Our Climate Your Say!

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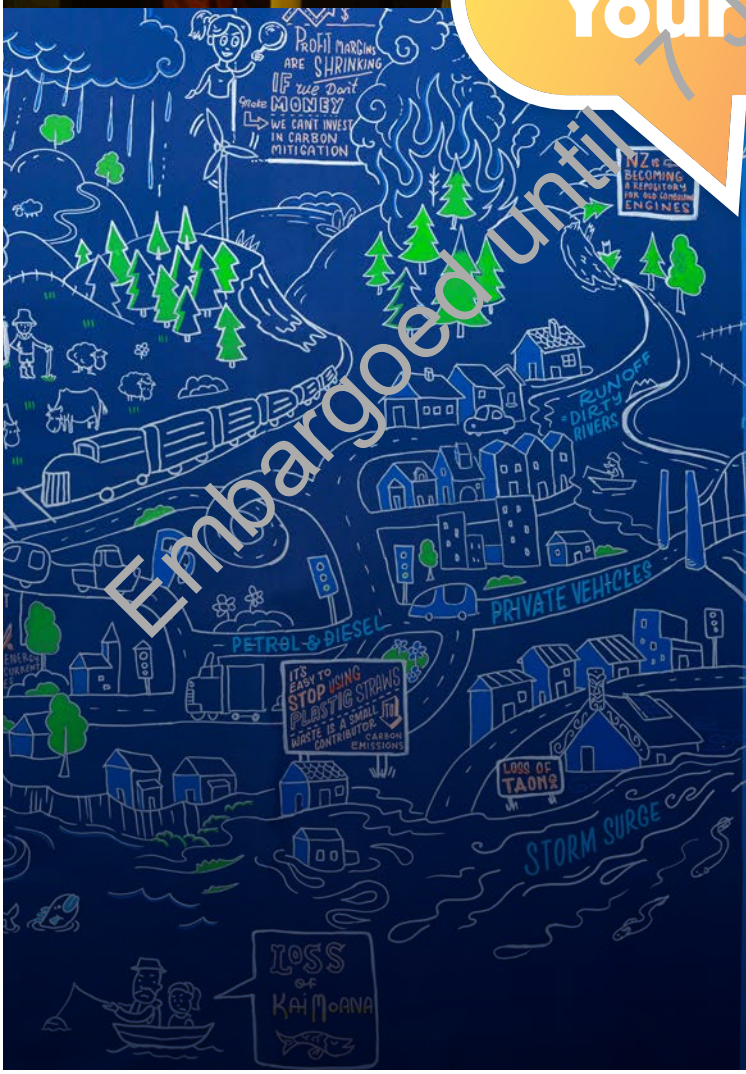

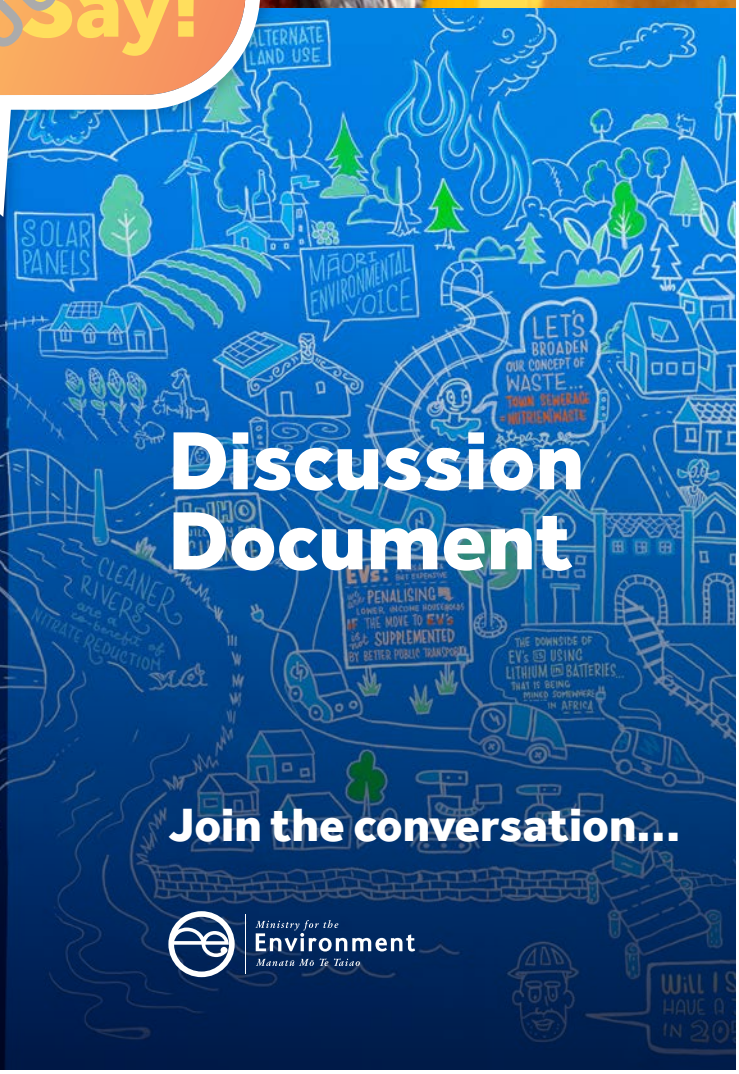

Discussion Document

Join the conversation...

Ministry for the Environment
Manatū Mō Te Taiao

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Ministry for the Environment
Manatū Mō Te Taiao

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How to use this document

You have a part to play in deciding how New Zealand responds to climate change.

Finding your way around the document

- We have produced a stand alone **Executive summary** that includes background information, a summary of the proposals in the Zero Carbon Bill and next steps.
- This summary is followed by the full consultation document, which contains three parts:

  Part one – Introduction

  – Outlines what climate change is, the impact it is having and our local and global context.

  Part two – Proposals for the Zero Carbon Bill

  – Sets out the proposals for the Bill, including the targets and the stepping stones to meet them, the Climate Change Commission and how we can plan to adapt.

  Part three – What happens next?

  – Contains information about the upcoming events, meetings and hui, and details the process for developing, finalising and implementing the Zero Carbon Bill.

To find more information

- Visit the Online Engagement Portal at http://www.mfe.govt.nz/have-your-say-zero-carbon.
- Ask the Zero Carbon Bill team at ZCB@mfe.govt.nz.
- Attend one of the events and hui held around the country and online.

Have your say on the Zero Carbon Bill

Please provide feedback by completing our submission form online, available at www.mfe.govt.nz/node/consultations.

Alternatively, you could download the submission form online (or request it from us) or write your own submission. Either email this submission to ZCB.Submissions@mfe.govt.nz (Microsoft Word document (2003 or later) or PDF) or post to Ministry for the Environment, PO Box 10362, Wellington, 6143.

In your submission include:

- your name or organisation name
- your email, or postal address.

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

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

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Message from the Minister

Over the past summer, many New Zealanders have experienced the changing climate in their everyday lives. The seas we swam in were warmer than anyone could remember. We had months of almost uninterrupted spectacular weather.

I say 'almost' because it was interrupted by a severe storm in January and two Pacific cyclones in February – Gita and Fehi. Roads were washed into the sea in the Coromandel, Auckland's Tamaki Drive was flooded (again) and Golden Bay saw huge landslides and damage to crops.

New Zealand has always had dramatic weather. But the frequency and the severity of storms, coastal and river flooding, droughts, and wildfires are increasing. These will continue to increase, as long as people continue to add large amounts of greenhouse gases into our atmosphere.

The costs to us are also increasing. We are seeing lost agricultural production, flood clean-up costs, sea-wall and road reconstruction, and so on. Insurance companies and banks are rethinking their risk profiles and premiums for coastal homes and businesses.

All of this sounds like a lot of bad news – but we now have many of the tools that we need to fix it. And, in doing so, we can grasp an extraordinary opportunity to upgrade our economy, not just to be 'clean and green' but also more productive, more resilient and better paid.

A new industrial revolution is taking place. This is happening, particularly in energy and transport, but also in every other sector of the economy, including agriculture.

Those leading the way are developing intellectual property, new technology and the products and services of the 'low-carbon economy'. Those that do not lead are letting the opportunity pass them by.

In New Zealand, investment has been held back by the lack of a clear position on climate change or any signal about the direction we want the economy to go in. Will we stick with our current reliance on traditional (and high pollution) technologies and products? Or will we commit to replacing those technologies with new, clean ones?

The Zero Carbon Bill is designed to create certainty. It is intended to provide a long-term and stable policy environment, with a clear emissions target and a guided pathway to get us there.

That certainty will drive investment in new industries and create new jobs to upgrade our economy. We have opportunities to increase our renewable electricity generation, plant more trees, invest in new technologies, continue our world-leading research into reducing emissions on our farms, and support the growing Māori economy.

The transition will affect every sector of the economy, but the change will be more far reaching in some than others. For that reason, we are absolutely committed that this transition will be planned, gradual and carefully phased in. We have had other transitions

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before, which were not well managed and led to displacement and upheaval. For this to work, we need to make sure we bring everyone with us and leave no one behind.

Cast your mind back 30 years, to 1988. The internet did not exist, at least not in its current form. But try to imagine running your school or your farm or your bank without the internet today. It has transformed every aspect of the economy – and our lives. It has been disruptive, and it has also created tremendous opportunity and whole new industries.

A planned transition over time gives us the best chance of minimising the negative social and economic impacts of change so it is just and fair for people, communities and regions. The longer we leave our planning, the more abrupt and difficult change will be. We want to avoid that risk.

We are not starting from scratch. Nearly 10 years ago, the then Prime Minister Rt Hon John Key made a commitment to halve our emissions by the year 2050, and we have taken the first steps towards that.

But, in 2015, we, alongside almost all countries in the world, decided that the world should achieve net zero greenhouse gas emissions by the second half of this century through the Paris Agreement. This Government has committed to setting a net zero target for New Zealand to meet by 2050. We seek your views on what this target should look like during this consultation.

Setting a new long-term target will be a clear signal of our commitment to the Paris Agreement, including its collective goals and our own contribution to global action. Our implementation journey has begun. Many of New Zealand's largest businesses have already gone 'carbon neutral', and many others are working on it.

Now is the right time to set a target of net zero and put in place the institutions and the strategy to reach it. At its core, this is what the Zero Carbon Bill does.

With this challenge comes opportunity. Together, we can build a more sustainable economy that ensures New Zealanders can prosper.

I invite you to be part of the conversation.

Hon James Shaw
Minister for Climate Change

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Executive summary

The Government is committed to acting on climate change. We want to build a more sustainable economy that is better for the environment, creates jobs and improves New Zealanders' lives. We also want to show global leadership by demonstrating to other countries that New Zealanders can be better off while taking action to reduce our impact on the climate.

Countries around the world emit greenhouse gases from activities like driving cars, farming, burning coal and deforestation. A big increase in human-made greenhouse gases has occurred in recent years, causing the global climate to change rapidly.

Each year, we are seeing more and more extreme weather events. Seas are rising. Our regions, businesses and communities have already seen costly damage and disruption. We are paying more to repair our roads and railways and to keep other vital infrastructure running. These costs will continue to increase over time.

In 2015, almost every nation decided to take action together to address climate change by adopting the Paris Agreement. It sets the world on the path to net zero emissions by the second half of the century. Net zero means the emissions we create are no greater than what is removed from the atmosphere, from things like forests soaking up carbon dioxide. Many countries are transitioning their economies and will continue to in the years to come. A number have set long-term emissions reduction targets, including the United Kingdom (UK), the European Union, Canada, Sweden and Norway. The global economy will look very different by 2050, as a result.

Although New Zealand's share of global emissions is very small (0.17 per cent), countries like us make up around 30 per cent of total emissions. New Zealand's per capita emissions are high, compared with similar economies in the Organisation for Economic Co-operation and Development (OECD).

The Zero Carbon Bill is an opportunity for New Zealand to decide how it delivers its part in the global effort while encouraging action by others. The Bill puts a new target in legislation that gives us certainty about our long-term goals. It creates the institutions to help us get there and to hold us to account. It can also put in place the plans we need to respond to the growing impacts of climate change. We want New Zealanders to help us decide the shape and form of this Bill.

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Why we should take action

With action comes opportunity. By setting a long-term target, we will have time to adjust and to upgrade our economy. In 2011, New Zealand committed to reduce its emissions by 50 per cent below 1990 levels by 2050. Since then, we have ratified the Paris Agreement, which commits us to increasingly ambitious targets over time. Taking a fresh look at our 2050 target will bring us further in line with the Paris Agreement. A recent study from Westpac New Zealand found that taking early and planned action on climate change could save $30 billion by 2050, compared with taking delayed, then abrupt action later.[1]

[1] Westpac NZ (2018).

