly) reductions will have to be made in later years to stabilise carbon dioxide concentration and climate.
- The New Climate Economy Report (2014) by the global commission on the economy and climate concludes that beyond 2030 net global emissions will need to fall further towards near zero or below in the second half of the century. However, the costs will be much lower and the opportunities for growth much greater if the foundations of a low-carbon economy are laid now.
- There is currently a discrepancy in the way emissions are accounted. Emissions from fossil fuel use are paid by the consumer, whereas agricultural emissions are paid for by the producer. This should not matter in a global emissions trading regime, but does currently lead to anomalies (e.g. New Zealand pays the GHG cost of agricultural, but not coal, exports of GHG emissions).

Therefore we consider that a 2030 emissions reduction target of at least 30–40% below 1990 levels is achievable and consistent with reaching New Zealand's earlier proposed 50% reduction in carbon emissions by 2050. These targets are comparable to the commitments of other developed nations.

When your submission is complete

Email your completed submission to climate.contribution@mfe.govt.nz or post to Climate Change Contribution Consultation, Ministry for the Environment, PO Box 10362, Wellington 6143.

Submissions close at 5.00pm on Wednesday 3 June 2015.