Te hau mārohi ki anamata

Transitioning to a low-emissions and climate-resilient future

Have your say and shape the emissions reduction plan

Ministry for the Environment
Manatū Mō Te Taiao

New Zealand Government

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Message from the Minister of Climate Change

Of the many challenges we face, the climate crisis is the one that will shape the lives of our children and grandchildren the most.

Over the last three and half years we have been putting in place the foundations for a low-carbon Aotearoa New Zealand that will be a catalyst for job creation, innovation, and prosperity for decades to come.

In that future, many of our everyday tasks will be powered by clean, renewable energy; there will be cleaner air to breathe; cars charged overnight by renewables; homes heated by the power of the sun, and kept warm by insulation; and we'll have lower energy bills, so there is more money in people's pockets to enjoy what they love.

Kids going to schools heated by clean energy because of the work we are doing to replace coal boilers. Cleaner options for getting around because of the billions we've invested in rail, light rail, buses, walking and cycling infrastructure. People travelling to work in more efficient cars powered by cleaner fuels because of the Biofuels Mandate and Clean Car Standard.

Warm, dry homes for people to live in because of the expansion of the Warmer Kiwi Homes programme and energy efficiency standards for new state homes. Cleaner and more efficient workplaces because of the Building for Climate Change programme. Low-emission business employing hundreds of people in well-paid jobs thanks to support from the Government Investment in Decarbonising Industry Fund.

New innovations in clean tech because of the unique support provided by the Green Investment Fund. New job and business opportunities in the clean energy industries of the future because of the work we have done to build a new energy research centre in Taranaki to kickstart the hydrogen economy. A public service that leads by example because of the tens of millions invested in zero-emission vehicles and our commitment to carbon neutrality by 2025. Carbon sinks all over the country thanks to the $1.2 billion invested in Jobs for Nature. Companies reporting to shareholders on their climate-related risks and redirecting capital to cleaner ways of doing business.

Every single one of these achievements is part of the enduring framework we are putting in place for a low-carbon, climate-friendly Aotearoa. A clean-tech, high-value economy that works for everyone. A future that is more equitable, more prosperous, and more innovative – and all within planetary limits.

None of this is to say that our job is done. Far from it. We are yet to see a sustained decline in the pollution we put into the atmosphere. And even when we do, we need to ensure that decline continues and, in fact, picks up pace, every year until we hit net zero. The Climate Change Commission's final advice made clear that this is possible, but only if we act now – and that we do so across a range of areas, including energy, transport, waste, agriculture, construction and financial services.

The Climate Change Response Act 2002 requires us to publish the emissions reduction plan by 31 May 2022, setting out how we will meet our climate targets. Over the last few months, Ministers have been discussing what contribution their agencies can make to this plan. This

work will continue throughout this consultation, but we wanted to take the opportunity to share with you some of the new ideas that have come up – and to get your feedback.

The emissions reduction plan will set the direction for climate action for the next 15 years and require action across a range of areas, including energy, transport, waste, agriculture, construction and financial services.

The document that follows is a focused look at some of the new ideas Ministers have come up with in each of these areas – policies that may be in the final emissions reduction plan. You will see there is still work to do, but that is precisely why your feedback is so important.

We also want to make sure that the emissions reduction plan reflects the part we must all play in the transition to a low-emissions future. Government policy will be crucial, but so too are the plans and strategies you will develop to reduce emissions in your own organisations and communities. We want to hear what these plans are – and how we can support you so that together we build a better, cleaner future.

The final emissions reduction plan needs to pull together the collective effort of every part of Aotearoa. It needs to set out future policy and regulatory change, but also the action that can be taken in every business, every town and city, and every community.

We look forward to hearing from you.

Hon James Shaw
Minister of Climate Change

Why we're consulting

Our first emissions reduction plan will be published in May 2022. This plan will set out the policies and strategies Aotearoa New Zealand will take to meet our first emissions budget, helping to transition to a low-emissions future in a way that is achievable and affordable.

Since the final advice of the independent Climate Change Commission (Commission) was published in June, conversations have been underway across Government about how Ministers and agencies can support emissions reductions in their portfolios – and what can be included in the final plan.

Some of the ideas that have come from these conversations form the basis of this discussion document, and we would like your feedback on them. Other ideas have already been consulted on – either through previous policy development, or the Commission's consultation – and are not included here. For these reasons, we are not presenting a draft plan in full. We know there is still work to do to make sure we meet our emissions budgets, and we want to hear your ideas so we can make sure they inform the conversations underway across Government.

We also want to hear about the part you will play in the transition – the steps your community can take, the low-carbon investments you can make in your businesses, the plans you can put in place on your farm, or the changes you can make – and what you need from the Government to support these changes. You know your organisations best, and what can be achieved. Tell us what could be included in the final plan and what you need from us to make it happen.

While the Government has an important role to play in getting the policy and regulatory settings right, we cannot do it alone. Building a low-emissions economy is a collective effort. Every tonne of emissions that needs to be reduced can only come about because of decisions made by businesses, community leaders and landowners, as well as by individuals and their families. From the small things – like working from home more often to cut down on trips in the car – to the more significant economy-wide change that will need to happen over a long period of time, the most important thing is that these decisions, including those made by Government, collectively add up to the reductions needed to meet our emissions budgets.

It's true to say that some of these changes can only be made if they are supported by policy or regulatory change. But that's not always the case, and the final emissions reduction plan needs to reflect this. It will make clear what part the Government will play and what emissions reductions can be achieved through policy, but it must also capture the huge contribution you can make.

This document is intended to encourage a discussion about what could be included in the final plan. There is no part of Aotearoa, no business, no community, no farm, no family, whose future will not be shaped in some way by the decisions we all take about what goes in the plan. This is why it is so important to get them right, and why the final plan needs to reflect the Government's ambition, as well as your own.

We also need to think about how we achieve this together. Since the Commission's final advice was published, additional work has been done on our starting point for the next three emissions budgets. This work shows the task ahead is more significant than the Commission anticipated. This means that we need to decide on the period over which we can achieve the emissions reductions. It doesn't change the goal – a net-zero-carbon Aotearoa for our children to enjoy – but it does change the way we go about it. If it is possible to lay the foundations

now for deeper cuts in the second emissions budget period, then that is what we should do. However, we want to hear from you about what is achievable over the next few years so we can make the best decision for future generations.

Introduction

Climate change is the greatest challenge of our time. But the solutions also offer a unique opportunity to transform our economy, support innovation, and bring benefits to Aotearoa New Zealand. We all have a role to play in creating this future – one that is low emission, climate resilient, and lifts the wellbeing of New Zealanders.

Our commitment to this future means reducing our greenhouse gas emissions to limit the global average temperature rise to 1.5˚C above pre-industrial levels. These targets require:

- all greenhouse gases, other than biogenic methane, to reach net zero by 2050
- emissions of biogenic methane to reduce to at least 10 per cent below 2017 levels by 2030, and to at least 24–47 per cent below 2017 levels by 2050.

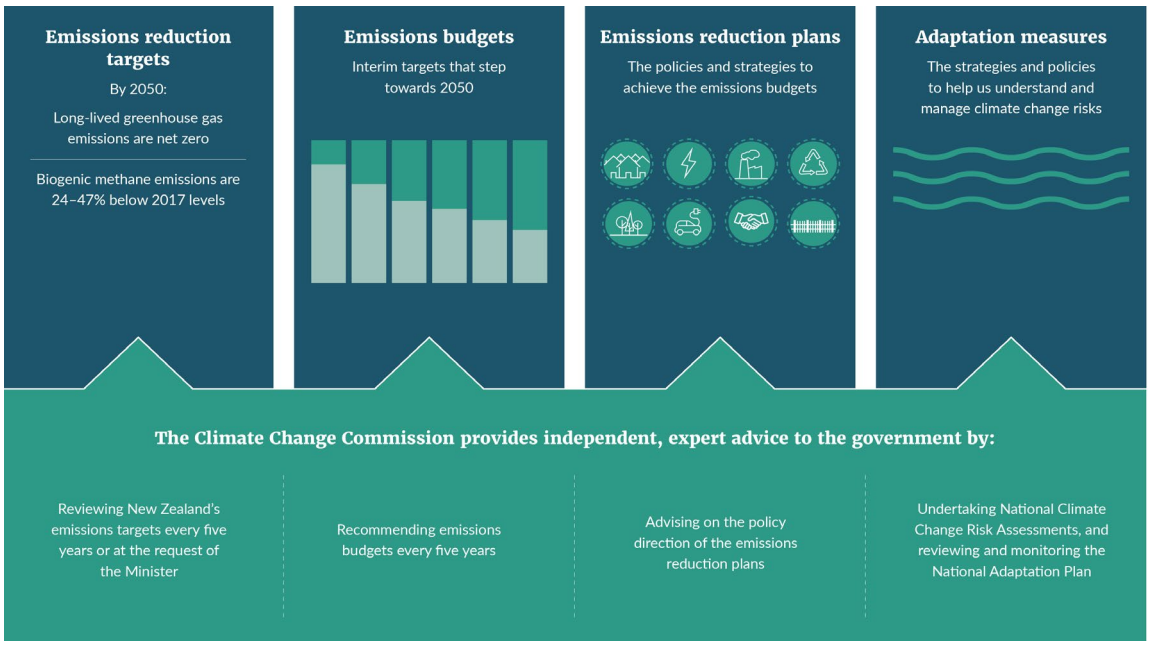
To help meet the targets and manage the impacts for all New Zealanders, the Climate Change Response Act 2002 (CCRA) also establishes a system of emissions budgets and emissions reduction plans.

Emissions budgets set a limit on the amount of greenhouse gas emissions allowed across a five-year period (or, in the case of the first budget, a four-year period). These budgets must put us on a path to meeting the targets. The reductions required must also be technologically achievable, economically viable and socially acceptable.

Emissions reduction plans set out the policies and strategies for achieving emissions budgets. A new plan must be published before each budget period, and can also look out to the next two budget periods.

This plan requires collective action and must be plan for all New Zealanders. This discussion document describes existing actions we have committed to and sets out new proposed actions to further reduce our emissions. We need your feedback on these actions to determine the impacts they will have, and how we can successfully achieve net zero together.

Figure 1: The Climate Change Response Act sets out tools for the transition (the Zero Carbon Framework)



The Government has made in-principle decisions on emissions budgets

On 31 May 2021, the Climate Change Commission provided the Government with advice on the first three emissions budgets (2022–25, 2026–30, 2031–35). The Commission's recommended emissions budgets are set out in table 1 below.

Table 1: The Commission's recommended budgets for 2022–25, 2026–30, 2031–35 (Mt CO_2e)[1]

Budget period	2022–25	2026–30	2031–35
All gases, net (AR5)[2]	290	312	253
Annual average	72.4	62.4	50.6

The Commission undertook extensive analysis and consultation and considers its recommended emissions budgets strike the right balance between ambition and achievability.

The Government proposes to broadly accept the Commission's advice on emissions budgets with modifications to take account of new developments since the release of the Commission's final report on 31 May 2021. In particular, a case can be made for revising the Commission's recommended budgets to recognise the changes in projected forestry emissions resulting from the latest Afforestation and Deforestation Intentions Survey.[3]

The survey identified an overall intention for landowners and forest managers to increase afforestation and decrease deforestation. These results were not available to the Commission when it prepared its final advice to Government.

Emissions from the forestry sector are now projected to rise in the first emissions budget period by about 2 $MtCO_2e$ due to initial carbon emissions from changing land use and planting new forests. However, the carbon gradually absorbed by new forests as they grow will soon start to outpace the initial release of carbon dioxide from expanded forest planting. As a result, emissions are now projected to be about 5 $MtCO_2e$ lower in the second emissions budget period and 11 $MtCO_2e$ lower in the third emissions budget period.

The combined effect of factoring the new information from the latest forestry intentions survey over the three emission budgets periods is to reduce projected emissions by a total of 14 $MtCO_2e$.

The Government has made an agreement in principle to set emissions budgets that reflect these changed forest emissions projections, as set out in table 2 below.

Table 2: The Government's proposed budgets for 2022–25, 2026–30, 2031–35 (Mt CO_2e)

Budget period	2022–25	2026–30	2031–35
All gases, net (AR5)2	292	307	242
Annual average	73.0	61.4	48.4

Final decisions on emission budgets will be made after this consultation has closed.

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1 Megatonnes (million tonnes) carbon dioxide equivalent.

2 The Commission's recommended emissions budgets are based on GWP_{100} (global warming potential over 100 years) metric values from the Intergovernmental Panel on Climate Change's (IPCC) *Fifth Assessment Report* (AR5).

3 Ministry for Primary Industries. 2021. *Afforestation and deforestation intentions survey 2020*. Wellington: Ministry for Primary Industries.

Legal responsibility for setting emissions budgets rests with the Minister of Climate Change and must follow the requirements set out in the CCRA.

Meeting the proposed emissions budgets

To meet our proposed budgets and our 2050 target, we need to build on existing policies and measures across the economy.

Meeting the first proposed emissions budget for 2022–25 is currently estimated by officials[4] to require an additional reduction of 7.7[5] Mt CO_2e compared to how emissions are tracking under current policy settings, including measures already in place under the Government's Climate Action Plan.

We have quantified preliminary estimates of the potential impacts of several policies proposed for inclusion in the emissions reduction plan, shown for transport, energy and industrial process sectors in Table 3 below. This shows that new and proposed measures are currently estimated to achieve abatement of between 2.6 and 5.6 Mt CO_2e and means that there is currently a gap between the estimated impact of policies quantified to date and the first emissions budget.

However, we are working to address this gap. This discussion document sets out a number of proposals (many of which have not yet been quantified) to support achievement of our first emissions budget and seeks your views on additional policies which could help close the gap. The final emissions reduction plan will be supported by updated estimates of the emissions reduction impact of policies.

Government policy will not, by itself, meet the full extent of any given emissions budget. Therefore, we are also seeking proposals and commitments from the private sector, in particular, that they are willing to make, as well as what support they need from Government in order to be able to make those commitments.

Table 3: Modelled emissions reduction estimates from new and proposed policies to help meet the proposed budget for 2022–25 (Mt CO_2e)

	Low policy impact	High policy impact
Transport	0.7	1.3
Energy and industry	1.5	3.3
Waste	0.1	0.3
F-gases	0.2	0.7
Total	**2.6**	**5.6**
Gap between current estimates of policy impacts and emissions reductions required to meet first emissions budget	5.1	2.1

Note: A number of uncertain factors will influence reductions. The ranges here represent lower and upper bounds, although these could be crossed. Some impact estimates are provisional or unavailable. The uncertainty varies and should be considered high.

[4] The officials' estimates discussed in this section were calculated using the current GWP_{100} metric values from the Intergovernmental Panel on Climate Change's (IPCC) *Fourth Assessment Report* (AR4.)

[5] This figure is officials' current best estimate based on latest projections and other information, including assuming the Marsden Point oil refinery converts to an import-only terminal as expected around mid-2022, assuming final board approval of the August 2021 shareholders vote to convert the oil refinery to an import-only fuel terminal.

Many of the policies and strategies to be included in the emissions reduction plan will depend on future funding decisions. Additional emissions reduction policies will be developed as new opportunities arise.

Managing risk and uncertainty

The Government can review and amend the plan during its lifetime, enhancing or adding policies to further close the gap and manage uncertainties and risks in meeting current or future budgets. Further public consultation will play an important role to ensure this continues to be a plan for all New Zealanders. The Commission also has a formal role in monitoring progress.

There are a number of risks and uncertainties that could impact the Government's ability to meet the proposed budgets once these have been set.

Many relate to measurement and baselines. Estimates of historic, current and future emissions are frequently revised. Projections of expected emissions and emissions reductions are uncertain, subject to revision, and based on a number of other critical assumptions including economic conditions, rainfall in the hydro catchments and the actual timing of the expected closures of major emitting operations, such as the Tiwai aluminium smelter in 2024 and the Marsden Point oil refinery in 2022.[6]

There are risks and uncertainties around the pace of technological uptake, the extent of behaviour change, and the effectiveness of policy in influencing these shifts in technology and behaviour. A positive and proactive response from leading businesses and investors, supportive public attitudes and shifts in consumer preferences could all accelerate the low-emissions transition.

Many of the proposals we are seeking your feedback on in this consultation will need further assessment for effectiveness, value for money and implications for other Government priorities. As new technologies and concepts for emissions reductions emerge, there will also be opportunities to develop new policies to support their uptake.

First emissions reduction plan will be published in May 2022

Work is underway on the first emissions reduction plan. This will be a plan for all New Zealanders and will require action across the economy and all sectors of society. This plan will outline how Aotearoa will reach its first proposed budget and put us on the path to meet our second and third.

Subsequent plans will continue to build on action being taken. More will need to be done to meet the second and third budgets.

While all sectors will need to make concerted efforts to reduce emissions, there are likely to be more emissions reductions in the transport, energy and industry sectors in the first budget period. This is where the most efficient and cost-effective reductions can be made in a short period of time.

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[6] On August 2021, the shareholders of Refining NZ voted to convert the oil refinery at Marsden Point to an import-only fuel terminal from around mid-2022, subject now only to final board approval. This change is anticipated to reduce emissions by around 2.5 Mt CO_2e in the first budget period.

The first emissions reduction plan will also set in place a number of longer-term actions that won't produce significant emissions reductions in the first budget period but will be crucial for achieving emissions budgets two and three.

This plan will also be communicated to the United Nations Framework Convention on Climate Change as our long-term, low-emissions development strategy.[7]

We all have a role to play

This plan will require all New Zealanders to work together to achieve a low-emissions future, where we know our roles and can act together to maximise opportunities.

The Government will provide leadership by setting emissions budgets, and preparing and delivering on the plan. This leadership will send strong signals to Aotearoa businesses, industry and households, and remove barriers to action. Government will pull all available policy levers – emissions pricing and other incentives (for example, the Clean Car Discount), targeted regulation, direct investment in innovation and infrastructure and technology change, and tailored sectoral policy packages to drive and support the change required.

However, strong policies alone will not be enough to spur the level of investment, innovation and behaviour change required. Strong commitment and drive from businesses and community leaders, in particular iwi, hapū and local government leaders, is critical to our success in meeting the challenge of climate change. The plan needs to create the right environment and space for business to act. New business models are required, and public attitudes and consumer preferences need to shift to support them. We need to see new approaches to how we power our economy and our lifestyles, how we build our cities, and how we move around them. We all need to create a stronger sense of national purpose to help mobilise these wider responses.

Enabling private sector climate action

Private sector leadership and action is vital for Aotearoa to successfully achieve our low-emissions future. Its many levers – from investment and its power to influence and inform, through to climate change reporting and risk management, and the innovation and agility it can offer – will be required to help achieve this change and influence our shared ambition.

Throughout this document we seek your views about how we can enable business to act, including:

- how low-emissions actions and business models could be encouraged
- barriers that could be removed
- the role the private sector could play and how we can work together.

[7] Paris Agreement, Article 4, paragraph 19. This outlines that all parties to the Paris Agreement should strive to formulate and communicate long-term low greenhouse gas emission development strategies, mindful of Article 2 and taking into account their common but differentiated responsibilities and respective capabilities, in light of different national circumstances.

We would like to hear from you

The transition will impact all sectors of the economy. We need widespread acceptance and support for the plan for it to be successful. We also need ambitious new policies to achieve the proposed emissions budgets.

The Commission consulted in February–April 2021 on emissions budgets and the policy direction of the plan. However, the Commission did not consult on all the steps the Government needs to take in the design of these measures.

This discussion document gives more detailed information on the **new strategies and policies that the Government may include in the plan.** Decisions are still to be made on these, which is why understanding your views is important. Many are also dependent on future funding decisions, including decisions to be made in future Budgets and how policies will be implemented. The following table sets out the areas where we seek your feedback.

Table 4: New strategies and policies that we seek your feedback on

Overall strategy	• Principles to inform the strategy.
Working with our Tiriti partners	• Developing a strategy to embed Te Tiriti o Waitangi (Treaty of Waitangi) principles in future emissions reduction plans. • Working together, Government and iwi/Māori designing a number of national-level strategies, including a National Energy Strategy, Circular Economy Strategy, Bioeconomy Strategy, National Low-emission Freight Strategy, Industry plans and policies to decarbonise the industrial sector, and a Building Transformation Plan. • Supporting Māori to create a transition strategy that responds to the particular priorities and needs of the Māori economy and Māori people.
Making an equitable transition	• Developing an Equitable Transitions Strategy to drive a well-signalled and inclusive transition, which maximises opportunities and minimises disruption and inequities. • Developing measures to support firms and households to understand and reduce their emissions footprint. • Promoting business and job opportunities in low-emissions sectors. • Supporting workers, households and communities to understand, plan and manage the transition. • Developing measures to better monitor and respond to the impacts of the transition.
Government accountability and coordination	• Improved coordination and monitoring across Government in order to implement the emissions reduction plan and respond to the climate emergency.
Funding and finance	• No additional policies. Note: The emissions reduction plan will reflect the work currently underway, including aligning and mobilising public finance.
Emissions pricing	• Encouraging gross emission reductions through the New Zealand Emissions Trading Scheme (NZ ETS). • Improving market governance.* • Reviewing free industrial allocation.*
Planning	• Integrating emissions reduction into land-use planning and investments as part of the resource management reforms currently underway. • Integrating emissions into urban planning and funding.
Research, science and innovation	• Setting research priorities through the Ministry of Business, Innovation and Employment's (MBIE's) Future Pathways programme. • Exploring ways to foster start-ups, including those that address environmental challenges such as emissions reductions. • Developing a mission-oriented innovation approach to climate change (for example, through innovative partnerships for clean technology, advanced technology research and development, and supporting the uptake of emerging technologies).
Behaviour change	• Establishing a fund to drive behaviour change.

Circular and bioeconomy	• Developing a strategy for moving to a circular economy with a thriving bioeconomy, which outlines the vision, guiding principles, roadmap and the Government's role. • Developing a circular sustainable development pilot fund to support business, communities and iwi to further move to a circular economy. • Developing further science and innovation support for the circular economy, including start-up support, innovation infrastructure and capability, and exploring mission-led innovation. • Accelerating the uptake of bioenergy through further supporting market facilitation of bioenergy. • Building knowledge and education on circular economy. Identifying skill needs and training options.
Transport	• Introducing four transport targets: – reduce vehicle kilometres travelled (VKT) by cars and light vehicles by 20 per cent by 2035 through providing better travel options, particularly in our largest cities – increase zero-emissions vehicles to 30 per cent of the light fleet by 2035 – reduce emissions from freight transport by 25 per cent by 2035 – reduce the emissions intensity of transport fuel by 15 per cent by 2035. • Integrating land use, urban development and transport planning and investments to reduce transport emissions. • Implementing mode-shift plans for our largest cities and begin planning for other urban areas. • Improving the reach, frequency and quality of public transport. • Providing national direction to deliver a step-change in cycling and walking rates. • Supporting local government to accelerate widespread street/road reallocation to support public transport, active travel and placemaking. • Making school travel greener and healthier. • Improving access and travel choice for the transport disadvantaged. • Reducing public transport fares. • Investigating the potential for public transport, walking and cycling in rural and provincial areas. • Enabling congestion pricing and investigate how we can use other pricing tools to reduce transport emissions. • Ensuring further investment in additional highway and road capacity for light private vehicles is consistent with climate change targets. • Implementing community-based solutions to make low-emission vehicles (including e-bikes) more accessible for low-income New Zealanders and others facing transport disadvantage. • Introducing measures to avoid Aotearoa becoming a dumping ground for high-emitting vehicles rejected by other countries. • Setting a maximum CO_2 limit for individual light ICE vehicle imports to tackle the highest emitting vehicles. • Investigating how the tax system should be used to avoid disadvantaging clean transport options. • Introducing a vehicle scrappage scheme to support low-income New Zealanders shift to low-emissions transport. • Partnering on solutions to supply constraints for low-emissions vehicles. • Determining whether there are legislative barriers to the use of some types of low-emission vehicles. • Accelerating the decarbonisation of trucks. • Developing a Freight and Supply Chain Strategy. • Implementing the New Zealand Rail Plan and investigate options to encourage greater use of coastal shipping. • Investigating ways to reduce aviation and maritime emissions. • Introducing a sustainable biofuels mandate. • Producing a national electric vehicle (EV) infrastructure plan.

Energy and industry	• Developing an energy strategy. • Setting a renewable energy target. • Setting outcomes and an approach to developing a plan for managing the phase out of fossil gas in the energy system. • Developing a plan to decarbonise the industrial sector. • Identifying the level of support the Government could provide for the development of low-emissions fuels, such as bioenergy and hydrogen, to support decarbonisation of industrial heat, electricity and transport. • Supporting the regulatory environment for electricity distribution.* • Developing a hydrogen roadmap.* • Developing national direction for industrial greenhouse gases under the Resource Management Act 1991, including a ban on coal boilers.* • Updating the energy efficiency product regulation system.*
Building and construction	• Reducing fossil gas use in buildings, including capping the emissions from buildings while allowing flexibility for potential low-emissions alternatives. • Setting a date to end the expansion of fossil gas pipeline infrastructure and eliminate fossil gas in all buildings as recommended by the Climate Change Commission. • Investigating a potential mandatory energy performance certificate or programme for commercial and public buildings. • Exploring a range of actions to lower emissions from buildings, and across all building processes (for example, design, planning, construction and deconstruction). • Addressing fossil fuel usage for boilers used for space and water heating in commercial buildings. • Investigating potential behaviour change programmes and other ways to encourage market (supply and demand) changes that support and enable lower building-related emissions.
Waste	• Reducing organic waste material – reduce food waste – reduce waste from construction and demolition – identify options for treated wood (reduction, diversion and disposal) – other reduction opportunities. • Reducing organic waste disposal to landfill. – food waste and green waste collection – businesses to separate food and green waste – identifying opportunities to divert households' and businesses' organic waste to be used for other purposes such as compost or biofuel feedstocks – better paper and cardboard recycling – transfer stations to prioritise recovery alongside new and expanded materials recovery facilities. • Reducing emissions from organic waste – gas capture at landfills – fast-tracking a waste data and licensing system.
F-gases	• Planning for combined emissions reductions from heating and cooling. • Extending the phasedown of hydrofluorocarbons (HFCs). • Regulating the import or sale of high-global warming refrigerants where alternatives are available.
Agriculture	• Accelerating the development of mitigations through a research and development plan. • Improving the delivery of extension services.
Forestry	• Determining the role of forestry in the New Zealand Emissions Trading Scheme (NZ ETS). • Establishing a long-term carbon sink. • Managing existing forests. • Working with Māori to develop and implement forestry policies.

*These actions are subject to separate consultation.

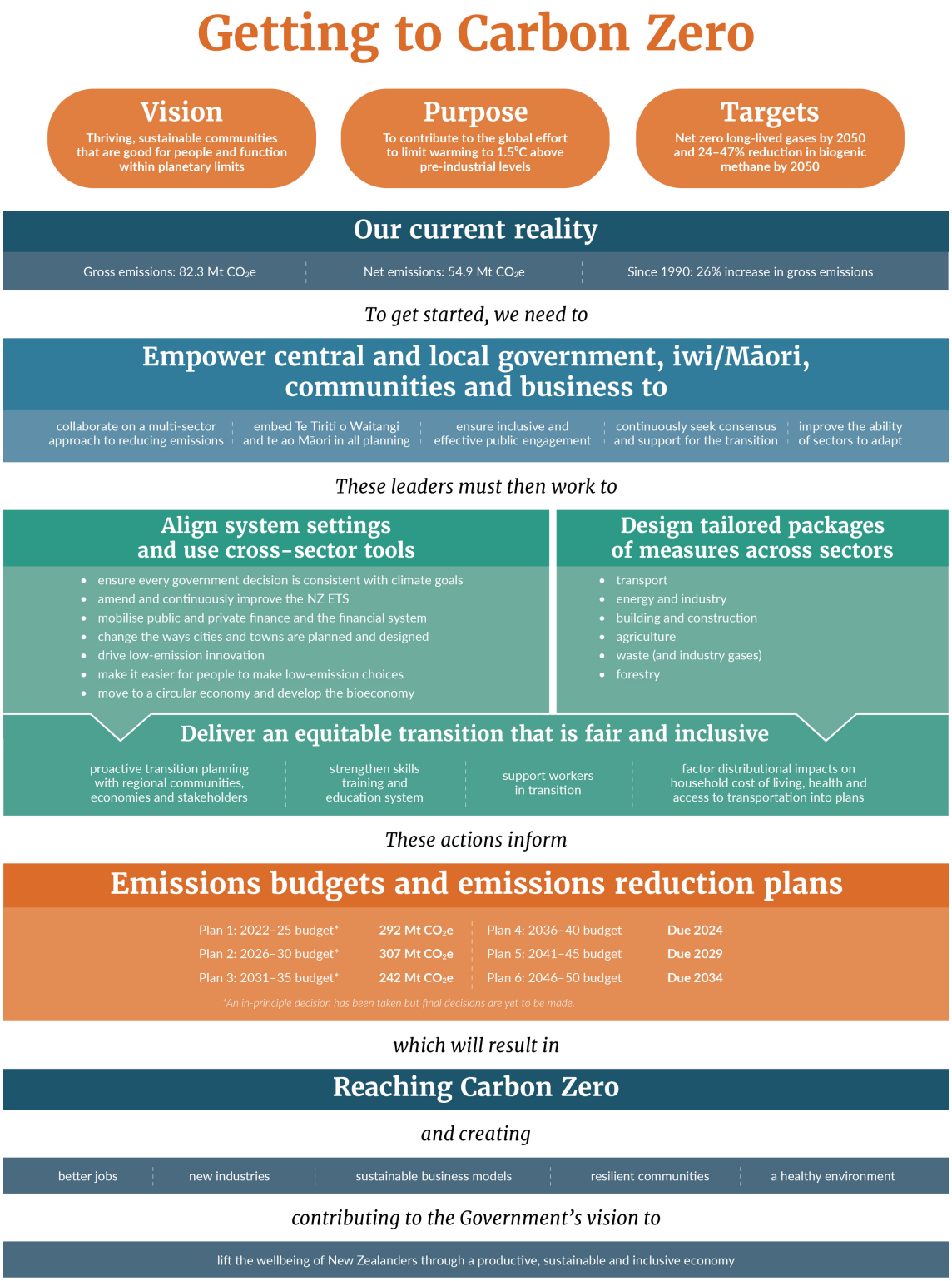
A comprehensive multi-sector strategy will help us move to the 2050 target and improve broader wellbeing

A successful transition requires both short- and long-term actions, covering every sector of the economy and society, and meeting all the requirements of the CCRA.

Individuals, households and businesses must come on board to make the necessary changes and adopt new ways of doing things. But government policy settings are critical to make sure the transition happens, and in a cost-effective way.

Figure 2 shows our multi-sector strategy to achieve carbon zero.

Figure 2: Aotearoa New Zealand's pathway to Carbon Zero



Meeting the net-zero challenge

SUMMARY

This section outlines the key components of our strategy to transition Aotearoa New Zealand to a low-emissions and climate-resilient future. It sets out the pathway to meeting our emissions budgets, how we will work with our Te Tiriti o Waitangi (Treaty of Waitangi) partners and ensure the transition is equitable.

The emissions reduction plan will cover every sector of the economy and society, and will drive the longer term transition.

The first plan will set out the policies and strategies for meeting the first budget for 2022–25.[8] It will also set the measures to meet the second and third budgets, including the urgent policies that must be in place before 2025.[9]

We seek your feedback on:

- principles guiding the transition
- how the Crown can work better with Māori in responding to climate change
- how to develop an equitable transition strategy.

Transition pathway

A vision for a productive, sustainable and inclusive Aotearoa

Transitioning to a low-emissions and climate-resilient future provides an opportunity for Aotearoa to transform our economy and bring long-term benefits.

The emissions reduction plan will enhance the wellbeing of our people and regional economies, while fostering industry, innovation and investment.

The plan aims to support nature-based solutions that are good for both the climate and biodiversity.

Reducing emissions is crucial to achieve the vision for 2050: a productive, sustainable and inclusive economy where:

- economic activity is nature-enhancing, carbon neutral and climate resilient
- energy and transport systems are accessible, affordable and sustainable
- production systems are regenerative, providing a way to innovate and invest to meet future challenges
- every household can meet its material needs, in turn reducing child poverty
- Te Tiriti partners work together to realise mutually beneficial economic opportunities and respective kaitiaki obligations
- our natural environment is thriving
- every New Zealander has a safe, warm, dry and affordable home.

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8 Section 5ZG of the Climate Change Response Act 2002.

9 Section 5ZG of the Climate Change Response Act 2002.

We want to use our unique strengths to overcome some of the world's biggest challenges. We aim to create new activities and jobs that are more knowledge intensive and enhance the environment.

Key elements include:

- A circular economy – designing out waste and pollution, keeping products and materials in use, and regenerating natural systems.
- Science and innovation – Aotearoa being a world-class generator of ideas and solutions.
- Skills and knowledge – helping people acquire the new skills they need to drive and adapt to change.

Principles for the transition

The following table sets out the principles that will guide the Government's decisions.

Table 5: Guiding principles for Government decisions on the emissions reduction plan

A fair, equitable and inclusive transition	• recognise and foster opportunities for affected regions, communities, employees, employers, and iwi and Māori, to reduce emissions in ways that work best for them • incorporate te ao Māori in transition planning • minimise and avoid the negative impacts, and social and environmental risks, of the transition and specific policies, including avoiding: – exacerbating existing inequities – penalising early movers – compounding historic grievances with iwi/Māori – leaving too much of a burden for future generations – exacerbating environmental issues.
An evidence-based approach	• draw on a range of sources including (but not limited to) the Intergovernmental Panel on Climate Change (IPCC), and mātauranga Māori • ensure emissions reductions are developed using the most up-to-date science and take into account our domestic context and international commitments.
Environmental and social benefits beyond emissions reductions	• promote nature-based solutions, which can sequester carbon while building resilience to climate change impacts and supporting biodiversity • consider wider benefits as a reason to act – such as building resilience, and broader social, health, economic, environmental and cultural benefits.
Upholding Te Tiriti o Waitangi	• strengthen the partnership approach and actively supporting iwi/Māori with this effort • apply Māori values and mātauranga Māori to the transition • involve a variety of Māori voices in the design and development of the transition.
A clear, ambitious and affordable path	• make predictable and stable policies, which are communicated early and clearly so that households, businesses, investors and industry can make investment choices • design effective policies that recognise the connections and flow-on effects within systems • use commercially available, low-emissions technology now, while fostering ambition, knowledge and innovation • acknowledge uncertainty and consider options that can adapt over time.