Over 30 years, New Zealand's economy will change, just as it has over the past 30 years. Taking action now means that we can:

- reduce the potential for sudden, drastic economic shocks
- gain an economic advantage as an early mover in emerging markets
- get the most from wider benefits like cleaner air and water and better health
- meet international commitments and encourage other countries to meet theirs.

This is our chance to build a high value economy that will hold us in good stead for the future. By upgrading our economy and preparing for the future, we can help make sure quality of life continues to improve for generations to come.

A move to a net zero emissions economy that is resilient to climate change will deliver health and environmental benefits. The air we breathe will be cleaner. More people catching buses and trains more often will reduce traffic congestion in our cities. Better insulation in homes for energy efficiency will reduce heating bills and lead to health cost savings and a higher quality of life because houses will be warmer, drier and healthier than they are now.

More forestry, in the right places, will improve the health of our birds, fish and plants. It will also improve water quality in our rivers and lakes and prevent erosion. Stronger climate action can also drive faster innovation as people find new solutions to old problems, and create new jobs.

Many Māori enterprises are involved in natural resource management including forestry, agriculture and fisheries. There will be opportunities for the Māori economy through the transition.

What the transition to net zero emissions could look like

There are plenty of ways we can take action. We can increase renewable electricity generation, plant more trees, invest in new technologies, shift our cars and trucks to electric and invest in public transport. We can also continue our world-leading research exploring how to reduce emissions on farms.

Change is not new. Our agriculture sector has responded to constant land use and other change over the past 70 years and, as a result, we are considered leading edge, globally.

Our economy is already dynamic and constantly adjusting to change. Jobs are continually created and lost. For some of us, the changes through the transition could be small or not noticeable – we could be driving vehicles powered by 100 per cent renewable electricity. For others, the changes could be bigger. The transition will affect how we travel, use land and what we produce and consume. Other countries, such as the UK, have shown that it is possible to reduce their emissions while growing their economy and maintaining a high standard of living.

It is uncertain how the future will unfold. We have used a range of studies to help us examine the impact of moving to a low-emissions economy. These can help us look ahead, but each has different strengths and weaknesses. Looking out to 2050 becomes less certain. The studies suggest changes will happen across all parts of our economy, including the following.

- As we reduce emissions, the economy will continue to grow but possibly less quickly. For example, if we make ambitious efforts to become a net zero emissions economy, gross

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domestic product (GDP) is estimated to grow by 1.9 per cent every year[2]. This is compared with an estimate of 2.2 per cent every year if we did not take new measures to reduce emissions. It is highly unlikely that New Zealand will take no further action on climate change in the period to 2050, given the international commitment to the Paris Agreement.

- We will need to invest in innovation and plant a lot more trees, to ensure we maintain a strong economy over the coming decades.
- If we set a net zero emissions target – the most ambitious target – some sectors and industries could decline or change and new sectors will emerge, creating new jobs. Businesses with high emissions will face challenges if they do not reduce them. The make-up of the workforce in some regions could change as a result.
- Low income households are likely to be more affected financially. The Government is committed to supporting those disproportionately affected.

The economic analysis we commissioned highlights the costs of taking action. Recent analysis also suggests that limiting global warming to 1.5 degrees Celsius instead of 2 degrees Celsius by mid-century could lead to an increase in global GDP of 1.5 per cent to 2 per cent and avoids damages from climate change globally of around $11 trillion to $16 trillion.[3]

Commitment to a fair and inclusive transition

We want to avoid sudden changes, by planning early. A planned transition over time gives us the best chance of minimising the impact on our jobs and livelihoods so it is just and fair for all New Zealand communities and regions. The Government is committed to this. Incorporating te ao Māori (the Māori world view) and kaitiakitanga (the concept of guardianship) in our approach, as well as working with industry across the agriculture, forestry, energy, transport and waste sectors, will help to get the transition right.

This could include training and upskilling people into new low emissions jobs and managing the timing of when policies would take effect. The Government is already looking into what else we need to do to support vulnerable regions, workers and communities, given the potential changes in the economy. Preparing for the change, and investing in our progress will make the transition less disruptive.

What drives a smooth transition?

A recent report from the New Zealand Productivity Commission identifies the core building blocks to a low emissions future: emissions pricing, laws and institutions, regulations and policies, and the right innovation and investment settings.[4] New Zealand is already making progress on these. For example, New Zealand was one of the first countries in the world to set up an emissions trading scheme.

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2 Please see the appendix for the full report for more information on the studies used to assess the economic impacts.

3 Burke et al., 2018.
Note the avoided damages are calculated using a 3% discount rate, and mid-century refers to the period between years 2046 to 2065.

4 New Zealand Productivity Commission (2018).

The previous and current Parliamentary Commissioner for the Environment[5] and the Productivity Commission[6] recommend the Government sets out the laws and institutions for a low emissions and resilient future, as other countries have. The Zero Carbon Bill responds to these recommendations by proposing to:

- set targets to reduce our emissions
- introduce the stepping stones (or budgets) to reach these
- set up the institutions to provide independent, expert advice and hold governments to account
- better understand the risks and to plan for how we adapt to climate change.

What the Zero Carbon Bill could do

This Bill sets the long-term commitment to transition us to a low emissions, climate resilient economy. It puts in place the core building blocks that will give certainty to New Zealanders that, no matter what government is in power, there will be a long-term approach to climate change that endures political cycles.

2050 target

A new 2050 target in the Bill would provide more certainty about the direction for the transition. This could help give businesses, households and local government a strong signal of the direction we are heading in as a country, and help people make confident choices about how to achieve our 2050 goal. Many other countries have already set ambitious long-term emissions reduction goals. The UK aims to reduce emissions by 80 per cent of 1990 levels by 2050. Canada is also aiming to reduce its emissions by 80 per cent in 2050 (relative to 2005 levels). The European Union's target is 80 to 95 per cent by 2050. Norway, Portugal and Sweden are seeking to achieve neutrality, or near-neutrality, by 2050 or earlier.

We want to hear your views on which net zero target is the right one for New Zealand.

- **Net zero carbon dioxide by 2050:** this target would reduce net carbon dioxide emissions in New Zealand to zero by 2050 (but not other gases like methane or nitrous oxide, which predominantly come from agriculture).
- **Net zero long-lived gases and stabilised short-lived gases by 2050:** this target would reduce emissions of long-lived gases (including carbon dioxide and nitrous oxide) in New Zealand to net zero by 2050, while stabilising emissions of short-lived gases (including methane).
- **Net zero emissions by 2050:** this target would reduce net emissions across all greenhouse gases to zero by 2050.

Each target has different implications for our climate and economy. Modelling suggests that, under any target, there will be significant increases in new forest planting and emissions reductions in transport and energy, as well as changes in how we use our land.

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5 Parliamentary Commissioner for the Environment (2017) (2018).

6 New Zealand Productivity Commission (2018).

We want to hear your views on the role the Climate Change Commission could have in setting the target. This could allow us to get independent advice before setting a target in law.

It may be worth New Zealand considering buying international emissions reductions with high environmental integrity from other countries, to meet a portion of its target. Although this may be a cheaper option in the short term, it would mean less investment in reducing domestic emissions.

Emissions budgets

The year 2050 is a long way away. To give more predictability, emissions 'budgets' are a necessary part of the Bill, because they set out how much greenhouse gas we can emit over a period of time, for example, five or six years.

Several choices are available around how we design this system, and we want to hear your views. For example, the duration of each budget, how far in advance we set them, whether they can be revised and what happens if they are not met.

Climate Change Commission

We propose the Zero Carbon Bill establishes a new Climate Change Commission. This would provide independent, expert advice and support New Zealanders and hold successive governments to account for progress.

We propose the Climate Change Commission advises the Government on emissions budgets to reach the target, and we also have a choice to make around the specific role the Commission could have with the New Zealand Emissions Trading Scheme (NZ ETS).

The Interim Climate Change Committee has already been set up to work on how we manage agricultural emissions and how we get to 100 per cent renewable electricity. The interim committee will be leading these issues outside of this consultation process and will develop analysis and evidence on them. The new Climate Change Commission would advise the Government on these issues, once the Zero Carbon Bill passes into law.

Adapting to the impacts of climate change

Even if we can reduce greenhouse gases globally, some climate change is already locked in and we will need to adapt. The Bill could help decision-makers manage climate change risks in a systematic way. The Bill could require the Government to develop national adaptation plans that prioritise actions based on regular risk assessments. We also want to explore whether a targeted adaptation reporting power might be set up. This could see some organisations share information on their exposure to climate change risks.

Your feedback will help shape the Zero Carbon Bill

We welcome your feedback on the proposals contained in the consultation document, which will help inform further policy development and shape what will become the Zero Carbon Bill. Once the Bill has been introduced into Parliament a select committee process will follow, with a view to passing the Zero Carbon Act by mid-2019.

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This will be followed by amendments to the Climate Change Response Act 2002, to strengthen the NZ ETS and help us implement the Paris Agreement. Public consultation on the NZ ETS will be undertaken through a separate process in August to September this year.

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Part one: Introduction

SUMMARY

Our climate is already changing, and our economy needs to respond as part of a global transition to a net zero emissions, climate-resilient future. This will require a fundamental economic shift in New Zealand.

As we have seen from transitions in the past, such as the industrial and digital revolutions, economic transitions can create challenges – but also opportunities. Taking early action in the right areas is likely to avoid the need for more abrupt action later.

We are fully committed to the emissions reduction goals embodied in the Paris Agreement. As New Zealanders, we need to make decisions about how we transition our economy, how far and how fast we go, and how we do it in a way that is fair, just and timely.

This is not just about the next three years, or the next six, but a decision that affects our collective long-term futures. What we decide must endure political cycles, whilst enabling successive Governments to make policy choices within a robust, transparent and lasting framework.

The Zero Carbon Bill can deliver the long-term goal and direction and set up the architecture to achieve a net zero emissions climate-resilient future. This is a critical conversation to have now, and we invite you to be part of it.

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What is climate change?

The Earth's atmosphere is made up of a large amount of nitrogen (78 per cent), oxygen (21 per cent) and a small amount of greenhouse gases (including carbon dioxide, methane and nitrous oxide). Greenhouse gases trap warmth from the sun and make life on Earth possible. Without them, the surface of the planet would freeze. But increasing greenhouse gases in the atmosphere trap more heat and cause the climate to change.

Over the past 200 years, there has been a big increase in human-generated greenhouse gases from activities like burning fossil fuels, farming and cutting down forests.[7] The global climate is changing rapidly compared with natural variations in the past. The world has already warmed about 1°C since 1900, and the increase in greenhouse gases is the main reason for this. The temperature will continue to rise and, if we do not dramatically curb emissions, the risks of harmful effects on people and ecosystems will increase.

Impact of climate change so far

We are already feeling the effects from a changing climate. In the past 100 years, seas have risen around 14 to 22 centimetres in New Zealand ports. More recently, we have suffered costly damage and disruption from coastal erosion, more frequent and severe weather events (flooding, droughts and wildfires) and damage to infrastructure and assets. This includes damage to sites of significance to Māori. Many Māori communities have ancestral ties to coastal areas with cultural heritage – marae, wāhi tapu and mahinga kai rohe.

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7 Trees act as a store or 'carbon sink' by absorbing or sequestering carbon dioxide over time through the process of photosynthesis. This means that, when areas are deforested, the carbon dioxide stored in those trees is released into the atmosphere.

The costs we face are continuing to rise. As an example, in the past 10 years, the cost of weather events to our transport network has risen from about $20 million per year to over $90 million per year.[8] The 2013 drought in the North Island cost the economy around $1.5 billion, and climate change will make droughts like this more likely.

Paris Agreement

In 2016, New Zealand signed the Paris Agreement. It sets out the international plan to put the world on track to avoiding dangerous climate change. It has been a game-changer: the world is now committed to a low emissions future.

The Paris Agreement says the world will:

- keep the increase in global average temperature to well below 2°C above pre-industrial levels, and pursue efforts to limit the temperature increase to 1.5°C, with an aim to reach peaking of global greenhouse gas emissions as soon as possible and to reach net zero emissions by the second half of the century
- enhance the ability of countries to adapt and reduce vulnerability to the adverse impacts of climate change
- make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient economies.

Our first target under the Paris Agreement is to reduce greenhouse gas emissions to 30 per cent below 2005 levels by 2030 (11 per cent below 1990 levels).

The Paris Agreement sets out developed countries' roles in the transition and says they should 'continue taking the lead by undertaking economy-wide, absolute emission reduction targets'. More detailed rules are due to be finalised this year. As a small country, our influence lies in holding ourselves and other countries to account to meet international commitments. Taking action at home helps give us a mandate to encourage other countries to do the same.

What do our emissions look like?

A large part of our economy is based on primary industries. Agriculture makes up nearly half of all emissions in New Zealand (figure 1). Its share of the national total is, on average, four times larger than for our OECD peers.

Most of New Zealand's electricity (about 80 per cent) is currently generated from renewable sources like wind and hydro. The Government has committed to making electricity 100 per cent renewable by 2035. We also have a sizeable forestry sector, which currently offsets about a third of our emissions.

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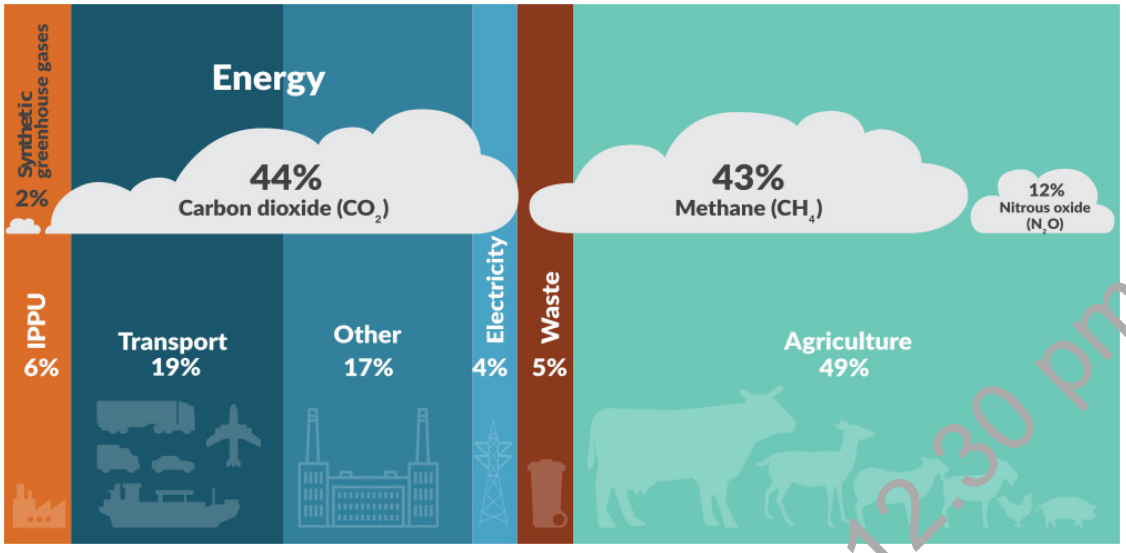
8 Ministry for the Environment (2017).

Figure 1: Emissions profile of New Zealand



Source: Ministry for the Environment. 2018b. *New Zealand Greenhouse Gas Inventory 1990–2016*. Wellington: Ministry for the Environment.

Note: Percentages may not add up to 100 per cent because they are rounded to the nearest per cent. IPPU stands for Industrial Processes and Product Use.

For more information on New Zealand's emissions profile, visit our website and look at the emissions inventory and emissions tracker.

Where are we starting from?

The Zero Carbon Bill will build on the progress New Zealand has already made on its international commitments and its Emissions Trading Scheme. It also builds on the steps many businesses and sectors have taken to reduce emissions and choices people are already making on how they get around and the products they buy.

Our towns and cities are contributing too. Regional and territorial authorities have a good understanding of how to adapt to climate change, and some are putting in place plans for creating low emissions communities. Government is working with iwi, communities and businesses to accelerate the transition. Many businesses have their own emissions reductions plans in place and are taking innovative steps to achieving their emissions reduction goals.

The Government's work to transition is already under way. Specific initiatives include:

- strengthening and improving the NZ ETS
- developing a land transport policy statement that supports investment in low emissions transport and urban design
- planting one billion trees
- establishing a Green Investment Fund, to stimulate new investment in low emissions industries
- continuing to develop practical solutions in the agriculture sector, where New Zealand is already a world leader, such as animal breeding and vaccines to reduce methane.

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MĀORI AND IWI LEADERSHIP IN THE TRANSITION

> Toitū te Marae o Tāne, Toitū te Marae o Tangaroa, Toitū te Iwi – When land and water are sustained, the people will prosper.

There are opportunities for iwi and Māori-owned businesses to show leadership in the transition. Te ao Māori and kaitiakitanga underpin leadership that can drive positive change. There will be opportunities for Māori enterprises through the transition; however, there will also be challenges. For example, Te Ture Whenua Māori Act 1993 has implications for how land can be used and is governed.[9]

As an example of a leading iwi-run farm, Ngāi Tahu Farming applies advanced best-practice land and water use across the nearly 100,000 hectares of dairy, sheep and beef farms and forestry land that it manages in Te Waipounamu (South Island). It is focusing on reducing greenhouse gas emissions through collaborative research and on-farm practices including tree planting to create carbon sinks.

It has been able to reduce stock while improving productivity. Ngāi Tahu Farming General Manager Shane Kelly believes the agriculture sector will play an important part in New Zealand's shift to a net zero emissions economy, advocating a collaborative and staged process. Farmers are looking for direction and leadership, he says. 'We all want to look after our environment and we need to work collaboratively as a nation. It's a huge opportunity, the question is, how do we make this work together as a nation?'

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[9] Note, Māori freehold land (which makes up 1.4 million hectares) has three unique characteristics. It comprises mainly small blocks with only a small proportion of arable land, it is subject to cultural importance to current and future generations, and it has individual, yet multiple owners.

Part two: Proposals

The transition will need to be deep and broad. We have choices around how far and how fast we go. For each choice we make, there will be opportunities and challenges as set out below.

OPPORTUNITIES:	CHALLENGES:
• reduce the potential for sudden, drastic economic shocks • get the most from the wider benefits in health and across the environment (eg, cleaner water and air) • avoid further damage caused by a changing climate (assuming the world continues to act in the same way) • drive faster innovation and productivity improvements • keep our small, export-led economy competitive • meet growing consumer demand for low emissions products and services • reduce sunk costs in infrastructure and other large-scale assets • benefit from mātauranga Māori (traditional knowledge) and te ao Māori through our Treaty of Waitangi partnership.	• the economy can continue to grow, possibly just not as quickly • significant changes to our energy, transport and agriculture sectors • some industries could experience decline while others emerge, with implications for jobs and regions • vulnerable communities could face a greater challenge • moving too early could affect the competitiveness of our trade-exposed businesses. This risks relocation of production to countries with less stringent climate change policies.

The Zero Carbon Bill aims to set the country's long-term commitment and provide transparency about what future policies we intend to use to achieve this. We are seeking your views on:

- the 2050 target
- emissions budgets
- the Climate Change Commission
- adapting to the impacts of climate change.

These core building blocks will give certainty to New Zealanders that, no matter what Government is in power, there will be a long-term approach that endures political cycles. Independent and expert institutions will keep Governments well advised and up to date on the science and help people hold politicians to account. This work will be guided by the following objectives:

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- **sustainable and productive economy:** continuing to develop and diversify the economy, while limiting greenhouse gas emissions and responding to the impacts of climate change
- **global and local leadership:** leading at home and internationally, with an ambitious and clear goal that stimulates innovation and is the main way for New Zealand to influence the global climate action response
- **creating a just and inclusive society:** managing the pace of the transition, and supporting Māori, regions and communities affected by transitional policies and inequities, and those affected by the damaging impacts of climate change.

2050 Target

SUMMARY

The Zero Carbon Bill proposes a new long-term emissions reductions target.

Three main considerations are involved in setting a new target: the Paris Agreement, the science of short-lived and long-lived gases and the potential economic impacts of different targets.

We explore three target options that could replace our current target of 50 per cent reduction below 1990 levels by 2050:

- **net zero carbon dioxide:** reducing net carbon dioxide emissions to zero by 2050
- **net zero long-lived gases and stabilised short-lived gases:** reduce emissions of long-lived gases to net zero by 2050, while also stabilising emissions of short-lived gases
- **net zero emissions:** net zero emissions across all greenhouse gases.

This section outlines the possible implications of different targets; whether we should use emissions reductions from overseas, the potential role of a new Climate Change Commission in setting targets, and how we could include flexibility to meet our targets over time.

We are seeking your views on:

- what target we should set
- how New Zealand should meet its emissions reduction targets
- whether the target should be able to change.

Consultation questions on this proposal can be found at the end of this chapter. The full list of consultation questions can be found in the attached submissions form and online.

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A new 2050 target

We propose introducing a new 2050 emissions reduction target through the Zero Carbon Bill. Putting a target in primary legislation would give it more prominence and discourage changes of ambition in response to short-term considerations.

Setting a new target would:

- provide an enduring, long-term signal to businesses, consumers and New Zealanders

- provide alignment to the Paris Agreement's global goal of reaching net zero emissions by the second half of the century
- help to inform our successive Nationally Determined Contributions[10] under the Paris Agreement
- signal to the world that New Zealand is playing its part in the global effort.

Setting the target in primary legislation would play an important role in:

- showing Parliament's long-term commitment to reducing emissions and provide clarity to New Zealanders about its policy objectives
- indicating the elevated priority level of the 2050 target (in relation to other Government considerations)
- discouraging changes of ambition in response to short-term considerations.

Setting targets is not new. New Zealand has already made commitments to reduce emissions to:

- 5 per cent below 1990 levels by 2020
- 11 per cent below 1990 levels by 2030 (or 30 per cent below 2005 levels by 2030)
- 50 per cent below 1990 levels by 2050.

Regardless of what decision is taken about a new 2050 target, the Government is still fully committed to implementing our Paris Agreement commitments and is focused on delivering our existing Nationally Determined Contributions by 2030.

All of the target options we consider are forms of net zero targets; they would all put New Zealand on a pathway to net zero emissions in the second half of this century. The difference between each option is the speed by which we would reach net zero emissions. The most ambitious target option we have considered, net zero emissions, would see us reach net zero emissions in 2050, whereas other options would put us on track to getting there in later years.

Setting the new 2050 target

Three main elements need to be considered when setting a new 2050 target:

- **the Paris Agreement**, because New Zealand has signed and ratified this global agreement
- **the science of short-lived and long-lived gases**, given the important differences between the impact of these gases on the climate
- **economic impacts**, meeting the different targets has implications for New Zealand's economy over the coming decades.

Paris Agreement

The Paris Agreement sets the gauge for international expectations around our efforts to reduce emissions over the long term.

[10] Nationally Determined Contributions are the efforts each country put forward under the Paris Agreement.

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The headline emissions reduction objectives of the Paris Agreement are:

- "holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels" – Article 2.1 (a)
- '[i]n order to achieve the long-term temperature goal set out in Article 2 […] to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century' – Article 4.1 (ie, achieving net zero emissions).

Any domestic action needs to be consistent with our commitment to the Paris Agreement goals. By honouring our commitments, we are better placed to encourage other countries to keep to theirs, including countries with much greater emissions than our own.

Science of different gases

Any target we set needs to be informed by the best available climate change science. Nearly half of New Zealand's greenhouse gas emissions come from agriculture, which means we need to pay particular attention to the scientific impact of short-lived gases like methane, which dominate agriculture's emissions.

SHORT-LIVED AND LONG-LIVED GASES

Short-lived gases like methane decay relatively rapidly in the atmosphere. They last for decades rather than centuries. This means global temperatures can be stabilised without necessarily reducing emissions of these gases to zero. We also have an opportunity to lower the impact even further by not only stabilising but also, where possible, reducing short-lived gases from our economy.

Long-lived gases like carbon dioxide either need to reduce entirely to zero or at least to the point where emissions can be balanced out by an equal amount of removals, for example, by planting new forests.

There are two scenarios where New Zealand's domestic emissions impact on global temperatures could be defined as zero.

- Reducing long-lived greenhouse gas emissions to zero and stabilising our short-lived gases, which would mean our domestic emissions would not contribute to any further increase in global temperatures.
- Reducing all greenhouse gas emissions to net zero, which would mean our domestic emissions would have no impact on the climate from that point forward.

Hypothetically, if both scenarios were applied worldwide then global temperatures would stabilise in each case, but they would stabilise at a lower temperature under the second scenario.

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Economic outcomes

To meet these targets, we are likely to need changes to the way New Zealanders work, travel and consume. This means it is important for us to try to understand the range of potential economic outcomes. Further information is included below.

Options for a new climate change target for 2050

This section examines the following three potential outcomes from different 2050 target options that would supersede our current 2050 target.

- **Net zero carbon dioxide by 2050:** this target would reduce net carbon dioxide emissions in New Zealand to zero by 2050 (but not other gases like methane or nitrous oxide).
- **Net zero long-lived gases and stabilised short-lived gases by 2050:** this target would reduce emissions of long-lived gases (including carbon dioxide and nitrous oxide) in New Zealand to net zero by 2050, while stabilising emissions of short-lived gases (including methane).
- **Net zero emissions by 2050:** this target would reduce net emissions across all greenhouse gases to zero by 2050.