Having the right mix of actions

International best practice supports a coherent strategic package, comprising a mutually supportive and balanced mix of emissions pricing, well-targeted regulation, tailored sectoral policies and direct investment.

This includes:

- An effective emissions price through a strengthened New Zealand Emissions Trading Scheme (NZ ETS). Emissions pricing through the NZ ETS provides an economy-wide financial incentive to reduce emissions. This helps lower the overall economic cost of achieving emissions reductions and leads to emissions reductions from sources that targeted policies might not otherwise reach. The expectation of a rising future emissions price path informs private investment decisions and aligns these better with a future low-carbon economy, influencing technology choices and the direction of future economic development.
- Policy measures that work strategically alongside the NZ ETS price, such as well-targeted regulation and additional measures to remove other barriers. Emissions pricing alone fails to achieve many low-cost emissions reductions opportunities, because real-world investment decisions in our economy and society do not always consider total lifetime costs. Targeted policies are also important to drive early adoption, market acceptance and learning by doing. This lowers the overall costs of economy-wide investment in new or niche technologies as they become needed on a wider scale in the future. These policies do not substitute for the NZ ETS price; they work with it, and take the NZ ETS price into account in their design.
- Mechanisms for public and private investment in innovation and infrastructure for long-term transition. Innovation and low-emissions infrastructure are essential elements of the long-term decarbonisation transformation and will require short-term investment for long-term results.
- Helping nature to thrive and supporting the wellbeing of communities and people.

Emissions reductions and forestry removals are both important in meeting Aotearoa New Zealand's "net" emissions targets

Decarbonising our economy is important if Aotearoa is to keep pace with – and seize the market opportunities from – the global technology transition in energy, transport and industry. Emissions reductions are also critical if we are to avoid shifting this responsibility to our children and future generations, and the ongoing need for land to be converted into forestry in the future to maintain net-zero emissions.

At the same time, even with strong reductions in emissions, there is a critical ongoing role for forestry removals: to offset remaining emissions in hard-to-abate sectors, as the feedstock for a future bioeconomy, and to enable flexibility in our transition path. Our large potential for low-cost forestry planting reduces the cost of meeting net emissions targets, but should not slow the rate of emission reductions.

Investment

Meeting our emissions budgets will require significant, sustained investment from the Government and throughout the private sector. An important focus of the emissions reduction plan will be to support the flow of private investment towards climate-positive outcomes and the growth of the green finance market. The Funding and financing section expands on this.

New sustainable investment brings with it other benefits: enhancing innovation and productivity with new technology, and generating new economic activity. And because investment in low-emissions technology tends to reduce waste and increase efficiency, operating costs are generally lower, offsetting the capital investment to reduce lifetime costs and often providing a rapid payback.

The economy will continue to grow as we make the transition, and the sooner we act, the better the economic outcomes. The Climate Change Commission modelled the long-term impact of making all the changes required to follow their pathway to the 2050 target. This estimated an overall reduction of gross domestic product (GDP) in 2050 of around 1.2 per cent.[10] The Commission also modelled a scenario where key actions were delayed (for example, the move to electric vehicles (EVs) and more efficient farm practices). This resulted in GDP in 2050 falling by around 2.3 per cent.

Aligning the transition with other priorities

The scale of the change is an opportunity to address other long-standing challenges in Aotearoa. We must integrate the reduction measures with strategies for industry, infrastructure, housing and urban development; fiscal management; and plans for building resilience to the physical effects of climate change.

We are at a critical moment in time. COVID-19 has highlighted the need for a continued focus on wellbeing as the headline indicator for success, and for strengthening how we tackle the long-term challenges that hold back our economy and affect our communities, such as climate change.

The plan will need to achieve a balance of creating sufficient certainty while maintaining flexibility for future decision-makers, as things change over time.

Our unique and precious wildlife is under threat from a range of pressures, including climate change. We need to address the climate crisis in a way that also helps address the biodiversity crisis. There is an opportunity to help our indigenous ecosystems thrive in a way that sequesters carbon and builds resilience to the impacts of climate change.

We also face other persistent challenges, such as low productivity, investment and innovation, and intergenerational disadvantage and inequality. Our response to COVID-19 and the climate emergency together can shape our international role, and turn challenges into opportunities.

QUESTIONS

1. Do you agree that the emissions reduction plan should be guided by a set of principles? If so, are the five principles set out above the correct ones? Please explain why or why not.
2. How can we enable further private sector action to reduce emissions and help achieve a productive, sustainable and inclusive economy? In particular, what key barriers could we remove to support decarbonisation?
3. In addition to the actions already committed to and the proposed actions in this document, what further measures could be used to help close the gap?

[10] The Commission's economic modelling estimated that GDP would grow to about $386 billion by 2035 and $481 billion by 2050 while meeting its recommended emissions budgets through the demonstration path. Under current policy settings (which are not on track to meet the recommended emissions budgets), GDP was estimated to grow to $388 billion by 2035 and $487 billion by 2050.

QUESTIONS

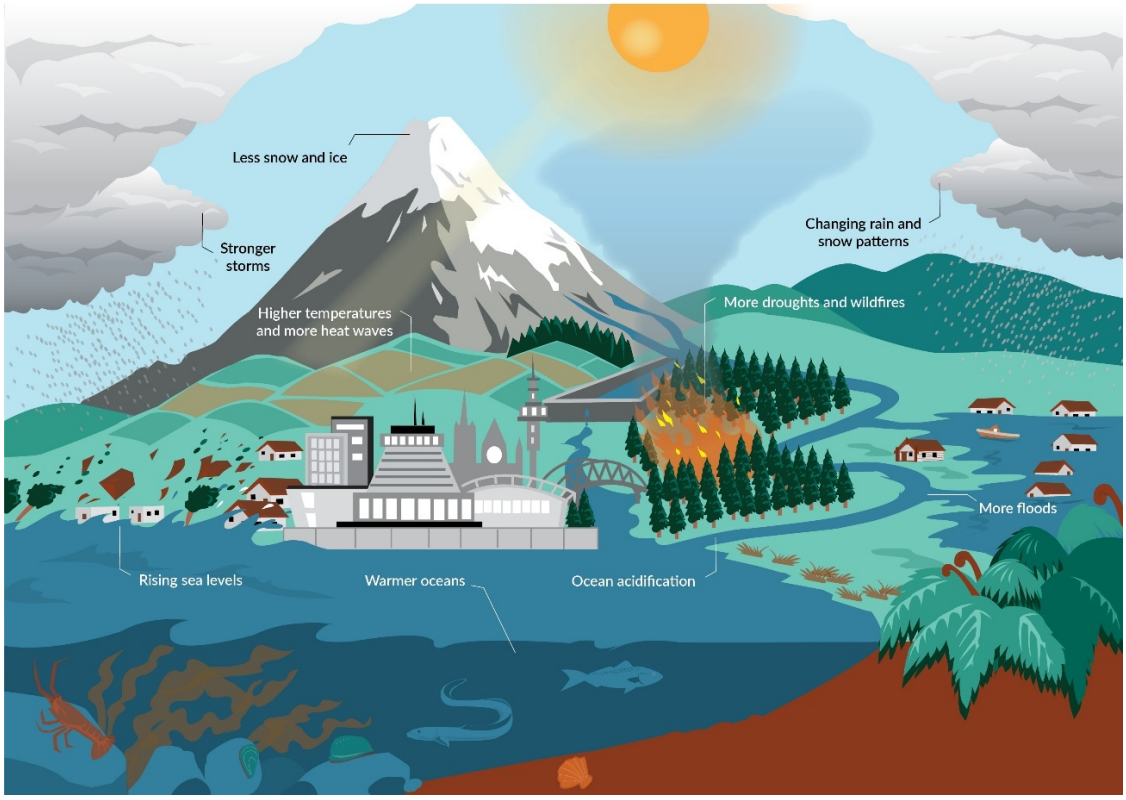
4. How can the emissions reduction plan promote nature-based solutions that are good for both climate and biodiversity?
5. Are there any other views you wish to share in relation to the Transition Pathway?

Helping sectors adapt

Building resilience

Our climate is warming, sea levels are rising, and extreme weather is becoming more frequent and severe. The climate we will experience in 2050 and 2100 will be different from today, because of previous global emissions of greenhouse gases. It will also be shaped by future emissions pathways. Figure 3 shows the expected effects.

Figure 3: Projected impact of climate change on Aotearoa



In August 2020 the Government released the first National Climate Change Risk Assessment (the risk assessment). This presented the first national picture of the risks Aotearoa faces.

It identified 43 priority risks, covering all aspects of life, from our ecosystems and communities to buildings and the financial system. It highlighted the 10 most significant risks requiring urgent action in the next six years to reduce their impact.

The assessment lays the foundation for a National Adaptation Plan, outlining how the Government will address the risks. This is due to be published in August 2022.

Building resilience and mitigating the risks

Emissions can be reduced in ways that increase our resilience or, if we're not careful, in ways that increase the impact of the risks of climate change. Nature-based solutions such as supporting native bush to regenerate can help sequester emissions and build resilience to the impacts of climate change.

Below is an overview of some of the risks that sectors will need to manage as they reduce their emissions. The National Adaptation Plan, which will be publicly consulted on in 2022, will set out the actions to do this.

Key climate change risks to address in each sector

Transport: As we implement the emissions reduction plan, we will need to consider how we reduce the risk of stranded assets and sub-optimal investment. Our networks and corridors may need to be reprioritised to manage and respond to the impact of climate change. For example, existing road and rail infrastructure may become vulnerable to the adverse impacts of a changing climate and we may need to choose between continued use or providing alternative transport solutions. We will also need to consider how new or improved infrastructure and services best support reducing transport emissions. Vehicle changes, such as heavier electric buses and trucks, will affect how our roads are constructed, and require new fuel and charging infrastructure. Our communities will be impacted by the changes needed to reduce transport emissions and we must support them to ensure that transport inequities are addressed.

Energy and industry: Key risks relate to the impacts of climate change on electricity transmission and distribution infrastructure. As we increase electrification of transport, process heat and industry, we will need to consider the increased pressure on electricity infrastructure. The risk assessment highlighted the need for more research to inform adaptation action, and to speed up current measures. Work is underway to address transmission and distribution network innovation.

Building and construction: To build for climate change we must put the right structures in the right places. We must not compromise a building's ability to adapt to the effects of climate change as we reduce emissions. For example, a site that may face certain climate hazards (for example, wind, storms, drought, flooding, wildfire) may require a different building design and materials. This could have an emissions impact compared to a similar building exposed to different hazards. Building for climate change also requires a focus on reducing emissions, noting that some adaptation can support mitigation and vice versa.

Agriculture: The primary sector faces risks from extreme events and ongoing gradual changes, such as more frequent extreme weather (drought, flooding), changes in mean annual rainfall, sea-level rise and higher average temperatures. These changes may affect the productivity and profitability of some parts of the sector. Aotearoa agriculture has relatively high adaptive capacity, but this differs between farms, locations and sectors. The sector is dynamic, and adaptation may mean shifts between production types and locations, so that in the longer term it may look quite different from today.

Waste: Landfills and contaminated sites carry risks. Active and closed landfills and contaminated sites are at risk from extreme weather and sea-level rise, as well as coastal and inland flooding, erosion and rising groundwater.

Forestry: Afforestation and forest management could help mitigate the impacts of some risks identified in the assessment. These include extreme weather events, drought, erosion and changes in long-term composition of native forest ecosystems. Our forests can also provide opportunities to adapt to a changing climate. For example, they reduce erosion, landslips and flooding, which makes production systems and communities more resilient, and they offer shade for stock.

QUESTIONS

6. Which actions to reduce emissions can also best improve our ability to adapt to the effects of climate change?
7. Which actions to reduce emissions could increase future risks and impacts of climate change, and therefore need to be avoided?

Working with our Tiriti partners

The CCRA recognises the Government's responsibility to give effect to the principles of Te Tiriti o Waitangi (Treaty of Waitangi). The CCRA requires the emissions reduction plan to include a strategy to recognise and mitigate the impacts on iwi and Māori, and that iwi and Māori are adequately consulted on these plans.

Through the Climate Change Commission's advice and our own Māori engagement, we have heard that the transformational changes required are more likely to succeed if there is a strong role for Māori that is consistent with Te Tiriti. This acknowledges that much can be achieved if Te Tiriti partners are enabled to work together and individually in a way that respects kāwanatanga (the right for Government to govern) and rangatiratanga (the right for Māori to make decisions for Māori).

Potential measures

We have already taken some actions and are developing others that will influence our low-emission pathways and partnership with Māori, including reforming our resource management system, creating local government climate strategies and some necessary policy and funding work. However, the Commission has suggested some specific ways to provide a comprehensive role for Māori in future emissions-reduction planning and decisions. This consultation seeks to better understand Māori perspectives on these recommendations and how they might be implemented.

Upholding the principles of Te Tiriti

The Commission recommends making the Government's actions for emission reductions accountable to Māori, through a strategy to embed Te Tiriti principles in future emission reduction plans. The strategy would include outcomes, milestones and monitoring. We are considering the next steps and resourcing required to implement this within the suggested timeframes and context of other emission reduction actions.

Making change in partnership

To guide our transition, the Commission has recommended that the Government and iwi/Māori design many national-level strategies together.

These include:

1. a National Energy Strategy
2. a Circular Economy Strategy
3. a Bioeconomy Strategy

4. a National Low-emission Freight Strategy
5. industry plans and policies to decarbonise the industrial sector
6. a Building Transformation Plan

The Commission has also suggested that an equitable transition for Māori can be enabled by the creation of a mechanism that helps to integrate Te Tiriti partnerships more consistently across climate-related evidence and policy processes. This recommendation entails planning, alignment and engagement to develop and potentially implement over the coming years.

A Māori-led transition

To ensure a Māori-led approach to the transition, the Commission has recommended that Māori and Government partner to create a strategy that responds to the particular experiences and needs of the Māori economy and Māori. This strategy should support Māori to take climate action, reduce emissions and prepare for a future in Aotearoa that will be both low emission and climate impacted. This work is separate to but could complement the Equitable Transition Strategy also recommended by the Commission.

The Commission advises that one of the first steps of the strategy should be for Government to support iwi/hapū and other Māori collectives to develop emission profiles. We would like to further understand how a profile could benefit Māori and what kinds of information would help Māori to understand and manage emissions and removals, particularly for groups and organisations that are not land owners or whose rohe/takiwā is urbanised.

QUESTIONS

8. The Climate Change Commission has recommended that the Government and iwi/Māori partner on a series of national plans and strategies to decarbonise our economy. Which, if any, of the strategies listed are a particular priority for your whānau, hapū or iwi and why is this?
9. What actions should a Māori-led transition strategy prioritise? What impact do you think these actions will have for Māori generally or for our emission reduction targets? What impact will these actions have for you?
10. What would help your whānau, community, Māori collective or business to participate in the development of the strategy?
11. What information would your Māori collective, community or business like to capture in an emissions profile? Could this information support emissions reductions at a whānau level?
12. Reflecting on the Commission's recommendation for a mechanism that would build strong Te Tiriti partnerships, what existing models of partnership are you aware of that have resulted in good outcomes for Māori? Why were they effective?

Making an equitable transition

Why an equitable transition matters

The Government is committed to a transition that reaches our targets, while minimising disruption, and seizing the opportunities the transition will bring.

Our economy and society will look very different in 2050. Moving to this future will require a range of changes. Many businesses will need to adopt new technology and ways of working, and some workers will need new skills. Changes will affect some communities, regions and households more than others.

We want to prepare communities, households and businesses with the tools to plan for and manage the transition. At the same time, we need to take the opportunities from the transition, and share the benefits.

Our vision is to shift to a high-value, resilient economy that creates a healthy environment and wellbeing for all.

Achieving this future will require:

1. Driving ambitious action while also allowing communities, households and businesses time to prepare and take steps to reduce their emissions.
2. Enabling iwi/Māori to drive our transition so that climate change mitigation does not perpetuate existing disadvantages.
3. Encouraging households and individuals to make investments and behavioural changes that reduce their emissions footprint; and ensuring any cost increases do not disproportionately burden those with limited capacity to respond.
4. Helping workers develop skills for quality, low-emissions employment. Where demand for certain skills declines, giving workers access to training and supporting a smooth transition into new jobs.
5. Supporting businesses to lower emissions, and those in low-emissions sectors to grow.
6. Clearly signalling the low-emissions pathway, and encouraging innovation and the uptake of new technology.
7. Empowering urban and rural regions and communities to transition in line with local objectives and aspirations.

How we plan to achieve an equitable transition

For a fair, inclusive and equitable transition, we will focus on four areas:

- *Reducing risks for firms and households.* The more successfully firms and households reduce their emissions footprint, the less vulnerable they will be to negative impacts from the transition.
- *Promoting business and job opportunities.* New opportunities will arise from the transition, and the demand for some emissions-intensive activities will drop. 'Transition-aligned' growth will help ease the shift and offer benefits for disrupted communities and workers.
- *Supporting workers, households and communities through the transition*. There will be an increasing need to help workers into new jobs or industries, as the demand for skills changes. These changes may be more concentrated in particular regions and communities.
- *Monitoring impacts and responding as they emerge*. We will closely watch impacts to avoid creating inequities or disadvantaging groups with limited capacity to respond.

What we are doing now

Existing measures to support communities, households and businesses to successfully transition include:

- helping businesses improve energy efficiency and switch to lower emissions fuels, including through the $70 million **Government Investment in Decarbonising Industry (GIDI) fund** and the Energy Efficiency and Conservation Authority's (EECA's) business support schemes
- supporting small businesses through the **Sustainable Business Network Climate Action Toolbox**, developed with private and public sector partners
- funding insulation and heating for households through **Warmer Kiwi Homes**, and setting **Minimum Energy Performance Standards** for products
- creating low-emissions jobs, markets and business opportunities through **resource recovery**
- establishing **Regional Public Service Leads** to promote the needs of regions and better organise the public service towards community needs
- establishing an **equitable transition partnerships team** to help communities understand, plan and manage their transition
- **research projects** to better understand the likely impacts of the transition on workers, businesses, regions and the Māori economy
- strengthening the **welfare, employment support and education systems** to help people adapt to a low-emissions future
- supporting nature-based employment through our $1.2 billion Jobs for Nature programme.

Potential measures

The Commission's key recommendation is to develop an **equitable transitions strategy** in the first budget period. This would drive a well-signalled and inclusive transition, which maximises opportunities and minimises disruption and inequities.

The Commission recommends that the strategy should address the following objectives:

- partnering with iwi/Māori
- proactive transition planning
- strengthening the responsiveness of the education system
- supporting workers in transition
- minimising unequal impacts in all new policies.

Developing this over the coming years will allow time to:

- better understand the likely impacts and opportunities
- work with Māori and other affected groups to remove barriers and maximise opportunities
- decide how best to manage negative effects.

The Government agrees with the need for a comprehensive equitable transitions strategy and seeks your feedback on the key objectives for the strategy and on the models and approaches that should be used in developing the strategy.

Reducing risks for firms and households

We will work with industry and communities to minimise the cost of the transition for firms and lower income households. During the first budget period, we will consider:

1. helping emissions-intensive businesses, or those more vulnerable to negative impacts, move to new operating models and adopt new technology
2. working with businesses to identify barriers to reducing their emissions profile, particularly those businesses with more limited capacity to respond to transitional change
3. providing clear information on likely impacts of the transition on different businesses
4. monitoring effects on household bills, so low-income households keep pace with rising costs
5. helping low-income and other households reduce emissions, including assistance with upfront costs of new technology
6. signposting policies early, where possible, so businesses have time to adjust and invest.

Promoting business and job opportunities

Seizing the opportunities of this transition will require:

1. reducing emissions across all industries
2. mobilising capital at different levels
3. a flexible skills system and employment support that responds as businesses adopt new ways of working, and new industries and jobs emerge.

A number of these opportunities are addressed in other parts of this document, such as the chapters on funding and finance, and those on transitioning key sectors. Māori-led opportunities should also be fostered, recognising the particular competencies and knowledge Māori bring (for example, to improve asset management and regeneration). Māori will have a key role in areas including agriculture, research, science and innovation, forestry, energy and industry, and building and construction.

We want to make high-quality, sustainable jobs accessible to young people, and those in lower paid work (including some Māori, Pasifika, women, and disabled people), and to enable the uptake of low-emissions business practices.

Supporting workers, households and communities

The Commission noted that employment and jobs will inevitably change as Aotearoa moves towards a low-emissions society. For many, this will mean learning new skills and for others it will mean moving into jobs in other industries. The Government is reforming the vocational education system, to ensure it's better able to produce the skills that learners, employers and communities need.

We must also do more to support and enable workers, households and communities to understand, plan and manage the transition, so they are better placed to build a productive, sustainable, inclusive and resilient society.

Potential responses include:

1. A new social unemployment scheme (through the Future of Work Forum), with the Council of Trade Unions and Business NZ. This would better support workers who lose their job, giving them financial stability to find the right job for their skills, or to retrain.

2. Supporting high-quality local planning, including:
   - developing user-friendly resources such as guidance, tools and information
   - improving how the public service supports transitions, building on programmes such as Kānoa Regional Economic Development Partnerships
   - deploying more intensive equitable transition support for communities and regions that need more assistance
   - investigating the ongoing role of the Regional Strategic Partnerships Fund and its potential to accelerate equitable regional transitions.

Monitoring and responding to impacts

We must carefully consider distributional impacts so that we can minimise negative effects, maximise co-benefits and reduce inequities. However, some impacts will be difficult to predict. Some options for better monitoring are:

1. a forward research programme to better identify vulnerable groups, and to assess mitigation options
2. better assessment of how current policies are playing out in practice
3. inviting Māori and stakeholders, including businesses and community groups, to provide real-time feedback on the effects of policies.

QUESTIONS

Equitable transitions strategy

The Climate Change Commission recommends developing an Equitable Transitions Strategy that addresses the following objectives: partnership with iwi/Māori, proactive transition planning, strengthening the responsiveness of the education system, supporting workers in transition, and minimising unequal impacts in all new policies.

13. Do you agree with the objectives for an Equitable Transitions Strategy as set out by the Climate Change Commission? What additional objectives should be included?
14. What additional measures are needed to give effect to the objectives noted by the Climate Change Commission, and any other objectives that you think should be included in an Equitable Transitions Strategy?

The Commission suggests that the Equitable Transitions Strategy should be co-designed alongside iwi/Māori, local government, regional economic development agencies, businesses, workers, unions, the disability community and community groups.

15. What models and approaches should be used in developing an Equitable Transitions Strategy to ensure that it incorporates and effectively responds to the perspectives and priorities of different groups?

Other actions

16. How can Government further support households (particularly low-income households) to reduce their emissions footprint?
17. How can Government further support workers at threat of displacement to develop new skills and find good jobs with minimal disruption?
18. What additional resources, tools and information are needed to support community transition planning?

QUESTIONS

19. How could the uptake of low-emissions business models and production methods be best encouraged?
20. Is there anything else you wish to share in relation to making an equitable transition?

Aligning systems and tools

SUMMARY

Moving to a low-emissions future means transforming all sectors of the economy. All our systems must point towards low emissions.

- **Government accountability and coordination** is essential for a well-resourced work programme that makes these system-wide changes.
- **Funding and financing** are a catalyst for significant cuts in emissions.
- **Emissions pricing** plays an important role in changing investor and consumer behaviour.
- **The planning system** controls how we use land, and the emissions that flow from those land uses – both urban and rural.
- **Research, science and innovation** generate knowledge, and new approaches and practices.
- **Behaviour change** by organisations, businesses and individuals is critical to achieving net zero.
- **Move to a circular and bioeconomy** to create economic value while restoring the natural systems.

Your views

We seek your comments on proposed measures to reduce emissions and align our systems with the transition. We would like to know if you think these are the right types of policies, if they go far enough, and what you think should be changed.

There are consultation questions throughout this section under each of the above headings.

Government accountability and coordination

Responding to climate change requires a coordinated work programme across central government to achieve our shared objectives and reach our climate targets. The Ministry for the Environment leads our country's climate change policy, and other government agencies hold the policy for key sectors to reduce greenhouse gas emissions and increase removals. The climate response will also require other actors – including local government and the private sector – to take action and mobilise resources.

The emissions reduction plan is just the first step. From June 2022 on, we will institute monitoring and public reporting of progress to track the implementation of the plan and enable accountability. The Climate Change Commission also has a role in monitoring and reporting progress against our budgets to the Government.

An equitable and managed transition requires:

1. building government capability to monitor progress against our budgets
2. making timely decisions so we stay on track
3. making sure social, economic and environmental policies support one another.

What we are doing now

Government leadership

Climate Change Response Ministerial Group – This is chaired by the Prime Minister. Formed in December 2020, it sets strategic direction on climate action and keeps the work programme timely and effective.

Climate Change Chief Executives Board – Formed in 2019, this brings together chief executives of key agencies to monitor and progress the Climate Action Plan,[11] and drives a climate work programme. The board will continue this governance role for the emissions reduction plan.

Aligning procurement with low emissions, and promoting investment

In October 2019 new Government procurement rules came into effect. They place more emphasis on social, economic, cultural and environmental outcomes, beyond the purchase of goods and services.

A priority is *supporting the transition to a net-zero-emissions economy*. This requires agencies to do their part by procuring sustainable goods and services. Read more on the Government procurement rules.

The Carbon Neutral Government Programme

Government is joining businesses and communities in leading the way to a net-zero future, through the Carbon Neutral Government Programme (CNGP).

Launched in December 2020, it aims to make a number of public organisations carbon neutral from 2025. Participants measure and report their emissions, set targets and plans to reduce emissions in line with the 1.5° pathway,[12] and offset their remaining emissions from 2025.

Potential and proposed measures

Implementing the emissions reduction plan

This plan is the first step on the path to a low-emissions economy. From June 2022, agencies and Ministers must be accountable for what it sets out. The Government is considering whether this might require enhanced or additional mechanisms.

We will also need to monitor and track progress against budgets, including responding to the Climate Change Commission's reports that monitor our progress. To keep decisions timely, we will need more rapid and focused feedback. This means significantly increasing the capability of data and modelling teams in agencies.

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[11] The Climate Action Plan was developed from the Government response to the Productivity Commission's Low Emissions Economy report.

[12] That is, to be consistent with the intent and purpose of the Climate Change Response (Zero Carbon) Amendment Act 2019, and the Paris Agreement, of limiting the global average temperature increase to 1.5° Celsius above pre-industrial levels.

Working together in new ways

Striving to meet our transition challenge could involve new ways of collaborating to transform our economy, like mission-oriented innovation.[13] By working in close partnership with business, iwi/Māori, and the public, a missions-led approach could catalyse innovation and crowd-in investment across the system to help drive transformation, forging new climate-resilient economic activities and jobs that embrace our unique strengths.

QUESTIONS

21. In addition to the Climate Change Commission monitoring and reporting on progress, what other measures are needed to ensure government is held accountable?
22. How can new ways of working together, like mission-oriented innovation, help meet our ambitious goals for a fair and inclusive society and a productive, sustainable and climate-resilient economy?
23. Is there anything else you wish to share in relation to government accountability and coordination?

Funding and financing

Climate change requires a step change in how we approach financing. Our climate targets will require significant, sustained investment from public and private sectors. To meet this challenge, we will need to:

- increase the amount of public funding available for new climate initiatives
- support the flow of private investment towards climate-positive outcomes and the growth of the green finance market
- consider how our policies, incentives and existing spending are contributing to where money flows across the economy
- ensure that our communities and businesses can access the finance they need to invest in the transition.

What we are doing now

Finance is an important catalyst for lowering emissions. Aligning finance with positive climate action may not directly reduce emissions, but it directs much-needed investment to low-emissions activities.

There is no single way to direct the flow of finance towards climate goals, but a range of options that need to be considered together. For a list of the current work being done across Government (at mid-2021), see International developments in sustainability reporting.

Aligning public finance

Given the breadth, scale and duration of the transition to low-emissions economy, we need to ensure **adequate, durable and certain** public funding for climate action. The Treasury and the Ministry for the Environment are currently considering how the public finance system can provide this, including:

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[13] Larrue P. 2021. The design and implementation of mission-oriented innovation policies. *OECD Science, Technology and Industry Papers* (100). Paris: OECD Publishing. The missions-led approach is also discussed in the Research, science and innovation section.

1. how we prioritise spending for positive climate action through the annual Budget process
2. how we assess and report on what gets funded through public spending, including how well broader public spending aligns with our climate targets
3. how the Government can coordinate and encourage climate investment in the private sector
4. how we can recycle revenue from the New Zealand Emissions Trading Scheme (NZ ETS) into climate spending.

Initial work on this will inform the next Government Budget and will build on a number of existing government funds that support low-emissions activities, such as the Government Investment in Decarbonising Industry Fund, the Low Emissions Transport Fund and the Technology Demonstration Fund.

Government agencies are also looking at novel ways to boost public investment in low-emissions activities. For example, Kāinga Ora launched its Sustainability Financing Framework in 2020, to support investment in green buildings.

Mobilising private finance

The investment needs of a climate change response cannot be met by public finance alone. There are significant opportunities for private investors in the growing green finance markets. In fact, the private sector is already taking these opportunities, such as through the recently launched Centre for Sustainable Finance.

The Government will support private investment into this space by providing co-funding, overcoming information barriers, and regulating where necessary. Over the last three years the Government has:

- established the New Zealand Green Investment Finance Limited (NZGIF) to direct private sector capital into investments that reduce emissions in 2018. The latest Government Budget provided $300 million of additional funding for NZGIF to invest into decarbonising public transport, waste and plastics.
- Banned default KiwiSaver funds from investing in fossil fuel production.
- Helped investors better understand climate change-related risks and opportunities and supported investor activity, by introducing mandatory climate-related disclosures in 2020. The Financial Markets Authority also published their disclosure framework for integrated financial products in late 2020 to support the growing market for ESG (environmental, social and governance) funds.
- Mobilised private finance in the regions to make them more productive, resilient, inclusive, sustainable and Māori-enabling through Ministry of Business, Innovation and Employment's Kānoa – Regional Economic Development and Investment Unit's (REDIU's) $200 million Regional Strategic Partnership Fund.

To encourage continued funding and financing, we would like to understand the barriers and gaps in allocating private capital to low-emissions investment, and clarify where to focus our initial efforts for the greatest impact.

Access to finance to support the transition

The costs of the transition will also fall on communities, businesses and individuals. We are considering where access to finance is creating a barrier to the transition, and how we can overcome those.

For example:

- To increase lending for sustainable agricultural activities, the Ministry for Primary Industries is working with the banking industry and the Sustainable Finance Forum of the Aotearoa Circle on a common set of guidelines for defining 'sustainable agriculture'.
- The Reserve Bank of New Zealand is exploring the challenges Māori face in accessing capital, with a focus on bank lending to small and medium-sized enterprises (SMEs), and is building a quantitative assessment of those challenges now. We would also like to understand whether Māori face other barriers to low-emissions finance, particularly outside of the SME context.

QUESTIONS

24. What are the main barriers or gaps that affect the flow of private capital into low-emissions investment in Aotearoa?
25. What constraints have Māori and Māori collectives experienced in accessing finance for climate change response activities?
26. What else should the Government prioritise in directing public and private finance into low-emissions investment and activity?
27. Is there anything else you wish to share in relation to funding and financing?

Emissions pricing

Emissions pricing helps change investor and consumer behaviour. It promotes lower emissions options by putting a cost on emissions, either directly or through obligations that are passed on to consumers. This allows businesses and consumers to make the most cost-effective choices for reducing their emissions. The NZ ETS is our main emissions pricing tool, and just under half our gross emissions face an emissions price through the scheme. It creates a trading market for New Zealand Units (NZUs), where each NZU represents one tonne of CO_2e. Participants are required to surrender one NZU for each tonne of CO_2e they produce. Participants who remove CO_2e from the atmosphere (mostly foresters) are entitled to receive NZUs. Businesses whose activities are emissions intensive and trade exposed can receive a free allocation of NZUs, termed industrial allocation.

The Government has put an overall limit (cap) on the emissions that participants produce. As the NZU supply decreases over time, the demand will increase, causing the price to rise. This makes emissions-intensive technology and behaviour more expensive, and encourages businesses and individuals to find ways to reduce their emissions and increase removals, such as by planting forests.

The NZ ETS is designed to limit net emissions (the sum of gross emissions and removals) in line with the net emissions budgets that will be set under the Climate Change Response Act 2002 (CCRA). There is currently no limit on the use of NZUs from forestry to meet NZ ETS surrender obligations.

What we are doing now

The overall limit and price control settings are updated annually to provide settings for the next five years.

The Government has announced that the unit volumes in the NZ ETS and the price control settings will be updated from 1 January 2022, in line with the Commission's recommendation. View the auction volumes and price control settings for 2022–26.

These changes have created a rising price corridor; the price at which extra units could be released for sale from the cost containment reserve[14] during NZ ETS auctions will increase from $50 to $70 from 1 January 2022, and will increase by 10 per cent plus inflation each year. The auction price floor will increase from $20 to $30 from 1 January 2022 and increase at 5 per cent plus inflation each year.

The settings may be revised in 2022 for 2023–27, to support our agreed emissions budget, and the Commission's annual advice on NZ ETS settings.

Potential and proposed measures

Encouraging gross emission reductions through the NZ ETS

To support our transition pathway, substantial gross emissions reductions are required by 2050. The NZ ETS needs a higher emissions price to drive investment and behaviour change to reduce gross emissions. This is especially important to achieve the transition pathway for gross emissions in energy, transport and industry. In these sectors, cost-effective technologies already exist to reduce some gross emissions. Any delay in investing in such technologies will cost us more in the long run, lead to higher cumulative emissions, and require more land-use change to forestry after 2050.

A rising NZ ETS price under current settings may drive more forestry rather than gross emissions reductions over the long term

Modelling undertaken by the Climate Change Commission identified that under current policy settings a rising NZ ETS price is likely to mostly drive exotic forest planting in the short term, rather than gross emissions reductions.

The Commission's modelling, and government analysis carried out in 2019,[15] as well as 2018 modelling from the Productivity Commission on our transition to a low-emissions economy identified abatement costs in forestry at then current emissions prices, and much higher abatement costs in the energy, industrial processes and product use, and waste sectors.