Table 1 provides further information on these three outcomes.

WHAT DOES 'NET' MEAN?

Gross emissions cover greenhouse gases from the parts of the economy that we traditionally think about as emitters – for example, cars, factories and livestock.

The term **net emissions** is normally used to describe gross emissions minus the emissions removed from the atmosphere through the impact of land use and forestry.

Different ways can be used to account for forests against our targets. Options include accounting for new forests only, as in our current target accounting, or including all forests, as reported in Ministry for the Environment's Greenhouse Gas Inventory.

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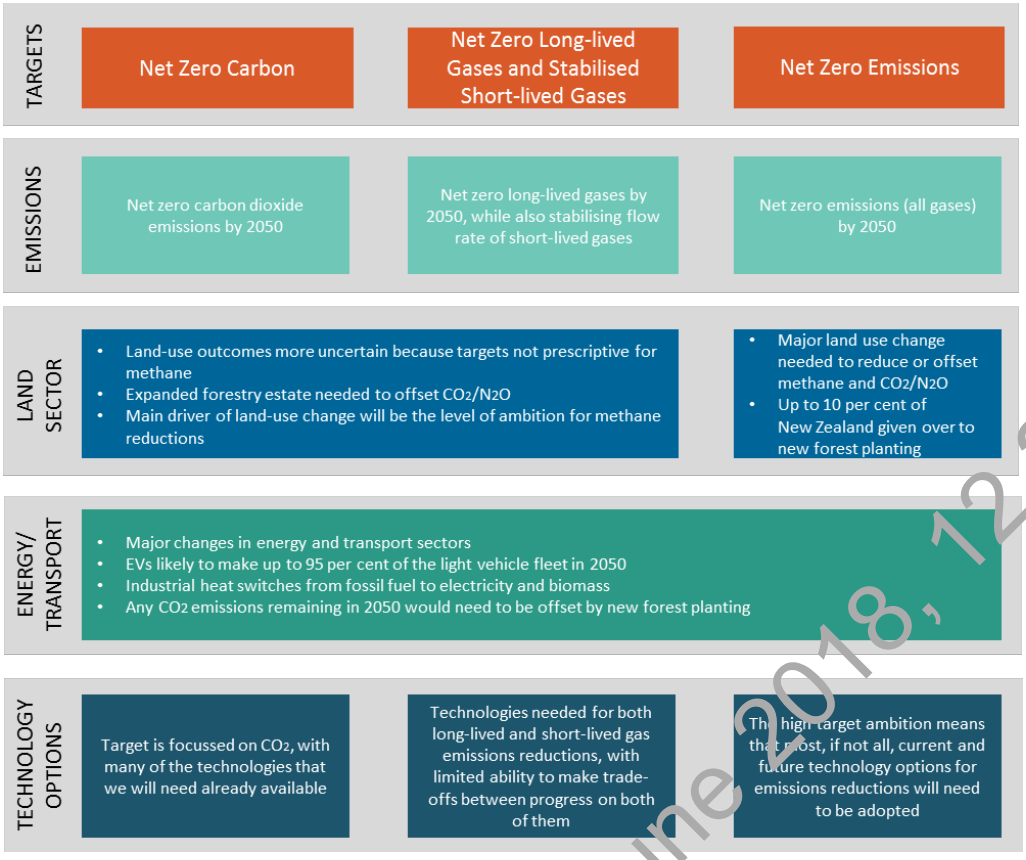
Table 1: Economic and emissions outcomes of the options for the 2050 target



Note: CO_2 = carbon dioxide; EVs = electric vehicles; N_2O = nitrous oxide.

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Studying the economic impacts

We have looked at a series of models and other studies, to assess the implications for the New Zealand economy.[11] This work can give a general sense of the range of economic impacts of our target options. This includes how they might affect different sectors, regions and households.

These studies have been carried out by a range of sources, including independent external experts and government economists.

Under any of the 2050 target options, our economy can continue to grow, possibly just not as quickly as it might have done without any further climate action. Table 2 provides a summary of the economic opportunities and challenges that could result from further climate action.

To keep our economy growing, we would need to substantially expand our forest estate while continuing to innovate. Some households and sectors are likely to face higher costs and more disruption than others. The Government is committed to an approach that includes policies to support a fair and inclusive transition.

[11] See the appendix for more information on the studies used to assess the economic impacts.

Table 2: Summary of the economic opportunities and challenges

Opportunities	Challenges
We could see: • higher rates of innovation in sectors exposed to a higher emissions price, leading to an up-lift in productivity • new business opportunities in lower emissions sectors • less time wasted in traffic congestion and improved health from switches to public and active transport • health benefits from warmer and drier homes • if the rest of the world acts as well, reduced impact on our economy from climate change efforts.	We could face: • slower rates of economic growth as a result of higher emissions prices and other transition policies • competitiveness issues in trade-exposed emissions-intensive industries • decline in output and jobs for higher emissions sectors • slower rates of growth in household incomes

Opportunities

Our research has explored the opportunities for stronger climate change policy to deliver wider positive effects. While opportunities are often more difficult to quantify than economic costs, many previous studies, from both New Zealand and overseas, have calculated substantial wider benefits of transitioning to a low emissions economy or estimated the scale of the problem.

These studies have informed the Ministry for the Environment paper on the co-benefits of emissions reductions, and the benefits to the New Zealand economy of avoiding damage caused by climate change. Examples from this paper are set out in table 3.

Table 3: Potential benefits of transitioning to a low emissions economy

Emissions reduction policy	Types of benefit	Estimated scale of benefit and/or problem	Strength of evidence
Energy efficiency/ home insulation	• Better health from drier warmer homes	Every $1 spent on the 'Warm Up New Zealand: Heat Smart' programme generates benefits of around $4. Retrofitting insulation can help deliver particularly strong health cost savings from at-risk groups (eg, children and the elderly). The emissions reduction benefits are relatively small.	Strong
Active transport (walking and cycling)	• Better health from more exercise and improved air quality • Reduced road traffic congestion	An investment of $630 million in infrastructure to support active transport could generate net benefits of $13 billion by 2050, mostly due to the health benefits from increased exercise. Human-caused air pollution can cost up to $4.3 billion each year, which includes costs from premature deaths, hospital visits and restricted activity days. Traffic congestion in Auckland costs $0.9	Strong

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Emissions reduction policy	Types of benefit	Estimated scale of benefit and/or problem	Strength of evidence
		billion to $1.3 billion each year.	
Public transport	• Reduced road traffic congestion • Better health outcomes from improved air quality and fewer road accidents	The benefits from the existing passenger rail network in Wellington and Auckland are estimated at between $1.1 billion and $1.2 billion, almost all from reduced congestion. Safety and air quality benefits made more modest contributions.	Moderate
Forestry	• Improved freshwater quality • Reduced soil erosion • Improved biodiversity and species protection	Forestry can improve water quality, enhance biodiversity, reduce soil erosion, improve land use productivity and stimulate regional economic development. Nearly one million hectares of private land subject to moderate to extreme erosion are potentially well suited to afforestation. For example, the ecosystem value of each hectare of plantation forestry in the Ohiwa catchment was $5,600 per annum, over half of which is from improved water quality.	Moderate
Road freight to rail	• Reduced traffic congestion • Reduced road maintenance costs • Improved road safety	Estimated benefits of current rail freight are about $200 million per year from reduced congestion, $80 million per year from reduced maintenance costs and $60 million per year from safety.	Moderate
Use of electricity for home and industrial heat	• Better health from improved air quality	*See 'active transport' for scale of possible air pollution costs in New Zealand.* Heat generation from burning fossil fuels contributes to air pollution. This includes domestic coal burners as well as industrial coal-fired boilers.	Moderate
Electric vehicles	• Better health from improved air quality	*See 'active transport' for scale of air pollution costs in New Zealand*.	Moderate
Improved farm practices	• Improved freshwater quality	Reduced nitrogen use (eg, fertiliser) and improved pasture management could reduce nitrogen leaching into rivers by 13 per cent.	Weak

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Modelling the impact across the economy

We have undertaken modelling to provide insights into the economic impacts of reaching different emissions reductions targets.

Overall, the modelling suggests the following.

- **The economy and household incomes will continue to grow but possibly not as quickly.** Achieving a net zero emissions target by 2050 could cause average GDP to grow less quickly, with the rate of growth depending on the target we aim for and how innovation in key emitting sectors develops.
- **A strong economy will require innovation and a lot of trees.** Emissions prices could be higher and growth rates lower if we do not plant enough trees or continue to innovate, or the impacts could be milder if we plant more trees or innovate faster.
- By 2050, per household national income would still have increased by 40 per cent, instead of 55 per cent. **Supporting lower income households will need to be part of our approach** – otherwise the impacts on these households could be disproportionate.
- The economic impacts could still be significant. **Some sectors may face a greater challenge, unless there are technical breakthroughs or support**, particularly those with high emissions and those competing in international markets and/or that have limited opportunities to reduce their emissions.
- **The difference in economic impact of moving from the current domestic target to a net zero emissions target is not substantial**. The annual growth rate could slow by about 0.2 per cent.

Two models have been commissioned

In an effort to gain insights into the economy-wide impacts of reaching different emissions reductions targets, we have used two different economic models developed by Vivid Economics (Vivid) and the New Zealand Institute of Economic Research (NZIER), respectively.

NZIER's model examines how emissions prices and economic growth might change for different emissions targets. **Vivid's model** looks at energy, land use and transport (without modelling interactions between them), and tells us the impact of meeting targets on emissions prices but not on economic growth. These emissions prices reflect the full cost of transitional policies rather than the price that industry will face. For example, if the Government invests in public transport, the prices industry will face could decrease.

NZIER's results

NZIER's modelling results span a wide range, due to varying assumptions about future innovation across energy, transport and agriculture.

For example, to meet net zero emissions, NZIER estimates an annual average emissions price in the range of $272 per tonne of carbon dioxide equivalent (CO_2-e) if we see innovation across energy, transport and agriculture, or $845 per tonne of CO_2-e if we expect innovation only in energy and transport.

NZIER also reports on the macroeconomic impacts (for example, GDP growth rates) of targets. Table 4 shows a range of results for meeting the current 2050 target, and other more ambitious targets under varying assumptions about innovation.

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Table 4: NZIER's average economic growth across scenarios and targets

	'Do nothing baseline'	Assume innovation in agriculture only, above the baseline			Assume innovation in energy and transport only, above the baseline		Assume innovation in energy, transport and agriculture, above the baseline		
Target (at 2050)	**–**	**50%**	**75%**	**Net zero**	**50%**	**Net zero**	**50%**	**75%**	**Net zero**
Average annual GDP growth rate over 2017–50	2.2%	1.8%	1.6%	1.6%	1.7%	1.5%	2.1%	1.9%	1.9%
Average GDP per year over 2017–50, $ billion	$386	$367	$359	$357	$359	$349	$377	$371	$370

Source: NZIER

Note: '50%' represents both net zero carbon and the current 2050 target; '75%' is a proxy for net zero long-lived gases and stabilised short-lived gases. A 75% reduction on 1990 levels by 2050 has been used as it approximates an outcome where long-lived gases have been reduced to net zero in 2050 and short-lived gases from agriculture have been reduced by 45% from 1990 levels by 2050; Net zero is net zero

The analysis by NZIER suggests that GDP will continue to grow but will be in the range of 10 per cent to 22 per cent less in 2050, compared with taking no further action on climate change. However, it is highly unlikely we would take no further action on climate change in the period to 2050, given our current domestic target and our international commitment to the Paris Agreement.

The full range of modelled outcomes will be released as part of the Zero Carbon Bill's consultation process.

Vivid's results

Vivid's modelling gave us emissions prices only and not the wider effects on the economy. To meet net zero emissions, Vivid estimates an annual average emissions price over 2018 to 2050 as $76 to $100 per tonne CO_2-e, which is significantly lower than the NZIER results indicate.

We can infer that, at the emissions prices Vivid suggests necessary to meet the targets, the impact on economic growth would be milder than the NZIER results indicate.

Limitations and assumptions

Each study gives us different insights. The NZIER study examines the impacts on the economy as a whole, so we can see how the economy might change in response to different targets. It helps us consider how technological innovation and different rates of forestry might affect the total cost of the different targets.

The NZIER numbers, especially those that derive from assuming little innovation in agriculture, are at the top of the range of modelled impacts. It can also be argued that the NZIER figures may be overestimates of the economic impacts because it is difficult to assess the responses of households and businesses to changes in the economy. The NZIER modelling shows much greater ranges of results as we widen variation in the innovation assumptions.

Vivid's model may result in underestimates because its modelling does not consider the flow-on effects across the whole economy.

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Neither model includes many of the benefits set out above of taking action on climate change, such as the wider co-benefits, or the potential benefit of avoiding damage to the economy caused by a changing climate, if the rest of the world acts too.

Modelling results change, depending on how they are designed and assumptions are made about the future.[12] This means that, while modelling gives us a reasonable view through to 2030, beyond that the picture becomes less certain. Looking back both at the changes in technology and shifts in our economy over the past three decades shows that we can expect huge changes between now and 2050. This means modelling out to 2050 is stretching the models used to their limits.

Modelling has limitations, and the economy-wide results should be read with care. While the models will estimate changes, they cannot perfectly predict exact changes in technology or changes in the economy as sectors grow or decline. Overall, modelling can help by indicating general trends and the relative differences in impacts from setting different targets.

Target comparisons

Given the difference in modelling approaches across Vivid and NZIER, and the range of scenarios considered, we think it is plausible that the relative costs and benefits of transition may fall somewhere in between the Vivid and NZIER results.

The results presented in table 5 reflect a sample of modelling results that assume more innovation across agriculture, energy and transport, and substantial forest planting – driven by climate change policies.

The assumptions used can be found in the appendix. The NZIER model builds on assumptions used by Vivid.

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[12] See the appendix for more information on modelling assumptions.

Table 5: A sample of modelling results on economic growth and emissions prices under 2050 target options, wide innovation scenario

		Net zero carbon	Net zero long-lived gases and stabilised short-lived gases	Net zero emissions
	Assumed forestry sequestration	25 mt	35 mt	50 mt
Economy-wide impact	GDP growth rate[13] (%)	2.1%	1.9%	1.9%
	Absolute change compared with current domestic target	–	↓0.1%	↓0.2%
	Absolute change compared with 'do nothing' baseline[14]	↓0.2%	↓0.3%	↓0.3%
	GDP[15] ($ billion)	$381	$374	$373
	Percentage change compared with current domestic target	–	↓1.7%	↓2.1%
	Percentage change compared with 'do nothing' baseline[14]	↓2.3%	↓4.0%	↓4.4%
Household impact	Per household GNDI[16] ($ thousand)	$228	$224	$223
	Percentage change compared with 2018 GNDI	↑21.8%	↑19.7%	↑19.3%
	Percentage change compared with current domestic target	–	↓1.7%	↓2.1%
	Percentage change compared with 'do nothing' baseline[14]	↓2.3%	↓4.0%	↓4.3%
Strength of climate action	Transition cost ('emissions prices')[17] ($ per tCO_2-e)	$109	$243	$272
	Absolute change compared with current domestic target	–	↑$134	↑$163

Source: Based on work by NZIER, 2018.
Note: GDP = gross domestic product; GNDI = gross national disposable income; mt = megatonnes; N/A = not applicable; tCO_2-e = tonnes carbon dioxide equivalent.

[13] GDP growth rate reflects the annual average GDP growth rate over the period 2018 to 2050.

[14] The 'do nothing' baseline has been constructed by NZIER based on Treasury's economic projections and emissions information provided by government agencies. This baseline's emissions projections are higher than those published in the most recent government projections, and this difference means the model could be over-stating the emissions reductions needed to meet each target, and so the impacts on the economy could be milder than modelled. The most recent government emissions projections were not finalised in time to feed into this modelling study but will provide the basis for continued modelling of the transition to low emissions.

[15] GDP reflects gross domestic product as an annual average over the period 2018 to 2050. Note, GDP in 2018 is approximately $269 billion.

[16] Per household GNDI reflects the gross national disposable income divided by number of households as an annual average over the period 2018 to 2050. Note, per household GNDI in 2018 is $187,000. Note also that GNDI is a measure of the total income of New Zealand residents from domestic production and from net income flows with the rest of the world.

[17] Emissions prices are annual averages over the period 2018 to 2050. The emissions price reflects the economy-wide average cost to reduce a tonne of CO_2-e to meet a given target. They do not necessarily represent a forecast for the price of New Zealand Units in the NZ ETS.

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Some sectors will face harder choices than others

The transition to low emissions will create bigger challenges for some sectors than for others. The sectors that are likely to face harder choices will be those that have high emissions, compete in international markets and/or have limited opportunities to reduce their emissions. Emissions-intensive sectors (eg, sheep and beef farming, dairy processing and petrochemical processing) could be more negatively affected than less emissions-intensive sectors (eg, retail services).

Land owners' decisions about how to respond to future climate change policies will have an important effect on the make-up of primary industries and rural communities. The modelling so far suggests that big increases in forestry will be required to meet any of the possible emissions reduction targets. For the strongest target we have assessed, net zero emissions, our modelling suggests that new forest planting could need to cover as much as 10 per cent of New Zealand's land area.[18] As the Productivity Commission points out, this scale of land use change would be comparable to the scale of the changes we have experienced in land use over the past 30 years, even if the types of changes are different.[19]

Farmers and land owners could also make a choice to convert to lower emissions land uses such as horticulture, or seek higher profits from forestry. Farmers have shown their ability to make productivity improvements over the previous decades, and we expect this trend to continue.

Impacts on households and supporting lower income households

Modelling shows the impact of domestic climate action would be felt more strongly by lower income households, because a higher proportion of their spending is on products and services that are likely to increase in cost as we reduce emissions across the economy.

Our modelling suggests the households that are in the lowest 20 per cent bracket for income may be more than twice as affected, on a relative basis, than those households with an average income. The Government has a number of tools it could choose to use to compensate affected households for higher costs, such as tax or welfare measures.

The uneven distribution of costs across different households is an important part of the reason for taking a planned approach to ensure a just and fair transition.

Economic impacts for Māori

While we have not specifically modelled the impacts on Māori businesses or households, our response to climate change will affect Māori enterprises, particularly in the forestry, agriculture and fisheries industries, and workers in some areas. In addition, modelling shows that vulnerable households will be more affected, and a proportion of these will be Māori. Government is committed to ensuring a fair and inclusive transition, and Māori households will need to be considered.

Many Māori and iwi-run organisations and businesses already practise kaitiakitanga and are actively thinking about how to be sustainable. Being ahead of the curve in reducing emissions

[18] Currently, over 35 per cent of New Zealand's land area is covered by forests. This amounts to 9.9 million hectares.

[19] New Zealand Productivity Commission (2018).

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and building resilience will see new business opportunities emerge for Māori and pave the way for others to follow, including broadening the Government's thinking for how the transition might be managed.

It is also important to consider the unique characteristics, governance and collective ownership of Māori land, Māori aspirations, cultural values, and rights under the Treaty of Waitangi in facilitating the adoption and implementation of climate change opportunities.

WHAT DOES STRONG CLIMATE ACTION MEAN FOR ME, IN TERMS OF COSTS?

A transition to a low emissions economy will require strong climate change action. This creates transition costs for businesses and New Zealanders. These costs can be represented in terms of emissions prices. There is huge uncertainty about how much emissions prices would need to increase to reach a net zero emissions economy, but these prices could range between $76 and $845 per tonne of carbon dioxide equivalent (CO_2-e) as annual averages. These emissions prices reflect the full cost of transitional policies rather than the price industry will face. For example, if Government invests in public transport, the prices industry face could decrease.

Businesses could pass on all or part of the transition costs they face through the prices they charge households. For example, a litre of petrol produces 2.3 kilograms of carbon dioxide. This means the price of a litre of petrol at the pump could increase by about 23 cents for every $100 per tonne of CO_2-e. This increase in petrol prices could result in some households deciding to replace their petrol car with an electric vehicle, which would cost less to run.

What this may mean for target choices

As indicated above, modelling and economic analysis gives us only a general sense of the trends and the impacts of target options. It shows that, in all cases, planting substantial new areas of trees to sequester carbon, supporting innovation and being deliberate about the journey to support economic prosperity and our communities will be important. We should also not lose sight of the fact that doing nothing comes with its own risks, as does delaying embarking on the journey.

An important result from the NZIER modelling is that, if we hold firm on all other assumptions including how industries innovate, then the difference to the economy of meeting more ambitious targets does not appear large. But if we have assumptions about different levels of innovation then there would be larger differences in growth rates.

The economic analysis should best be considered alongside other important considerations, such as our international standing and aspirations for leadership globally, and the brand our businesses are able to project internationally. We will also want to consider how actions we take to reduce domestic emissions also support other outcomes, such as improved housing, health or waterways.

Many of the economic effects of the transition to 2050 will be felt slowly over time. The Government wants to plan well, to avoid unexpected shocks.

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Using emissions reductions from overseas

The Government is committed to ambitious climate change action at home and to transitioning the New Zealand economy to net zero emissions over the coming decades. This is consistent with the Paris Agreement.

Depending on how far and how fast we decide to transition, we may require technology that does not become available, or is not cost effective to purchase, until nearer 2050. The Paris Agreement recognises that countries may choose to cooperate to meet their climate change commitments. Having the option to purchase emissions reductions from overseas may provide us with flexibility in meeting targets.[20] It might allow us to meet ambitious climate change targets at a reduced cost.

This could be a cheaper option in the short term. However, it could mean less investment in upgrading New Zealand's economy to reduce emissions, and we would have to keep purchasing emissions reductions from overseas until we reduced emissions in New Zealand.

The extent to which the use of international emissions reductions lowers the economic cost of meeting our 2050 target depends strongly on the price at which reductions with high environmental integrity might be able to be purchased.

Our modelling can help us understand the reduction in economic cost that could be achieved if international emissions reductions were available at lower emissions prices than our domestic price. For example, in a hypothetical scenario, where the price of international emissions reductions is assumed to be $150 per tonne CO_2e in 2050 (in 2018 dollars), and we assume there is no limit on the supply of international units, then the economic cost of meeting the net zero emissions target would be roughly halved.

International carbon markets

We seek your views on the extent to which international emissions reductions could play a role in helping New Zealand to meet its climate change targets. We would need to evaluate the relative cost of the emissions reductions available overseas and those available in New Zealand. If international carbon markets are used in the future, this type of cooperation would need to satisfy a number of criteria. For example, the Government would want to be satisfied that:

1. the credits and/or units are genuine and have environmental integrity (that is, the emissions reductions are real)
2. we will maintain substantive domestic progress towards our transition to our chosen emissions reduction target
3. it makes economic sense
4. we can do it in a way that maintains a steadily rising domestic carbon price, so that incentives stay in place for domestic reduction options, like forestry.

Under the Kyoto Protocol, international carbon markets were problematic. There was an oversupply of cheap units as well as issues with the environmental integrity of some. There was also no cap on the amount of international units that could be surrendered by participants in the NZ ETS. Later this year, we will be consulting on changes to the NZ ETS that help to

[20] These could be referred to as 'carbon credits' or 'international units'.

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safeguard its integrity, if international carbon markets are used in the future. An important part of these changes will be the introduction of a volume limit on the use of international units within the NZ ETS. This limit will allow us to manage the impact of any international use on our domestic market and ensure that incentives to make domestic emissions reductions are retained.

The Government is involved in a number of international efforts to ensure the environmental integrity of international carbon markets in the future. This includes negotiations through the United Nations Framework Convention on Climate Change, providing leadership to establish the 'Ministerial Declaration on Carbon Markets' and a range of other initiatives.

How we set the target

Potential role for the Climate Change Commission

We seek your views on the role a new Climate Change Commission could have in setting the 2050 target. The Parliamentary Commissioner for the Environment has suggested that the target could be set in a two-stage process. First, the Government could set a more general statement of ambition in the Bill, in line with the collective global ambition set out in the Paris Agreement. Then, the Climate Change Commission could advise, within a defined timeframe, on the specific target consistent with the statement of ambition. A less specific target in the Zero Carbon Bill itself could both allow more time for a decision about the target to be made as well as potentially providing more flexibility on future emissions budgets. This would mean the process of setting the specific target would be longer than under the other options.

A 2050 target could change over time

We seek your views on whether the Bill should allow the target to be revised. This could be in response to significant changes to the economy, our understanding of the science, the technology available or to take into account what the rest of the world is doing. Being able to review the target would allow the Government the opportunity to adjust the target to respond to unforeseen and significant events under predetermined conditions. The downside of being able to review the target is that it might provide less certainty about what is expected from different sectors. Legislation can provide a mechanism to revisit the target and it could also provide guidance or restrictions on what conditions would need to be met for a change to be made, as well as the extent to which it could be adjusted. This should maintain the Government's commitment to the long-term goal while offering a process for transparent and well-signalled review.

The proposed Climate Change Commission could have a role in advising the Government on revisions to the target. See the Climate Change Commission for more detail.

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QUESTIONS

1 What process should the Government use to set a new emissions reduction target in legislation?

Pick one:

- the Government sets a 2050 target in legislation now
- the Government sets a goal to reach net zero emissions by the second half of the century, and the Climate Change Commission advises on the specific target for the Government to set later.