Modelling from the Productivity Commission found that an emissions price of $150–250 per tonne of carbon is needed to achieve net zero emissions by 2050. While the reductions in net emissions come mainly from afforestation, gross emissions reductions are achieved at higher emissions prices from replacing fossil fuels with clean electricity and other low-emissions energy sources in transport and process heat. These higher prices could come about through land scarcity impacting afforestation costs. The Productivity Commission noted that while afforestation provides a cost-effective means of reducing net emissions, this is only an interim solution as substantial gross emissions will remain in 2050 (over 50 Mt CO_2e) and there will only be sufficient suitable land for afforestation for the next 30 to 50 years, at projected planting rates.

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[14] The cost containment reserve (CCR) is a reserve volume of units available to be released to the NZ ETS market if the CCR trigger price is hit at auction.

[15] Ministry for the Environment. 2020. *Marginal abatement cost curve analysis for New Zealand: Potential greenhouse gas mitigation options and their costs*. Wellington: Ministry for the Environment

Climate Change Commission recommends further NZ ETS amendments

The Commission recognised that this could cause a problem with the effectiveness of the NZ ETS in driving gross emission reductions. The Commission recommended amending the NZ ETS to strengthen the incentive for gross emissions reductions, and manage the amount of exotic forest planting the NZ ETS drives. This is because while the emissions removed by exotic forest planting can offset gross emissions, this is a one-off benefit, and means the land must remain in forest permanently. This reduces the flexibility of land use and delays reducing gross emissions.

We intend to look at this issue more closely, and if needed will change the way forestry is treated under the NZ ETS.

Future carbon sequestration incentives

New Zealand needs new forests to be planted over the coming decades, to continue to offset emissions, including hard-to-abate emissions up to and beyond 2050, and to provide flexibility for meeting domestic and international targets if gross emissions are harder to achieve than anticipated. An increased wood supply will also support our efforts around biofuels and the circular economy. We also need forestry to support Māori aspirations, contribute to economic prosperity, biodiversity, soil and water health, and climate resilience.

These many benefits are why the Government is committed to maintaining effective incentives for planting new forests of the right type, in the right place and for the right purpose. If there will be constraints on forestry in the NZ ETS, then Government will work with land owners and industry on ways they can be rewarded for carbon sequestration and other benefits outside the NZ ETS.

Anticipating the likely incentives for carbon sequestration from the 2030s is work that needs to happen regardless of any decision on whether to constrain forestry driven by the NZ ETS. If Aotearoa substantially reduces gross emissions by the 2040s there will be less demand for forestry removals from existing NZ ETS emitters responsible for those emissions. We will continue to need forestry removals, however, for offsetting hard-to-abate emissions and biological emissions currently outside the NZ ETS. There may also be demand from the voluntary and international markets. Given the long timeframes that new forests contribute removals over, decisions made in the next few years will influence the quantity and type of forestry removals in the NZ ETS up to 2050.

The Commission has noted that current NZ ETS settings will incentivise more planting of fast-growing exotic species, such as pine, than may be desirable to meet the 2050 target. The Commission also noted Aotearoa should transition from a reliance on exotic forests to permanent native forests before 2050. Because forestry removals may also be thought of as insurance if progress in other sectors is slower than forecast, it's important to maintain investor and land owner confidence by carefully analysing the impacts of any changes to forestry incentives.

The Commission presented several options for how to amend the NZ ETS to manage incentives for afforestation, including:

- reducing demand by limiting how many forestry units non-forestry participants can surrender
- requiring them to pay an additional fee when surrendering forestry units
- reducing the rate at which units can be earned by exotic forest

- limiting the overall area of forest that can be registered in the NZ ETS each year, or otherwise amending the eligibility criteria.

There may be other options, and each option will have different impacts on different groups. The Government will need to identify and work through the risks and benefits of different approaches, including the status quo, during the policy development process. We will analyse the implications of different policy options on the NZ ETS to avoid unintended consequences. Your feedback and ideas are important, and will inform this analysis. There will be further consultation as options, including the status quo, are developed.

We will decide by the end of 2022 on whether to change NZ ETS rules in the future. If changes are necessary, we will also decide on preferred options.

Improving market governance

Market governance is critical for the integrity and efficiency of the NZ ETS. Consultation on options to improve the governance of advice, trading, and market conduct, and appointing a market regulator closed on 17 September 2021. The aim is to improve the current framework to manage risks of misconduct in the NZ ETS and protect NZ ETS users from financial harm. We will include feedback from this consultation in a summary of submissions expected to be published in late 2021. The results of the consultation, alongside further policy analysis, will inform advice on designing a governance framework for the NZ ETS.

Reviewing free industrial allocation

Some businesses are allocated free NZUs for activities considered emissions intensive and trade exposed (EITE). Industrial allocation reduces the risk of the emissions price driving EITE firms, production and the associated emissions overseas, which could increase global emissions. This risk is known as **emissions leakage**.

We consider that current industrial allocation policy is contributing to over-allocation. Consultation on options to improve the policy, to manage any ongoing risk of emissions leakage and align with our climate change commitments closed on 17 September 2021. We are also considering the longer term direction of the policy, and alternative mechanisms.

The results from this consultation, alongside further policy analysis, will inform advice to Ministers about policy changes to industrial allocation. These changes are likely to be progressed through an amendment to the Climate Change Response Act introduced in 2022, and later through changes to the industrial allocation regulations.

QUESTIONS

28. Do you have sufficient information on future emissions price paths to inform your investment decisions?
29. What emissions price are you factoring into your investment decisions?
30. Do you agree the treatment of forestry in the NZ ETS should not result in a delay, or reduction of effort, in reducing gross emissions in other sectors of the economy?
31. What are your views on the options presented above to constrain forestry inside the NZ ETS? What does the Government need to consider when assessing options? What unintended consequences do we need to consider to ensure we do not unnecessarily restrict forest planting?
32. Are there any other views you wish to share in relation to emissions pricing?

Planning

Decisions on land use and resources affect the emissions pathway we take, and can lock us into that pathway for generations to come.

In many parts of New Zealand, rapid outward growth has led to poorly functioning urban form and higher emissions. Strategic planning and investment can lower emissions over time by influencing urban form through locating medium- and high-density development and mixed-use centres to support active and public transport. Planning can drive climate action in almost every sector – for example, enabling afforestation to offset emissions and supply the emerging bioeconomy, enabling renewable energy, or enabling a range of infrastructure and building types that support emissions reductions.

What we are doing now

The existing national direction on urban development, which guides council planning, enables growth 'up and out' in locations with existing services and infrastructure, promoting growth in centres and public transport networks.

Urban design schemes for safe, accessible, liveable neighbourhoods, which complement climate objectives, are underway at a small scale, as is work on Māori-led housing.

Partnerships between iwi/Māori and central and local government are already producing long-term spatial plans for high-growth regions, with well-planned intensification and public transport-oriented projects.

Other programmes include national direction on renewable energy generation and industrial greenhouse gas emissions and the Building for Climate Change programme.

The Kāinga Ora programme is working to understand how it can reduce urban emissions through planning and infrastructure in its large-scale regeneration programmes. This is supported by a Housing Acceleration Fund for infrastructure, and work to take a climate lens across investment.

Proposed policies and measures

Since 1991, the way we manage our environment has largely been governed by the Resource Management Act 1991 (RMA). **Reforms** are currently underway and provide an opportunity to integrate emissions reduction into land-use planning and investments.

The reforms seek to replace the RMA with:

- A Natural and Built Environments Act (NBA) to protect and restore the environment while better enabling development, underpinned by Te Oranga o te Taiao. This is proposed to require mandatory direction for greenhouse gas emissions.
- A Strategic Planning Act (SPA) to require long-term regional spatial strategies to help align priorities and integrate decisions across land use, transport and local government. This will help align how investment is directed across legislation – for example, under the new NBA, and the existing Local Government Act 2002 (for example, long-term plans) and Land Transport Management Act 2003 (for example, Government policy statements).
- A Climate Adaptation Act (CCA) to address issues around managed retreat.

Development of the proposed SPA and NBA, and engagement with local government and iwi/Māori, will happen throughout 2021. These reforms are a key opportunity to align the planning and funding frameworks with climate mitigation and adaptation. This will assist local authorities to make and fund decisions aligned with reducing emissions and adapting to climate change, but further system change may be needed. These should be considered alongside sector-specific policies, for example, in relation to the New Zealand Building Code. Further system-wide reforms will likely also be needed to support the new resource management system and optimise emissions reductions, for example through alignment of the Local Government Act, Land Transport Management Act, and the Building Act 2004.

Other direction will be developed as part of a 30-year infrastructure strategy, and the draft Government Policy Statements on Housing and Urban Development (which will set expectations for Kāinga Ora for how it mitigates and adapts to climate change).

The Commission recommended bringing climate change into the decision-making processes of Crown agencies, entities and Crown-owned companies. Investigation into opportunities to reduce emissions across all public and private infrastructure assets is needed – including embodied emissions from construction and maintenance, operational emissions, and the infrastructure-enabled emissions. Changes may be needed in several areas to support low-emissions, climate-resilient built assets – including investment, funding and financing settings, infrastructure-related targets supported by sectors and backed by behaviour change programmes, as well as risk disclosure and monitoring. Alongside this, green infrastructure solutions should be supported.

The Commission recommended a greater focus on partnership with iwi and Māori in relation to urban development. Partnerships with mana whenua are underway as part of the Urban Growth Partnerships and further work will be done on a partnership approach as part of the work on the Spatial Planning Act. The Commission also recommended better protection of Māori interests and site of cultural significance and resource management reform could provide a better framework for progressing this.

The construction sector, urban designers and developers, who are key to achieving effective land-use planning, will need different support.

Integrating emissions into urban planning and funding

We do not know the total emissions contribution of urban areas. We need to develop a way to measure the emissions associated with urban development decisions. This should incorporate the likely lifetime emissions of transport and energy use that would be enabled under different scenarios, and embodied emissions in buildings and infrastructure.

Understanding the emissions impact could inform strategic, spatial and local planning and investment decisions, and drive emissions reductions going forward.

There are major opportunities in planning and investing for a more compact mixed-use urban form, oriented around public and active transport. As noted in the Transport section, the Government will require transport emissions impact assessments for urban developments and factor these into planning decisions (with requirements to avoid, minimise and mitigate transport emissions impacts). Transport plans and future investments will also strongly prioritise travel by public transport, walking, and cycling.

Future work could explore the:

- economic benefits and distributional impacts of intensifying development in towns and cities
- price signals and economic instruments to support this.

This includes options proposed by the Resource Management Review Panel, such as 'value capture' tools, as well encouraging the uptake of alternative, low-carbon infrastructure and its financing.

QUESTIONS

33. In addition to resource management reform, what changes should we prioritise to ensure our planning system enables emissions reductions across sectors? This could include partnerships, emissions impact quantification for planning decisions, improving data and evidence, expectations for crown entities, enabling local government to make decisions to reduce emissions.
34. What more do we need to do to promote urban intensification, support low-emissions land uses and concentrate intensification around public transport and walkable neighbourhoods?
35. Are there any other views you wish to share in relation to planning?

Research, science and innovation

Research, science and innovation (RSI) help us towards an inclusive, sustainable and productive future. The Climate Change Commission identified innovation as a pillar of our emissions reduction interventions.

The RSI system[16] yields scientific knowledge and innovation to drive the transition, including lower emission practices. It also promotes mātauranga Māori in addressing the problems and opportunities.

[16] The RSI system consists of people, institutions (including research organisations and businesses) and infrastructure. The Government supports the system through direction setting, funding, ownership of research and innovation institutions, coordination, and regulation (eg, for intellectual property).

We are committed to increasing our RSI activity to 2 per cent of gross domestic product (GDP) (from the current rate of 1.35 per cent).

The RSI system drives emissions reduction in three approaches:

1. Knowledge: this enhances our understanding of climate change and the scale of reduction needed. A growing knowledge base helps the Government, communities and businesses adapt, and manage the transition.
2. Sectors: this aims to solve the scientific and technological challenges in reducing emissions in domestic sectors, with novel methods. Sectors can commission research and development (R&D) and use RSI resources. Government support can accelerate innovation to assist individual sectors, for example by lowering agricultural emissions, fostering the bioeconomy, or addressing hard-to-abate emissions.
3. Opportunities: cutting-edge science expertise and frontier firms give Aotearoa an advantage in designing new, low-emissions technology, businesses and sectors. These can be exported to connect with the global green economy. These opportunities are hard to plan for but will underpin an equitable transition to new sectors with higher productivity jobs.

The RSI system ensures that our research community and innovative businesses have the science capability, people, infrastructure, culture and experience to meet new challenges as they arise. Greater emphasis on low emissions would require additional funding or a shift away from other areas of innovation.

With the short timescale for the transition, and the breadth of science and innovation required, our RSI system must be adaptable, resilient, connected to the global frontier, and able to deliver and absorb innovation at pace.

What we are doing now

Existing funding is both broad-based and targeted at low-emissions R&D. We support projects driven by knowledge, sector and opportunity.

Examples include:

- funding for research to reduce agricultural greenhouse gas emissions – focusing on information, technology and behaviour for agriculture in a carbon-constrained world[17]
- support for the Bioresource Processing Alliance, which helps reduce waste through high-value products from low-value biological resources[18]
- the Strategic Science Investment Fund (SSIF),[19] to develop new knowledge and capabilities, working closely with end users to support the uptake of research.

Government investment in research, science and innovation

Annual government investment in RSI is $2 billion currently, with $2.2 billion from the private sector, equating to 1.35 per cent of GDP (while our total RSI investment is below the Organisation for Economic Co-operation and Development (OECD) average of 2.34 per cent,

[17] See more information about the Ministry for Primary Industries (MPI) and Ministry of Business, Innovation and Employment (MBIE) funded New Zealand Agricultural Greenhouse Gas Research Centre.

[18] See the Bioresource Processing Alliance.

[19] See the SSIF research programmes.

the government-funded share is higher than the OECD average). Major investments include the Marsden Fund, the Endeavour Fund, the Sustainable Food and Fibres Fund, and the Research and Development Tax Incentive (RDTI), which supports business innovation.

Government investment in climate change research covers:

- understanding climate change and emissions, contributing to the global body of knowledge
- understanding the effects of high emissions on our environment, including towns and cities
- developing the new knowledge and technology that will help to mitigate and move away from high emissions
- developing the knowledge and technology to build new net-zero industries.

Research and Development Tax Incentive

The Research and Development Tax Incentive is the main mechanism to support business innovation. It allows companies to claim back 15 per cent of eligible R&D expenses, and helps them to grow and contribute to the New Zealand economy.

Vision Mātauranga

The Vision Mātauranga policy unlocks the science and innovation potential of Māori knowledge. Mātauranga Māori offers insights and solutions to climate change issues that reflect a holistic worldview.

The Expanding the Impact of Vision Mātauranga initiative will assist Māori to make future investments in RSI. It will be co-developed with Māori to achieve outcomes driven by and for Māori, and reflect Te Tiriti o Waitangi (Treaty of Waitangi). We will promote a system that supports and reflects Māori aspirations and mātauranga Māori in RSI.

The Endeavour Fund

The Endeavour Fund invests in a wide range of research. The Endeavour Fund Investment Plan 2022–24 emphasises proposals that aim to support the transition to a low-emissions and climate-resilient economy. Explicit consideration will be placed on the potential impact of research on greenhouse gas emissions. This initiative is cost-neutral, as it sits within existing processes. The fund invests about $57 million in new projects annually.

Research on agricultural emissions

The Budget 2021 initiative Accelerating Agricultural Climate Change Research is a collaboration between MBIE and MPI to address research in the agriculture sector. It will accelerate agricultural greenhouse gas mitigation R&D in high-impact areas (for example vaccines, methane and nitrous oxide inhibitors, low-emissions animal breeding, and soil carbon enhancement).

Supporting and commercialising innovation

The Ministry for the Environment and Callaghan Innovation highlight environmental challenges through accelerator schemes such as the Climathon and Creative HQ's Climate Response Accelerator. They advise private sector participants on designing new products and services, including low-emissions technology.

Callaghan Innovation has launched a partnership with other government agencies that work in the innovation sector entitled 'Cleantech: Making it Happen'. This will connect innovators with the Government, investors, Māori trusts and customers to increase cleantech innovation and commercialisation.

Potential measures

MBIE aims to target investment in lower emissions, so that the RSI system delivers cutting-edge innovation. MBIE seeks public input on where and how to direct our RSI efforts.

The RSI system can also coordinate activities to decarbonise different sectors, such as wider access to established low-emissions technology.

Future Pathways programme

MBIE's Future Pathways programme will set the priorities for research to address the challenges facing New Zealand, such as the transition to a low-emissions economy. Initial consultation will be through a green paper, scheduled for the third quarter of 2021.

Future Pathways will consider:

- giving complex challenges such as climate change a clear locus of activity and dedicated resourcing
- reshaping the funding system to give effect to those priorities, and to build our capability now and in future
- shaping our institutions so they can act on those priorities and adapt in a fast-changing world.

Start-up Action Plan

MBIE is exploring ways to foster start-ups in New Zealand; this includes how it can help them address environmental challenges, including lowering emissions.

A cross-government approach will enhance the visibility and connectedness of this scheme. It will also improve access to resources for scaling up, starting with a publication to highlight the current system.

It also involves co-designing mechanisms with Māori to assist Māori start-ups.

Mission-oriented innovation

MBIE is developing a proposal for a mission-oriented innovation[20] approach to climate change. This would join efforts, resources and knowledge across disciplines, sectors and policies, to collectively support projects that tackle climate change. It would focus on opportunities from new low-emissions technology, and help address sector-specific problems. It would also consider the need for innovation infrastructure to help people adopt available emerging low-emissions technology, and new technology and ideas.

This includes providing strategic direction; improving networks among researchers, businesses and institutions; supporting international cooperation; and fostering new relationships between RSI and firms at the cutting edge.

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[20] Larrue P. 2021. The design and implementation of mission-oriented innovation policies. *OECD Science, Technology and Industry Papers* (100). Paris: OECD Publishing.

Below are some initiatives that could kick off a mission-oriented approach.

- Innovative partnerships for clean technology

  MBIE proposes an Innovative Partnerships programme on clean technology (cleantech) to investigate new and emerging initiatives, including those that would reduce emissions. It would attract frontier firms to conduct R&D, invest and build a sustained presence in Aotearoa.

  Through this approach, Aotearoa could become a global destination for cutting-edge R&D, provide a test bed for low-emissions innovation, and stimulate and scale up domestic and overseas clean technology.

- Advanced technology research and development

  MBIE is considering creating a roadmap to guide investment in advanced technology over the next 5–10 years. Some of these – such as new energy vehicles, smart grids, hydrogen energy and new forms of energy storage – will lower our emissions profile.

- Supporting the uptake of emerging technologies

  MBIE proposes addressing the gap in support for new technology that is under development. This could include creating test beds, through pilot plant facilities and regulatory coordination. It would also look at emerging international technology that supports our transition.

  MBIE is also scoping ways to scale up high-impact projects more quickly. It will seek partnerships with private enterprise and government agencies to test solutions as part of a partner's normal operations, to reduce the lag between development and widespread uptake.

QUESTIONS

36. What are the big challenges, particularly around technology, that a mission-based approach could help solve?
37. How can the research, science and innovation system better support sectors such as energy, waste or hard-to-abate industries?
38. What opportunities are there in areas where Aotearoa has a unique global advantage in low-emissions abatement?
39. How can Aotearoa grow frontier firms to have an impact on the global green economy? Are there additional requirements needed to ensure the growth of Māori frontier firms? How can we best support and learn from mātauranga Māori in the science and innovation systems, to lower emissions?
40. What are the opportunities for innovation that could generate the greatest reduction in emissions? What emissions reduction could we expect from these innovations, and how could we quantify it?
41. Are there any other views you wish to share in relation to research, science and innovation?

Behaviour change – empowering action

Public engagement is central to the emissions reduction plan – especially as a net-zero future depends on individuals, households and organisations changing their behaviour.

Promoting public awareness, communication and education helps to meet four objectives:

1. Keep the public well informed, so they understand Government plans and policies.
2. Engage people in consultation, so that the best decisions are made for Aotearoa and our people in the transition.
3. Co-develop and share the Government's vision.
4. Motivate people to act in their own lives, and make long-term decisions that will help everyone make the shift.

In the short term, we can lower emissions by encouraging New Zealanders to make choices and new actions – for example, using the car less, taking public transport, native tree planting and walking and cycling (active travel).

However, promoting only small-scale, ad hoc changes risks a short-lived impact. We must drive deep and long-term systemic change to change behaviour at the scale required. The Government should take a central role in driving this. Finding the best way to do it is a key challenge.

What we are doing now

The Commission noted that education and information can promote behaviour change.

We have a wide range of activities to raise public awareness, educate, provide information and avenues for individuals to take climate-positive action. Examples include:

- The GenLess public campaigns and communications platform helps raise the willingness of the public and businesses to think about climate change and encourage energy-efficient and low-carbon choices (Energy Efficiency and Conservation Authority (EECA)).
- The Environmental Education for Sustainability Strategy and Action Plan helps equip young people to address environment challenges (Ministry of Education, Department of Conservation and Ministry for the Environment).
- The Ministry of Education resource Climate Change – prepare today, live well tomorrow helps students understand the effects of climate change at a local, national and global scale.
- He Waka Eke Noa Primary Sector Climate Action Partnership will bring in a farm-level pricing scheme by 2025. This will encourage farmers to reduce their emissions through currently available practices (Ministry for Primary Industries and Ministry for the Environment).
- BikeReady is a national cycling education system delivered by people in your community. It helps people gain safe road skills for cycling early in life, and fosters a more empathetic transport environment, so that cycling feels like a real transport choice for most people (Waka Kotahi NZ Transport Agency and ACC).
- We are developing updated guidance for voluntary offsetting in New Zealand. The purpose of this guidance is to mobilise and incentivise private finance to enable additional emissions reductions or removals. The guidance will also clarify how organisations and individuals can demonstrate that the voluntary action undertaken has high environmental integrity.

Potential and proposed measures

Behavioural change fund

Although the programmes above are a good starting point, the Commission recommended a more coordinated approach to meet our targets.

The Commission advised on the Government's role in embedding behavioural change in policies and programmes, and setting up a fund with a nominated lead agency to drive behaviour change. We are considering this advice. We are aware that any effort to inform and engage New Zealanders should build on what is already in place (above), with a greater focus on interventions and campaigns for faster behaviour change.

QUESTIONS

42. What information, tools or forums would encourage you to take greater action on climate change?
43. What messages and/or sources of information would you trust to inform you on the need and benefits of reducing your individual and/or your businesses emissions?
44. Are there other views you wish to share in relation to behaviour change?

Moving Aotearoa to a circular economy

A circular economy is about building up a new economic system that operates within planetary boundaries and achieves wellbeing for all. It is about moving from an extractive economic model (for example, one that can have an unsustainable impact on the environment, relies on extracting non-renewable resources and exploits cheap labour) to one that is regenerative, circular and equitable.

The circular economy is often seen as an approach to waste management and resource recovery, but it is much more than this. It is about rethinking how we consume and produce all goods and services, how we live as individuals and communities, and our integration into global value chains.

Our current working principles for a circular economy include:

- designing out waste, pollution and emissions, and unnecessary use of materials
- taking a whole-of-life approach to materials and products, and eliminate waste and pollution through design and planning
- taking responsibility for the past, present and future condition of our natural resources
- keeping products and materials in use, at their highest value
- protecting and regenerate natural systems, to ensure the environment is healthy for future generations
- thinking in systems, where everything is interconnected
- delivering equitable and inclusive outcomes.

The circular economy is an important part of reducing emissions. Globally, 45 per cent of emissions comes from making products – everyday products like cars and clothes, and

managing land.[21] Using our finite resources more efficiently and in circular ways will generate numerous co-benefits, such as a more sustainable economy, less reliance on imported materials, a more resilient economy, and innovative value-add economic activities.

There is a significant sustainable economic development opportunity presented through a shift to a circular economy approach. The development of this approach provides an opportunity to build up the new green economy, with new, value-adding sustainable activities and industries being created. This includes potential new resource recovery- and energy-focused jobs.

A more circular economy aligns with a te ao Māori view, which is vital for the sustainable and equitable use of our resources. A circular economy will bring together aspects of mātauranga Māori and the waste hierarchy.

We want to know what you think a circular Aotearoa economy could look like in 2050, what we could do to get us there, and important milestones to measure progress along the way. While there are significant opportunities in becoming circular, we have some way to go and there are challenges to overcome.

Constraints

Aotearoa is still in the early stages of developing circular approaches. Barriers include:

- Lack of consistent and reliable data on material flows through the economy.
- Lack of information to help businesses review their supply chains, understand how to make resources more efficient, and assess the opportunities that circular approaches may present.
- Broader policies to reduce and reuse materials, including incentives, are still in development and not yet reflected in design (for example, supply chains are linear and favour single-use products).
- Lack of depth in 'circular' skills, such as product design and manufacture; growing our knowledge economy is also key to unlocking the circular economy.
- Consumer culture and marketing that favours convenient linear or single-use options, and markets that promote and benefit from this model.

The bioeconomy has a key role in the transition

The Climate Change Commission defines the bioeconomy as those parts of the economy that use renewable biological resources (biomass) to produce food, products, and energy.

Although we are taking a broader view, the focus of bioeconomy work programme globally appears to be on:

- recovery and reuse of biological waste (by-products from one activity as an input into another)
- directly replacing fossil fuels with renewable sources
- new, uncommon, or innovative ways of using renewable biological resources (for example, bio-resource extraction and manufacturing), and new organic-based materials and products (for example, bamboo, mushrooms and timber used for buildings).

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[21] Ellen MacArthur Foundation. 2019. *Completing the picture: How the circular economy tackles climate change*.

The bioeconomy is an important part of a circular economy, with both being based on restorative circular systems leveraging greater use of renewable biological resources.

Biomass

Biomass is any organic matter that can be used as fuel or turned into a useful material or chemical. This includes forestry slash, wood chips, tallow, straw, effluent, and organic household waste.

The Commission notes that when the bioeconomy incorporates circular economy principles, it can use biomass residue or waste from forestry, fisheries, agriculture and households as raw materials for other products.

Opportunities

Fostering the bioeconomy is an opportunity to:

- decarbonise our energy sources, including providing a low-cost route for decarbonisation for some uses (for example, process heat), and an option to reduce emissions from hard-to-electrify sources such as long-haul aviation and trucking
- reduce our reliance on imported resources, for greater resilience
- encourage, trial and promote new technology, methods and organic resources to lower emissions and design more climate-resilient materials, products, and processes (for example, diversified high-value wood products for construction)
- strengthen and leverage our relative position on the global stage as a genuinely low-carbon food- and fibre-producing nation
- support an equitable transition through new economic activity and learning and job opportunities.

Challenges

Meeting our target for process heat and transport emissions will drive a rapid increase in demand for biomass, and competition between different uses. This will create several challenges, including securing long-term supply, managing regional supply and demand, and the cost of transport.

Some bio-based technologies, such as solid biofuels, are ready for wide-scale use. However, other products such as bioplastics or renewable biofuels require further work, and face challenges to commercialise and attract investment.

What we are doing now

The Government already has several initiatives that will support the move to a circular economy and thriving bioeconomy, for example:

- developing a refreshed national waste strategy with a focus on circular economy
- funding circular economy innovation and economic development opportunities, including:
  - the Ngawha circular economy innovation park in Northland
  - Āmiomio Aotearoa – a circular economy for the wellbeing of New Zealand research programme led by the University of Waikato

- the Bioresource Processing Alliance, which works with the primary sector to get better value out of biological secondary streams
- Scion's bioenergy research programme.

Circular and bioeconomy considerations are already being incorporated into key policies, including Industry Transformation Plans (ITPs), National Resource Strategy and procurement. For example, the forestry and wood-processing sector ITP is exploring policies to help ensure adequate resource within the bioeconomy to support emissions reductions targets, and options to accelerate the development of high value bioproducts.

Potential and proposed measures

Moving to a circular economy with a thriving bioeconomy

Aotearoa must take a well-planned but agile approach to a circular economy transition, including the bioeconomy. It must take an integrated approach, linking the economy with the wellbeing of people and the planet, in line with the living standards framework. Where possible we will combine strategies to yield benefits across the four wellbeings – social, economic, environmental and cultural.

We need a strategy that outlines the vision, guiding principles and roadmap, and the role for the Government. A strategy for a circular economy will cover the whole economy as well as key sectors and activities, especially the bioeconomy.

Moving to a circular and zero carbon future will require new ways of working together. We all have a role to play – business, workers, iwi, governments, communities and more. We are interested in options to build on the partnerships that are already taking shape between industry, non-government organisations (NGOs) and other players, and to explore collaboration tools such as mission-led innovation.

Taking time to find the best way forward and work with our partners should not slow the growing momentum in Aotearoa. We will progress action where possible, while we set the strategic direction and foundations to see us to 2050.

While there is a lot already underway, we are interested in your views on how we can further enable New Zealand to move to a circular economy with a thriving bioeconomy. Below is a list of potential proposals we have identified for consideration:

- The development of a strategy, in partnership with iwi, for moving to a circular economy with a thriving bioeconomy, which outlines the vision, guiding principles, roadmap and the Government's role.
- Establishing a baseline for our current performance, such as a 'circularity gap' country scan report.
- A circular economy sustainable development pilot fund to support business, communities and iwi to further move to a circular economy. This could include supporting:
  - business advisory services
  - regional circular economy initiatives such as eco-parks, hubs
  - iwi-led circular economy initiatives
  - partnership approaches between business, government, communities and others, including investigating actions within the Government's Industry Transformation Plans (ITPS) and other existing partnerships.

- Further science and innovation to support the move to a circular economy with a thriving bioeconomy. This could include:
  - expanding the Bioresource Processing Alliance
  - supporting start-ups that align with a circular economy, through competitions, criteria for incubators and accelerators and procurement approaches
  - exploring the role of mission-led innovation (see the Research, Science and Innovation section)
  - innovation infrastructure for piloting, prototyping and testing.
- Accelerating the uptake of bioenergy. The Government could consider taking a more active role in market facilitation of bioenergy by helping establish long-term agreements between feedstock producers, intermediaries and end users, assisting in the development of a platform to help match buyers and sellers, and providing information to the market.
- Building knowledge and education on circular economy and using Regional Skills Leadership Groups and Workforce Development Councils to identify skill needs and training options.
- We are also looking into some more sector-specific initiatives. For example, the Building for Climate Change programme is exploring a specific building-related circular economy package, details of which are in the Building and Construction section.
- Measures in the transport and energy sectors that will support the adoption of bioenergy include:
  - the introduction of a sustainable biofuels mandate to reduce emissions from existing vehicles.
  - the Government Investment to Decarbonise Industry (GIDI) fund provides financial support for co-investment to decarbonise industrial process heat through energy efficiency, technology innovation and fuel switching, including fuel switching to biomass.
- The proposed Government circular economy strategy would link to the Aotearoa Waste Strategy and Waste Minimisation Act 2008 review, which is proposed for consultation in 2021. As other economies have done globally, transitioning our current "disposal centric" waste system towards 'reduce, reuse and recycle' provides for the engine room of genuine circular economy.

QUESTIONS

45. Recognising our strengths, challenges, and opportunities, what do you think our circular economy could look like in 2030, 2040, and 2050, and what do we need to do to get there?
46. How would you define the bioeconomy and what should be in scope of a bioeconomy agenda? What opportunities do you see in the bioeconomy for Aotearoa?
47. What should a circular economy strategy for Aotearoa include? Do you agree the bioeconomy should be included within a circular economy strategy?
48. What are your views of the potential proposals we have outlined? What work could we progress or start immediately on a circular economy and/or bioeconomy before drawing up a comprehensive strategy?
49. What do you see as the main barriers to taking a circular approach, or expanding the bioeconomy in Aotearoa?

50. The Commission notes the need for cross-sector regulations and investments that would help us move to a more circular economy. Which regulations and investments should we prioritise (and why)?

51. Are there any other views you wish to share in relation to a circular economy and/or bioeconomy?

Transitioning key sectors

SUMMARY

The emissions reduction plan will include tailored measures to help industries maximise opportunities and transition. This section outlines the work underway and other possible measures for the following sectors:

- **Transport –** changing the way we travel, improving our passenger vehicles and promoting a more efficient freight system.
- **Energy and industry –** preparing our highly renewable electricity sector to power the low-emissions economy, moving away from fossil fuels, and speeding up industrial decarbonisation through fuel switching and energy efficiency.
- **Agriculture –** continuing to develop and adopt the technology and practices that keep this sector on track to meet the biogenic methane targets, and reduce long-lived emissions.
- **Waste and HFCs –** supporting the waste hierarchy, prioritising the reduction and diversion of waste from landfill (particularly organic), and reducing hydrofluorocarbons (HFCs) with high-global warming potential.
- **Building and construction –** reducing building-related emissions, and realising health or other co-benefits where possible.
- **Forestry –** establishing forest sinks that remove carbon from the atmosphere and promote biodiversity and wider environmental outcomes where possible.

Your views

We invite your feedback on:

- The new policies we are considering, or may consider, to meet emissions reduction targets. We would like to know if you think these are the right types of policies, if they go far enough, how any negative impacts of policies are best managed and what you think should be changed.
- Any other potential policies that we have not considered.

Transport

Why reducing emissions from this sector matters

Transport is our second-largest source of greenhouse gas emissions. It is responsible for:

- approximately 20 per cent of gross domestic emissions
- 43 per cent of total domestic CO_2 emissions.

We must set a pathway to a zero-carbon transport system by 2050.

To do this, the Climate Change Commission (the Commission) recommends reducing transport emissions by:

- 13 per cent by 2030
- 41 per cent by 2035 (compared to 2019).

This is equivalent to a 6.7 mega-tonne (Mt) reduction from 2019 levels.