2 If the Government sets a 2050 target now, which is the best target for New Zealand?

Pick one:

- net zero carbon dioxide: Reducing net carbon dioxide emissions to zero by 2050
- net zero long-lived gases and stabilised short-lived gases: Long-lived gases to net zero by 2050, while also stabilising short-lived gases
- net zero emissions: Net zero emissions across all greenhouse gases by 2050.

3 How should New Zealand meet its targets?

Pick one:

- domestic emissions reductions only (including from new forest planting)
- domestic emissions reductions (including from new forest planting) and using some emissions reductions from overseas (international carbon units) that have strong environmental safeguards.

4 Should the Zero Carbon Bill allow the target to be revised if circumstances change?

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Emissions budgets

SUMMARY

The Zero Carbon Bill will how we do emissions budgets.

Emissions budgets can act as stepping stones to guide progress towards our 2050 target.

- An 'emissions budget' is a quantity of emissions allowed over a period of time.
- Emissions budgets could be set 10–15 years in advance, with each budget specifying emissions for a five-year period.
- Future budgets could be revised to allow for changes in the economy and technology.
- When setting budgets, a range of considerations would need to be made.

We seek your views on:

- timeframes over which budgets should be set
- whether these budgets should be able to be reviewed
- whether you agree with the list of considerations that need to be made when setting budgets.

Consultation questions on this proposal can be found at the end of this chapter. The full list of consultation questions can be found in the attached submissions form and online.

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What are emissions budgets?

Emissions budgets describe a quantity of emissions allowed over a defined period (for example, five or six years). We have used budgets before through the Kyoto Protocol and under the Paris Agreement.

Emissions budgets are a necessary tool to set out the shorter-term steps that need to be taken to reach our 2050 target. They can:

- increase predictability for businesses and New Zealanders about what is needed over a shorter-term horizon
- inform a wide range of policy decisions, including the allocation of units within the NZ ETS.

Emissions budgets provide a good balance between signalling the emissions reduction path far enough into the future, while also allowing flexibility to deal with changing circumstances. Allowing flexibility in the path we take to reduce emissions is essential to cope with changes, such as much higher (or lower) costs for reducing emissions than we anticipated.

The Government does not consider that other options (such as setting a fixed, straight-line reduction pathway in legislation) provide enough flexibility to adjust to changes in our economy, and in technology and science.

Design choices for emissions budgets

There are several important design choices to consider for emissions budgets. The first is the length of each budget, second is how far into the future budgets are set. The third is whether they should be able to be revised.

Length of each budget

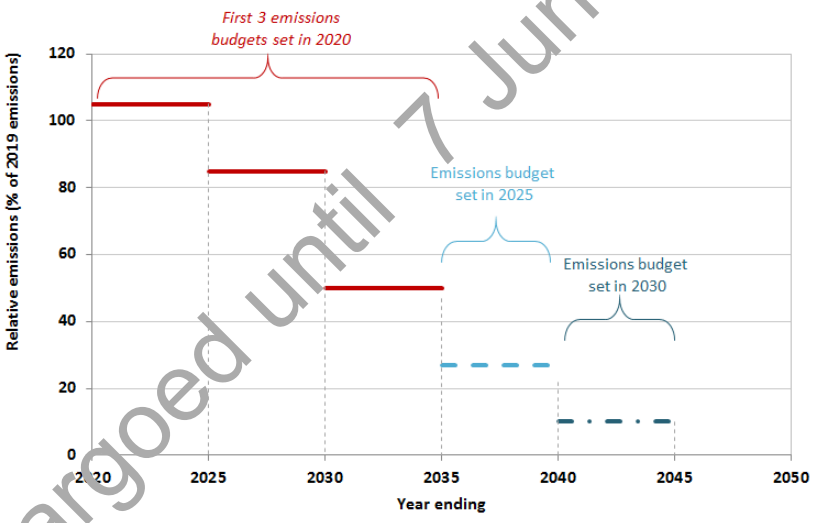
We propose that the length of each budget should be five years because it provides greater predictability for businesses and communities while remaining flexible for the future. It would also have lower administrative costs and align with our Nationally Determined Contributions under the Paris Agreement.

When deciding, we need to consider that too short a period provides less predictability for businesses and communities and too long a period requires decisions to be made today on very uncertain information. There are other ways to do this. The Parliamentary Commissioner for the Environment recently recommended New Zealand set a six-yearly budget with a three-year review of the policies implemented by the Government. This is designed to line up with our electoral cycle.

How far into the future budgets are set

We propose that three emissions budgets of five years each be in place at any given time (figure 2). This would mean we have a minimum 'look-ahead' timeframe of between 10 years and 15 years. We think this is a good balance between improving predictability and remaining flexible to changes in the future. These timeframes may help to depoliticise the budget-setting process because the Government of the day would not be able to set or influence the budget for its own political term.

Figure 2: Possible approach to emissions budgets (three five-year budgets)



An initial set of three emission budgets of five-year durations could be set in 2020 providing coverage out to 2035. This would provide abatement predictability for a minimum of 10 years (two budgets) and maximum of 15 years (three budgets). Subsequent budgets could be set in five-year intervals with the fourth set in 2025

Revising emissions budgets

We propose that the Government should be able to alter the last emissions budget (that is, the budget that is the furthest into the future). The advantage of this approach is that each Government would have a say in setting future emissions budgets. However, it could also make future emissions budgets less predictable for New Zealand businesses.

We also welcome your views on whether the second emissions budget in the sequence should be able to be reviewed under exceptional circumstances (eg, following a natural disaster) and adjusted within a specified range.

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What should be taken into account when setting emissions budgets

We seek your views on what the Climate Change Commission and the Government should take into account when advising on and setting emissions budgets. This includes important factors such as economic and social circumstances. These considerations aim to help make the process robust and balanced. Details on the proposed considerations are set out in the Climate Change Commission section below.

Other design choices of emissions budgets

Monitoring emissions budgets: we propose that a brief annual report is produced to show how New Zealand is tracking towards the emissions budgets. This could be based on New Zealand's Greenhouse Gas Inventory, which provides tier one data (which meets international statistical obligations).

Banking or borrowing from one emissions budget to the next: we propose introducing a small amount of flexibility into each emissions budget. A threshold could be set where a budget could be considered as being met.

Aligning emissions budgets with the NZ ETS: the emissions budgets and the NZ ETS can easily be designed to be compatible. We are making improvements to the scheme that will give the Government the tools to align the volume of units[21] in the NZ ETS with our emissions budgets.

Aligning emissions budgets with international commitments: domestic emissions budgets and budgets used to account for Nationally Determined Contributions, under the Paris Agreement, have different purposes. Therefore, they do not need to be exactly the same.[22] The accounting for both our Nationally Determined Contributions and for our domestic emissions budgets will need to be robust, transparent and aligned with international norms and clearly communicated to our international partners.

Government response

Budgets alone will not achieve our targets. We will also need to implement policies to reduce emissions. We propose that the Bill requires the Government to publish a plan to meet future emissions budgets. The plan would provide a longer term strategy for the economy and society to support the transition.

Developing a longer term strategy for a low emissions economy was recommended by the Productivity Commission in its draft final report.[23] It is also consistent with the Paris Agreement which has an expectation that we formulate a long term low greenhouse gas emissions development strategy. Having this in place promotes international cooperation and indicates we are following a rules-based system globally.

There are choices about how we require the Government to prepare and publish its plans and policies. We propose that, in response to each emissions budget, the Government publishes:

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[21] A small amount of other emissions are not accounted for under the NZ ETS and will need to be factored into setting emissions budget amounts and New Zealand Unit limits.

[22] The Parliamentary Commissioner for the Environment noted this in its March 2018 report *A Zero Carbon Act for New Zealand*, and we strongly agree with this.

[23] New Zealand Productivity Commission (2018).

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- a 10 to 15 year outlook on the choices for our transition pathway
- specific policies within sectors to reduce emissions and achieve the emissions budget (for example, incentives to support low emissions alternatives, like energy efficiency standards)
- other actions we need to take (eg, supporting investment in low emissions sectors and funding for research)
- how we address challenges faced by vulnerable communities and sectors, to ensure a just transition.

We are proposing that the Government must publish its plan within a set timeframe after each emissions budget has been announced.

QUESTIONS

5 The Government proposes that three emissions budgets of five years each (ie, covering the next 15 years) be in place at any given time. Do you agree with this proposal?

6 Should the Government be able to alter the last emissions budget (ie, furthest into the future)?

Pick one:

- yes, each incoming Government should have the option to review the third budget in the sequence
- yes, the third emissions budget should be able to be changed, but only when the subsequent budget is set
- no, emissions budgets should not be able to be changed.

7 Should the Government have the ability to review and adjust the second emissions budget within a specific range under exceptional circumstances?

8 Do you agree with the considerations we propose that the Government and the Climate Change Commission take into account when advising on and setting budgets?

GOVERNMENT RESPONSE

9 Should the Zero Carbon Bill require Governments to set out plans within a certain timeframe to achieve the emissions budgets?

10 What are the most important issues for the Government to consider in setting plans to meet budgets? For example, who do we need to work with, what else needs to be considered?

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Climate Change Commission

SUMMARY

The Zero Carbon Bill establishes a new Climate Change Commission (the Commission) to provide independent expert advice and to support New Zealanders to hold Governments to account towards progress.

- There is a spectrum of roles that the Climate Change Commission could take, from advisory through to decision-making.
- We propose it would have an advisory role in providing advice on:
  - the level of emissions budgets
  - areas of the economy to focus on when achieving emissions budgets
  - issues related to climate change as requested.
- We propose it would have a role in monitoring New Zealand's progress towards emissions budgets and reducing the risks of climate change.
- It could play different roles with respect to the New Zealand Emissions Trading Scheme (NZ ETS), from advisory through to decision-making.
- It could advise on the upper limit of use of international emissions reductions.

We seek your views on:

- the proposed set of core functions for the Climate Change Commission and its role in respect of the NZ ETS
- what matters it should consider or take into account when undertaking its work
- what expertise commissioners need.

Consultation questions on this proposal can be found at the end of this chapter. The full list of consultation questions can be found in the attached submissions form and online.

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Institutions to support transition

Why set up a Climate Change Commission?

New Zealanders need confidence that climate change policies will remain stable and that our pathway to the long-term target will stay broadly consistent. We think that a Climate Change Commission would be the best institution to show that New Zealand is on track and to help people hold Governments to account.

Climate change is a long-term problem yet decisions are needed now on how we address it. There is a strong case for insulating the policy-making process from short-term political pressures. Establishing a climate change commission would provide ongoing, independent expert advice to the Government on how we make the transition.

Other countries have already established independent institutions to provide advice to Government.[24] Both the former and current Parliamentary Commissioners for the

[24] These include Australia, Denmark, Finland, Ireland, Sweden and the United Kingdom.

Environment and the Productivity Commission have recommended an institution like this should be established in New Zealand.

For the Climate Change Commission to be successful and become a trusted and stable part of New Zealand's government institutions, it would need:

- political consensus for its work underpinned by widespread community and business support
- stable and ongoing funding
- a credible expert board of commissioners, appointed through a robust and transparent process
- a capable secretariat with access to good quality data from across government.

CASE STUDY: THE UNITED KINGDOM MODEL

The United Kingdom's Climate Change Committee (the UK Committee) is a highly regarded model internationally, and both the Parliamentary Commissioner for the Environment and the New Zealand Productivity Commission have provided advice to the Government on how the UK approach could be applied in New Zealand.

The UK Committee is made up of a chair and five to eight other members with expertise in climate change science, technology, economics, policy and business. Its primary role is to advise on the level of carbon budgets as well as related matters, such as the extent to which domestic reductions and international credits should be relied on to achieve each budget, which sectors of the economy offer particular opportunities for emissions reductions, and advice on the most cost-effective route to achieving budgets.

The UK Committee also has a sub-committee dedicated to the role of adapting to climate change.

What role could the Climate Change Commission have?

We propose the Climate Change Commission has an advisory rather than a decision-making role. This creates a new channel of independent expert advice and strikes a good balance between providing additional accountability, while ensuring Governments are able to make decisions based on their own priorities.

The decisions that we will need to take on climate change policy will have a broad impact on New Zealanders. Determining the right role for the Climate Change Commission will depend on balancing how much power and independence we give to appointed commissioners compared with democratically accountable bodies (ie, the Government).

Currently, decisions on climate change policy are made by the Government with the support of advice from officials. New laws, and changes to existing laws, are subject to the parliamentary process, providing important checks and balances.

Too much power could make a Climate Change Commission more at risk of being removed by future parliaments, if those Governments in power do not like what it is doing. However, if not enough weight and attention is given to the Commission's recommendations, this could reduce its effectiveness. Both the Parliamentary Commissioner for the Environment and the Productivity Commission have recommended New Zealand establish a Climate Change

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Commission based on the example of the UK Committee. This would be an advisory role, with mechanisms built in to hold government to account, as described in table 6.