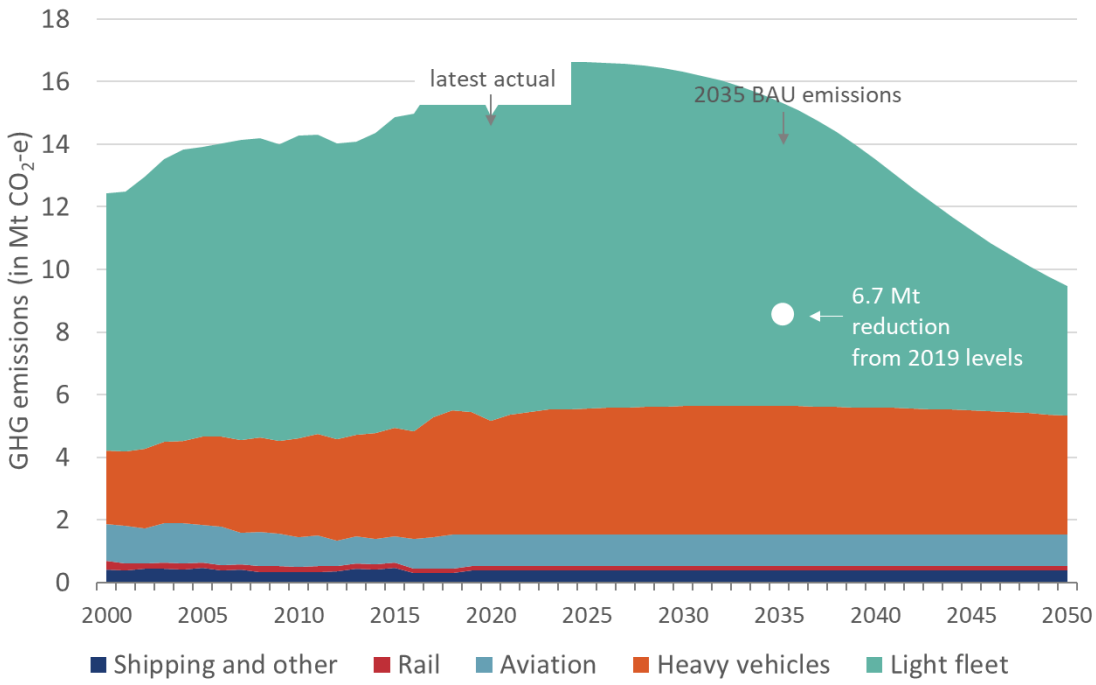
The scale of change to achieve these reductions and complete decarbonisation cannot be overstated.

Decarbonising transport also offers opportunities to improve the wellbeing of New Zealanders. Air pollution, crashes and congestion from traffic impose a large cost on our health, environment and economy. For many people and communities, transport is not affordable or accessible. The transition could make transport more inclusive, safe, healthy and resilient, and better support economic activity.

Almost every person and business relies on the transport system daily. Many difficult decisions and major investments are needed to create sustainable travel options for them. The Ministry of Transport forecasts that transport emissions will be nearly double where they need to be in 2035, unless we introduce major interventions to put us on a different pathway (see figure 4).

We need urgent, wholesale changes across the system to change this trajectory.

Figure 4: Ministry of Transport's emissions projections for transport



Previous consultation on reducing transport emissions

In May 2021, the Ministry of Transport released the discussion document *Hīkina te Kohupara – Kia mauri ora ai te iwi – Transport Emissions: Pathways to Net Zero by 2050* (*Hīkina te Kohupara*). This identified potential pathways and opportunities to phase out emissions across the transport system.

The consultation material in this section is based on advice from the Climate Change Commission, *Hīkina te Kohupara* and insights from feedback on *Hīkina te Kohupara.* Here we highlight our commitments and actions to reduce transport emissions.

How we plan to reduce emissions in the transport sector

The Commission recommends the Government focuses on three areas to reduce emissions from the transport system:

1. Reducing reliance on cars and supporting people to walk, cycle and use public transport.
2. Rapidly adopting low-emission vehicles and fuels[22].
3. Beginning work now to decarbonise heavy transport and freight.

We agree with these focus areas and have used them to guide our approach. They also align well with the Ministry of Transport's paper *Hīkina te Kohupara.*

Government must partner with iwi/Māori

Partnering with iwi/Māori to co-design and develop solutions to reduce our transport emissions is important. Submitters on *Hīkina te Kohupara* agreed a partnership is critical to address transport inequity across the transport system, notably for Māori.

Te ao Māori and Māori principles, such as rangatiratanga (leadership) and kaitiakitanga (guardianship) will inform co-design of policies. This will require active collaboration and partnering with iwi/Māori to understand the issues, find Māori-led solutions and develop proposals.

We will support iwi/Māori to fully engage on this co-design. This will include establishing regional groups and building enduring partnerships for ongoing policy design and development.

The Government's role in reducing transport emissions

We will need to use all our levers together in a concerted and coordinated way to achieve the scale and pace of change required. Our levers include:

- *The regulatory system* – including transport-specific laws, regulations, rules and standards, and changes to the resource management system so that urban planning supports lower emissions urban form.
- *Investment and funding* – including the Government Policy Statement on Land Transport (GPS-LT), which sets the Government's objectives for land transport investment, and Crown funding for transport initiatives.
- *Economic incentives* – such as fees and rebates to encourage the uptake of cleaner vehicles and fuels.
- *Leading by example and setting expectations* – such as public sector procurement requirements for electric buses and cars; and setting expectations that Crown agencies such as Waka Kotahi New Zealand Transport Agency (Waka Kotahi), Maritime New Zealand and the Civil Aviation Authority incorporate emissions reductions into their decision-making.
- *Partnerships* – such as the Urban Growth Partnerships programme, to align urban/transport planning and investments.
- *Behaviour change tools* – such as public communication campaigns, while recognising that the biggest barrier is often a lack of good transport options.

[22] We have amended this focus to include low-emission fuels to acknowledge that biofuels (and other low-emission fuels) will also play a role in reducing light vehicle emissions.

The role of local government, businesses, and communities

A combined effort from all New Zealanders is required to reduce emissions and build a healthy, safe and accessible transport system. Local government, communities, and business have a role to play alongside central government. This includes:

- *Local government* – which has a major role in planning and funding transport and urban development at a regional and local level. Bold decisions and strong collaboration with central government will be needed to ensure a joined-up approach to decrease emissions.
- *Private sector (businesses)* – a major investor and employer in transport. It also leads innovation which will shape our future. Certainty and early notice of decisions will help this sector consider how it can transition its businesses to zero emissions.
- *Communities* – grow the mandate for change and can make change happen. All New Zealanders have a stake in our transport system and can influence its direction. It can be supported by advocacy groups, for example, cycling and neighbourhood groups. Change will vary across communities and effort will be needed to ensure it serves all New Zealanders equitably.

Complementing the New Zealand Emissions Trading Scheme (NZ ETS)

The NZ ETS plays an important role, but it will not be enough to reach the net zero target. This will require other interventions to encourage travel reduction, mode-shift to lower emission modes, and cleaner technology. Although the cost of the NZ ETS on fossil fuel use for transport is ten times what it was five years ago, the impact on travel has been minimal – consistent with overseas findings.

Reliance on the NZ ETS alone to drive transport behaviour would likely require substantial increases in the price paid through the NZ ETS beyond the changes to the proposed auction ceiling price recommended by the Commission. For example, a recent study by Concept Consulting and Retyna estimated that relying on the NZ ETS alone to boost electric vehicle uptake would require a carbon price of $595.

To reinforce the impact of the NZ ETS, policies must:

- give greater certainty to businesses and households
- provide infrastructure
- address distributive impacts, lack of consumer information, and other non-price barriers.

Reducing emissions from transport infrastructure

This section addresses emissions from vehicle use. It does not cover embodied or operational emissions from infrastructure construction, maintenance and operation. In part this is addressed in the Building and construction section. However, a whole-of-life approach to transport emissions should consider emissions that arise from constructing and maintaining transport infrastructure – such as streets and roads, rail and ports. This also supports a circular economy.

From 2021 onwards, Waka Kotahi requires energy use and embodied emissions to be measured for all new improvement projects and maintenance contracts. Contractors are also expected to assess and plan to implement opportunities for improving resource efficiency. For selected projects, they must also demonstrate how these emissions are reduced compared to a business-as-usual approach. In addition, Waka Kotahi has a resource efficiency strategy, *Te Hiringa o Te Taiao*, with a longer-term vision that resources are used sustainably with

minimal environmental impact. This includes taking a stronger whole-of-life approach to reducing emissions and ultimately working towards a circular economy.

We are considering how to do this, including from aviation and maritime.

Overview

Table 6 shows our proposed approach to reducing transport emissions over the first three budget periods. This includes existing measures, such as the Clean Car Standard and Discount, and new measures.

Table 6: Steps to reduce transport emissions over first three budget periods

Focus area	Transport targets	Budget 1 (2022–25)	Budget 2 (2026–30)	Budget 3 (2031–35)
1. Reducing reliance on cars and supporting people to walk, cycle and use public transport.	1. Reduce vehicle kilometres travelled (VKT) by cars and light vehicles by 20 per cent by 2035 through providing better travel options, particularly in our largest cities.	Reduce emissions and support thriving cities and towns by integrating land-use, urban development and transport planning and investments. Provide New Zealanders with better travel choices by implementing already agreed mode-shift plans in our largest cities, in partnership with local government. Start planning for other urban areas. Ensure further investment for additional highway and road capacity for light private vehicles is consistent with climate change targets. This is to avoid encouraging further travel by private cars and light vehicles. Maintain a resilient road network, and when undertaking maintenance and repair activities consider how to repurpose assets for the best transport use, including active modes.	Implement mode-shift plans for other urban areas.	
		Support New Zealanders to use public transport, walk and cycle by making significant improvements to public transport services nationwide, and investing in walking, cycling and shared	Continue investment in mode-shift and street/road changes.	Continue investment in mode-shift and street/road changes.

Focus area	Transport targets	Budget 1 (2022–25)	Budget 2 (2026–30)	Budget 3 (2031–35)
		mobility. This include assessment of mass transport in Auckland, Wellington and Christchurch. Make public transport cheaper. Provide national direction to deliver a step-change in cycling and walking rates. Change regulation to make it easier for local government to reallocate road/street space rapidly for public transport, walking, cycling and shared mobility in urban areas, and create an expectation that this will occur. Engage with the public to build support for active and shared travel. Consider how to improve school travel to be more sustainable and healthier.		
		Reduce congestion and support emission reductions by enabling congestion pricing, and work with Auckland Council to implement it. Create a model that other councils can adopt, with emphasis on Wellington in this emissions budget period. Look at using other pricing tools to reduce emissions. Ensure regulation enables and encourages local government to use these tools. Investigate ways to raise revenue for transport in future, including to replace the land transport funding system. This will include revenue, funding, and pricing options, and how these may be used together.	Work with other centres with large populations on congestion pricing or other pricing tools. Consult on options to raise revenue for transport in the future.	Consider implementing new revenue model.

Focus area	Transport targets	Budget 1 (2022–25)	Budget 2 (2026–30)	Budget 3 (2031–35)
2. Rapidly adopting low- emission vehicles and fuels.	2. Increase zero-emission vehicles to 30 per cent of the light fleet by 2035.	Support New Zealanders to buy low-emissions vehicles by implementing the Clean Car Standard and Discount. Set maximum CO_2 limit for individual light internal combustion engine (ICE) imports. Implement community solutions to make low-emission transport options accessible for low-income New Zealanders. Work with industry on addressing supply constraints facing low-emission vehicles. Introduce a vehicle scrappage scheme to support low-income New Zealanders to shift to low-emissions transport. Introduce a sustainable biofuels mandate to reduce emissions from existing vehicles, and plan for large-scale rollout and investment in EV charging.	Continue to support uptake of zero-emission vehicles where suitable alternatives are available, and introduce measures to avoid New Zealand becoming a dumping ground for high-emitting vehicles rejected by other countries.	
3. Beginning work now to decarbonise heavy transport and freight.	3. Reduce emissions from freight transport by 25 per cent by 2035. 4. Reduce the emissions intensity of transport fuel by 15 per cent by 2035.	Create a National Freight and Supply Chain Strategy with industry to identify how to decarbonise freight transport, while improving the efficiency and competitiveness of our supply chain. Implement the New Zealand Rail Plan to foster resilience in the rail network and provide a platform for future investment for growth. Investigate ways to encourage greater use of coastal shipping. Support industry to buy low-emission heavy vehicles with standards and incentives. Work with the air transport industry on	Continue to support uptake of low-emission heavy vehicles. Begin implementing opportunities identified to reduce freight, rail, aviation, and maritime emissions.	

Focus area	Transport targets	Budget 1 (2022–25)	Budget 2 (2026–30)	Budget 3 (2031–35)
		opportunities to reduce aviation emissions, including investigating the feasibility of sustainable aviation fuels in New Zealand. Draw up a national action plan to reduce maritime emissions and set targets for low-emission shipping. Introduce a sustainable biofuels mandate. Plan for large-scale rollout and investment in EV charging infrastructure and investigate support for clean fuels.		

What we are doing now

We have already begun to lay the groundwork to reduce emissions. This includes the key policies we have already committed to, listed below.

Table 7: Key transport policies we have committed to

Policy	Purpose	Estimated emissions reduction for 2022–25
Clean Car Standard (implementation in 2022)	Support a cleaner vehicle fleet by improving the efficiency of imported new and used light vehicles. This will be strengthened over time.	74,700 tonnes[23]
Clean Car Discount (implementation underway)	Support New Zealanders to buy cleaner vehicles by addressing their high upfront cost through incentives. From 1 January 2022, a charge on high-emitting vehicles will apply at point of first registration in Aotearoa, to discourage purchase.	68,600 tonnes[24]
Transitioning to a low-emissions Government fleet (implemented)	Clean up the Government's fleet by reducing its number of vehicles, and choosing electric or hybrid vehicles unless operational requirements prevent this.	Already incorporated in the Clean Car package.
Low-Emissions Transport Fund (LETF) (scope and funding increased from 2021)	Support industries and groups to demonstrate and adopt low-emission transport technology, vehicles, innovation and infrastructure with co-funding.	Not available
Extending the light EV exemption from road user charges to 2024	Continue to encourage New Zealanders to buy light EVs.	25,300 tonnes

[23] Emissions reduction estimates are obtained using the Ministry's revised baseline with NZ ETS ceiling prices, obtained from the Ministry for the Environment based on the Climate Change Commission's final report *Ināia tonu nei: a low emissions future for Aotearoa*.

[24] Ibid.

Policy	Purpose	Estimated emissions reduction for 2022–25
Zero-emission vehicle (ZEV) mandate	Government has created a mechanism to ensure there are a minimum percentage of ZEVs in the imported light vehicle supply. This will be used if the Clean Car Standard and Discount do not prompt sufficient supply of ZEVs.	Not available
Extending heavy EV exemption from road user charges	To encourage businesses to buy heavy EVs, we are looking to amend current legislation (the Road User Charges Act 2012) to expand the length of time that heavy EVs are exempted from paying RUC and to enable differential charging based on fuel or emissions.	Not available
Decarbonising public transport	To reduce emissions and improve air quality in our towns and cities, we have committed to requiring only zero-emissions public transport buses to be purchased by 2025, and to a target of decarbonising the public transport bus fleet by 2035.	51,400 tonnes
The New Zealand Rail Plan (Rail Plan)	The Rail Plan lays out a 10-year vision to support increased investment and resilience in the rail network.	Not available
Coastal shipping investment	Allocates $30–45 million from the National Land Transport Fund to identify opportunities for coastal shipping and enable mode-shift to this lower emissions mode.	Not available
Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL)	Aotearoa will ratify this Annex in 2022 and apply new measures to reduce ship emissions. We have agreed to prepare a national action plan to reduce maritime emissions, and research ways to speed the uptake of alternative low- and zero-carbon fuels for shipping.	Not available

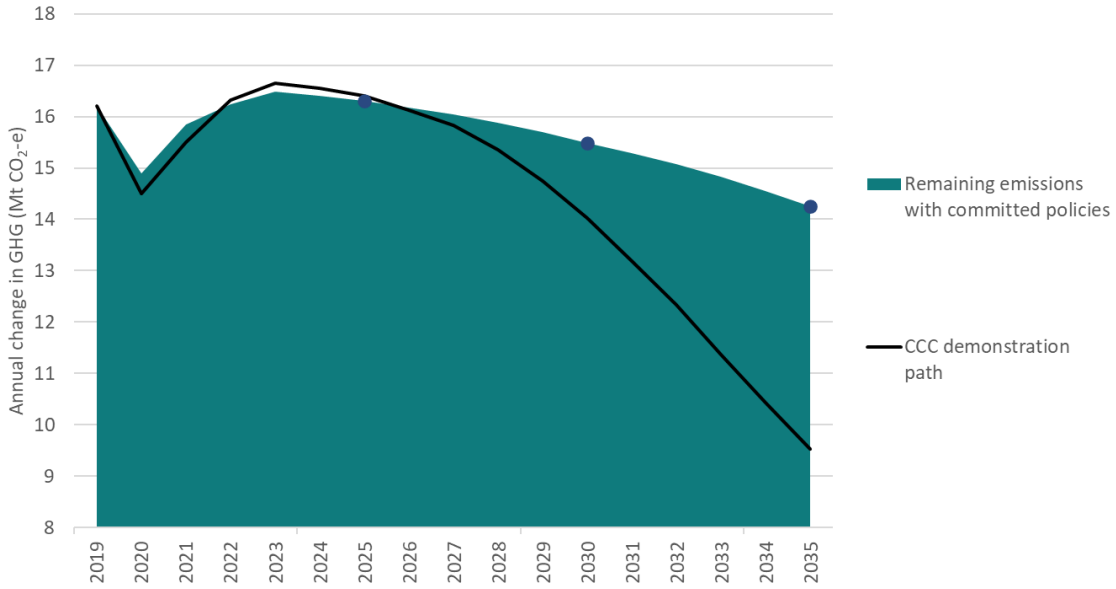
Transport is on track for the first budget period

Under high NZ ETS price conditions[25] the cumulative impact of the Clean Car package, progress on decarbonising the public transport bus fleet, and RUC exemption policies, is 0.22 Mt over the 2022–25 period. Along with changes in the vehicle fleet's profile and fuel efficiencies over time, these policies are estimated to achieve the change in emissions needed to meet the Commission's first emissions budget for transport (see figure 5). This is a good start and will also mean that more New Zealanders have access to low-emission vehicles, which are cheaper to run, and improve air quality.

However, these policies alone are not sufficient to achieve budget 2 and 3 (as shown by the Commission's demonstration path). This gap needs to be addressed with further action in the first budget period. Deferring action risks locking in emissions-intensive transport patterns that will make it even harder and more expensive to reduce emissions at the scale and pace required in the future.

[25] High ETS price conditions that were modelled by the Ministry of Transport reflect the price path used in the Climate Change Commission's modelling and are higher than the baseline ETS price settings

Figure 5: Transport emissions with committed policies



Potential measures

Significant new measures are required to put us on track to achieve the emissions reduction required from transport for budgets 2 and 3.

We are consulting on **four new transport targets**, which cover the key areas where change is required to put us on a pathway to zero carbon by 2050.

Four transport targets

1. Reduce vehicle kilometres travelled (VKT) by cars and light vehicles by 20 per cent by 2035 through providing better travel options, particularly in our largest cities.
2. Increase zero-emissions vehicles to 30 per cent of the light fleet by 2035.
3. Reduce emissions from freight transport by 25 per cent by 2035.
4. Reduce the emissions intensity of transport fuel by 15 per cent by 2035.

Achieving these targets will generate a 41 per cent reduction in transport emissions by 2035 from 2019 levels, as suggested by the Commission. It also means that New Zealanders will have better transport choices, cleaner and more efficient vehicles, and a safer and more resilient transport network. It will also have a significant impact on the liveability of our cities and towns, with less congestion and improved air quality.

Achieving these targets does depend on complementary policies, such as a strong ETS price, and changing the way we plan our towns and cities (see Planning). In addition to enabling sustainable transport choices now, immediate planning and investment is also needed to signal and start building the infrastructure needed to achieve deeper emissions cuts later.

To reach the targets, we must work with key partners to take some initial actions in the first budget period. Further actions, and refinement, will be needed in budget 2 and 3 depending on how we are tracking.

Focus 1: Reducing reliance on cars and supporting people to walk, cycle and use public transport

Transport target 1: Reduce vehicle kilometres travelled (VKT) by cars and light vehicles by 20 per cent by 2035 through providing better travel options, particularly in our largest cities.

The amount of travel that people do in fossil-fuelled vehicles is at the heart of the transport emissions challenge. We cannot rely on just decarbonising the vehicle fleet quickly. Offering better options and managing demand to reduce VKT by cars is vital. Most of this reduction must be in our largest cities, where people are more likely to have other choices.

Encouraging the uptake of public transport, walking, and cycling and managing demand on the transport network offers significant benefits beyond reducing emissions. This includes improved travel choice and accessibility, better health and safety, and less congestion.

This ambitious VKT target will require the Government to also address the broader systems that affect transport, such as urban development and land-use planning.

Initial actions

Integrate land-use, urban development and transport planning and investments to reduce transport emissions

To reduce transport emissions and support thriving towns and cities, we need to prioritise urban development in areas with frequent existing or planned public transport services. This was highlighted in the Planning section, which discussed how strategic planning and investment can reduce emissions by supporting medium- and high-density mixed-use development oriented around public and active transport. This requires better integration of land-use, urban development and transport planning and investments.

In the first budget period, we will:

- require transport emissions impact assessments for urban developments and factor these into planning decisions, with requirements to avoid, minimise and mitigate transport emissions impacts
- ensure that emissions reduction (through better urban form and the provision of transport infrastructure) is enabled through the reform of the resource management system, particularly the proposed Spatial Planning Act.

The transport system needs to complement and support this by ensuring that transport plans and future investments strongly prioritise travel by public transport, walking, and cycling. This applies to both existing and new urban areas. This will accommodate more people and businesses in our cities, without causing ever-increasing congestion and emissions.

Implement mode-shift plans for our largest cities and begin planning for other urban areas

The Commission recommends setting targets and implementing plans to substantially increase walking, cycling, public transport, and shared transport.

In the first budget period, we will provide New Zealanders with better travel choices by implementing the mode-shift plans we have for six of our largest/high-growth cities in

partnership with local government.[26] This includes Auckland, Tauranga, Hamilton, Wellington, Christchurch, and Queenstown.

At the same time, we will review how well aligned these plans are with meeting a national 20 per cent reduction in VKT by light vehicles by 2035. We will then revise the plans to ensure they reduce emissions at the scale and pace necessary to achieve the VKT target. Planning will also start for other urban areas.

The new and revised plans will set mode-shift targets for each urban area and prioritise:

- urban development in areas with frequent public transport routes
- using transport demand management approaches, alongside changes to the way we plan and manage urban form
- reallocating significant amounts of road/street space to rapidly deliver more dedicated bus lanes and safe separated bike/scooter lanes
- completing connected cycle networks
- more traffic-calming and low-traffic neighbourhoods
- improving footpaths/crossings for pedestrians.

The review of the resource management system and development of a more streamlined approach to strategic planning offers an important opportunity for the Government to improve the role and weight that Regional Land Transport Plans (RLTPs) carry in the transport planning system. To help give effect to regional spatial strategies and encourage a more strategic approach to the transport planning necessary to deliver mode-shift across a region, we will review how the role of RLTPs could be clarified and strengthened further. This will be an important tool in giving effect to mode-shift plans and other strategies developed by local government to deliver on mode-shift targets.

Improve the reach, frequency and quality of public transport

We need to provide New Zealanders with better public transport to achieve the VKT target. Most submissions on *Hīkina te Kohupara* supported increasing the share of travel by public transport in towns and cities.

Well-integrated networks of public transport services can significantly increase levels of access between communities, and are vital for connecting employers to labour markets, and individuals to social and economic opportunities.

Public transport can provide the backbone for our cities to grow in a way that avoids emissions from new development.

We also need to provide better travel choices in New Zealand's regions and rural areas, including by public transport. Too many parts of regional New Zealand are only accessible by private vehicle.

[26] Waka Kotahi NZ Transport Agency. Keeping cities moving. 2019. Wellington: Waka Kotahi NZ Transport Agency.

In the first budget period, we will:

- establish a clear set of principles for planning and funding different kinds of public transport, within and between towns and cities, to enable the development of a national public transport network
- progress towards delivery of Auckland light rail along the city centre to Māngere corridor; as signalled in the Auckland Transport Alignment Project, this will be the first of three new mass transit corridors in Auckland
- work with Auckland to agree a plan for the development of Auckland's rapid transit network for the next 30 years
- progress Let's Get Wellington Moving, including the delivery of bus priority measures and the planning of mass rapid transit
- progress work with local government in Greater Christchurch on a mass rapid transit network, together with increasing public transport capacity
- plan for and substantially increase investment in urban public transport nationwide; this includes commuter rail networks in Auckland and Wellington, and a major uplift in all urban bus networks
- deliver national integrated ticketing for public transport
- complete the review of the Public Transport Operating Model and implement any reforms to the planning and procurement of public transport
- develop clearer guidance on the viability of interregional passenger rail, coach, and bus services, and improve the way these projects are planned, funded, and delivered.

Provide national direction to deliver a step-change in cycling and walking rates

There are major opportunities to reduce emissions while also improving public health, and to make streets more inclusive for people, by making it safer and easier to travel by foot, bike/scooter, and other active modes. This was supported by the majority of submitters on *Hīkina te Kohupara*.

In the first budget period, we will:

- deliver a strategy to boost cycling, and a strategy to boost walking (recognising that cycling and walking are separate modes)
- substantially increase funding for cycling and walking improvements
- link new funding with clear expectations and funding criteria
- implement Accessible Streets proposals nationwide to support safe walking, cycling/scooting and other active modes
- provide support for local authorities to boost capabilities in designing and delivering cycling/scooting and walking improvements at speed.

Support local government to accelerate widespread street/road reallocation to support public transport, active travel and placemaking

Street/road reallocation, such as providing dedicated bus lanes and bike/scooter lanes, can be a quick and cost-effective way to support people to use public transport, or walk and cycle. Submitters on *Hīkina te Kohupara* strongly supported widespread street space reallocation to support walking, cycling, scooting and public transport. We need to support local government to make these changes.

In the first budget period, we will:

- make regulatory changes to streamline public consultation requirements and make it easier for councils to trial street/road changes that support travel by public transport, walking, and cycling, including low-traffic neighbourhoods.
- Work with Waka Kotahi to rapidly change streets nationwide that promote multimodal transport
- investigate changes to policy and funding settings to ensure that Waka Kotahi and road-controlling authorities maximise opportunities to 'build back better' when doing street renewals, to better utilise road space for multimodal transport
- give extra support for community programmes promoting street reallocation.

Making school travel greener and healthier

Making walking and cycling/scooting to and from schools safer for children can improve access, reduce road and parking congestion around schools, contribute to positive health outcomes, improve local air quality, and reduce emissions.

We will work with local government and private business operators to:

- improve walking and cycling infrastructure to/along school routes and in surrounding neighbourhoods
- explore dedicated active transport funding and/or education programmes to schools, including funding for school bike-leasing schemes or biking education classes.
- implement the Tackling Unsafe Speeds programme to reduce speed limits around schools and encourage active travel
- improve school bus services.

Improve access and travel choice for the transport disadvantaged

Low-income households spend a larger share of their budget on transport – particularly on their cars. They also tend to be in areas with poorer transport choice. In addition to poor environmental outcomes, the status quo is not providing safe, healthy or equitable access to transport for many. We must provide equitable access as part of the transition to a zero-emissions transport system.

In the first budget period, we will:

- improve public transport and active travel networks in low-income or low-socioeconomic areas (where appropriate, based on population size and distribution), and improving safety for walking and cycling
- monitor and respond to the impacts of transport policy actions on the accessibility and affordability of transport, particularly for lower income households and communities
- improve access and connectivity for people in social housing, investing in public and active transport and supporting car share, carpool, and shared bike/scooter schemes.

Reduce public transport fares

The Commission recommends reducing public transport fares, and many submissions on *Hīkina te Kohupara* called for lower cost public transport to make it more competitive with cars. For low-income people, the cost of public transport is a barrier, along with convenience and accessibility.

The Government is currently implementing a three-year Community Connect pilot of a 50 per cent concession to Community Services cardholders in Auckland and will consider rolling this pilot out across Aotearoa. The pilot will inform approaches to reducing public transport fares, focusing on low-income groups.

In the first budget period, we will work with local government to reduce public transport fares, with a particular focus on low-income users.

Investigate the potential for public transport, walking and cycling in rural and provincial areas

Public transport, walking and cycling are often not practical or viable in rural communities and provincial towns. Low and zero-emission vehicles will play a greater role here. However, there is more we can do. Several submissions on *Hīkina te Kohupara* highlighted the need for greater consideration of the role of public transport, walking and cycling in rural communities, and the importance of interregional connections.

In the first budget period, we will look at travel options for these areas, particularly for the transport disadvantaged. This could include better public transport to and between rural communities, shared transport/taxi schemes, and street improvements that make it safer to walk and cycle. We will also look at speeding up the rollout of on-demand public transport, noting positive signs from the MyWay trial in Timaru.

Enable congestion pricing and investigate how we can use other pricing tools to reduce transport emissions

The Commission recommends evaluating the role of pricing incentives for transport. *Hīkina te Kohupara* noted that a range of pricing mechanisms are integral to the transition, alongside changes to land use and investment in public transport.

Most of the submissions on *Hīkina te Kohupara* that commented on transport pricing agreed that it is an important way to change behaviour and reduce emissions. Several noted that pricing tools will affect vulnerable communities, so there is a need for good alternatives or other mitigations as they are implemented. Revenue must be used transparently.

Congestion pricing, and other pricing tools, can have significant benefits beyond reducing emissions. Reducing congestion in our major cities will support economic activity and save New Zealanders time and money.

In the first budget period, we will:

- progress legislation to enable congestion pricing in urban centres, and work with Auckland Council to implement the first phase of congestion pricing based on the Congestion Question report recommendation
- work with Wellington City Council and Wellington Regional Council in response to their requests for congestion pricing
- consider other pricing tools (such as parking management, low-emission zones, and incentives for using public transport, walking and cycling) for urban centres
- ensure regulation enables and encourages local government to use these tools
- look at ways to reduce the equity/distributional impacts of pricing tools

- investigate the potential of a mobility as a service platform, which incorporates the ability to offer subscription packages and incentive payments to encourage the uptake of low-emissions modes
- investigate how pricing can encourage mode-shift and reduce emissions, as part of the Ministry of Transport's review of the revenue system.

Require further roadway expansion and new highways to be consistent with climate change targets

Hīkina te Kohupara noted that central and local government will need to review investment in urban highways and road expansion. These projects could induce more private vehicle travel. Submissions on *Hīkina te Kohupara* supported this view and suggested that projects should only be funded if they help to reduce transport emissions.

For this reason, we will ensure further investments that expand roads and highways are consistent with climate change targets, and avoid inducing further travel by private motorised vehicles.

In cases where investment in additional network capacity may be warranted (for example, to connect a new medium-density housing area or to a new freight hub), it must be accompanied by parallel and integrated investments that avoid/reduce emissions. This includes, for example, investment in EV-charging infrastructure, road-space reallocation, and improvements to active travel networks and public transport options.

We will continue to maintain a resilient road network, including by managing and reallocating it for the best transport use. Adaptation to climate change will also drive different ways to build and maintain roads. Safety changes will continue.

Focus 2: Rapidly adopting low-emission vehicles and fuels

Transport target 2: Increase zero-emissions vehicles to 30 per cent of the light fleet by 2035

Two-thirds of transport emissions come from the light vehicle fleet.

Decarbonising the light vehicle fleet is critical for meeting our targets. We need to increase the supply of clean vehicles, support New Zealanders to buy low-emissions vehicles, and put the infrastructure in place for their use.

We recently brought in the Clean Car Standard and Discount. This is a significant step towards decarbonising light vehicles, especially those entering the fleet. We will need to take further action to achieve the target.

Initial actions

Implement community-based solutions to make low-emission vehicles (including e-bikes) more accessible for low-income New Zealanders, and others facing transport disadvantage

The upfront cost of low-emission vehicles is a significant barrier for lower income New Zealanders. The Commission recommended that the Government support EV leasing, purchasing and sharing schemes to improve equitable access. Several submitters on *Hīkina te Kohupara* supported initiatives to make these vehicles (including e-bikes and e-scooters) more accessible to low-income people and communities.

We will give extra support to implement community-based and Māori-led schemes to make low-emission vehicles (including e-bikes) more accessible – for example, social leasing, shared mobility schemes run by community/iwi/hapū, rent-to-buy or gradual payments, car and bike sharing.

Introduce measures to avoid New Zealand becoming a dumping ground for high-emitting vehicles

A growing number of countries have announced plans to phase out the production and import of ICE vehicles to mitigate climate change and improve local air quality. With many countries phasing out ICEs, there is a risk that unwanted ICEs will end up on our roads. Manufacturers will make choices on where to continue to send ICE vehicles based on government policies. Permitting more ICEs to enter our fleet will result in us retaining a legacy high-polluting fleet for a longer period of time, making it more challenging to achieve future emissions budgets.

Without additional measures, we will become a dumping ground for high-emitting vehicles rejected by other countries – with economic, environmental and health consequences.

Many submitters on *Hīkina te Kohupara* supported the Clean Car Standard and Discount, and the eventual phase out of ICE imports, provided reasonable alternatives are available.

The Climate Change Commission recommended setting a time limit on light vehicles with ICEs entering or being manufactured or assembled in Aotearoa as early as 2030. If adopted, there may be benefit in considering a split approach to this to ensure availability of vehicles. For example, from 2030 only plug-in hybrid electric vehicles and conventional hybrids with emissions under a set threshold could be imported, and from 2035 only zero-emission light vehicles could be imported.

Important details such as how or when this change should occur to effectively manage the transition need to be addressed. For example, to ensure people have access to the vehicle type they need, ICE vehicles should only be phased out if alterative zero-emission vehicles in the same vehicle class are available.

Set a maximum CO_2 limit for individual light ICE vehicle imports to tackle the highest emitting vehicles

To complement the Clean Car Standard and Discount, we are proposing a maximum CO_2 limit for individual light vehicles imported into Aotearoa. This would specify the grams of CO_2 per kilometre threshold for light vehicle imports. This would apply until made redundant by a phase out of light ICE vehicle imports.

The Clean Car Standard reduces the average vehicle emissions of the fleet of vehicles imported. However, it does not prevent highly polluting vehicles from entering the fleet, as it allows these vehicles to be offset by low-emission vehicles. The limitation of this approach is that the highest emitting vehicles tend to be driven more, which means they create significantly more emissions. The highest emitting light vehicles – with some exceptions – tend to be luxury vehicles rather than vehicles providing a significant productivity benefit over lower emissions options (for example, towing capability).

Investigate how the tax system could support clean transport options

Aspects of the current tax system may be creating financial incentives that could be working against reducing transport emissions. The Commission recommended that the Government

determine how the tax system be used to discourage the purchase of ICE vehicles and support the adoption of low-emissions vehicles.

Several submitters on *Hīkina te Kohupara* highlighted ways to encourage mode-shift and low-emission vehicles (including changes to the Fringe Benefit Tax). We are reviewing aspects of the tax system to ensure low-emissions vehicles and transport options are not disadvantaged.

Introduce a vehicle scrappage scheme to support low-income New Zealanders' shift to low-emissions transport

We are already ensuring the vehicles entering Aotearoa have progressively lower emissions. However, transport decarbonisation will stall unless low-income New Zealanders can buy them, or access them through convenient and affordable alternatives, like EV car-share services. We need measures in place to make sure all New Zealanders can benefit from the move away from high emitting vehicles.

To make quality cleaner vehicles more accessible, we will introduce a vehicle scrappage scheme for low-income New Zealanders, similar to California's Clean Cars 4 All initiative. This scheme could have income-tiered rebates, coupled with financial support for the installation of home EV charging. It could also offer financial incentives for people to opt for low-emission alternatives, such as bicycles, rather than replacing their vehicles.

Partner on solutions to supply constraints for low-emissions vehicles

The Commission recommends exploring bulk procurement of EVs. The supply of new and used low- and zero-emissions vehicles (light and heavy) is likely to remain tight in the 2020s. We are setting up a clean vehicle sector leadership group to tackle this issue alongside industry – finding new ways to aggregate, coordinate and communicate demand for vehicles. We will use this to find ways to improve the availability and price of low-emissions vehicles for New Zealanders.

Determine whether there are legislative barriers to the use of some types of low-emission vehicles

Globally there are different types of electric light vehicles that might be suitable for short-distance low-speed use, but current regulations do not permit their use on the road here. In the first budget period, we will determine how we can allow these vehicles into the national fleet, without unduly compromising safety or other objectives. This could include making amendments to the Land Transport Act 1998 and several land transport rules.

Focus 3: Beginning work now to decarbonise heavy transport and freight

Transport target 3: Reduce emissions from freight transport by 25 per cent by 2035

Reducing emissions from freight transport will be critical for achieving a 41 per cent reduction in transport emissions by 2035. Heavy vehicles, most of which are for freight, emit almost a quarter of our transport emissions.

We will work with industry to find the best ways to reach this target. In the short term, we will also speed up the decarbonisation of trucks and other heavy vehicles.

Initial actions

Accelerate the decarbonisation of trucks

The Commission recommends the Government support demonstration and pilot projects for low-carbon heavy vehicles and provide targeted support to increase their uptake. Several submitters on *Hīkina te Kohupara* noted the challenges and limited options for decarbonising heavy trucks.

In the first budget period, we will consider the options to reduce truck emissions, set out in the Ministry of Transport's Green Freight Strategic Working Paper:[27]

- fuel-efficiency standards for trucks
- more funding – for example, through the LETF – to support industry to purchase zero- and low-emissions trucks
- investment in infrastructure for green fuels and fast-charging heavy vehicles
- green freight procurement through third-party contractor rules for government activities.

We will also consult on using the RUC system to differentially charge by fuel type/emissions.

Develop a Freight and Supply Chain Strategy

The Commission recommends that the Government develop a national low-emission freight strategy. Several submitters on *Hīkina te Kohupara* underscored the challenges with decarbonising the freight system, and the need to consider the entire supply chain. We need to combine new investment with effective pricing, other incentives and planning.

In the first emissions budget, the Ministry of Transport will develop a Freight and Supply Chain Strategy with industry. This will provide a better understanding of the system and how it can help us reach several outcomes – including decarbonisation. This includes exploring ways to encourage mode-shift to rail and coastal shipping. We will then consider what actions we should take in the second and third budget periods.

Developing a freight and supply chain strategy will also highlight opportunities to improve the efficiency and competitiveness of the freight system.

As our capacity to build infrastructure will remain constrained, this strategy will also signal a long-term investment pathway for infrastructure that supports freight decarbonisation.

Implement the New Zealand Rail Plan (the Rail Plan) and investigate options to encourage greater use of coastal shipping

In April 2021 we committed to implementing the Rail Plan. This 10-year vision will foster resilience in the rail network, restoring rail freight and providing a platform for future investment for growth.

Rail contributes to national and regional economic growth, reductions in emissions and congestion, and has the potential to reduce road deaths and injuries, facilitate wider social benefits, and provide resilience and connection between communities.

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[27] Ministry of Transport. *Green Freight Strategic Working Paper*. 2020. Wellington: Ministry of Transport.

Implementation of the Rail Plan will be carried out the first and second budget period, with significant funding already allocated to rail. This investment will lay the groundwork to future investment or other interventions to support growth in rail freight in the third budget period. Moving freight to low-emissions modes such as rail will be a greater initial priority than improving their emissions performance.

There are also opportunities for significant mode-shift to coastal shipping. Waka Kotahi will invest in supporting coastal shipping, allocating $30–45 million over the next three years.

The Freight and Supply Chain strategy will explore further opportunities to support mode-shift to lower emissions freight modes.

Investigate ways to reduce aviation emissions[28]

The Commission recommends undertaking a detailed study into the use of low-carbon fuels for aviation. Submitters on *Hīkina te Kohupara* expressed a range of views on decarbonising aviation. Many called for more 'avoid' and 'shift' interventions to reduce flying. The aviation sector supported a public-private, cross-agency advisory body focused on aviation decarbonisation, and government investment in sustainable aviation fuel.

In the first emissions budget period, we will:

- work with the air transport industry to investigate the feasibility of sustainable aviation fuels in Aotearoa, to complement the Sustainable Biofuels Mandate
- support the establishment of an industry-led advisory body on decarbonising aviation
- develop the policy and regulatory settings required to support the development of zero-emission aircraft.

Coaches and trains are an alternative to interregional air travel in some places. Increasing the number, efficiency, and quality of such options could reduce emissions, as could communications technology. Investment in rapid rail could help to provide a replacement to interregional air travel for longer distances, however there are still likely to be a number of flights through domestic aviation, meaning improving its sustainability is also important.

Air travel connects us within Aotearoa and to the world. It also provides for people who can't use other modes for long-distance trips, for medical, business or other reasons. We must reduce the aviation fleet's emissions domestically and internationally.

Investigate ways to reduce maritime emissions[29]

The Commission recommends undertaking a detailed study into the use of low-carbon fuels for shipping. We have already agreed to draw up a national action plan to reduce maritime emissions. This will include looking at low-carbon and zero-carbon fuels, and the development of standards for shipping. We will need to work with the maritime sector to understand the challenges and opportunities to decarbonise shipping.

In addition, we will set the following targets for reducing maritime emissions:

- all new small passenger, coastal fishing, and recreational vessels to be zero emissions by 2035

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[28] This covers aviation for both freight and passengers.

[29] This covers maritime for both freight and passengers.

- all new large passenger, cargo and offshore fishing vessels to meet highest carbon intensity reduction, as set by the International Maritime Organization, by 2035
- work towards net zero-carbon shipping on key trade routes by 2035.

Transport target 4: Reduce the emissions intensity of transport fuel by 15 per cent by 2035

We need to take action to reduce emissions from the fuels used for transport. Lower carbon liquid fuels, such as biofuels, will play a role, alongside electrification, the use of hydrogen and other technology. Lower carbon liquid fuels are one of the best options for vehicles already in use, and for challenging modes such as aviation.

Introduce a sustainable biofuels mandate

As recommended by the Commission, we will introduce a Sustainable Biofuels Mandate to help overcome the cost and risk barriers facing biofuels. This will require liable fuel suppliers to reduce emissions of the liquid transport fuels they supply in Aotearoa by a set percentage each year.

Initially this will be through the supply of biofuels, though there is opportunity to expand the mandate to include other low-emissions fuels over time. We consulted on the mandate in June–July 2021. We will also consider additional support to encourage domestic production of biofuels, which would benefit regional economies.

Presently, the proposed emissions reduction targets are 1.2 per cent, 2.3 per cent, and 3.5 per cent for years 2023, 2024, and 2025 respectively. These initial percentages have been kept purposefully low to allow fuel suppliers time to adapt to the mandate, and to source and establish reliable sources of sustainable biofuels supply.

Raising these annual emissions reduction targets over time would generate further emissions reductions from transport fuels. Setting a higher level of ambition will require careful consideration of biofuels supply, including reliable feedstock sources. The Government will work closely with industry and fuel suppliers to ensure sustainable biofuels will be deployed to maximum benefit.

Produce a national EV infrastructure plan[30]

Rapid uptake of EVs will rely on the infrastructure being in place to support them. The Commission recommended enhancing the rollout of EV-charging infrastructure. Many submitters on *Hīkina te Kohupara* expressed concerns about charging infrastructure for EVs.

The Ministry of Transport, Ministry of Business, Innovation, and Employment (MBIE), the Energy Efficiency and Conservation Authority (EECA) and Waka Kotahi are drawing up a national EV infrastructure plan. This will:

- serve the 30 per cent of the light vehicle fleet that we expect to be zero-emissions by 2035
- give consumers confidence to switch to low- and zero-emissions vehicles.

We have already co-funded many rapid/fast public charging stations, forming a nationwide network for the current EV fleet. The expanded LETF will support this rollout.

[30] This covers infrastructure for both light and heavy vehicles.

As we achieve mass uptake of light EVs, we will need further investment and regulation to ensure good access to charging infrastructure. Another consideration is providing information and direction to inform required upgrades to the electricity network.

The plan will also consider whether requirements for EV charging infrastructure should be included in new developments. Continued work is also required on standards, information, and payment systems to ensure interoperability across the EV network.

Cross-cutting measures

Develop a strong evidence base

Government will invest in widening the evidence base to support the equitable transition to a zero-carbon transport system, and ensure these policies and measures are effective in the Aotearoa context. A better understanding of travel accessibility, preferences and behaviour across all user groups and modes will aid the development, assessment and modelling of future policies. The evidence base will support the monitoring and evaluation of the future state, to understand the impact of policies. This base will be integral to shaping current and future policies.

We are also consulting on a proposed mandatory energy and greenhouse gas emissions reporting scheme to address current data gaps on New Zealand's energy use and associated emissions. The proposed scheme would require large energy users including transport companies to report their energy use and associated emissions to Government and the public. More information about the proposed scheme and consultation questions can be found in the Energy and Industry chapter.

Embed long-term planning

Transport investments have long lives that affect our communities. We will set a longer-term planning horizon, with a pipeline that can change when needed. This will give greater confidence that we're on a path to eliminate emissions and achieve other goals.

The Ministry of Transport is using the Generational Investment Approach to guide planning through to 30–50 years out. It is applying this with partner agencies, through cross-system strategies such as the National Supply Chain and Freight Strategy.

Information and education to support change

Transport will be one of the first areas to make significant changes to reduce emissions. This will affect our people, communities and businesses nationwide. We will invest in information and education to support and encourage people and businesses to change their behaviour, while recognising that the biggest barrier is often a lack of good transport options. We will work across sectors to ensure consistent messages and actions.

Skills and capability

People in the transport sector will need to develop new skill sets, and in some cases, retrain. For example, we expect a need to upgrade skills and capacity in high-end engineering, modelling and analysis, and changing skills in automotive trades and services. We will signal what the transport workforce might look like, and work with industries to plan for transitions.

Making an equitable transition

The current transport system is inequitable. Māori, Pasifika, disabled people, lower income households, older people, children, and rural communities are often underserved. They are also overburdened by related impacts such as deaths and serious injuries from transport, and air and noise pollution.

There are major opportunities to make society more inclusive and equitable, by transitioning to a zero-carbon transport system. By 2050 most urban residents, including those in social housing, could live within walking/biking distance of schools, shops, parks, and amenities. They could have good access to convenient public and shared transport for longer trips, such as to/from jobs and to visit whānau.

Many people and products will still travel by cars, vans, trucks and other vehicles. However, people and businesses will not be vulnerable to fluctuating oil prices and higher petrol prices. Cleaner vehicles will reduce air and noise pollution, reducing the disease burden on many communities.

While the vision for transport in 2050 is generally positive, specific effort will be needed to make this transition an equitable one. We must ensure that transport/access is still affordable. Cleaner vehicles will become more affordable over time, supported by initiatives to speed their uptake. We will also need to support community solutions to make low-emissions vehicles more accessible for low-income New Zealanders.

To progress some pricing tools, such as road/congestion charging, we must help communities to access a range of affordable low-emissions transport options. We will consider redirecting revenue from emission-lowering interventions into subsidies for disadvantaged groups, to help them afford lower emission alternatives.

We may need to consider interventions that go beyond the transport system. For example, locating social housing in urban areas well served by public transport, making school bus services (procured by the Ministry of Education) available for more students in remote/rural areas, and broader initiatives to reduce poverty and increase household income for low-income people.

We will also seek to mitigate the distributional impacts on different sectors and industries, including energy, agriculture, freight and tourism. We will help industries to adapt and overcome the challenges of the transition, and to capitalise on opportunities.

Impact on emissions

Figure 6: Potential emission reductions for each focus area, compared to 2019

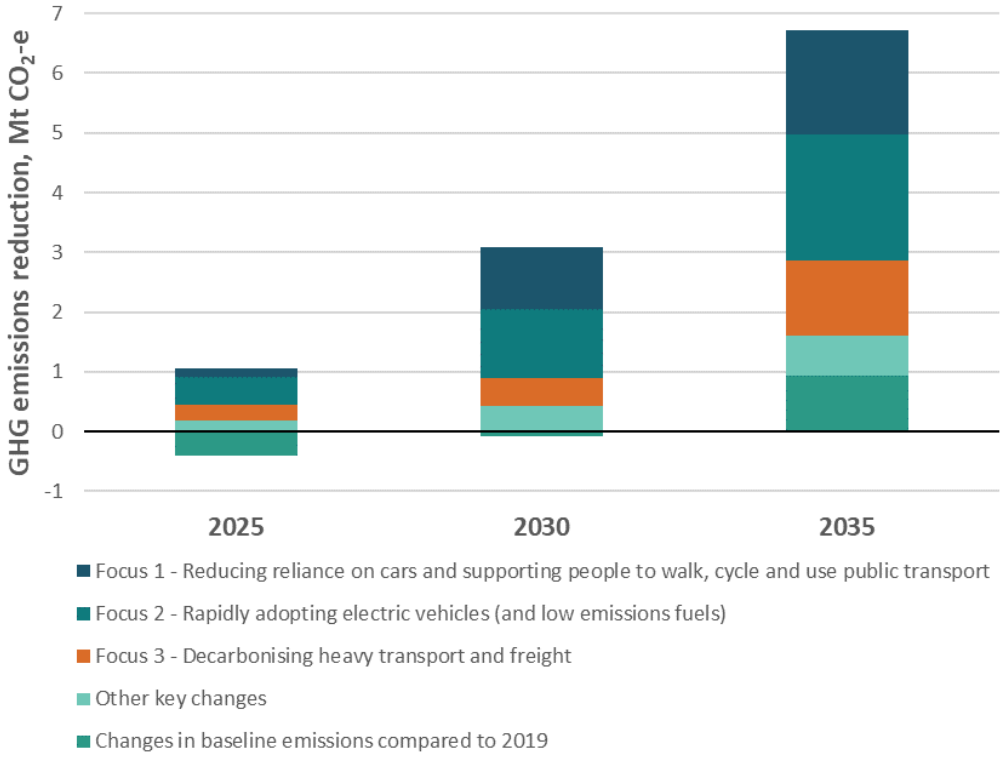


Figure 6 illustrates how each focus area can contribute to achieving a 41 per cent reduction in transport emissions by 2035 (or 6.7 mega-tonne reduction) from 2019 levels.

Baseline changes include the effects of growth in the vehicle fleet and electrification of the vehicle fleet under business as usual. Other key changes include the impact of the NZ ETS price on electrification and travel. Focus areas 2 and 3 both include the impact of alternative fuels (for example, biofuels).

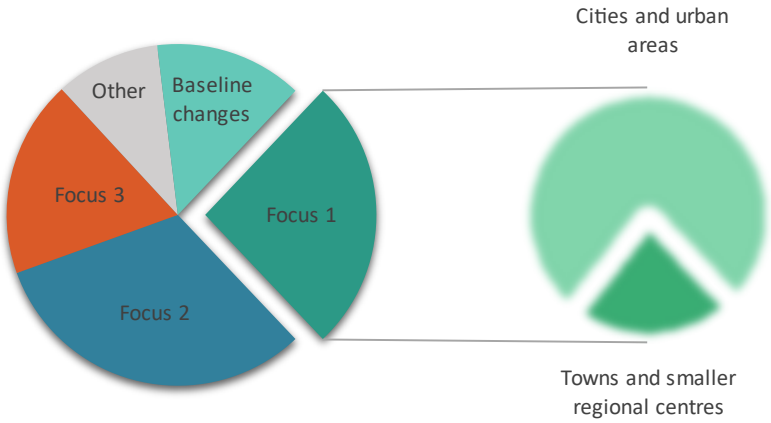
Achieving this level of emission reduction will require significant and sustained action across all focus areas.

Focus 1 – Reducing reliance on cars and supporting people to walk, cycle and use public transport

When it comes to reducing reliance on cars and supporting people to walk, cycle and use public transport, we support taking a place-based approach. Each place in Aotearoa is unique, with different requirements and potential to support mode-shift and reduce VKT by light vehicles. Local government is often best placed to make the decisions that will deliver the practical changes required, as well as ensuring local communities and businesses are engaged.

Our cities – particularly our largest- and fastest-growing cities – will need to contribute more to reducing VKT by light vehicles. This is because it is more viable to support people in cities to walk, cycle and use public transport (as illustrated below in figure 7).

Figure 7: Focus 1 – the potential relative contribution of cities and urban areas vs towns and smaller regional centres to reducing VKT by light vehicles by 2035



We will work with local government to implement mode-shift plans for each major urban area that include targets to rapidly increase walking, cycling, public and shared transport. While each plan will differ depending on the requirements of each place, they will need to align with meeting a national target to reduce VKT by light vehicles by 20 per cent by 2035. We will support these plans with significant investment and regulatory changes.

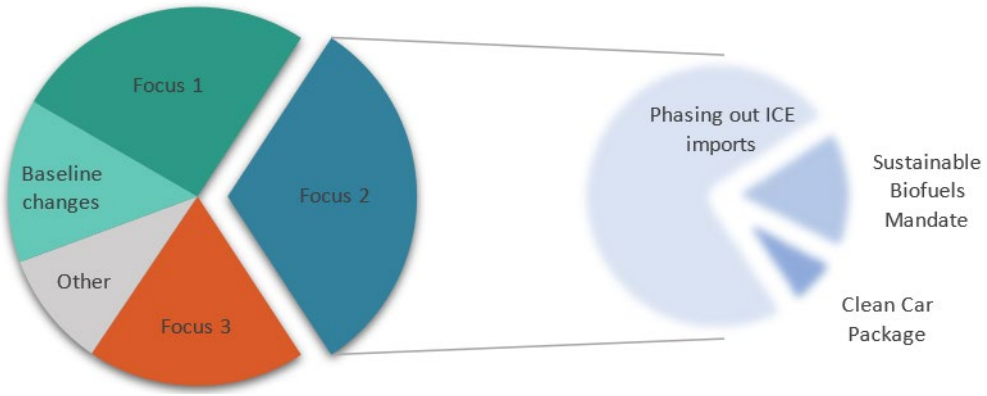
Key assumptions

- We have made assumptions about the impact land-use changes (such as increasing the mix and density of urban development), public transport, walking and cycling improvements, and pricing mechanisms (such as congestion pricing) can have on the way people travel. This is based on research used in *Hīkina te Kohupara* and what we heard from submissions.
- We have assumed that cities have more opportunity and will take more action to support mode-shift and reduce VKT by light vehicles. We have acknowledged in these estimates that more rural areas have limited opportunities to reduce light vehicle travel.

Focus 2 – Rapidly adopting low-emission vehicles and fuels

Most of the emission reduction required for Focus 2 can be achieved through implementing the Clean Car package, introducing measures to avoid New Zealand becoming a dumping ground for high-emitting vehicles rejected by other countries, and introducing a sustainable biofuels mandate (figure 8 illustrates what this split could look like). However, additional measures are required to ensure these actions are effective and deliver equitable access. This includes investment and support for EV-charging infrastructure, which will give consumers confidence to switch to low-emission vehicles, and targeted support to make low-emission vehicles accessible for low-income New Zealanders.

Figure 8: Focus 2 – the relative impact of actions to decarbonise light vehicles on emissions by 2035



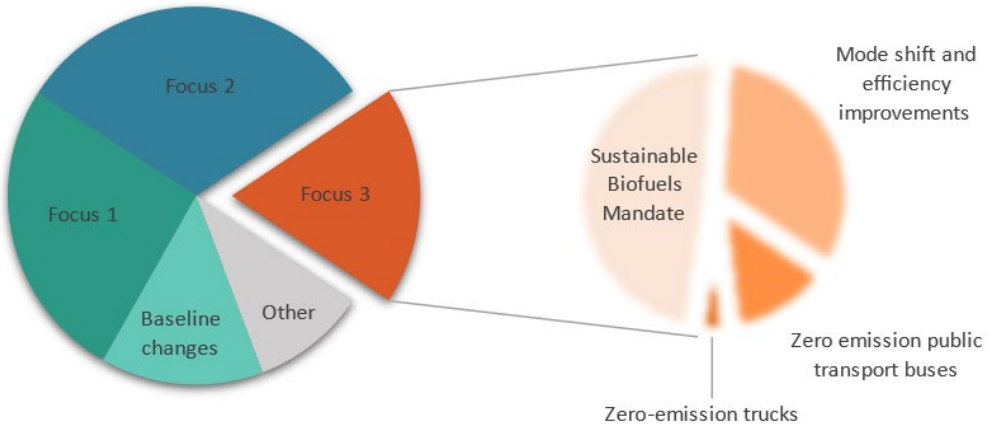
Key assumptions

- The impact of Focus 2 is based on achieving a 20 per cent reduction in VKT by cars and light vehicles by 2035 (as outlined in Focus 1). This reduces the number of light vehicles and the amount of fuel that we need to decarbonise.
- The supply of low-emission vehicles in Aotearoa matches the demand created by these actions.
- The impact of the sustainable biofuel mandate may be split differently between light and heavy vehicles. The mandate is an emissions-targeted mandate, which means that fuel suppliers can meet the target through replacing any fossil fuel consumed domestically with biofuel to achieve the targeted emissions reduction. As a result, we may see more emissions reductions from biofuel for light vehicles and fewer reductions for freight transport – or vice versa.

Focus 3 – Decarbonising heavy transport and freight

Significant emission reduction will be achieved for Focus 3 through introducing the sustainable biofuels mandate (figure 9 illustrates the potential approximate source of emissions reductions for focus 3). The development of a freight and supply chain strategy with industry will help to identify the best options for reducing the remaining emissions. We have assumed this will be a combination of decarbonising trucks (for example, increasing the uptake of electric or hydrogen trucks), mode-shift to rail and coastal shipping, and efficiency improvements. In addition, public transport bus electrification will play an important role, as the size of the fleet grows to cater for more public transport use.

Figure 9: Focus 3 – the relative impact of actions to decarbonise heavy transport and freight on emissions by 2035



Key assumptions

- We have made assumptions about the level of emission reductions that can be achieved through increasing the uptake of low-emission trucks, improving efficiency, and shifting freight to rail and coastal shipping. This is based on what we heard from submitters on *Hīkina te Kohupara*. The strategy will help us to work with industry more closely on what the best options are to reduce emissions from freight transport.
- As noted in Focus 3, the impact of the sustainable biofuel mandate may be split differently between light and heavy vehicles. The mandate is an emissions-targeted mandate, which means that fuel suppliers can meet the target through replacing any fossil fuel consumed domestically with biofuel to achieve the targeted emissions reduction. As a result, we may see more emissions reductions from biofuel for light vehicles and fewer reductions for freight transport – or vice versa.
- Maritime and aviation emissions are not included in these estimates. However, we have included several actions to begin reducing emissions from these sectors.

QUESTIONS

We are proposing **four new transport targets** in the emissions reduction plan, and are seeking your feedback.

52. Do you support the target to reduce VKT by cars and light vehicles by 20 per cent by 2035 through providing better travel options, particularly in our largest cities, and associated actions?
53. Do you support the target to make 30 per cent of the light vehicle fleet zero-emissions vehicles by 2035, and the associated actions?
54. Do you support the target to reduce emissions from freight transport by 25 per cent by 2035, and the associated actions?
55. Do you support the target to reduce the emissions intensity of transport fuel by 15 per cent by 2035, and the associated actions?
56. The Climate Change Commission has recommended setting a time limit on light vehicles with internal combustion engines entering, being manufactured, or assembled in Aotearoa as early as 2030. Do you support this change, and if so, when and how do you think it should take effect?
57. Are there any other views you wish to share in relation to transport?

Energy and industry

Why reducing emissions from energy and industry matters

The energy and industry sectors are important for our lives and our economy, from providing electricity to light and heat our homes and workplaces, to providing the heat to produce steel for building our homes, factories and offices. Their performance affects the prices and quality of many goods and services we use on a daily basis, and the competitiveness of businesses.

Aotearoa is well positioned to tackle emissions in the energy and industry sectors due to our high level of renewable electricity – but we must do more. Speeding up the rollout of renewable electricity generation will be a key factor in replacing fossil fuels in other sectors. Improving energy efficiency, scaling up provision of low-emissions energy sources such as bioenergy and hydrogen, and managing the phase down of fossil fuel use will also be crucial to achieving our net-zero target by 2050.

As the sectors transition over the next 30 years, we must ensure that:

- energy remains accessible and affordable to support the wellbeing of all New Zealanders
- energy supply is secure, resilient and reliable throughout the transition and beyond
- energy systems support economic development and productivity growth aligned with the transition.

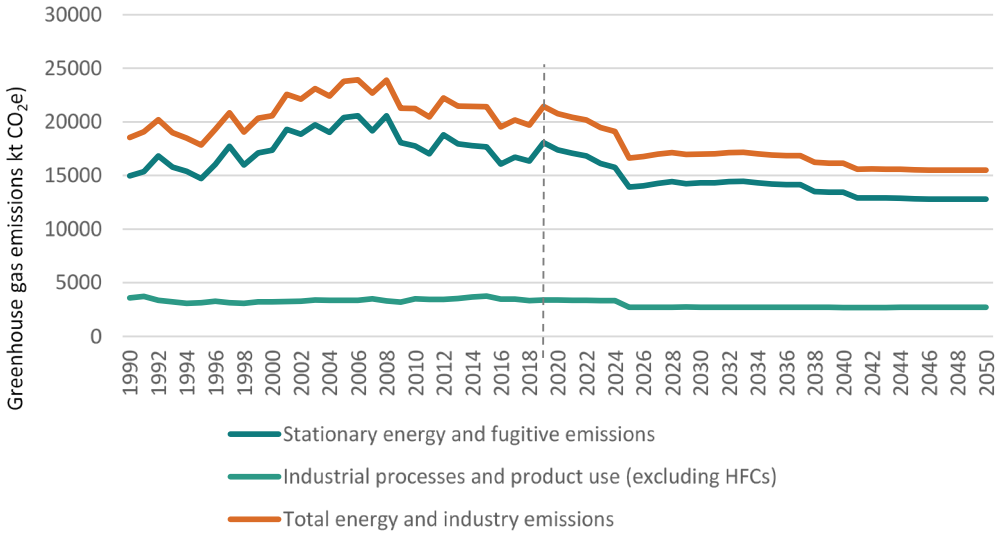
A combined effort from all New Zealanders is required to reduce emissions and build a secure, affordable and sustainable energy system that supports our wellbeing. Government, businesses and communities all have an important role to play.

In 2019, emissions from these sectors made up 26 per cent of our total gross greenhouse gas emissions. This includes:

- emissions from stationary energy combustion, including from electricity generation, process heat, and residential and commercial energy use (19.8 per cent total greenhouse gas emissions)
- fugitive emissions, including from oil and gas venting and flaring, and geothermal operations (2.1 per cent of total greenhouse gas emissions)
- emissions from industrial processes and product use (IPPU), including production of aluminium, cement and steel but excluding hydrofluorocarbons (HFCs) (4.1 per cent of total greenhouse gas emissions).

These emissions are projected to decrease by 22 per cent from 2019 levels by 2025, 21 per cent by 2030, and 21 per cent by 2035 (figure 10).[31]

Figure 10: Emissions from the energy and industry sectors



How we plan to reduce emissions in these sectors

What we are doing now

The NZ ETS is a key mechanism to reduce emissions in these sectors. A rising carbon price discourages fossil fuel use, through energy efficiency improvements and fuel switching.

Other measures aim to reduce emissions in areas that are not responsive to emissions pricing due to market or other barriers, to unlock co-benefits, and to address the distributional impacts of the transition.

The Government's renewable energy strategy work programme (including consultation on MBIE's *Accelerating Renewable Energy and Energy Efficiency* discussion document) has guided work including promoting decarbonisation and investment in renewable electricity generation.

[31] The stationary energy emissions projection is from MBIE's updated Electricity Demand and Generation Scenarios (EDGS). Since the release of the EDGS in 2019, MBIE has updated the EDGS's Reference scenario to incorporate the impact of COVID-19 in the 2021 projection. This updated projection will be published in *Energy in New Zealand 2021* (forthcoming). The non-energy emissions projection for industrial processes and product use is provided by the Ministry for the Environment.

Initiatives include:

Supporting businesses and industry to decarbonise

- The $70 million Government Investment in Decarbonising Industry Fund (GIDI) provides funding to support the adoption of energy efficiency and fuel switching to renewable technologies in industry, including electrification and bioenergy. It aims to accelerate industrial heat decarbonisation to catalyse adoption of low-emission technologies, and to contribute to the COVID-19 recovery. Sixteen projects received co-funding from the first round of the GIDI fund to help transition away from fossil fuels. Together, they will make emissions reductions of 3.8 Mt CO_2e over their lifetimes, the equivalent of taking 62,500 cars off the road.
- EECA business support programmes help businesses and large energy users reduce emissions through providing technical advice and energy services (including energy audits, feasibility studies and support for energy graduates) and co-investing with industry.
- Technology demonstration funding co-invests with businesses to pilot innovative energy and carbon-saving technologies and process improvements that are yet to be widely adopted in New Zealand.
- The Energy Transition Accelerator partners with large businesses on customised transition plans to identify investments and actions they can take to reduce emissions.
- The Sustainable Business Network and EECA Climate Action Toolbox assists small and medium enterprises to act on climate issues.
- EECA's Sector Decarbonisation Programme will support other (non-large emitting) businesses, starting with a pilot with Horticulture NZ.

Accelerating the uptake of energy-efficiency measures and technology

- EECA's GenLess campaign mobilises businesses, communities and individuals to adapt, innovate and undertake actions to reduce their emissions.
- The Warmer Kiwi Homes programme offers insulation and heating grants to homeowners either living in areas identified as low income or who have community services cards. This allows energy to be used more effectively to maintain warmer, dryer homes, and also unlocks significant health benefits.
- Product regulations create a national system for regulating the energy efficiency of appliances and equipment sold in Aotearoa. We recently consulted on a range of proposals to enhance the energy efficiency regulatory system.

Supporting development and use of low-emissions fuels

The Government:

- has developed *A Vision for Hydrogen in New Zealand* to outline potential uses of hydrogen in Aotearoa and explore issues around hydrogen use
- supports hydrogen demonstration projects
- is developing international partnerships, including with Japan and Singapore
- is actively working to ensure that current regulatory settings are fit for purpose to advance the hydrogen industry and support our climate change response
- recently consulted on a sustainable biofuels mandate (transport), and is developing a Forestry and Wood Processing Industry Transformation Plan (forestry)

- supports industries and groups to demonstrate and adopt low-emission transport technology, vehicles, fuels, innovation and infrastructure with co-funding from the LETF.

Potential and proposed measures

A New Zealand Energy Strategy

Once the emissions reduction plan is in place, we will develop an energy strategy to consider priorities, challenges and opportunities for a successful transition. This is in line with the Climate Change Commission's recommendation for a strategy to decarbonise the energy system and ensure the electricity sector is ready to meet future needs, and responds to suggestions from the energy sector to draw various pieces of work together into an overarching strategy.

The Commission recommended that a strategy:

1. sets targets for the energy system
2. ensures access to affordable and secure low-emissions electricity for all consumers
3. manages the phase out of fossil fuels (including planning for the diminishing use of fossil gas in the energy system, and phasing out coal for electricity generation).

This strategy will need to be considered alongside the Commission's other recommendations (such as a bioeconomy strategy and a plan for decarbonising industry), and existing strategies such as the New Zealand Energy Efficiency and Conservation Strategy (NZEECS).

A first stage will be to determine what an energy strategy could address and how it would define a pathway, as we make the 30-year transition towards our 2050 target. We seek your feedback on this.

Setting targets for the energy system

The Commission has recommended setting a target of 50 per cent of all energy consumed coming from renewable sources by 2035 and treating the existing target of 100 per cent renewable electricity by 2030 as aspirational. The Commission also suggested that the Government could consider replacing the renewable electricity target with a goal of 95–98 per cent renewable electricity by 2030.

The aspirational target of 100 per cent renewable electricity will be reviewed in 2025 before the second emissions reduction plan is put in place. Ultimately Aotearoa will need to move to a more renewable electricity system as we head towards our 2050 target. A review in 2025 allows time for additional information on potential solutions to the dry year challenge identified through the New Zealand Battery Project.

We acknowledge the importance of reducing emissions in the broader energy sector, including through the use of electricity to decarbonise other sectors' energy uses, and increasing the use of low-emissions fuels such as bioenergy and hydrogen. We agree there is merit in setting a renewable energy target, to track progress in the broader energy sector. We seek your feedback on a renewable energy target.

Preparing the electricity system for future needs

The Commission has made a range of recommendations for a low-emissions electricity system that is fit for evolving technology, and for a fast-paced build of low-emissions electricity generation and infrastructure.