Table 6: Possible options for the role of a Climate Change Commission

	Advantages	Disadvantages
Advisory only Provides expert advice, but the Government is not obliged in a strong way to respond to recommendations. (Similar to the Parliamentary Commissioner for the Environment.)	Provides an additional source of expert independent advice on climate change issues.	Not likely to give strong additional accountability for Government to New Zealanders, because there is no requirement to publicly respond to advice.
Advisory, with mechanisms built in to hold Government to account Government must publicly respond to, and provide rationale when it deviates from, the Commission's advice. (Similar to the UK Committee – with strong requirement to develop policies within a specified timeframe.)	Creates a sound source of advice from an independent commission and a hurdle for Government to deviate from that advice. Maintains the Government's ability to make decisions on policy and to trade off outcomes across the economy and society.	The commitment to the long-term goal under this option is not as strong as the decision-making option.
Decision-making The Climate Change Commission makes decisions or sets policy under its own authority at arm's length from Government. (Similar to our Commerce Commission.) Note, no other countries have a Commission with a decision-making role.	Creates a very strong commitment to the long-term goal by delegating decisions to an independent authority.	Decisions on climate change policy require trade-offs against a range of outcomes. Delegating decisions to an independent authority risks making progress on climate outcomes while neglecting other social and economic outcomes. Delegating too much power could risk susceptibility to changes by future parliaments. This could damage its stability.

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Advisory and monitoring functions

We propose the Climate Change Commission could have advisory and monitoring functions on the following:

- **emissions budgets:** advise on the most appropriate level and composition of emissions budgets and monitor our progress towards achieving these budgets
- **independent expert advice:** provide independent advice on areas of the economy to focus on and achieve emissions budgets, and what is important to consider in getting there
- **2050 target:** periodic check-in on the target level, in light of changes in technology as well as accounting for what the rest of the world is doing. It could also advise the Government on the most appropriate level for the 2050 target. See the section 2050 target in part two for more details
- **adaptation:** monitor New Zealand's progress towards addressing the risks posed by climate change. Publish a report setting out progress towards delivering the national adaptation plan
- **international emissions reductions:** advise on the extent to which international emissions reductions should be used towards our targets.

The Climate Change Commission's role in the New Zealand Emissions Trading Scheme

We seek your views on the Climate Change Commission's role in the operation of the NZ ETS. The NZ ETS is a well-established tool that puts a price on emissions and supports New Zealand to meet its climate change targets.

The most recent review of the NZ ETS found that the current settings create significant regulatory uncertainty. If the Climate Change Commission had either an advisory or decision-making role on the NZ ETS, it may help provide greater policy stability and predictability. This could result in more consistent long-term signals to business to invest in low emissions technologies and forestry.

The Commission could have an advisory role on the NZ ETS. This view is supported by two recent reports. The Productivity Commission's draft report on a low emissions future suggested a Climate Change Commission could make recommendations on unit supply in the NZ ETS, based on evidence, for the Government of the day to adopt, modify or reject.

> 'The Productivity Commission agrees that it is not appropriate for a Climate Commission to have decision-making powers. New Zealand's transition to a low-emissions economy will have profound and widespread impacts, and require the weighing of a range of economic, environmental, social and foreign policy considerations… no government has so far been willing, or deemed it prudent, to transfer decision-rights on climate change mitigation matters to an independent body'.[25]

In addition, the Parliamentary Commissioner for the Environment's report *A Zero Carbon Act for New Zealand: Revisiting Stepping Stones to Paris and Beyond* recommended that unit supply in the NZ ETS should be determined by the Government as part of its policy implementation responsibilities.

> 'Instead of giving the Commission a decision-making role, the Zero Carbon Act could require the Commission to provide advice prior to any change a Government might seek to make to ETS settings'.[26]

Another option is for the Climate Change Commission to have a decision-making role with respect to the NZ ETS, such as the overall level of units supplied into the NZ ETS. This is likely to result in a highly independent NZ ETS, with a very clear role in reducing emissions. The Climate Change Commission's decisions may also have the following outcomes:

- determining the overall cost to our economy of meeting our target
- setting the maximum emissions prices for NZ ETS businesses
- determining the emissions cost exposure for our emissions intensive and trade-exposed industries.

These outcomes have implications for the emissions costs for businesses and households, the overall functioning of the New Zealand carbon market and on public finances. This may result in the Climate Change Commission having decision-making powers that have traditionally been associated with Government. This would need to be balanced with the advantages of the NZ ETS being managed with a high level of independence, to support New Zealand to meet its climate change targets.

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[25] New Zealand Productivity Commission (2018), p 186.

[26] Parliamentary Commissioner for the Environment (2018), p 29.

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WHAT THE NEW ZEALAND EMISSIONS TRADING SCHEME DOES

The NZ ETS puts a price on greenhouse gas emissions by issuing a restricted volume of permits to emit into the market. The NZ ETS requires all sectors of New Zealand's economy to report on their emissions and, with the exception of emissions from agriculture,[27] to purchase and surrender emissions units to the Government for those emissions.

This creates a financial incentive for businesses to invest in technologies and practices that reduce emissions. It also encourages forest planting by allowing eligible foresters to earn New Zealand Units (NZUs) as their trees grow and absorb carbon dioxide.

The NZ ETS was reviewed in 2015/16. There was a clear call from stakeholders to improve the stability and predictability of the scheme. As a result, the Government has made in-principle decisions on a package of four proposals to improve the operation of the NZ ETS in the 2020s. The in-principle decisions are expected to be implemented in 2019, following further policy development and consultation later in 2018.

The in-principle decisions include: introducing auctioning of units, to align the NZ ETS to our climate change targets; limiting participants' use of international units when the NZ ETS reopens to international carbon markets, developing a different price ceiling to eventually replace the current $25 per tonne carbon dioxide equivalent fixed-price option, and coordinating decisions on the supply settings in the NZ ETS over a rolling five-year period.

Design choices for a new Climate Change Commission

What the Climate Change Commission could consider when undertaking its work

It is important the Climate Change Commission undertakes all of its proposed functions in a transparent and predictable way. To do this, we propose that it be required to consider a number of factors set out in legislation. The Government should also have to follow these same factors when setting emissions budgets. The UK's Climate Change Act 2008 offers a useful precedent for what matters its Climate Change Committee should take into account when undertaking its work. These include:

- scientific knowledge about climate change
- technology relevant to climate change
- economic circumstances and, in particular, the likely impact of the decision on the economy and the competitiveness of particular sectors of the economy
- fiscal circumstances and, in particular, the likely impact of the decision on taxation, public spending and public borrowing
- social circumstances and, in particular, the likely impact of the decision on fuel poverty
- energy policy and, in particular, the likely impact of the decision on energy supplies and the carbon and energy intensity of the economy.

These considerations will help inform judgements on the level of emissions budgets and the pace of our economic transition. In New Zealand, we will need to take into account our own circumstances. This includes our obligations under the Treaty of Waitangi.

[27] Methane and nitrous oxide.

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The Commission could also consider the three government objectives for climate change policy: sustainable economy, global and local leadership and creating a just and inclusive society.

Implications for the Government on the Climate Change Commission's role and functions

The Zero Carbon Bill will propose new requirements on the Government to respond to the reports of the Climate Change Commission. Where it provides advice, such as on the emissions budgets, the Government would be required to take this into account and issue a public report in response. Where the Government's actions differ from the advice of the Climate Change Commission, these reports should outline why.

Where the Climate Change Commission has monitoring functions, the Government would also be required to publicly respond to the monitoring report. Requiring the Government to do this within a timeframe of six to twelve months would provide additional accountability.

This accountability is important so New Zealanders can see how Governments are planning for and addressing climate change issues.

What expertise could the Climate Change Commission have?

We seek your views on the range of expertise that the commissioners could have.

The UK Committee consists of a chair plus five to eight committee members and an adaptation sub-committee with five members. The members have a high level of standing in society and are sector experts rather than representatives of particular stakeholder groups.

We consider our Commission should have similar credibility and the following essential expertise:

- climate change policy (including emissions trading)
- resource economics and impacts (including social impacts, labour markets and distribution)
- te Tiriti o Waitangi, te reo me ona tikanga Māori and Māori interests
- climate and environmental science including mātauranga Māori
- experience with addressing adaptation challenges like planning, insurance and local government
- risk management
- engineering and/or infrastructure
- community engagement and communications.

Desirable, but non-essential, expertise could include:

- business competitiveness
- knowledge of the public and private innovation and technology development system.

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Including the expertise needed in the Commission in the Zero Carbon Bill aligns with the UK approach[28] and the recommendation of our Parliamentary Commissioner for the Environment.[29]

QUESTIONS

11 The Government has proposed that the Climate Change Commission advises on and monitors New Zealand's progress towards its goals. Do you agree with these proposed functions?

12 What role do you think the Climate Change Commission could have in relation to the New Zealand Emissions Trading Scheme (NZ ETS)?

Pick one:

- advising the Government on policy settings in the NZ ETS
- makes decisions itself, in respect of the number of units available in the NZ ETS.

13 The Government has proposed that Climate Change Commissioners need to have a range of essential and desirable expertise. Do you agree with the proposed expertise?

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Adapting to the impacts of climate change

SUMMARY

The Zero Carbon Bill can help New Zealand adapt to the impacts of climate change.

- Historical emissions have already changed our climate.
- Even with successful reduction of greenhouse gases, we will need to adapt to the impacts of climate change.
- New Zealand is already incurring costly damage to its assets and infrastructure, and the resilience of its people and communities is being challenged.

We propose that the Zero Carbon Bill includes the following adaptation provisions, to help decision-makers manage climate change risks in a systematic way:

- a national climate change risk assessment
- a national adaptation plan
- regular review of progress towards implementing the national adaptation plan
- an adaptation reporting power.

We seek your views on:

- the scope, scale and content of the national climate change risk assessment and national adaptation plan
- the respective roles of central government and the Climate Change Commission for each of the adaptation provisions
- how an adaptation reporting power should be used and who it should apply to.

Consultation questions on this proposal can be found at the end of this chapter. The full list of consultation questions can be found in the attached submissions form and online

[28] See the UK's Climate Change Act 2008: www.legislation.gov.uk/ ukpga/2008/27/schedule/1.

[29] Parliamentary Commissioner for the Environment (2017).

Increasing our resilience

Regardless of what level of ambition we set in the Zero Carbon Bill, our climate will continue to change over the coming decades. This is because some climate change is already locked in from historic emissions, and we will need to adapt to this.

As a result, we will face risks from rising sea levels and extreme weather and from slow changes to our ecosystems and biodiversity, including our animals, plants and soils that underpin not only the primary sector but also human health.

The costs from climate change are already high and growing. For example, in the past 10 years, the cost of weather events to our transport network has increased from about $20 million per year to over $90 million per year.[30] Reports from the Parliamentary Commissioner for the Environment indicate that the cost of replacing every building within half a metre[31] of the average high tide mark[32] could be $3 billion and within 1.5 metres as much as $19 to 20 billion.[33]

We are committed under the Paris Agreement to plan for and take action on climate change adaptation. In 2016, the Climate Change Adaptation Technical Working Group was set up to provide advice on adapting to the impacts of climate change while sustainably growing our economy. Two reports have now been released,[34] with the most recent identifying a series of actions New Zealand should take to increase resilience and adapt to the changing climate.

This section considers possible tools that could be used to help us adapt to climate change.

Creating the right environment for adaptation

At the moment, the way we respond and adapt to climate change impacts is not well coordinated. Many of the risks, impacts and actions to adapt are dealt with across a number of different legislative and regulatory regimes.

There are gaps in our information. We have some knowledge about the impact of sea level rise on our coastlines and communities but even less about the impact rising temperatures will have on our natural systems. We do not know what unwanted plants and animals might arrive and thrive as a result, or the impact of ongoing extreme weather events on production in the primary sector. There is more work to do to understand the possible impacts on our health, biodiversity and culture over time.

The Zero Carbon Bill could include requirements in law that we understand the risks and have a plan to manage them. Setting up the right tools for decision-makers would help us consider the risks to the whole of society and the economy. We could also introduce ways to encourage or require some organisations to share more information on their exposure to climate change risks.

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30 Ministry for the Environment (2017).

31 The mid-range projected sea-level rise over the next 50 years is about 30 centimetres, and could vary between 20 centimetres and 50 centimetres. Note in the past 100 years, seas have risen around 14–22 centimetres in New Zealand ports.

32 Defined as the mean high water springs.

33 Parliamentary Commissioner for the Environment (2015), p 89.

34 Available at: www.mfe.govt.nz/publications/climate-change/adapting-climate-change-new-zealand-stocktake-report-climate-change.