The Electricity Authority is seeking feedback on issues relating to the best regulatory environment for the distribution sector to invest efficiently to support the transition to a low-emissions system. Government will also address other potential barriers to connection and operation of more renewable electricity generation, and new demand to the electricity transmission and distribution networks. This is to ensure settings enable independent and distributed generation.

The New Zealand Battery Project is investigating the feasibility of options to manage or mitigate 'dry year' risk in a highly renewable electricity system, and move towards 100 per cent renewable electricity. Phase one investigation is underway. Further work on a second phase would relate to design of preferred options once phase one is completed.

We will also consider whether the existing electricity market can support a shift to a more renewable system over time. Retiring fossil fuel power stations in an orderly fashion will be critical to reducing emissions and maintaining a secure supply of electricity. In line with this work:

- the Government has a manifesto commitment to ban the building of new thermal baseload electricity generation, and will be looking at how we can transition in a managed way to a fully renewable electricity system
- the Electricity Authority's Market Development Advisory Group (MDAG) has commenced a project investigating price discovery in the wholesale electricity market under a 100 per cent renewable electricity supply, including determining how the wholesale market will operate, reservoirs will be managed and how efficient investment in new generation will be enabled by the market
- to support the 2050 emissions target and the 2030 renewable electricity target, the Electricity Authority is investigating how to ensure the electricity system remains stable, secure and resilient over coming decades
- the Authority is also progressing reform to transmission and distribution pricing to enable efficient operation of, and investment in, network infrastructure supporting electrification and renewables development.

We are also reviewing the National Policy Statement for Renewable Electricity Generation (NPS-REG) and other national direction instruments to help accelerate the development of renewable electricity generation.

Low-emissions fuel options could also be considered to help reduce fossil fuel use in the electricity sector, as discussed below.

Phasing out fossil gas while maintaining consumer wellbeing and security of supply

Under its recommendation to develop an energy strategy, the Commission specifically recommended creating a plan for managing the diminishing role of fossil gas across the energy system, covering associated consequences for network infrastructure and workforce during the transition.

Our energy supply chains are complex and interrelated. As we consider phasing out the use of gas and associated infrastructure it will be important to ensure the method and speed of transition maintains security of energy supply and prevents adverse or unexpected effects on consumers.

The Gas Industry Company has been investigating whether gas market settings are fit for the transition.[32] Industry-led work is also underway, including the Gas Infrastructure Futures Group, and a Green Gas Certification System.

The development of a plan for managing the diminishing role of fossil gas could provide direction to the gas sector, industry users and other consumers. We seek your views on the outcomes, scope, timeframes and approach to the development of a plan for managing phase out of fossil gas.

We are working to reduce building-related emissions through the Building for Climate Change programme. The Commission's recommendation to set a date to end the expansion of fossil gas connections in buildings is considered in the next section, Building and construction.

Decarbonising industry

We recognise that all fossil fuel use in industry and buildings must reduce. The Government could look to accelerate our financial support for the decarbonisation of process heat by expanding existing investment programmes, such as the GIDI fund.

We are developing national direction for industrial greenhouse gas emissions under the Resource Management Act 1991 (RMA). Proposals for this national direction include developing nationally consistent rules to decarbonise process heat by banning new low- and medium-temperature coal boilers installations and phasing them out by 2037, reducing use of other fossil fuels in process heat, and requiring some industrial sites to have emission plans.

We are also considering an energy and emissions reporting scheme for large energy users, to address current data gaps on our energy use and associated emissions.

The Commission recommended developing a plan to decarbonise industry, and to speed up the switch to low-emissions fuels for process heat. We seek your feedback on next steps for drawing work programmes together – for example, either:

- a standalone plan as recommended by the Commission
- as part of developing an energy or bioeconomy strategy
- through the review of the NZEECS.

The Commission also recommended setting a timetable for phasing out fossil fuels for boilers. The Government recognises that all fossil fuel use in industry and buildings needs to reduce. In the first budget period, we will consider setting a timetable for the phase out of fossil fuel use in boilers, alongside other work relating to phasing out of fossil gas (as outlined above) and use of fossil fuels in buildings.

We will be looking at approaches to hard-to-abate industries in the context of broader economic development, New Zealand's resource needs and an equitable transition.

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[32] Gas Industry Company Limited. 2021. *Gas market settings investigation consultation paper*. Wellington: Gas Industry Company Limited.

Addressing current data gaps on energy use in Aotearoa and associated emissions through an Energy and Emissions Reporting scheme

We are proposing a mandatory energy and greenhouse gas emissions reporting scheme for large energy users. The proposed scheme would require those users to report their energy use and emissions to government and the public.

The proposed scheme will provide information to businesses, the Government and the public to monitor energy sector progress towards emissions targets. The information could be used to develop opportunities for emissions reductions, and to design meaningful and evidence-based policy interventions for ongoing emissions reduction.

The current proposal includes a suggested reporting threshold of 1 kt CO_2e. This threshold would capture large energy users across stationary energy entities and their transport emissions (for example, Fonterra and its truck fleet), commercial entities (for example, large retail companies and airports), and transport companies such as road freight, coastal shipping and tourism helicopter operators. Approximately 200 industrial and commercial (stationary energy) companies could meet this proposed threshold. The proposed scheme was originally consulted on as part of a package in Accelerating Renewable Energy and Energy Efficiency in December 2019, referred to as Corporate Energy Transition Plans (CETPs)[33]. However, that consultation was not targeted at the transport and commercial sectors. To ensure all stakeholders have an opportunity to comment on the sectoral coverage of the scheme, we seek your views on how the proposed scheme would affect these sectors.

Key design features of the proposed scheme will be set through regulations rather than through primary legislation. This will involve further consultation in 2022 on matters such as methods, protocols and frequency for reporting information.

Supporting development and use of low-emissions fuels

In addition to renewable sources such as wind, solar, hydro and geothermal electricity generation, use of low-emissions fuels such as bioenergy and hydrogen will be critical to decarbonise the energy system. We are:

- seeking your feedback on approaches to the circular and bioeconomy
- undertaking work to develop a sustainable biofuels mandate to incentivise the uptake of biofuels from sustainable sources, which have significantly lower lifecycle emissions than their fossil fuels equivalent
- developing a hydrogen roadmap; a first stage to develop an initial view of hydrogen supply and demand in New Zealand has been completed,[34] and the next stage will be to explore issues for hydrogen use to determine 'right size' for our hydrogen economy.

The Government could consider more active support for development of larger scale bioenergy and hydrogen industries to enable emissions reductions in the process heat, electricity and the transport sectors.

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[33] Following submissions, a simplified scheme was progressed. The feedback on the proposal for CETPs was mixed, with strong support for mandatory reporting and improving data accessibility (including from some large energy users), but limited support for energy audits.

[34] Ministry of Business, Innovation & Employment. 2020. *A roadmap for hydrogen in New Zealand*. Wellington: Ministry of Business, Innovation & Employment.

In the industrial heat sector, the Commission's demonstration path shows significant switching from coal to biomass across the first three emissions budgets, starting in the first budget period. Alongside development of a bioeconomy strategy, support for development of biomass resources to ensure availability will be critical for this switching.

In the electricity system, thermal fuels have played a number of roles, including providing baseload electricity supply, cover for dry years, and peaking when demand is high.

The New Zealand Battery Project is looking at longer term options to address the dry-year issue, such as pumped hydro (including the Lake Onslow option), 'overbuilding' renewables, biomass, hydrogen, and demand-side management solutions. Some of these dry-year solutions could take several years to develop and construct.

We may need to consider additional measures to help reduce emissions in the first emissions budget. Supporting the development and use of low-emissions fuels now could help Aotearoa to meet the first budget, and to reach our second and third emissions budgets.

We seek your views on whether government could or should provide additional support for the development of bioenergy and hydrogen resources to support decarbonisation across the energy sector, and if so, what form this should take.

Policies for an equitable transition

Addressing industry transition

Complementary policies for process heat, such as the GIDI fund and EECA's business programmes, will promote energy efficiency (reducing energy costs) and reduce carbon emissions.

EECA's Energy Transition Accelerator gives bespoke technical support for large emitters to make long-term transition plans. The GIDI fund supports employment in the regions while reducing emissions.

The Government is helping communities, businesses and sectors to understand and plan their transition through equitable transitions partnerships. Current partnerships are focused on the Taranaki and Southland regions.

Keeping energy affordable and secure

Following the 2019 Electricity Price Review (EPR), we are progressing initiatives that will address affordability and hardship for electricity consumers. These include:

- establishing an Energy Hardship Expert Panel to recommend policy priorities and actions to alleviate energy hardship in Aotearoa, and an Energy Hardship Reference Group to assist the Expert Panel and share information and insights across government agencies, community organisations, consumer advocates, industry participants and regulators
- developing an agreed definition and indicators of energy hardship to assist with measuring and tracking energy hardship over time; this will also help inform how we evaluate programmes to address energy hardship and whether further initiatives and/or better targeting is needed
- delivering the Support for Energy Education in Communities (SEEC) programme to help build a network of energy hardship initiatives and support people to achieve warmer homes and lower energy bills

- progressing an amendment to the Electricity Industry Act 2010 to give the Electricity Authority an explicit function to protect the interests of small consumers (residential and small businesses).

Additionally, funding for community energy can help low-income consumers gain access to distributed renewable energy technologies. A $28 million community energy fund has been set up to help Māori and those in public housing access renewable energy technologies.

The Warmer Kiwi Homes programme and Minimum Energy Performance Standards are helping consumers and businesses to improve energy efficiency, with associated benefits to their wellbeing.

Our work around the energy market's ability to support the phase down of fossil gas will consider affordability and equity impacts of transition for consumers, and implications for current gas infrastructure.

The timing of the transition for gas-dependent households and light commercial businesses ties in with other initiatives, including the Building for Climate Change programme (Building and construction section).

QUESTIONS

Energy strategy

58. In your view, what are the key priorities, challenges and opportunities that an energy strategy must address to enable a successful and equitable transition of the energy system?
59. What areas require clear signalling to set a pathway for transition?

Setting targets for the energy system

60. What level of ambition would you like to see Government adopt, as we consider the Commission's proposal for a renewable energy target?

Phasing out fossil gas while maintaining consumer wellbeing and security of supply

61. What are your views on the outcomes, scope, measures to manage distributional impacts, timeframes and approach that should be considered to develop a plan for managing the phase out of fossil gas?

Decarbonising the industry sector

62. How can work underway to decarbonise the industrial sector be brought together, and how would this make it easier to meet emissions budgets and ensure an equitable transition?
63. Are there any issues, challenges and opportunities for decarbonising the industrial sector that the Government should consider, that are not covered by existing work or the Commission's recommendations?

Addressing current data gaps on New Zealand's energy use and associated emissions through an Energy and Emissions Reporting scheme

64. In your view, should the definition of a large energy user for the purposes of the proposed Energy and Emissions Reporting scheme include commercial and transport companies that meet a specified threshold?

QUESTIONS

65. We have identified a proposed threshold of 1 kt CO_2e for large stationary energy users including commercial entities. In your view, is this proposed threshold reasonable and aligned with the Government's intention to meet emissions budgets and ensure an equitable transition?
66. In your view, what is an appropriate threshold for other large energy users such as transport companies?
67. Are there other issues, challenges or opportunities arising from including commercial and transport companies in the definition of large energy users for the purposes of the proposed Energy and Emissions Reporting scheme that the Government should consider? Supporting evidence on fleet size and characteristics is welcomed.

Supporting development and use of low-emissions fuels

68. What level of support could or should Government provide for development of low-emissions fuels, including bioenergy and hydrogen resources, to support decarbonisation of industrial heat, electricity and transport?
69. Are there any other views you wish to share in relation to energy?

Building and construction

Why reducing emissions in this sector matters

Buildings are part of the everyday lives of people, communities and businesses, affecting most wellbeing indicators for individuals, communities and the nation. The sector is also a major part of the economy, contributing 7.3 per cent of GDP in 2019 ($20.5 billion).

Our vision is to significantly reduce all building-related emissions as soon as possible, and where possible, also have other benefits that make an important contribution to wellbeing and higher living standards (for example, improved health, energy affordability). For example, warmer, drier homes have health and economic benefits for households and Government. Decisions about the design, construction and operation of buildings aimed at helping reduce emissions may also have health, social, and environmental benefits (for example, less extraction of raw materials and reduced landfill). Each of these co-benefits also translates to financial and/or other value for Government, the community and individuals. We have started work to understand who may benefit, and when.

Emissions budgets take a production-based approach.[35] Using this approach, the sector directly contributed about 4 per cent of greenhouse gas (long-lived) emissions in 2018. Taking a consumption-based approach,[36] 15 per cent of these emissions in 2018 were building related.

There is significant potential for this sector to help reduce emissions in other sectors. Emissions from the manufacture of building products and materials, and from energy use

[35] The production approach accounts for emissions at the point where they are emitted.

[36] The consumption approach accounts for emissions 'embodied' in a good or service at the point where the emissions are 'consumed'. These includes emissions that result from the entire supply chain required to produce that good or service for final use from the extraction and manufacturing of materials, construction, through to deconstruction and waste disposal.

in buildings (for example, space and water heating, cooling, cooking) are reported under the energy and industry sectors. Over half of New Zealand's electricity use is building related.[37]

Planning and design affect how much energy it will take to heat and cool a building, and the choice and quantity of materials. It can affect waste (which can flow on to energy and transport emissions). Transporting materials (including many from overseas) and workers on and offsite produces further building-related emissions.

Housing affordability is an important consideration when reducing emissions. There is the risk that measures will raise new-build costs, although construction is only one of the factors that determine housing prices. We are exploring how to both reduce emissions reductions and support affordability. Key to this will be encouraging behaviour change, along with planning decisions (see Planning section) that help realise our vision.

How we plan to reduce emissions in this sector

Emissions related to buildings generally fall into two groups:

- **Operational carbon emissions** are from the energy and other resources used when operating the building.
- **Embodied carbon emissions** are emitted during the manufacture and use of the materials and products that form the building, and across its life, from construction to deconstruction. These include emissions from the production, transportation and eventual disposal of materials in buildings.

A whole-of-life approach considers emissions that arise at all points in the supply chain, and over the lifetime of that material or product, supporting a circular economy. This spans from raw material extraction to manufacturing and through to building construction, maintenance and ultimately deconstruction, including disposal, recycling and repurposing.

What we are doing now

Building for Climate Change programme

Building for Climate Change programme is the Government's key mechanism for reducing emissions from this sector (see MBIE – Building for Climate Change).

We are looking at ways to create and scale up the changes and actions needed to meaningfully contribute to our targets. This includes:

- **Regulatory proposals** – We are looking at options such as emissions caps for buildings. Possible approaches are shown in the two frameworks MBIE consulted on in 2020: Transforming Operational Efficiency and Whole-of-Life Embodied Carbon Reduction. (Read the summary of submissions and other feedback on the programme website.) New builds are the first priority because lowering emissions in existing buildings is more complex.
- **Improving energy efficiency** – We are exploring how to use the current system to help reduce emissions while we develop a broader transformational policy package. In May

[37] Ministry of Business, Innovation & Employment. 2020. *Energy in New Zealand*. Wellington: Ministry of Business, Innovation & Employment.

2021 MBIE consulted on proposed changes to the New Zealand Building Code's energy efficiency requirements (Clause H1) (see MBIE website).

- **Modelling** – We have started testing scenarios for implementing Transforming Operational Efficiency and Whole-of-Life Embodied Carbon Reduction. The modelling will guide our choice of scenarios for the final plan and includes options for both mandatory reporting and emissions caps of different strengths and timing.
- **Reducing emissions in existing buildings** – We are scoping options to reduce existing buildings' emissions, including supporting retrofits, measuring emissions and exploring other tools to improve how buildings perform. This will include looking at mandatory energy performance programmes, as recommended by the Commission, for commercial and public buildings.

Government leading the way

We are reducing emissions through the government property portfolio and other initiatives. Some examples are:

- **The Carbon Neutral Government Programme (CNGP).** See Government accountability and coordination, including the requirement for many larger (over 2,000 square metre) government buildings to now achieve certain NABERSNZ ratings.
- **NABERSNZ (EECA).** Rates the energy and carbon performance of commercial buildings.
- **Government Procurement's** Sustainable Construction: Construction Procurement Guidelines**.** Helps agencies implement the emissions reduction component of the Government Procurement Rules.
- **Kāinga Ora large redevelopment.** Government investment of over $25 billion to 2050 (plus the $3 billion housing investment in 2019).
- **Kāinga Ora waste minimisation scheme.** Aims to significantly reduce on-site waste from construction and demolition. Its procurement processes in relation to construction and demolition wate require that 80–85 per cent of materials must be recycled (or diverted from landfill).
- **Warmer Kiwi Homes (EECA).** Insulation and heater grants to low-income homeowners.

The Building for Climate Change programme, in developing its transformational package, is also working with other agencies to explore how else Government can lead by example in reducing building-related emissions. This may include considering possibilities for Kāinga Ora fast tracking its emissions reduction targets across its construction programme. This would create a significant market for low-carbon construction materials, practices and designs; advancing industry knowledge and accelerating uptake across the sector. This would also reduce energy hardship, and improve health and wellbeing for some of the most vulnerable New Zealanders. Options to strengthen procurement requirements to encourage industry to deliver lower emission buildings for Government will also be considered.

Construction Sector Accord

Launched in April 2019, the Construction Sector Accord is a platform for industry and government to jointly work on the challenges facing the sector, such as sustainability and people development. The Accord is supporting the construction sector to help increase knowledge and capability (for example, through a resource hub and webinars) in the areas of environmental sustainability. It has a network of organisations committed to the Accord vision of a higher performing construction sector.

The Accord will be a valuable platform for government and industry to work together to meet the shared emissions reduction challenge, and help support businesses to recognise the significant role that industry has to play in reducing building-related emissions.

Examples of business leading the way

We recognise that some of the industry is leading the way for the sector, with some recognised examples of good practice including:

- Naylor Love developing a Building Carbon Calculator, which supports comparison of carbon emissions from different structural building elements and material types
- the Heavy Engineering Research Association (HERA) developing guidance to help steel manufacturers calculate and understand their carbon footprint
- Green Gorilla establishing a Construction and Demolition Waste Processing Facility, which diverts more than 70 per cent of incoming construction and demolition waste from Auckland landfills.

We will support the business community to develop, demand and share emerging practices aimed at reducing emissions.

Reducing demand for fossil fuels in buildings

The Building for Climate Change programme is proposing capping the total operational emissions from new buildings. This approach allows people to choose how they lower emissions from the building's use overall, rather than specifying the systems to be used or not used for heating and cooking. We are also considering caps for the emissions from the fuels used for the operation of buildings, including fossil fuels. The caps are anticipated to reduce demand for fossil fuels used for heating, cooling and cooking over time. This may have co-benefits, such as minimising the health risks from these fuels. This approach may also allow time for low-emissions alternatives to become commercially available.

The Commission has subsequently recommended that Government set a date to end the expansion of fossil gas pipeline infrastructure (recommendation 20.8a). We seek your views on this approach, and to understand the impact it would have on people, families, communities and businesses.

Reducing demand for fossil fuel in buildings may have implications for new and existing fossil gas connections. Energy supply chains are complex. MBIE is investigating the phase out of fossil fuels from the energy system. Details of this and national direction tools (a national policy statement and national environmental standard) are in the Energy and industry section.

Potential policies and measures

The Building for Climate Change programme will also consider:

- **Behavioural and cultural change –** scoping a programme to raise consumer and sector knowledge about lower emissions building and construction. This will help reset social and sector norms, and to enable warmer, drier buildings with health, economic and other benefits. This will require a focus on two different groups:
  - *Consumers* – awareness, knowledge and increasing demand for lower emissions buildings: for example, information and education campaigns for building consumers, product rating schemes, and tools such as energy and water meters.

- *Industry* – knowledge and action, with a focus on the sector reducing its footprint including as building material and product consumers. This could include encouraging and supporting architects, builders, manufacturers and others in the sector to advise clients on and provide lower emissions buildings. Ways to encourage businesses to source and create demand for lower emissions products and materials from their supply chains could also be explored.

- **Financial and other incentives to encourage lower emissions buildings –** reinforcing behaviour change and lower emissions practice:
  - This could include considering subsidies, rates or tax rebates, or low- or no-interest loans for low-emissions buildings or retrofits.
  - One example is exploring an initiative similar to the Exemplary Buildings programme in Brussels, which gave funding, technical support and publicity to eligible building owners and designers.
- **Removing barriers –** we will consider ways to remove barriers to lower emissions building, and to encourage new products and ways of building. This will include identifying and addressing any undue barriers the building consenting system presents to the recycling and reuse of building products and materials.
- **Improving energy efficiency –** helping reduce energy-related emissions and realise other benefits – options we want feedback on include:
  - funding the development and rollout of energy performance certificates to buildings, potentially linking energy performance to other incentives. This could involve expert evaluation of buildings to baseline their current level of energy performance and recommend potential changes they could make to improve it
  - subsidies or low- or no-interest lending for energy efficiency improvements to existing buildings
  - expanding eligibility criteria for Warmer Kiwi Homes programme and reviewing it to ensure it is fit-for-purpose to achieve emissions-reduction goals.
- **Encouraging innovation and scaling –** this will bring down costs and influence market behaviour. Methods such as offsite manufacturing can lift productivity, reduce waste and emissions, and supply warm, dry, durable and affordable homes. Kāinga Ora is increasingly using this method to bring such benefits and embed innovation into construction. Recent Building Act 2004 changes (which include a voluntary certification scheme for manufacturers of modular components) help foster this innovation.
- **Contestable innovation fund and other potential ways to increase innovation, technology and scaling –** exploring how to help businesses and other organisations to trial, tailor and upscale low-emissions innovations such as new technology and materials, might help the sector substantially reduce emissions. Proposals we are seeking views on include:
  - competitions and rewards to support the development of innovative and scalable low-emissions building materials, designs and processes
  - funding that could support concepts to be developed, trialled or brought to market, such as lower emissions concrete, waste reduction innovations, or low-emissions housing designs
  - funding may also help support local, or potentially global, mentoring or partnerships.
- **Circular economy package:** A potential suite of initiatives and incentives to reduce construction waste and increase reuse, repurposing and recycling of materials.

- This could include scaling up existing building-related circular economy initiatives and providing guidance and information to help reduce construction waste across a building's lifecycle, from construction to demolition.
- Elements of this package could build on the Ministry for the Environment's Waste Minimisation Fund, with a specific focus on rolling out or scaling up building-related circular economy initiatives. For example, funding the expansion of existing local programmes through to supporting major businesses to trial or champion demonstrated programmes.
- It could also include providing guidance and information about ways for designers, builders, procurers and others to reduce construction waste across a building's lifecycle, from construction to demolition. The proposed behaviour change programme could also include a circular economy focus, driving both consumer and sector activity.

- **Workforce transformation coordination and support:** there are various sector and other initiatives aimed at ensuring the sector has the right workforce at the right time. We are looking at how these could be effectively supported, and any gaps identified and addressed. Options being considered include:
  - coordinating role or supports, to minimise duplication of initiatives and to help businesses/industry connect, identify and respond to skills gaps
  - targeted funding and other supports to train or retrain building professionals to use lower emissions building approaches
  - education and potentially funding to encourage changed practice among key worker groups; these may include those involved in upfront decisions (for example, design, planning and project management), those doing onsite work (Licensed Building Practitioners, plumbers, gasfitters and drainlayers) and those performing a regulatory function (Building Consent Authority staff) to support workforce transformation
  - supporting more on-the-job mentoring, and more effectively using the educational system to develop and prepare workers and the workforce to build for climate change.

Making an equitable transition

The new measures will affect many different groups, including: workers, businesses, building occupants (or 'consumers'), renters and tenants, lower socioeconomic households, and Māori and Pacific peoples. The changes may also bring opportunities.

The initial focus on new homes is likely to disproportionately affect new build occupants. Māori and Pacific peoples, low-income households and renters are more likely to live in buildings that are older, less energy efficient, as well as damp, mouldy and poorly ventilated.[38] More energy-efficient new-build public housing will directly and significantly improve health and reduce hardship for many low-income residents, likely outweighing the initial costs.

The building and construction sector is our fourth largest employer. OECD research and modelling indicates that reducing emissions is likely to create a continued decline in low-skill jobs. Workers in heavy-emitting industries that the building and construction industry currently relies on, such as metal and concrete manufacturers, may also be vulnerable to market and industry shifts to less carbon-intensive designs and products. At the same time,

38 Statistics NZ. 2020. *Housing in Aotearoa: 2020*. Wellington: Statistics NZ.

many existing roles and the new jobs created (for example through new building processes and designs) are anticipated to become increasingly skilled. There will also be opportunities to reskill and upskill workers and the sector overall. An important priority of any workforce transformation coordination and support will to be make sure key initiatives and supports include a strong focus on workers and businesses most likely to be disproportionately impacted.

Reducing fossil fuels in buildings

Reducing fossil fuels in buildings will have both direct and indirect impacts for occupants. Any transition must recognise that the impacts on the coal, fossil gas and LPG markets and their consumers may differ.

A first step is to better understand these impacts, future energy demands for households, businesses and communities and potential alternative low-emissions energy sources. This, and consultation with affected industries, will guide phasing and help manage related risks. For the distributional impacts of phasing out of fossil fuels, see Energy and industry.

QUESTIONS

70. The Commission recommended the Government improve the energy efficiency of buildings by introducing mandatory participation in energy performance programmes for existing commercial and public buildings. What are your views on this?
71. What could the Government do to help the building and construction sector reduce emissions from other sectors, such as energy, industry, transport and waste?
72. The Building for Climate Change programme proposes capping the total emissions from buildings. The caps are anticipated to reduce demand for fossil fuels over time, while allowing flexibility and time for the possibility of low-emissions alternatives. Subsequently, the Commission recommended the Government set a date to end the expansion of fossil gas pipeline infrastructure (recommendation 20.8a). What are your views on setting a date to end new fossil gas connections in all buildings (for example, by 2025) and for eliminating fossil gas in all buildings (for example, by 2050)? How could Government best support people, communities and businesses to reduce demand for fossil fuels in buildings?
73. The Government is developing options for reducing fossil fuel use in industry, as outlined in the Energy and industry section. What are your views on the best way to address the use of fossil fuels (for example, coal, fossil gas and LPG) in boilers used for space and water heating in commercial buildings?
74. Do you believe that the Government's policies and proposed actions to reduce building-related emissions will adversely affect any particular people or groups? If so, what actions or policies could help reduce any adverse impacts?
75. How could the Government ensure the needs and aspirations of Māori and iwi are effectively recognised, understood and considered within the Building for Climate Change programme?
76. Do you support the proposed behaviour change activity focusing on two key groups: consumers and industry (including building product producers and building sector tradespeople)? What should the Government take into account when seeking to raise awareness of low-emissions buildings in these groups?
77. Are there any key areas in the building and construction sector where you think that a contestable fund could help drive low-emissions innovation and encourage, or amplify,

QUESTIONS

emissions reduction opportunities? Examples could include building design, product innovation, building methodologies or other?

78. The Ministry of Business, Innovation and Employment (MBIE) is considering a range of initiatives and incentives to reduce construction waste and increase reuse, repurposing and recycling of materials. Are there any options not specified in this document that you believe should be considered?
79. What should the Government take into account in exploring how to encourage low-emissions buildings and retrofits (including reducing embodied emissions), such as through financial and other incentives?
80. What should the Government take into account in seeking to coordinate and support workforce transformation, to ensure the sector has the right workforce at the right time?
81. Our future vision for Aotearoa includes a place where all New Zealanders have a warm, dry, safe and durable home to live in. How can we ensure that all New Zealanders benefit from improved thermal performance standards for our buildings?
82. Are there any other views you wish to share on the role of the building and construction sector in the first emissions reduction plan?

Agriculture

Why reducing emissions in this sector matters

Our agricultural sector is highly productive and plays an important role in our economy. It is central to the continued success of the primary industries and contributes to the wellbeing of our society.

Aotearoa has a unique emissions profile for a developed country. Emissions from agriculture make up 48 per cent of our gross greenhouse gas emissions.

Biogenic methane is a short-lived greenhouse gas, emitted from livestock digestive systems, that makes up almost three-quarters of agriculture emissions.

The next largest source is nitrous oxide from nitrogen added to soils through dung and urine and fertiliser, followed by manure management.

Most agricultural emissions come from the dairy sector, followed by sheep and beef cattle.

Reducing emissions

The Climate Change Response Act 2002 (CCRA) sets a target to reduce biogenic methane by 10 per cent below 2017 levels by 2030, and by 24–47 per cent below 2017 levels by 2050.

Our current mid-range projections would see agricultural reductions of **6.5 per cent for biogenic methane** and **3.1 per cent for long-lived gases by 2030**, relative to 2017 levels.

Our **food and fibre sectors** are already some of the most emissions-efficient producers in the world, but they need support to become even more sustainable and meet our targets. The sector has already committed to doing its part to meet our 2030 biogenic methane target. This will require widespread changes in farm practice, new technology and more investment.

Opportunities include:

- **Pricing –** The He Waka Eke Noa Primary Sector Climate Action Partnership will bring in a farm-level pricing scheme by 2025. This will encourage farmers to reduce their emissions through currently available practices.
- **Extension –** Extension and effective advisory services will help farmers and growers gain the knowledge and resources to measure, manage and reduce their emissions.
- **Research and development –** Investment in research and development of technology, such as methane inhibitors and a methane vaccine, will also be vital. Using new technologies, farmers could contribute to more ambitious goals, without needing costly offset mechanisms or substantial change in land use.

These actions are expected to have a bigger impact in later emissions budgets as farm practice changes and new technologies become available, but the work needs to begin now to unlock these opportunities. By focusing now on delivering the right solutions, we can expect greater impacts out to 2050. We will need to work together to achieve this.

How we plan to reduce emissions in this sector

What we are doing now

Government and primary sector roadmap

The Ministry for Primary Industries' roadmap, *Fit for a better world – accelerating our economic potential* (released July 2020) sets out opportunities to accelerate the productivity, sustainability, and inclusiveness of the primary sector. This is the framework the Government will base its climate-related work with the primary sector under, setting out three ambitious targets for our food and fibre sector to create a more productive, sustainable and inclusive economy. This includes adding $44 billion in export earnings over the next decade by building off the strong position of our core food and fibre sectors, reducing biogenic methane to 24–47 percent below 2017 levels by 2050, restoring New Zealand's freshwater to a healthy state within a generation, and employing 10 percent more New Zealanders in the primary sector by 2030.

He Waka Eke Noa Primary Sector Climate Action Partnership

We are working with the food and fibre sector and iwi/Māori through He Waka Eke Noa. This partnership aims to equip farmers and growers with the knowledge and tools to measure, manage and reduce their emissions, while sustainably producing quality products for domestic and international markets.

The CCRA sets a series of milestones for He Waka Eke Noa, including implementing a farm-level pricing mechanism for agricultural emissions by 2025. The partnership will make recommendations to Ministers on price design in March 2022.

The partnership also has pre-2025 milestones to help farmers know their total annual on-farm emissions, and to develop farm plans to measure and manage those emissions.

In June 2022, the Commission will assess the partnership's progress. If the partnership is not on track, the Government can bring agriculture into the NZ ETS at processor level before 2025.

More funding for research

Over the last 10 years about $20 million per annum has been invested in agricultural emissions research.[39]

In Budget 2021, funding for agricultural climate change research increased by $24 million over four years. This will accelerate the development of new technology and practices.

Investment in novel solutions, such as methane and nitrous oxide inhibitors, and selective breeding for lower methane-emitting sheep and cattle, could reduce hard-to-abate biogenic methane and nitrous oxide emissions.

Funding for integrated farm planning

Budget 2021 committed $37 million over four years to speed up a national integrated farm planning (IFP) system for farmers and growers, in partnership with industry and regional sectors. This will make it easier and quicker for farmers and growers to meet their greenhouse gas reporting requirements by integrating them into wider farm planning. A further 100 skilled farm advisors will also be trained. Industry, regional council, community, and catchment initiatives will also receive funding.

Regulatory oversight for methane inhibitors

Work is underway to enable the regulatory oversight for methane inhibitors under the Agricultural Compounds and Veterinary Medicines (ACVM) Act. This will allow for the regulation of greenhouse gas inhibitors when they become available. This measure is the first step to unlocking a future opportunity to reduce greenhouse gas emissions.

Potential and proposed measures

Pathways to reduce agricultural emissions

We need a range of policies and support to reduce agricultural emissions in line with our 2030 and 2050 targets.

We are working through He Waka Eke Noa to develop solutions to measure and price agricultural emissions. This includes workstreams on emissions pricing, emissions reporting, farm planning, on-farm sequestration, and delivery (early adoption, innovation and uptake, and extension). A cross-cutting workstream will integrate Māori perspectives.

We are assessing the additional work that will be needed to complement He Waka Eke Noa. Other measures could include improving farm advisory and extension services, resources for evidence-based decision-making on farms, and supporting early uptake of new practices on-farm.

Accelerating innovation and technology

Innovation and technology are critical to meeting emissions budgets. As part of the Fit for a Better World roadmap, the Ministry for Primary Industries, in partnership with industry, Māori and science, is developing a research and development (R&D) plan to accelerate the development of mitigations to reduce biological emissions.

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[39] Leading science partnerships; Global Research Alliance.

This R&D plan will consider the pathway from knowledge to impact for mitigations, and identify measures to accelerate their availability for farmers. Many new mitigations are not yet on the market and will make limited contributions in the first emissions budget period. However, accelerating R&D mitigation efforts now will unlock new options to reduce emissions in later periods.

On-farm practice changes through targeted extension services

Extension services help farmers access knowledge, expertise and tools to make informed decisions about on-farm practice change. We are assessing whether further public and private investment can help the He Waka Eke Noa extension workstream to support and upskill a greater number of farmers and growers.

Measures could focus on the delivery of extension services through a national network of rural/farmer collectives, including catchment groups, Māori land owner collectives and other producer groups. This could be through a combination of leveraging existing groups and industry programmes, through to new activity.

Making an equitable transition

The transition will have distributional impacts on farmers and growers, including on productivity and profitability, and on rural communities and Māori. We will factor these impacts and ways to provide support into policy development.

The rollout of integrated farm planning will decrease the compliance burden and costs due to streamlined systems, helping farmers and growers to stay sustainable and profitable.

The unique characteristics of Māori land (including ownership, governance and land type) affect the ability of many iwi/Māori land owners to respond to policy changes and opportunities. Any additional costs from new policies could hinder the development of iwi/Māori landholdings. We must consider whether policies are suitable for a range of Māori farming activities and management structures. The work of He Waka Eke Noa in 2022 will aim to build Māori farmer and grower capacity to respond to a farm-level price signal.

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83. How could the Government better support and target farm advisory and extension services to support farmers and growers to reduce their emissions?
    a. How could the Government support the specific needs of Māori-collective land owners?
84. What could the Government do to encourage uptake of on-farm mitigation practices, ahead of implementing a pricing mechanism for agricultural emissions?
85. What research and development on mitigations should Government and the sector be supporting?
86. How could the Government help industry and Māori agribusinesses show their environmental credentials for low-emissions food and fibre products to international customers?
87. How could the Government help reduce barriers to changing land use to lower emissions farming systems and products? What tools and information would be most useful to support decision-making on land use?
88. Are there any other views you wish to share in relation to agriculture?

Waste

Why reducing emissions in this sector matters

In 2019, waste disposal and treatment in Aotearoa produced 3316.9 kt CO_2e or around 4 per cent of gross emissions. These emissions comprised:

- methane (CH_4) (92 per cent)
- nitrous oxide (N_2O) (5 per cent)
- carbon dioxide (CO_2) emissions (3 per cent).

Reducing waste biogenic methane emissions

The Climate Change Commission has recommended reducing waste biogenic methane emissions to at least 40 per cent below 2017 levels by 2035.

The main sources are:

- the organic waste part of solid waste disposal (81 per cent)
- wastewater treatment (11 per cent)
- incineration and open burning (6 per cent)
- biological treatment of solid waste (compost) (2 per cent).[40]

Organic waste includes anything that contains degradable organic carbon – for example, recoverable materials such as food and green waste, paper, cardboard, and timber.

Most household and commercial waste (including some from construction and demolition) goes to managed municipal (class 1) landfills.[41] Many unmanaged disposal sites also generate emissions, including fills for construction and demolition and earthwork materials (classes 2 to 5), industry (class 1 monofills), and farm fills.

We have higher certainty about waste volumes, composition, and emissions from managed municipal landfills than we do for unmanaged disposal sites. For classes 2–5 landfills and farm fills, the data uncertainty is estimated to be ±140 per cent.

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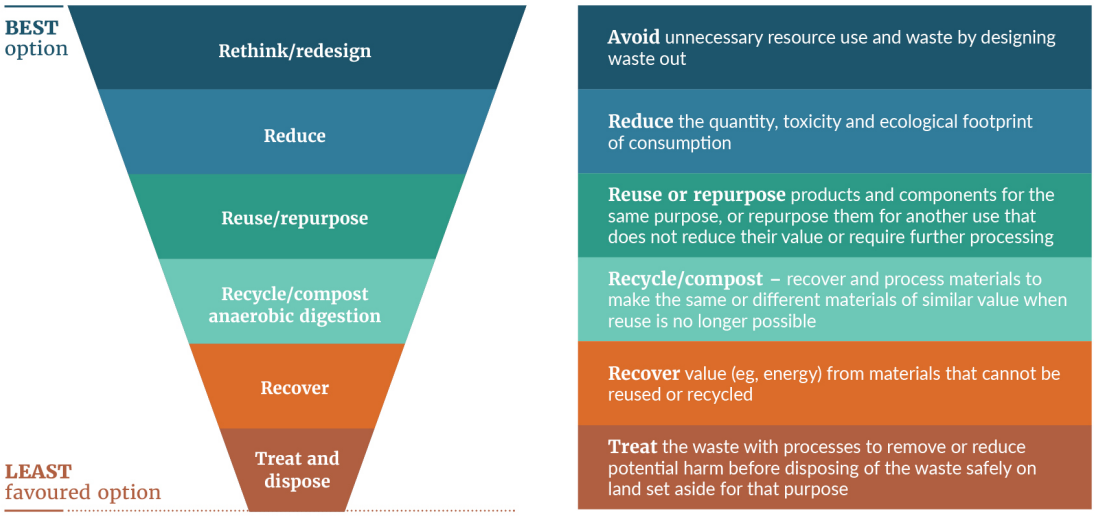
[40] Ministry for the Environment. 2021. *New Zealand's Greenhouse Gas Inventory 1990–2019*. Wellington: Ministry for the Environment.

[41] Terms and definitions for types of wastes and landfills are based on the nomenclature followed by the National Greenhouse Gas Inventory. 'Unmanaged' in the inventory context can be translated to class 2–5 landfills and farm fills. 'Managed' means municipal or class 1 landfills.

Figure 11: The waste hierarchy



Challenges and opportunities for landfill waste

Current policies will not deliver the emissions reductions we must achieve. Significantly reducing landfill biogenic methane emissions will require us to reduce organic material wastage at the top of the waste hierarchy, divert organic materials (for example, to recycling and composting, including anaerobic digestion) and sending organic wastes to landfills that capture landfill gas (LFG). This will require targeted investment and improved management of what goes where within our disposal and resource recovery systems.

Landfill gas (LFG) capture

What is LFG capture?

LFG is a by-product of decomposing organic waste in landfills. It is mainly composed of methane and carbon dioxide. Modern landfills are able to capture some of the gas, so the methane can be used to produce energy, or flared. The process converts the methane to less harmful carbon dioxide.

The Commission has recommended that we significantly reduce emissions by capturing more LFG. We agree with this recommendation; however, some landfills do not yet have the technology. Our options to address this could be requiring that capture systems be installed and where LFG capture is not appropriate, banning sites without LFG capture from receiving organic waste.

Retrofitting LFG capture at non-municipal landfills, where they have not been designed or built with gas capture in mind, requires further investigation. Depending on the landfill, it may be impractical for many construction and demolition fills to have gas capture systems installed. A blanket requirement brought in too quickly would lead to diverting timber and other organic wastes to more expensive managed municipal landfills that capture LFG. It could also increase the potential for illegal dumping in the absence of diversion infrastructure and a supporting licencing system.

Our proposed approach to implementing this specific recommendation is outlined below. This is a staged approach, including requiring LFG capture at all Class 1 municipal landfills by 2026. Instead of also applying this timeframe as a blanket approach to Class 2-5 landfills that receive

much higher volumes of inorganic waste (ie, materials that do not decompose and make methane gas), it is proposed that all organic material disposal be banned from Class 2–5 by 2030. In addition, key organic materials such as food, green, and paper waste could also be banned from Class 1 landfills by 2030, given the lifetime emissions from Class 1 landfills are significant, even with LFG capture in place.

In the meantime, the proposed focus is to improve our enabling systems and infrastructure, thereby providing for the opportunity to consider when and if any Class 2–5 landfills should be required to capture gas, alongside bigger shifts in how organic waste is managed overall. This 'no-regrets' approach is in line with the Commission's advice and would see more materials moving up the waste hierarchy faster, by focusing on waste reduction and increased recycling systems that see more organic waste diverted from landfill and back into a circular economy.

The benefits of this proposed approach are that this:

- allows time for the sector to adapt and build our onshore resource recovery capacity
- ensures we will have accurate data to inform future planning
- largely meets the Commission's proposed 40 per cent biogenic methane reduction target for waste.

The risk of the approach is that relatively cheap disposal for Class 2–5 landfills undermines reduction and resource recovery alternatives. We want to hear your views on the proposed approach and how to get the balance right.

How we plan to reduce emissions in this sector

What we are doing now

The main policies for managing emissions include the NZ ETS (which applies to municipal landfills) and the National Environmental Standards for Air Quality 2004 (which require landfills over a certain size and materials composition to collect greenhouse gas emissions).

Other projects include:

- Changes to the waste disposal levy, which may reduce emissions by providing an economic incentive to reduce waste to landfill and divert and recycle organic materials. This also raises revenue to invest in waste minimisation, including reducing food waste, composting and anaerobic digestion, and kerbside collection of organic waste. Investment is currently through the Waste Minimisation Fund.
- Revising the New Zealand Waste Strategy, which links to the emissions reduction plan, with targets that align with the plan.
- Developing a national infrastructure plan for waste, setting out the path to a fit-for-purpose resource recovery system. The plan will have a 10+ year outlook and be supported by an infrastructure and services stocktake.
- Product stewardship for six product groups that were declared a priority in July 2020, including refrigerants (refer to the F-gases section) and e-waste (which includes large batteries, such as those in EVs). Product stewardship schemes for these products are being co-designed.

For more information on the Government's broader approach to waste minimisation, see the Waste reduction work programme.

Potential and proposed measures

Options to cut waste disposal emissions broadly fall into three categories – reducing organic waste material, reducing organic waste disposal to landfill, and reducing emissions from organic waste if it ends up in landfill.[42]

Reducing organic waste material

Reducing food waste

Reducing the amount of food waste has environmental, economic, and social benefits. Every dollar invested in businesses that reduce food scraps gains a $14 return.[43]

The Government has contributed some funding to campaigns such as Love Food Hate Waste and GenLess. These highlight the issue and give households practical tips.

To date there has been less focus on helping businesses reduce food waste. Australia and the UK have helped different business sectors measure and reduce their food waste, with proven success. For example, Your Business is Food (Australia) helps the hospitality sector and the Courtauld Commitment (UK) supports retailers and food manufacturers.

We could explore opportunities for New Zealand.

Reducing waste from construction and demolition

Buildings are a significant contributor to waste emissions. There is potential to shift the sector towards a circular economy, designing out waste when buildings are designed and made, with options for reusing and re-purposing materials when they reach the end of their life. The Building for Climate Change programme will consider this.

Identifying options for treated wood (reduction, diversion and disposal)

Wood waste is a mixture of products from the construction industry. When identifiable, untreated timber can more easily be diverted for reuse (native timber in particular) or as a feedstock for boiler fuel.

However, treated wood products containing additives such as glues, fire retardants and preservatives are far more common in the waste stream. In a commercial setting only (and with strict systems and approvals), it is possible to burn or otherwise process treated wood for energy. Even so, it remains a challenge, as it will release extremely harmful toxins (such as arsenic) if not appropriately managed.

The treated wood problem requires a multifaceted approach, including reduction, clearer labelling, and genuinely sustainable end-of-life solutions. We're interested in your feedback on how to sustainably manage treated wood products and the associated issues.

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[42] Options for pre-treatment is another pathway particularly relevant to wastewater treatment plant sludges and will be a focus area for future emissions reduction plans. The option to bio-stabilise municipal solid waste as a form of pre-treatment (that is, compost and sort shredded mixed municipal solid waste in a 'dirty' materials recovery facility (MRF)) could play a role in future, but is not considered best practice for resource recovery, and has not been explored further at this time.

[43] Hanson C, Mitchell P. 2017. *The business case for reducing food loss and waste*. Washington DC: Champions 12.3.

One such option is to move from demolition as the default to a deconstruction model, in which buildings are removed in a way that separates and conserves materials, maintains their value, and better allows for recovery and reuse.

Other reduction opportunities

Other initiatives to reduce organic waste require resourcing or further development. These include phasing out junk mail, increasing education on and access to reusable nappies, and regulated product stewardship for textiles and clothing (including a focus on reducing consumption).

Reducing organic waste disposal to landfill

Food waste and green waste collection

Organic resources that cannot be used as food can be processed into nutrients and bioenergy. These materials are commonly recovered internationally. Both the feedstock and the resulting products are valuable resources in a circular bioeconomy, with significant potential to reduce our reliance on fossil fuel fertilisers and energy.

Although some household food and green waste is being diverted already, there is substantial scope for better recovery. Many households send food and green waste to landfill via kerbside rubbish collections. Only 55 per cent of Aotearoa households currently separate food and/or green waste for composting at home[44] (down from 63 per cent in 2008[45]). Some households are limited in their ability to compost at home (for example because of a lack of space),[46] while others face different barriers.

Five councils have been diverting food and green waste to compost via separate kerbside collections for some time. More recently, the number of councils with kerbside organic collection has increased to 11, and others are proposing new services or have trials underway. In many other countries such services are commonplace. To meet our targets for waste, most communities would need food waste collections, or viable alternatives to landfill disposal for all their food scraps, as well as access to a green waste service where appropriate.

A key driver of 'value' in recycling is clean, uncontaminated recovered materials that make good feedstocks for other processing and manufacturing industries. This is also true for organic waste materials. The separate collection of food waste, and where appropriate green waste, is in line with the recommendations of the Rethinking Rubbish and Recycling (2020) report[47] which covers the wider kerbside system. The Government received this report in 2020 and committed to improving kerbside collection performance across the country. However, such a large-scale change requires more specific consultation, which is likely to begin in early 2022.

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44 Butt T. 2021. *General public attitudes to composting and compostable packaging* – survey report. Prepared for the Ministry for the Environment by UMR. Wellington: Ministry for the Environment

45 Johnson M, Fryer K, Raggett N. 2008. *Household Sustainability Survey Research New Zealand*. Prepared for the Ministry for the Environment by Research New Zealand. Wellington: Ministry for the Environment.

46 For example, 25 per cent of New Zealanders live in housing with no garden, or only a container garden on their balcony.

47 WasteMinz. 2020. *Rethinking rubbish and recycling*. Auckland: WasteMinz.

Businesses to separate food and green waste

Food and green waste emit significant amounts of methane in landfills. A driver for change will be promoting the separation, diversion and collection of these materials, and investing in processing facilities. Some Aotearoa cities and districts have commercial food waste collections for compost or animal feed. Barriers to using these services can include higher cost, less convenience than commercial waste disposal, and needing agreement from the property owner or body corporate members. Requiring businesses to separate food waste, and where applicable green waste, would encourage more providers and processors to enter the market.

As our onshore capacity for processing organic waste grows, we will look for opportunities for households and businesses to separate some or all organic materials such as food, green, wood and paper waste, in order for them to be collected and processed via household and community compost, large-scale commercial composting processes (for example, open or in-vessel windrow), anaerobic digestion (biogas/biomethane), recycled or used as other biofuel feedstocks.

Initiatives could motivate businesses to look for ways to reduce their food waste and might encourage more donations of food-to-food rescue and redistribution or turning food unsuitable for people into stock food. Pathways are in place elsewhere, including the United States, the United Kingdom and Europe. The progressive increase and expansion of the waste levy over the next four years will yield extra revenue that could be invested in organic waste separation and collection.

Better paper and cardboard recycling

As for other types of organic waste, paper and cardboard produce methane when disposed of in landfills and make up a sizable proportion of waste in municipal landfills.

Clean, separated paper and cardboard are very recyclable. Recyclability decreases when they have been mixed with other materials (such as in commingled recycling bins) or are heavily contaminated with food or other waste. Ideally separation would be at source (the house or business). A requirement to separate recyclable materials from other waste would prevent valuable resources from ultimately producing landfill emissions. If a source separation requirement led to more effective recovery of paper and cardboard, it could also be appropriate to consider a disposal ban for these materials by 2030.

Transfer stations to prioritise recovery alongside new and expanded materials recovery facilities (MRFs)

In addition to source separation, the requirement to separate material streams can apply to transfer stations, where trailers and skip bins of waste are split into material streams to maximise recovery. Instead of dumping waste into an open pit for ‘transfer’ to a landfill, the station becomes more of a drive-through, with different drop-off zones or bins for different materials.

Mechanical sorting through materials recovery facilities (MRFs) can also process bulk loads of mixed waste from skip/hook bins and tip trucks. Construction and demolition waste in particular could be prioritised for diversion and processing through specialist MRFs.

Separating material at transfer stations and through processing at specialised MRFs is commonplace internationally. It is another investment option that would help reduce the volume of organic (green waste, wood, and cardboard) and inorganic (metals, plastics, glass) resources entering landfills.

Reducing emissions from organic waste in landfills

Gas capture at landfills

The Commission recommends that all landfills accepting organic waste (except farm fills) have effective gas capture systems by 31 December 2026. This implies two scenarios for landfill sites without LFG capture; either:

1. they can no longer receive organic material
2. where appropriate, they must install LFG capture systems to continue to receive organic materials.

Under scenario 1, landfills without LFG capture that are also not suitable for retrofitting an LFG system would no longer be able to receive any organic waste by 31 December 2026. They could instead divert the waste to recycling, composting or, potentially, to bioenergy; or, if these options are not available, to landfills with LFG capture.

Investment in better diversion and resource recovery systems could also generate co-benefits elsewhere in the economy, so this is viewed as preferable. For example, in the case of construction and demolition fills, investment in separating material streams (to remove organic waste such as timber) would also support separation and reuse of inorganic materials (for example, concrete and steel). More recycling of these materials could reduce emissions elsewhere in the economy, by displacing the need to produce and use virgin materials. Organic waste (mostly wood in construction and demolition waste) could be separated on site or at commercial MRFs or waste-sorting centres, such as in Auckland and Marlborough.

Under scenario 2, landfills that do not have LFG capture but are suitable for it would have to install an LFG system.

Our proposed response to this recommendation

All municipal landfills that do not currently have LFG capture could be required to install it by 2026, because of a lower threshold under the National Environmental Standards for Air Quality.

However, simply diverting all other organic waste to landfills with LFG capture commits us to a path of ongoing biogenic methane emissions from landfill disposal in the future. This is sub-optimal from an emissions standpoint because LFG capture, while beneficial at reducing emissions, is not perfect and some methane release is inevitable.[48] If done too quickly and in the absence of data, a disposal ban also risks perverse outcomes such as illegal disposal and levy avoidance.

Given the data and emissions uncertainty for non-municipal landfills is high, the proposed approach is to improve our data and work towards a future decision on organic material bans in both municipal and non-municipal landfill types by 2030. This could potentially include any of food and green waste, fibre (paper and cardboard) and possibly wood waste for municipal landfills, and all organic materials to landfills without LFG (largely non-municipal landfills). The need for disposal bans and/or alternative policies to achieve similar ambitious levels of abatement would require further work, pending data improvements, and would be subject to future emissions reduction planning (that is, 2025–30) and consultation processes.

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[48] On average, the latest New Zealand greenhouse gas inventory assumes the lifetime efficiency of LFG capture at 'open' landfills as 68 per cent.

Combined policy impact

Figure 12 shows the projected impact of the total combined policy options on both municipal and non-municipal landfill emissions. Waste emissions by source are stacked, with the black-dotted line showing business-as-usual projections for total methane emissions from waste. The black solid line represents our proposed emissions reduction pathway, with the Commission's path represented by the black-dashed line.

The cumulative policies scenario assumes a broad and high abatement approach to 2035, with organic materials increasingly diverted to resource recovery to 2030 ahead of a potential material disposal ban, should this be shown to be necessary. The model output below is illustrative only and assumes a mix of processing options are employed for different organic feedstocks.[49] It is noteworthy that the organic waste-processing technology options and feedstock combinations do have different emissions profiles. From 2030 onwards, organic material disposal bans to class 1 for food, green and paper waste are assumed to apply; and *all* organic materials (assumed to be largely wood and green waste) are banned from unmanaged (classes 2–5) landfills. The scenario also includes regulatory measures that require materials separation at source. These projections go to 2050 and are calculated in tonnes of carbon equivalent.

Figure 12: Total projected methane emissions from waste showing the impact of proposed combined waste policy options

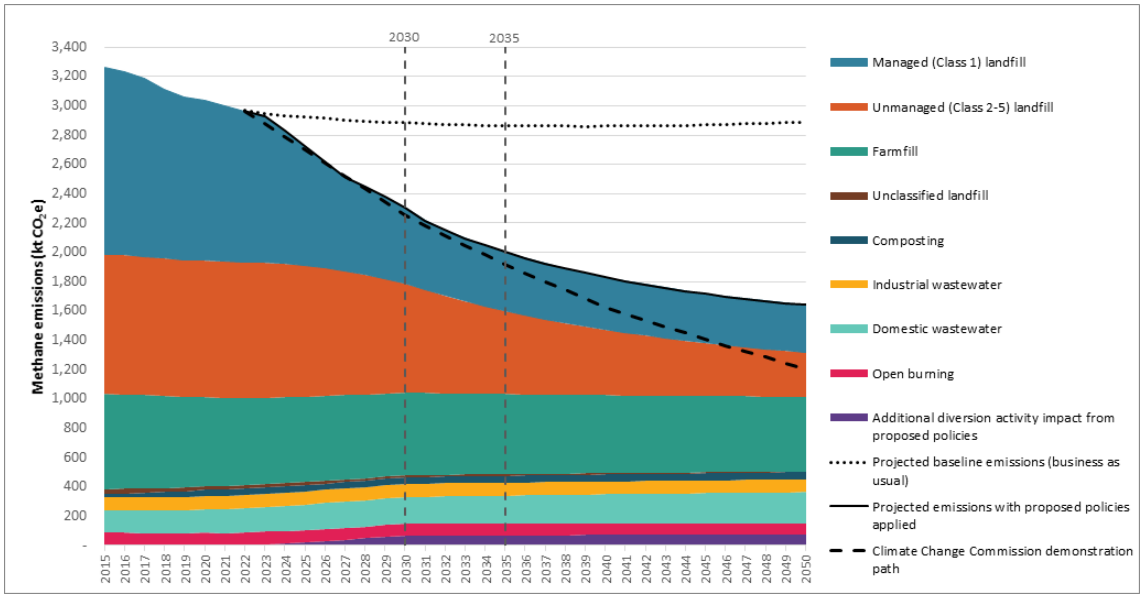

Figure 12 shows that the combined effect of targeting biogenic methane emissions through reduction, diversion and improvements to LFG capture in the first two budget periods (to 2030) puts waste emissions at 96 per cent of the reduction path in 2030. This chart shows all sources of methane emissions from waste. Modelled impacts have varying degrees of uncertainty.

Individual abatement options modelled are presented in the Appendix.

[49] This model output assumes 40 per cent of diverted food waste to composting (20 per cent windrow and 20 per cent in-vessel composting, or IVC) and 60 per cent to anaerobic digestion; it also assumes 100 per cent of diverted green waste to composting (60 per cent compost and 40 per cent IVC). In reality the preferred processing option will also need to give consideration to the availability of organic feedstocks and markets for the potential process output products.

Co-benefits and future opportunities

A 'highly circular' resource recovery system that captures and processes organic waste could have significant co-benefits for other sectors. For example, where appropriate, farm, forestry and commercial/industrial waste diverted to composting and anaerobic digestion facilities that also process urban waste[50] would see emissions reductions across many sectors, while leveraging the same infrastructure. For waste sector emissions the quantification and abatement options for wastewater treatment and farm fills require further work, and we welcome feedback on how best to reduce emissions from these activities.

Proposed priority action: Fast-tracking a waste data and licensing system

Reliable data is vital for reducing emissions, and minimising waste. A national licensing system is recommended to meet the Commission's recommendations for improving waste data:

- publishing annual waste statistics from 31 December 2023
- improving data collection across the waste sector
- investing in data collection, to track progress towards a circular economy.

A licensing system would provide a more efficient and robust basis for administering the range of requirements for how sites operate (including the waste disposal levy and potentially the NZ ETS), as well as strengthening the evidence base for organic waste disposal bans and/or the alternative options.

The system would require new legislation (a review of the Waste Minimisation Act 2008 is underway), and would ideally align with local government data collection and reporting mechanisms. Pending improvements to other regulations (National Environmental Standards for Air Quality and the NZ ETS), it could also be used to capture information on waste composition and landfill gas, leading to improvements in the measurement of site-specific landfill gas capture efficiency, which is another key option for reducing emissions.

Partnership

The emissions reduction plan will be critical in the transformation of our waste sector. The New Zealand Waste Strategy aims to bring together the different drivers in a comprehensive approach towards a circular economy for Aotearoa by 2050. Partnerships and collaboration will be key to achieving our goals. In particular, partnerships between local authorities, industry and community that consider local feedstocks and markets will be key to determining the best approach at a local level. Whatever the method, all parts of society – iwi, hapū and marae, community organisations and groups, academia, households and businesses across the full supply chain – will need to engage in the journey.

Making an equitable transition

Actions and policies to minimise waste have implications at local, regional and national levels. For example, the distributional impacts of a disposal ban could be significant and the costs of the wider transition to a low-waste, low-carbon economy will fall to everyone.

The broad range of policy options for waste emissions reduction will require further specific analysis and consultation. For some aspects, this will begin with the review of the New Zealand

[50] In practice, waste streams may be mixed or processed separately, pending markets and end use applications.

Waste Strategy and Waste Minimisation Act – also likely to take place in 2021. For others, improved data is needed before we can assess the impacts. Some more specific policies, such as improving kerbside collection performance, will be consulted on in early 2022.

Financial impacts are expected to be manageable in the long run. An increase in disposal costs can be offset by the reducing the amount of waste to be disposed of (through households and businesses reducing and diverting waste). As the resource recovery sector in Aotearoa grows, it will be easier for households and businesses to 'do the right thing' with their waste. Managing the transition equitably will be a key part of future engagement.

QUESTIONS

89. The Commission's recommended emissions reduction target for the waste sector significantly increased in its final advice. Do you support the target to reduce waste biogenic methane emissions by 40 per cent by 2035?
90. Do you support more funding for education and behaviour change initiatives to help households, communities and businesses reduce their organic waste (for example, food, cardboard, timber)?
91. What other policies would support households, communities and businesses to manage the impacts of higher waste disposal costs?
92. Would you support a proposal to ban the disposal of food, green and paper waste at landfills for all households and businesses by 1 January 2030, if there were alternative ways to recycle this waste instead?
93. Would you support a proposal to ban all organic materials going to landfills that are unsuitable for capturing methane gas?
94. Do you support a potential requirement to install landfill gas (LFG) capture systems at landfill sites that are suitable?
95. Would you support a more standardised approach to collection systems for households and businesses, which prioritises separating recyclables such as fibre (paper and cardboard) and food and garden waste?
96. Do you think transfer stations should be required to separate and recycle materials, rather than sending them to landfill?
97. Do you think the proposals outlined in this document should also extend to farm dumps?
98. Do you have any alternative ideas on how we can manage emissions from farm dumps, and waste production on farms?
99. What other options could significantly reduce landfill waste emissions across Aotearoa?

F-gases

Why reducing emissions in this sector matters

Fluorinated gases (F-gases) make up about 2.5 per cent of New Zealand's total emissions. This is a small proportion, but innovative technology could reduce these emissions promptly; by 2035, we could lower emissions from this sector by around 35 per cent.

F-gases are mainly used as refrigerants for heating and cooling, and are mostly hydrofluorocarbons (HFCs). They are potent greenhouse gases, with global warming potential (GWP) hundreds or thousands of times greater than CO_2. HFC refrigerants contribute a hugely disproportionate amount to global warming – hundreds or thousands of times more than the metric quantities used.

How we plan to reduce emissions from HFCs

What we are doing now

Kigali Amendment to the Montreal Protocol

Aotearoa has already taken a major step to reduce HFCs by ratifying the Kigali Amendment to the Montreal Protocol. This has been signed by 121 countries and requires parties to reduce the import and export of bulk HFCs. When fully implemented, the Kigali Amendment could mitigate up to 0.4°Celsius of warming globally if all countries achieve their goals.

The year 2020 was the first of our phase-down of HFCs under the Kigali Amendment. Our use of imported HFCs (to insert in equipment) will drop by 81 per cent in 2036, from a baseline of the average consumption in 2011–15.

Synthetic Greenhouse Gas Levy

Goods and vehicles containing HFCs or perfluorocarbons (PFCs) are subject to a levy on import or registration. This levy is linked to the price of carbon and is updated annually to reflect NZ ETS costs.

These existing policies are projected to reduce total HFC emissions by 17 per cent from 2019 levels by 2035.

Product stewardship

In July 2020, refrigerants were declared a priority product under the Waste Minimisation Act. A stewardship scheme must be developed and accredited for a priority product, and a regulation may require producers and sellers to join an accredited scheme. Manufacturers, importers, retailers and users would have to take responsibility for the emissions from refrigerants. The scheme is being co-designed by industry and the Government. The Ministry for the Environment will consult on the scheme regulations in early 2022.

The Synthetic Refrigerant Stewardship Working Group led the co-design of the product stewardship scheme for refrigerants. Read their report and recommendations.

Cumulatively, these policies are projected to reduce emissions by 23 per cent by 2035.

Potential measures

The heating and cooling sector is already making the transition to more environmentally friendly refrigerants. The Government is considering additional policies to support good industry practice. These proposals are projected to reduce emissions from F-gases a further 4 per cent below 2019 levels by 2035, bringing total estimated reductions to 35 per cent.

Planning for combined emissions reductions from heating and cooling

We are examining the role of refrigerants like HFCs in low-emissions heating and cooling. The transition to more sustainable heating and cooling is already happening; for example, buildings can be designed to require little or no air conditioning. And while nearly all domestic fridges in Aotearoa use refrigerants with very low GWP, technical constraints in sectors like transport refrigeration make this transition more difficult.

The Government could fast track progress through a cross-sector reduction of HFC refrigerants in heating and cooling systems. We could also speed up climate and social benefits by combining emissions reductions from refrigerants with other improvements to energy efficiency and building design.

We need to ensure that alternatives do not compromise the effectiveness of cold chains, New Zealanders do not face additional heating and cooling challenges, and health and safety standards are maintained.

Extending the phase down of HFCs

Extending the import phase down to include HFCs in finished products like heat pumps, air conditioning units, and refrigerators, as well as recycled HFCs, could bring all uses of HFCs under the same regulatory approach. When we sought feedback on the Kigali Amendment in 2018, some submitters said we should phase down the import of equipment containing HFCs, alongside the timetable for reductions in bulk HFCs required by the Kigali Amendment.

Regulating high-global warming refrigerants where alternatives are available

The Government is investigating phasing out finished products if they contain refrigerants with a high GWP, by certain dates. Aotearoa would not accept these refrigerants into the market if there were alternatives available. Doing this would limit the risk of dumping and ensure all businesses move as quickly as possible to more environmentally friendly alternatives. Applying restrictions on the type of refrigerants used for manufacturing in Aotearoa and servicing existing equipment could also help speed up the transition to alternatives. This transition could be achieved without negatively impacting the efficiency of heating and cooling appliances used by New Zealanders.

Global warming potential (GWP)

Refrigerants are classified by their global warming potential (GWP). This is a measure of a gas's ability to trap heat in the atmosphere, compared to carbon dioxide (CO_2). For example, if leaked to the atmosphere, a refrigerant with a GWP of 750 would have a warming impact 750 times that of CO_2.

We are considering dates by which it could be technically possible to restrict the sale and use of high-GWP refrigerants. This is an opportunity to gather data about the feasibility of transitioning to lower GWP refrigerants that will inform the development of policy. Consultation on these and other options will occur in due course.

This phase out proposal is based on two criteria – the accessibility and availability of alternative refrigerants.

- availability: products with lower GWP refrigerants and higher efficiency that are available for import

- accessibility: factors that could influence access to alternatives, including affordability, supply chains, regulations and servicing.

The criteria are based on research and modelling by the Montreal Protocol Technology and Economic Assessment Panel.

Table 8 outlines the dates by which we could restrict the:

- import or sale of products containing HFCs
- construction and installation of new systems using HFCs
- type of refrigerants that could be used in systems already in Aotearoa.

The possible transition times are *based on application* and show assumptions about available technology. Restrictions on refrigerants used to service existing systems may be better considered on a *by-refrigerant basis*.

The limits are based on the GWP of commonly used refrigerants, and their replacements.

Table 8: Draft schedule for phase out of goods and systems containing high GWP refrigerants

Application	Phase out limit and date: new goods and systems		Phase out limit and date: for servicing	
	GWP limit <750	GWP limit <150	GWP limit <750	GWP limit <150
Residential refrigerators and dehumidifiers	**2022** Low charge (less than 150g) means many are already using isobutane (GWP <1) or propane (GWP <1).	**2022**	**2023** R450A[51] (GWP 600) or R513A (GWP 32) are likely drop-ins (assume available by 2022).	**2028** Uncertain whether R600a could be a safe drop-in; 5-year delay to GWP <150 (after which appliances may become unserviceable).
Residential air conditioning, heat pumps and air conditioners	**2022** New systems rapidly moving to R32 (GWP 675).	**2026** One year after the EU's planned prohibition.	**2023** R466A (GWP 763) or similar are possible drop-ins.	**2032** A GWP <150 drop-in for service is unlikely; this date signals likely replacement.
Residential water-heating heat pumps	**2023** Lead time for locally made systems. HFCs, CO_2, R513A (629)/R450A (GWP 600) or R32 (GWP 675) should be viable.	**2025** May need system development to reach this target.	**2023** R513A (GWP 629)/R450A (GWP 600) are likely drop-ins.	**2032** A GWP <150 drop-in for service is unlikely; this date signals likely replacement.
Vehicle air conditioning excluding trains and buses	**2023 (new)** **2028 (used)** Most vehicles are imported; schedules depend on manufacturers.	**2023 (new)** **2028 (used)**	**2023** R513A (GWP 629)/ R450A (GWP 600)/ R446A (GWP 459) are likely drop-ins.	**2032** A GWP <150 drop-in for service is unlikely; this date signals likely replacement.

[51] Refrigerant types are categorised using 'R' numbers designated by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers. In this table, the GWP of different refrigerants are included for reference.

Application	Phase out limit and date: new goods and systems		Phase out limit and date: for servicing	
	GWP limit <750	GWP limit <150	GWP limit <750	GWP limit <150
Passenger vehicle air conditioning, eg, trains and buses	**2023 (new)** Flammability and efficiency are significant constraints.	**2032**	**2023** R513A (GWP 629)/ R450A (GWP 600) are likely drop-ins.	**2032** A GWP <150 drop-in for service is unlikely; this date signals likely replacement.
Commercial air conditioning, eg, office buildings and retail including VRF systems	**2024** Japan shifted to GWP <750 in 2020; readily available options expected soon.	**2029** Five-year lead time for GWP <150 as options are uncertain.	**2023** R513A (GWP 629)/ R450A (GWP 600) are likely drop-ins.	**2032** A GWP <150 drop-in for service is unlikely; this date signals likely replacement.
Commercial refrigeration – food retail, eg, supermarkets and self-contained cabinets	**2023** Self-contained cabinets can shift to isobutane (GWP <1) and propane (GWP <1) relatively quickly. Larger supermarkets can use CO_2.	**2023**	**2023** R513A (GWP 629)/ R450A (GWP 600) or similar are likely drop-ins.	**2032** A GWP <150 drop-in for service is unlikely; this date signals likely replacement.
	GWP limit <1500	**GWP limit <750**	**GWP limit <1500**	**GWP limit <750**
Commercial refrigeration with <40kW rated capacity excluding food retail and applications below -50°C, eg, food service, restaurants, walk-in cold rooms, milk vats	**2023** Limited non-flammable and efficient options.	**2028**	**2023** R513A (GWP 629)/ R450A (GWP 600) and R407H (GWP 1495) or similar are likely drop-ins.	**2032** A non-flammable GWP <750 drop-in for service is unlikely; this date signals likely replacement.
Transport refrigeration, eg, refrigerated trucks, shipping containers, fishing boats and reefer vessels	**2028** Charge size makes non-flammable refrigerants hard to use.	**2032**	**2023** R513A (GWP 629)/ R450A (GWP 600) and R407H (GWP 1495) or similar are likely drop-ins.	**2032** A non-flammable GWP <750 drop-in for service is unlikely; this date signals likely replacement.
	GWP limit <2500	**GWP limit <150**	**GWP limit <2500**	**GWP limit <750**
Industrial refrigeration, eg, stationary refrigerant systems with rated capacity >40kW excluding applications below -50°C	**2023** Most very large systems expected to use ammonia (GWP 0). Secondary systems allow safe use of a variety of refrigerants.	**2028** Allows time for medium-sized systems to change, to use lower GWP refrigerants.	**2023**	**2032**

QUESTIONS

100. Do you think it would be possible to phase down the bulk import of hydrofluorocarbons (HFCs) more quickly than under the existing Kigali Amendment timetable, or not?
101. One proposal is to extend the import phase down to finished products containing high-global warming potential HFCs. What impact would this have on you or your business?
102. What are your views on restricting the import or sale of finished products that contain high-global warming potential HFCs, where alternatives are available?

QUESTIONS

103. What are your views on utilising lower global warming potential refrigerants in servicing existing equipment?
104. Do you have any thoughts on alternatives to HFC refrigerants Aotearoa should utilise (eg, hydrofluoroolefins or natural refrigerants)?
105. Can you suggest ways to reduce refrigerant emissions, in combination with other aspects of heating and cooling design, such as energy efficiency and building design?

Forestry

Why forests matter to our climate change response

Aotearoa has a comparative advantage in the role forestry can play in our climate change response. We have a significant amount of land suitable for plantation forests, and suitable conditions for a number of rapidly growing plantation species that sequester carbon fast.

Our forests will play a critical role in meeting our targets, while growing a productive source of renewable materials that can provide substitutes for emissions-intensive materials and fossil fuels and support regional economies.

There are some key strategic considerations in thinking about the role of forestry:

- At current projected NZ ETS prices, it is likely forestry will over-deliver on the sequestration needed to meet our targets. In the medium term, it could be a low-cost buffer if other sectors of the economy under-deliver. Alternatively, this additional sequestration could be used to increase the ambition of our future international targets.
- If future forestry units push down the carbon price, this could also potentially delay gross emissions reductions.
- In the short term, in some rural communities forestry may displace other forms of land use and change the pattern and skill requirements of employment.

Sequestration

Sequestration from exotic forests is a low-cost way to meet our 2050 net zero target, which can be delivered at scale.

There is also potential to extend our native forests to deliver a slower growing, long-term carbon sink that provides many other environmental benefits.

We must balance the role of forest sequestration with gross emissions reductions from other sectors to ensure a cost-effective, equitable and timely transition.

Based on current policy settings, we estimate that between 806,000 and 1,370,000 hectares of new forest (native and exotic) could be planted between 2020 and 2050.[52]

[52] The range reflects different carbon price paths, based on the 'price floor' and the cost containment reserve trigger under current NZ ETS settings. While these projections use the results of the Afforestation and Deforestation Intentions Report 2021, significant uncertainty remains when predicting land-use intention and future actions of land owners. See Afforestation and Deforestation Intentions Survey 2020.

Based on these projections, forestry[53] will make an important contribution to emissions budgets from 2022 to 2035 (table 9) through sequestration. The level of sequestration from forests in the Commission's demonstration pathway falls within the range projected for each budget period. The Government estimates that in 2050, forestry could sequester between 18 and 32 million tonnes of CO_2e.

Table 9: Projected net carbon removals from forestry: current projections and the Commission's demonstration pathway (Mt CO_2e)

Net carbon removals from forestry for first three budget periods		2022–25	2026–30	2031–35
2021 Government projections	Lower	21	44	57
	Mid-range	24	50	71
	Upper	27	56	86
The Commission's demonstration pathway		26	50	69

Note: Projections are by their nature uncertain. Although scenario modelling allows for this, these scenarios are based on our best estimates of land owners' behaviour and does not consider future policy direction. They are an estimate only. Upper range assumes carbon prices around $50, average afforestation rates around 44,000 hectares per year 2020–50, and low deforestation rates. The mid-range assumes carbon prices around $35, average afforestation rates around 35,000 hectares per year 2020–50, and deforestation rates declining to around 750 hectares per year by 2050. Lower range assumes carbon prices around $20, average afforestation rates around 24,000 hectares per year 2020–50, and higher deforestation rates.

Other opportunities

Effective use of production forests as a renewable resource could support our transition.

Residues from harvest and wood processing are our largest source of renewable biomass, accounting for between 60 and 70 per cent of all residual and waste biomass resources. This resource will play an important role in the transition by providing low-emissions substitutes for emissions-intensive materials and fossil fuels. For example, research completed last year estimated there are sufficient wood residues generated through the harvest of existing production forests to replace 70 per cent of domestic aviation fuel consumption, or 30 per cent of all diesel consumption, with biofuels made from wood biomass (see Moving Aotearoa to a circular economy).

The Climate Change Commission's pathway: challenges and opportunities

The Commission proposes a significant shift in the level and type of afforestation compared to current projections. The most recent projections[54] suggest that between 450,000 and 710,000 hectares of new forest could be established between 2020 and 2035, with around 9 per cent native forest.

The Commission's pathway has around 710,000 hectares of new forest over the same period, with around 43 per cent (over 300,000 hectares) of that native. Rates of native afforestation reach 25,000 hectares in 2031 and continue at that rate out to 2050.

To put this in perspective, Te Uru Rākau New Zealand Forest Service estimates that up to 2.7 million hectares of low-productivity pastoral land may be suitable for new afforestation.

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[53] Forestry's contribution to emissions budgets and net zero includes sequestration from post-1989 forests up until their long-term average carbon stock, and emissions from pre-1990 and post-1989 forest deforestation activities.

[54] The projections were updated after the Afforestation Deforestation Intentions Survey.

This includes about 1.5 million hectares that could be suitable for planting production forestry, and 1.2 million hectares for new permanent forest, due to steep, erosion-prone land.

We are carefully considering how to encourage greater afforestation with native trees, particularly on land where there are few alternative uses due to economic and environmental limitations. Afforestation, including regeneration, will mainly be on private land (including Māori land), and we need to understand the support and incentives that could encourage land owners and others to undertake afforestation.

The sequestration pathway for forestry and the appropriate mix of forests must take into account uncertainty in afforestation rates and how policy uncertainty and change may lead to under- or over-delivery of forest sequestration.

How we plan for forests to meet our targets

What we are doing now

Grants and incentives

Current and historical grants and incentives have driven, and in some cases continue to drive, afforestation in Aotearoa. These schemes include the One Billion Trees Fund, Crown Forestry Joint Ventures, Permanent Forest Sink Initiative, Afforestation Grant Scheme, Hill Country Erosion Programme, and the Erosion Control Funding Programme.

Many of these forests will sequester carbon that counts towards our targets for decades to come (though grant-funded forests may not all be eligible to enter the NZ ETS[55]).

We estimate that forests planted as a result of these grants could sequester around 46 million tonnes CO_2e between 2022 and 2035.

New Zealand Emissions Trading Scheme

The NZ ETS is an important driver of afforestation, alongside log prices and the availability of affordable land.

Owners of eligible forests established after 1989 can register their forests in the NZ ETS and earn New Zealand Units (NZUs) for the carbon they sequester. They can choose to keep these NZUs or sell them.

Pre-1990 exotic forests face an NZ ETS deforestation liability (with some exceptions[56]) if the land is converted to a new use, such as farming. Post-1989 forests registered in the scheme are estimated to sequester around 91 million tonnes of CO_2e from 2022 to 2035.[57]

Afforestation rates are expected to continue to increase as the carbon price increases. The NZ ETS reforms have made it easier to participate in the scheme. This includes averaging

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[55] Both the Afforestation Grant Scheme (for all species) and the One Billion Trees Fund (for Pinus radiata) have stand-down periods where grant-funded forests cannot be registered in the NZ ETS. These were put into place to ensure the Crown was not 'paying' the forester twice: once with the grant and once with NZUs. The length of the stand-down ensures the value of the forgone NZ ETS NZUs was equal to the grant rate when the grant was issued.

[56] When deforestation obligations don't apply, MPI.

[57] Under our international Kyoto Protocol and 2030 Paris Agreement, Aotearoa is liable for all forest deforestation.

accounting (which provides more certainty on the returns from rotation forestry), and a new category for permanent forestry (incorporating the Permanent Forest Sink Initiative). Regulations to implement these decisions are in development, and are expected to come into force from 1 January 2023 (see Emissions Pricing).

Working with Māori on forestry opportunities

Māori have an interest across the whole forestry system, and are well positioned to contribute to and lead developments in forestry, both for exotic and native species.

Māori own $4.3 billion of forestry assets and more than 30 per cent of land under plantation, and large areas of native forest. A high proportion of Māori freehold land is pre-1990 forest.

Forestry is a significant employer, with around 2200 Māori working in the sector.[58] About 80 per cent of Māori-owned land is less versatile,[59] and if not already forested, is often suitable for forest cover.

We will work in close partnership with Māori to develop and implement forestry policies. We propose working with Māori groups, including forestry experts, over the remainder of 2021 to identify priorities and develop a Māori engagement strategy. This will guide how we work with Māori to develop policy from 2022.

Forestry and Wood Processing Industry Transformation Plan (ITP)

There is potential to reduce emissions by replacing emissions-intensive materials and fossil fuels with domestically manufactured wood products and wood-derived bioenergy, such as biofuels. Long-lived wood products such as engineered wood products could also be a substitute for emissions-intensive materials such as concrete and steel, and store carbon for many decades.

The Forestry and Wood Processing ITP will identify interventions to:

- increase onshore processing
- lift productivity
- scale up internationally competitive wood-processing clusters
- create a roadmap for transforming the sector.

It will develop a clear role for the Government in transforming the forestry sector, and set out a framework of policies for implementation.

The ITP will consider options for how forests can provide a more consistent supply of wood fibre, to attract investment in the production of low-emissions wood products and biofuels.

A draft of the ITP will be released for public consultation by early 2022.

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[58] Business and Economic Research Limited (BERL) and the Reserve Bank of New Zealand. 2020. Te Ōhanga Māori 2018 – The Māori Economy 2018.

[59] Statistics New Zealand, Land fragmentation.

A new planning and advisory service

The Government is setting up a new planning and advisory service within Te Uru Rākau New Zealand Forest Service. It will support the priorities for forests and forest products that emerge from the emissions reduction plan.

Potential policies

Decisions on sequestration will shape our path to net zero

The amount of sequestration required to meet our climate change targets will depend on how quickly we reduce gross emissions from all other sectors. To determine the optimal sequestration pathway, we will seek to balance the benefits of forestry against the risk that relying on sequestration might discourage the timely reduction of emissions.

Forestry is a long-term investment, and forest owners and managers need certainty to achieve the level of afforestation needed to meet our targets.

The Emissions pricing section of this document sets out the work proposed to consider the role of forestry in the NZ ETS over the longer term. That section seeks your feedback on whether NZ ETS-driven afforestation risks delaying gross emissions reductions in other sectors and tests the options presented by the Commission for feedback. It also sets out consultation questions on this topic.

If the Government decides that there is a need to manage the role of forestry removals in the NZ ETS, then this will shape the approach to further work set out below.

Establishing a long-term carbon sink

A variety of native and exotic species can form a permanent forest cover that delivers long-term sequestration, to offset hard-to-abate gases and sectors.

Native forests

New and regenerating native forests typically sequester carbon at a slower rate than exotic species. However, they provide other benefits such as native biodiversity, erosion control, freshwater quality, and social and cultural value. Current rates of native forest regeneration and establishment are low. The costs of establishing and maintaining native forests, particularly on marginal land, are high[60] and there are limited commercial returns.

We will investigate how to overcome barriers to planting and regenerating native forest. This will include working with the native nursery sector, and looking at the optimal mix of investment, direct regulation and price. We will decide on shorter term options regarding financial support by the end of 2021.

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[60] The cost of establishing one hectare of native forest depends on the purpose and type of forest. Initial stocking rates can vary from 750 stems per hectare to 5000+. A native forest established through regeneration or planting may cost from around $1500 to $50,000 per hectare, the lower end based on pure mānuka planting rather than mixed native. Species selection, plant size, site preparation, fencing, supplementary planting and maintenance (including pest and weed control) can have significant impact on the costs of a successful forest (native and exotic). In comparison, planting radiata pine may cost from around $1500 to $2500 per hectare. Regional variation, including topography and access, can also have a significant impact.

By the end of 2023 we will deliver a broader package of changes to bring down the cost of planting native forests, improve economic return, address supply chain barriers, develop sustainable models to incentivise afforestation and improve planting success.

Exotic forests

Exotic forests that provide permanent canopy cover can offer rapid, long-term sequestration and wider benefits, such as erosion control. Some land owners, including some Māori land owners, consider permanent or long-rotation exotics the most viable option for remote and marginal land. There are already examples of this, such as the long-lived redwood species.

Increasingly, non-harvest permanent pine is being planted mainly for carbon. We are aware that some communities are concerned about the potential impacts of large-scale permanent exotic forests on local economies and jobs, particularly if the land is suitable for other uses.

We will investigate the role of different types of permanent exotic forests, and whether and how the Government can influence the type, location or scale of these forests, with the aim of making decisions by the end of 2022. This will include options to ensure exotic plantation forests transitioning to native forests are managed in line with that intent.

Enabling and managing afforestation to achieve wider benefits and avoid adverse effects

We will look at whether there are opportunities to help deliver the Government's objectives for forestry through the current reform of the RMA. Existing national direction under the RMA, including the National Environmental Standards for Plantation Forestry (NES-PF), will be moved into the proposed National Planning Framework.[61] Where forests are not covered by the NES-PF, councils can make their own rules under the RMA. The RMA reform is an opportunity to consider how the potential risks and environmental effects may be managed, and whether national regulation is appropriate.

There may be opportunities for the regulatory system to support afforestation and sector development within the broader array of rural land uses and priorities.

We will consider other options outside the RMA to influence afforestation and forest management decisions, for example, targeting investment to marginal land, amending NZ ETS eligibility settings, and the new planning and advisory service.

We will investigate options to improve the resource management system, and to manage any environmental effects of forests, with the aim of making these decisions by the end of 2022.

Managing existing forests

There are 7.7 million hectares of native forest, and around 1.4 million hectares of pre-1990 planted exotic forest.

Of the native forest, there was an estimated 750 hectares (less than 0.01 per cent) of pre-1990 native deforestation in 2019 – 401 hectares was regenerating and 349 hectares tall forest. [62]

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[61] Plantation forests are deliberately established for commercial purposes, being at least one hectare of continuous cover of species that have been planted and have or will be harvested or replanted; NES-PF, regulation 3.

[62] Ministry for the Environment. 2021. *New Zealand's greenhouse gas inventory 1990–2019*. Wellington: Ministry for the Environment.

Aotearoa can claim both additional carbon storage that results from changes in how these forests are managed (if robust methods can be developed for estimating these) and avoided emissions in our pre-1990 forests towards our targets.

The main opportunity to improve climate outcomes from existing forests is through large-scale pest management.

We will also need to consider the balance between public and private investment. Rewarding landowners for extra sequestration in existing pre-1990 forest will be complex because of the challenges in measuring this. Work on these issues must align with and complement the work of the He Waka Eke Noa partnership and support the implementation of the Biodiversity Strategy.[63]

We intend to have a longer term work programme agreed by the end of 2021, building the evidence base for interventions to maintain and enhance sequestration and/or avoid carbon loss in existing forests.

Making an equitable transition

Afforestation is likely to be concentrated in areas of marginal, low-cost hill country, which often faces long-term demographic challenges. The purpose, scale and rate of afforestation will have different impacts at a local level (for example, whole-farm conversion vs forestry integrated on farms; production vs permanent forest).

More domestic processing of wood and better use of wood residues onshore is likely to increase benefits for communities, including more jobs.

A recent report by PwC has calculated that every 1,000 hectares of production forestry on average (per year) over its production cycle (25 to 30 years) contributes $1.7 million directly to the Aotearoa economy, and 11 direct full-time equivalent jobs (FTEs). When the indirect and induced contributions are added, the whole of the supply chain contributes $4.6 million and 38 FTEs per year on average. This compares with a direct contribution of $0.7 million and seven full-time equivalent jobs from sheep and beef farming. With indirect and induced contributions added, the whole of the sheep and beef supply chain adds up to $1.7 million and 17 FTEs. However, some caution needs to be taken in generalising from the results in the PwC report, as the figures are national averages and do not reflect the specific local impacts from any particular 1,000 hectares.

Afforestation can be concentrated on marginal land with high biodiversity value, and can affect native ecosystems.[64] Trees can be profitably integrated into hill-country farms to support a range of objectives including economic diversification, erosion control and native biodiversity.

Māori land owners often face constraints to developing land (for example, land is remote, ownership is complex, capital constraints), and policies such as grants, information and advisory services have often been poorly targeted to their specific needs. Policies such as the NZ ETS liabilities for the deforestation of pre-1990 exotic forest have limited land-use flexibility, particularly on land returned through Te Tiriti o Waitangi (Treaty of Waitangi) settlements. To ensure an equitable transition, we must design new models for sustainable land use that support people and are developed in partnership with Māori.

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63 Objective 13 of the Aotearoa NZ Biodiversity Strategy 2020 relates to nature-based solutions to climate change.

64 The Government is developing is proposing a National Policy Statement for Indigenous Biodiversity.

QUESTIONS

106. Do you think we should look to forestry to provide a buffer in case other sectors of the economy under-deliver reductions, or to increase the ambition of our future international commitments?
107. What do you think the Government could do to support new employment and enable employment transitions in rural communities affected by land-use change into forestry?
108. What's needed to make it more economically viable to establish and maintain native forest through planting or regeneration on private land?
109. What kinds of forests and forestry systems, for example long-rotation alternative exotic species, continuous canopy harvest, exotic to native transition, should the Government encourage and why?
    a. Do you think limits are needed, for example, on different permanent exotic forest systems, and their location or management? Why or why not?
    b. What policies are needed to seize the opportunities associated with forestry while managing any negative impacts?
110. If we used more wood and wood residues from our forests to replace high-emitting products and energy sources, would you support more afforestation? Why or why not?
111. What role do you think should be played by:
    a. central and local governments in influencing the location and scale of afforestation through policies such as the resource management system, ETS and investment
    b. the private sector in influencing the location and scale of afforestation?

    Please provide reasons for your answer.
112. Pests are a risk to carbon sequestration and storage in new, regenerating and existing forest. How could the Government support pest control/management?
113. From an iwi/Māori perspective, which issues and potential policies are a priority and why, and is anything critical missing?
114. Are there any other views you wish to share in relation to forestry?

How to have your say

The Government welcomes your feedback on this discussion document. The questions posed throughout this document can also be found on the Ministry for the Environment's website. They are a guide only; all comments are welcome. You do not have to answer all the questions.

To ensure your point of view is clearly understood, you should explain your rationale and provide supporting evidence where appropriate.

Timeframes

This consultation starts on 13 October 2021 and ends on 24 November 2021.

When the consultation period has ended, officials will analyse submissions and provide advice to the Government on the strategies and policies to be included in the emissions reduction plan.

How to provide feedback

There are two ways you can make a submission:

- via Citizen Space, our consultation hub, at https://consult.environment.govt.nz/climate/emissions-reduction-plan
- write your own submission.

If you want to provide your own written submission you can provide this as an uploaded file in Citizen Space.

We request that you don't email or post submissions, as this makes analysis more difficult. However, if you need to, please send written submissions to *Emissions reduction plan consultation, Ministry for the Environment, PO Box 10362, Wellington 6143* and include:

- your name or organisation
- your postal address
- your telephone number
- your email address.

If you are emailing your feedback, send it to climateconsultation2021@mfe.govt.nz as a:

- PDF, or
- Microsoft Word document (2003 or later version).

Submissions close at 11.59pm, 24 November 2021.

More information

Please direct any queries to:

Email: climateconsultation2021@mfe.govt.nz

Postal: Emissions reduction plan consultation, Ministry for the Environment, PO Box 10362, Wellington 6143

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, environment.govt.nz. Unless you clearly specify otherwise in your submission, the Ministry 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 document under the Official Information Act.

The Privacy Act 2020 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 agencies working on the emissions reduction plan (the Ministry for the Environment; Ministry of Foreign Affairs and Trade; Ministry of Business, Innovation, and Employment; Ministry of Transport; Ministry of Primary Industries; Ministry of Housing and Urban Development; Ministry of Social Development; Department of Prime Minister and Cabinet; Te Puni Kōkiri; Treasury; Te Arawhiti; Te Waihanga; Public Service Commission; Waka Kotahi; Energy Efficiency & Conservation Authority) only in relation to developing the emissions reduction plan, including assessing policies within the plan. Please clearly indicate in your submission if you do not wish your name to be included in any summary of submissions that the Ministry for the Environment may publish.

Appendix: Waste emission policy options and supporting technical information

Table 10: Waste policies abatement scenarios for each budget period

Policy/programme	First budget 2022–25 (kt CO_2e)	Second budget 2026–30 (kt CO_2e)	Third budget 2031–35 (kt CO_2e)	All budgets 2022–50 (kt CO_2e)
Food waste kerbside collection				
Low – kerbside collection in major urban areas (pop > 100,000)	-16	-147	-231	-1,183
Medium – kerbside collection in major and large urban areas (pop > 30,000)	-24	-218	-344	-1,757
High – kerbside collection in major, large and medium urban areas (pop > 10,000)	-25	-235	-371	-1,895
Garden waste kerbside collection				
Low – kerbside collection in major urban areas (pop > 100,000)	+6	+10	-19	-206
Medium – kerbside collection in major and large urban areas (pop > 30,000)	+10	+16	-31	-332
High – kerbside collection in major, large and medium urban areas (pop > 10,000)	+11	+18	-34	-362
Limits and ban on food and garden waste to managed landfill				
Low – ban on food and garden waste by 2040	-16	-224	-542	-4,445
Medium – ban on food and garden waste by 2035	-12	-350	-832	-5,317
High – ban on food and garden waste by 2030	-18	-438	-1,050	-5,754
Limits and ban on other organic waste (non-food and garden) to managed landfill				
Low – ban on other organic waste by 2040	-8	-86	-240	-2,370
Medium – ban on other organic waste by 2035	-9	-130	-367	-2,927
High – ban on other organic waste by 2030	-13	-166	-458	-3,218
Reduction of paper waste to managed landfill due to commercial recycling initiatives				
Low – 15% reduction of paper waste	-2	-23	-64	-466
Medium – 30% reduction of paper waste	-4	-47	-127	-932
High – 50% reduction of paper waste	-7	-78	-212	-1,553
Reduction of wood waste to managed landfill due to construction changes				
Low – 5% reduction of wood waste	-1	-6	-17	-125
Medium – 10% reduction of wood waste	-1	-12	-34	-250
High – 20% reduction of wood waste	-2	-25	-68	-499

Policy/programme	First budget 2022–25 (kt CO_2e)	Second budget 2026–30 (kt CO_2e)	Third budget 2031–35 (kt CO_2e)	All budgets 2022–50 (kt CO_2e)
Reduction of food and garden waste due to education campaign				
Low – small-scale campaign	**-5**	**-29**	**-37**	**-200**
Medium – medium-scale campaign	**-7**	**-38**	**-49**	**-267**
High – large-scale campaign	**-9**	**-48**	**-61**	**-334**
Expansion of landfill gas (LFG) capture to managed landfills without LFG capture systems				
Low – expansion to largest landfill (without existing system)	**-64**	**-332**	**-260**	**-1,123**
Medium – expansion to two largest landfills	**-93**	**-483**	**-379**	**-1,637**
High – expansion to all managed landfills except small (<500 tonnes annual waste)	**-163**	**-846**	**-663**	**-2,866**
Existing LFG capture system efficiency improvement				
Low – efficiency improvement by 1% (absolute)	**-20**	**-76**	**-119**	**-626**
Medium – efficiency improvement by 2.5% (absolute)	**-49**	**-190**	**-298**	**-1,564**
High – efficiency improvement by 5% (absolute)	**-99**	**-380**	**-596**	**-3,128**
Limits and ban on organic waste to unmanaged landfill*				
Low – ban on organic waste by 2040	**-28**	**-272**	**-738**	**-6,957**
Medium – ban on organic waste by 2035	**-30**	**-411**	**-1,127**	**-8,661**
High – ban on organic waste by 2030	**-42**	**-525**	**-1,406**	**-9,570**
Total reduction				
Low	**-138**	**-982**	**-1,874**	**-15,313**
Medium	**-197**	**-1,522**	**-2,887**	**-19,436**
High	**-335**	**-2,235**	**-3,870**	**-23,006**
Emissions without these policies	**12,858**	**15,855**	**15,741**	**91,721**
Emissions with these policies				
Low	**12,720**	**14,873**	**13,867**	**76,408**
Medium	**12,661**	**14,333**	**12,854**	**72,285**
High	**12,523**	**13,620**	**11,871**	**68,715**
Emissions budget (Commission's path)	**12,402**	**13,516**	**11,598**	**64,135**

Note: negative values indicate emissions reductions; positive values indicate increased emissions

Glossary

Term	Definition
2050 target	Net zero emissions of all greenhouse gases (except biogenic methane) and biogenic methane emissions reductions of 24–47 per cent below 2017 levels.
Abatement	Efforts to reduce or remove emissions.
Active travel	Walking, cycling and other non-motorised forms of travel.
Adaptation	Efforts to respond to a changing climate.
Anaerobic digestion	The process of breaking down organic material in the absence of oxygen; used to manage waste or to produce fuels.
Bioenergy	Renewable energy produced by living organisms.
Biofuel	Fuel produced from plant or animal waste.
Biogenic methane	Biogenic methane is made in different ways by natural processes involving plants and animals. As a greenhouse gas, methane is 25 times more potent than CO_2 and dominates emissions from waste and agriculture. Human activities create additional methane emissions that otherwise would not have occurred naturally (such as through decomposition of organic waste in landfills). Biogenic methane emissions from agriculture and waste make up 41 per cent of our gross emissions (agriculture 91 per cent, waste 9 per cent).
Carbon sequestration/ sink	Any reservoir, natural or otherwise, that absorbs more carbon than it releases, thereby lowering the concentration of CO_2 in the atmosphere. Examples include vegetation, forests, peatland and the ocean.
CCRA	Climate Change Response Act 2002.
Circular economy	An economic system based on designing out waste and pollution, reusing products and materials, and regenerating natural systems.
Cleantech	Clean technology – refers to a wide range of environmentally friendly practices and technology.
Climate Change Commission (the Commission)	A Crown entity that gives independent, evidence-based advice to the Government, to help Aotearoa move to a climate-resilient, low-emissions future.
Climate Change Response (Zero Carbon) Amendment Act	This Act sets a framework for emissions targets: reduce net emissions of all greenhouse gases (except biogenic methane) to zero by 2050; and reduce emissions of biogenic methane to 24–47 per cent below 2017 levels by 2050, including to 10 per cent below 2017 levels by 2030.
CO_2	Carbon dioxide.
CO_{2e}	Carbon dioxide equivalent. Used to describe and compare different types of greenhouse gases, by comparing their warming potential to that of CO_2.
Cost containment reserve (CCR)	The CCR is a reserve volume of units available to be released to the NZ ETS market if the CCR trigger price is hit at auction.
Decarbonise	Reduce CO_2 emissions through the use of low-carbon power sources.

Term	Definition
Distributional impacts	The effects of environmental policies (for example, higher transport or energy costs) across households, iwi/Māori, businesses, communities and regions. Some groups may pay more, or receive fewer benefits from the policies.
Embodied emissions	For construction materials or products, this is the amount of carbon emissions released throughout their supply chains. This includes raw material extraction and transportation, manufacturing processes, construction site activities and material losses, repair, maintenance and replacement, as well as the end-of-life processing. For a building, the embodied carbon is the sum of the embodied carbon of all the constituent materials or products within the building.
Emissions budget	The cumulative amount of greenhouse gases that can be emitted over a certain period. Aotearoa legislation requires three budgets to be in place at any given time.
Emissions	Greenhouse gases, especially CO_2, released into the atmosphere, where they trap heat or radiation.
Emissions reduction plan	A pathway towards the 2050 emissions target, with policies and strategies to reduce and remove emissions, in order to meet each emissions budget.
F-gases	Fluorinated gases, mainly used as refrigerants for heating and cooling.
Fossil fuels	Fuels such as coal, fossil gas and LPG, that release greenhouse gases and have potential health risks.
Fossil gas	Commonly known as natural gas. The term 'fossil gas' is used to distinguish methane from the lithosphere (under the ocean floor or on land) from methane from the biosphere (animal and biological waste). See biogenic methane.
Fugitive emissions	Leaks of gases or vapours from containers (for example, appliances, storage tanks).
Global Warming Potential (GWP)	The GWP of a greenhouse gas is its ability to trap extra heat in the atmosphere over time, compared to CO_2. A common GWP scale allows us to compare the impact of emissions and reductions of different gases.
Greenhouse gases	Gases in the atmosphere that trap the sun's heat by preventing it from leaving the atmosphere. Common greenhouse gases include water vapour, CO_2, methane and nitrous oxide. Greenhouse gases covered by the CCRA are CO_2, methane, nitrous oxide, HFCs, perfluorocarbons and sulphur hexafluorides.
Hydrofluorocarbons (HFCs)	Manmade greenhouse gases, with high GWP, used in refrigeration, air conditioning and other processes.
Hydrofluoroolefins	Alternative natural refrigerants with low GWP and zero ozone depletion potential.
ICE	Internal combustion engine (eg, in vehicles), which uses petrol or diesel and emits CO_2.
Kaitiakitanga	Stewardship, guardianship.
Kt CO_2e	Kilotonnes (thousand tonnes) CO_2e.
LFG	Landfill gas, a by-product of decomposing organic waste in landfills, mainly composed of methane and CO_2.

Term	Definition
LFG capture	The process used at modern landfills to capture landfill gas, which is then used for energy or flared.
LPG	Liquefied petroleum gas.
Managed landfill	Class 1 or municipal solid waste landfill (classification used for our greenhouse gas inventory).
Mātauranga Māori	Māori knowledge and knowledge systems.
Mitigation	Efforts to reduce or prevent emissions.
Mode-shift	A change from one form of transportation to another, eg, from a car to a bike.
MRF	Materials recovery facility.
Mt CO_2e	Megatonnes (million tonnes) CO_2e.
Municipal landfill	A landfill that accepts household waste as well as other wastes. Classified as Class 1.
NABERSNZ rating	An independent, government-backed system for rating the energy efficiency of office buildings.
National Climate Change Risk Assessment (NCCRA)	In August 2020, the Government released the first National Climate Change Risk Assessment. This risk assessment highlighted risks covering all aspects of life from our ecosystems and communities to buildings and the financial system. The Government is now working on developing its response to the risks in the report, through the National Adaptation Plan. The Climate Change Commission will produce further national climate risk assessments at least every six years.
NDC	Nationally Determined Contribution (NDC). An NDC represents the contribution a party to the Paris Agreement will make to the global effort to reduce emissions (both domestically and internationally). Our first NDC is currently an economy-wide, absolute emissions reduction target to reduce greenhouse gas emissions by 30 per cent below 2005 levels by 2030.
Net zero	In Aotearoa this means completely negating the amount of greenhouse gases, produced by human activity (except biogenic methane) by 2050. This can be done by balancing emissions and removals of greenhouse gases, or by eliminating emissions from society.
NZ ETS	New Zealand Emissions Trading Scheme is a key tool for meeting our domestic and international climate change targets. It places a price on greenhouse gas emissions and requires all sectors of our economy, except agriculture, to pay for their emissions.
Operational emissions	Emissions from energy and other resources used when operating a building.
Ozone	A gas that occurs high in the atmosphere, where it protects the earth's surface from harmful ultraviolet (UV) rays. Some greenhouse gases and human activity can deplete ozone and reduce its protective effect.
Paris Agreement	A legally binding international treaty on climate change mitigation, adaptation and finance, adopted by 196 parties in Paris and signed in 2016.

Term	Definition
Product stewardship	A scheme in which a producer, importer, retailer or consumer takes responsibility for reducing a product's environmental impact.
Rangatiratanga	Right to exercise authority and leadership, self-determination, ownership.
Recovery	Reusing and recycling waste.
Resilience	The ability to prepare for, and respond to hazards, risks and trends related to climate change.
Rohe	District, region, territory.
RMA	Resource Management Act 1991.
Shared mobility	Transportation resources or services that are shared among users. This includes carpools, car sharing and shared micromobility.
Submission	Feedback and views from individuals or organisations on a proposal (eg, in a discussion document), which they send to the relevant Ministry.
Takiwā	District, region, territory.
Te ao Māori	The Māori world view, acknowledging the interconnectedness of all living and non-living things.
Te Tiriti	Te Tiriti o Waitangi/the Treaty of Waitangi.
The Ministry	The Ministry for the Environment.
Waste disposal levy	A levy (fee) on waste sent to municipal (Class 1) landfills. Revenue from the levy is used for initiatives to reduce waste and encourage resource recovery. From 2021 this rate will progressively increase and from 2022 the levy will be expanded to apply to more landfill types.
Waste hierarchy	A pyramid framework ranking the preferred order of waste disposal, with preventing and reducing waste at the top, and sending to landfill at the bottom.
Zero Carbon Framework	A legislated framework that includes tools to reduce our greenhouse gas emissions (targets, emissions budgets and emissions reduction plans) and improve our climate resilience (national climate change risk assessments and national adaptation plans).