If we introduce, through primary legislation, a way to assess risks and create a plan to adapt, we can take a broad view and ensure the right settings are in place to respond. This includes how we respond to different needs in different communities around New Zealand. We propose that the Zero Carbon Bill includes the following provisions:

- a national climate change risk assessment
- a national adaptation plan
- regular review of progress towards implementing the national adaptation plan
- an adaptation reporting power.

A national climate change risk assessment

Climate change exacerbates existing risks and creates new risks.[35] Many councils and communities are already dealing with some of these.

At the moment, our actions to adapt are ad hoc and we cannot measure our effectiveness. To address this, we propose introducing a compulsory national climate change risk assessment that is updated regularly.

The Climate Change Adaptation Technical Working Group has recommended that this type of assessment is a priority. If we can get a better understanding of which areas and communities are the most exposed and vulnerable to risks, we can ensure we are taking the most effective actions to address these.

Our first step is determining what the risks are for people, infrastructure, the natural environment and the economy. This information needs to be accessible and standardised to help decision-makers, including iwi and hapū, communities, transport and infrastructure sectors, private sector firms, and central and local government.

A risk assessment would need to align with and inform other risk work by the Government. It could provide valuable information to the National Security System and the Ministry for Civil Defence and Emergency Management and other interested agencies. The proposed national climate change risk assessment would:

- identify risks to New Zealand that arise from, or are worsened by climate change
- provide the necessary evidence to improve how we communicate current and future risks and opportunities
- provide a foundation for investment and decision-making, and guide future work
- inform development of a national adaptation plan
- inform planning and actions to minimise the cost of future climate-related disaster response and recovery
- contribute to an approach across all sectors to help stimulate action in a systematic way
- provide accessible and standardised information for decision-making.

Placing this requirement in primary legislation means future risk assessments continue to take a broad view across the economy and society and there will be continuity over time, creating a more stable policy environment.

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[35] IPCC (2014).

A national climate change risk assessment would be publicly available, updated at five-yearly intervals and the Climate Change Commission would hold responsibility for this.

While the Commission is being set up, central government could initiate the first risk assessment, with future assessments falling under the responsibility of the Climate Change Commission. Future assessments could include information obtained from the adaptation reporting power, if developed (see below).

National adaptation plan

Climate change adaptation is not currently integrated into many central government agency objectives. This means legislation and regulatory frameworks and policies around long-term planning are not well aligned. This makes it difficult for local government, businesses and communities to proactively organise themselves and take action.

To date, most action taken to adapt to climate change has been reactive. In the case of local government, responses to climate damage are paid for out of maintenance funds. With clear direction, local government and others would have more certainty. This would mean they could plan funding for ongoing climate change-related impacts.

We propose introducing a way to have a planned response to climate change risks. This would provide a national approach to prioritising adaptation action. Given the long-term nature of adaptation, and the breadth and potential scale of the issue, a national adaptation plan would:

- identify priority actions for addressing risk, as identified in the climate change risk assessment, including assisting and prioritising vulnerable people and regions
- be based on strong scientific evidence, provide robust information and raise awareness of climate change risks
- help clarify roles and responsibilities on climate change adaptation across different pieces of legislation, different sectors of society, and determine who needs to act on what and when
- be aligned with the work of the Ministry of Civil Defence and Emergency Management, including the need for community and individual resilience
- be designed to deal with changing risks and encourage proactive planning in a comprehensive way
- aim to integrate climate change risk into decision-making
- recognise the importance of coordination, collaboration, cooperation and partnerships between central government and other levels of government, and across sectors and society and including iwi and hapū
- recognise the importance of monitoring and evaluating progress towards enhanced resilience
- be designed to look for and take advantage of opportunities for adaptation.

We propose that the Government, rather than the Climate Change Commission, holds responsibility for the national adaptation plan. To address local challenges, we would develop the plan with local government and other stakeholders. The plan should be updated at five-yearly intervals, to synchronise with the five-yearly climate change risk assessment process.

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We would require ongoing evaluation of how the national adaptation plan is being implemented. This will ensure the plan endures and that it leads to effective adaptation action. We recommend that the Climate Change Commission reviews how the national adaptation plan is being implemented at the mid-point of each five-year cycle. The outcomes of each review could be used to update the next iteration of the plan.

Exploring potential for an adaptation reporting power

We want to explore whether the Government should introduce an adaptation reporting power. At the moment, we do not have a clear picture of what action is being taken as part of risk management processes by organisations.[36]

We think we could get a better picture of our risks and opportunities if we could get more information from organisations that own public infrastructure or deliver public services. We want to hear your views on whether we should explore this further. The type of considerations we could have are:

- the value of having a targeted and specific reporting obligation from organisations
- who this would apply to, for example, organisations such as Crown entities or state-owned enterprises, local and central government or private companies that provide public services like energy and transport services, including rail
- what the choices are around such a power being voluntary, or included in legislation and mandatory
- what such reporting should cover, for example, how ready organisations are to respond to risks and opportunities.

There are likely to be some benefits from this approach. Organisations would be better informed and more prepared to mitigate or manage risks that have been identified. The reports would reveal how prepared organisations are. They would help the Government design supportive policies and to ensure that the regulatory environment encourages adaptation.

Experience in the UK has found that mandatory reporting delivers a higher standard of reports, as well as complete coverage from the required organisations, providing a better understanding of the adaptation action being taken.

However, it would also bring administrative and compliance costs to both organisations and to the Government.

QUESTIONS

14 Do you think the Zero Carbon Bill should cover adapting to climate change?

15 The Government has proposed a number of new functions to help us adapt to climate change. Do you agree with the proposed functions?

16 Should we explore setting up a targeted adaptation reporting power that could see some organisations share information on their exposure to climate change risks?

[36] These organisations all have different governance arrangements, some are constituted under specific legislation, some will be Crown entities, some private companies, some publicly listed companies.

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Part three: Next steps

The Zero Carbon Bill proposes to create the necessary enduring institutional architecture to meet New Zealand's long-term emissions reduction goals and build resilience to the impacts of climate change. The Zero Carbon Bill will not get us through the transition by itself. We also need to continue with a strong emissions pricing regime through the NZ ETS, develop regulation and policy in areas to complement emissions pricing, and support innovation and investment in low emissions technologies.

The Government has a number of existing initiatives alongside the Zero Carbon Bill, including:

- strengthening and improving the NZ ETS
- developing a land transport policy strategy that supports investment in low emissions transport and urban design
- planting one billion trees
- establishing a Green Investment Fund to stimulate new investment in low carbon industries.

Our towns and cities are also contributing. Regional and territorial authorities are improving their understanding of how to adapt to climate change and are putting in place plans for low emissions communities. Government is working with iwi, communities and businesses to accelerate the transition. For example, it has worked with the dairy sector to develop the 'Dairy Action for Climate Change', helping farmers reduce emissions over time. The Low Emissions Roadmap with Fonterra is helping large energy users transition off fossil fuels and onto renewable energy sources.

Your feedback

Your specific feedback on the proposals contained in this document will help inform further policy development and shape what will become the Zero Carbon Bill. Final policy decisions are expected to be made later this year.

Amendments to the Climate Change Response Act 2002 will follow to strengthen the NZ ETS (in line with changes made through the Zero Carbon Act) and give effect to our international obligations under the Paris Agreement.

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Appendix

Mitigation opportunities in key sectors where emissions reductions are possible

Energy	The energy sector is experiencing rapid technological innovation and will play a huge role in the transition. For example: Electric vehicles (EVs) are already economic over the lifetime of the car and we can expect EV uptake will substantially reduce emissions. Hydrogen fuel cell vehicles might also play a role, and/or advanced biofuels and similar technologies, particularly for moving freight. Industrial process heat (eg, milk and meat processing) holds potential to improve energy efficiency and switch to much lower emission fuels, such as woody biomass or electricity. Wind and geothermal are currently the lowest-cost electricity generation options in New Zealand. We still have extensive high-quality untapped renewable energy resources. Energy efficiency improvements from the use of residential LED lighting and industrial scale plant modifications can reduce emissions directly or help lower costs of using cleaner energy sources.
Agriculture	A methane vaccine is under development to mitigate on-farm emissions in the dairy, sheep and beef sectors. Research and development may give rise to material on-farm abatement opportunities in the future. Land use change to lower-emitting uses will likely be needed to achieve material emissions reductions from agriculture.
Forestry	Increasing our forested land area will play a huge role in soaking up more emissions, both commercial plantation forests and permanent native forests. Forestry helps buy us time until other technological developments or options become available, but we will need continued emissions reductions post 2050 – beyond planting more trees – to maintain a low-emissions economy.
Industrial processes	Efficiency gains in industrial processes (eg, steel, cement, fertiliser) will help because there are currently a limited number of available technology options. Industrial sectors that use other high greenhouse gas warming potential products (such as refrigerants) have viable alternatives and improved management practices that can markedly reduce their impacts.
Waste	Waste can be a valuable resource, for example, Palmerston North's waste treatment plant's anaerobic digestion of organic waste creates renewable methane used to generate electricity.[37]

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[37] Available at: www.bioenergy.org.nz/documents/resource/Reports/Going-greener-PNCC.pdf.

ABOUT THE ECONOMIC MODELLING

A multi-method economic analysis approach is under way because no one approach can give the whole picture. This combines bottom-up cost modelling, whole-of-economy modelling and research on specific impacts, to build an understanding of both the challenges and upsides of new targets for 2050. The studies include:

- bottom-up and linked sector modelling building on rural land use and energy sector models to indicate transition pathways and emissions prices from 2030–50 to meet different target options. The different range of pathways developed drive the transitions via higher emissions pricing, by sectoral shifts or significant technological change within existing economic structures (Vivid Economics, Concept and Motu Economic and Public Policy Research, 2018)
- whole-of-economy computable general equilibrium (CGE) modelling to determine emissions prices and the gross domestic product impact of different targets. The assumptions on emissions reductions options are, where possible, aligned with the Vivid modelling[38]
- economic analysis of the impact of stronger climate action on innovation and competitiveness within the New Zealand context (Sense Partners), as well as related international evidence
- the co-benefits of emissions reductions, and the benefit to the New Zealand economy of avoiding damages caused by climate change.

This and future material will be published on the Ministry for the Environment website as it is finalised. This is part of building a clearer picture and evidence base over time to support future decisions and the advice of entities such as the Climate Change Commission, once it is established.

Other externally commissioned reports are also relevant. For example, Westpac NZ commissioned a report from EY (and Vivid) to determine the benefit to the economy of acting sooner rather than later. This report was based on a limited range of scenarios and included an assumption about the introduction of agriculture to the NZ ETS from 2020.

ASSUMPTIONS UNDERLYING NZIER'S MODELLING OF EMISSIONS

The NZIER model builds on assumptions used by Vivid and includes scenarios where:

- a baseline assuming current policy settings remains, sets energy efficiency and technological change assumptions based on today's rates, electric vehicles increase to make up 65 per cent of the light vehicle fleet by 2050 based on pricing considerations alone, other countries act consistently with the Paris Agreement, which they also signed, agricultural emissions remain unpriced and no international units are used
- faster energy innovation occurs, driven by higher emissions prices and transitional policies that double the baseline energy efficiency trends across all industries and provide a shift to 98 per cent renewable energy by 2035 with the remaining 2 per cent used being gas-fired generation in dry years only
- faster transport innovation occurs, driven by higher emissions prices and transitional policies that increase electric vehicle uptake to 95 per cent of the light vehicle fleet and 50 per cent of the heavy vehicle fleet by 2050

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[38] NZIER (2018).

ASSUMPTIONS UNDERLYING NZIER'S MODELLING OF EMISSIONS

- faster agricultural innovation occurs, this sees a one-off innovation of a methane vaccine introduced in 2030 being adopted across all farms, which reduces dairy emissions by 30 per cent and sheep and beef emissions by 20 per cent. A reduction in global demand for dairy (11 per cent fall in 2050 output from 2015 levels) and sheep and beef (15 per cent fall) is experienced as consumer preferences shift towards lower emissions intensive foodstuffs, such as synthetic meats.

These assumptions define the scenarios of mitigations deemed possible, and so, after assuming these things happen, the models then calculate the emissions prices necessary to meet a given target. The faster innovations can be turned on and off to see the impact of changing technology in different sectors, if meeting different targets.

The models do not include everything that might happen in the future: they do not allow for unforeseen technologies to ever take us beyond the faster innovation rates. For example, recent developments in breeding lower emissions sheep and other voluntary measures that we are already seeing on farm and by businesses.

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Submissions form

We seek your feedback on the specific proposals in the Zero Carbon Bill.

2050 target

1. What process should the Government use to set a new emissions reduction target in legislation?

   Pick one:

   - the Government sets a 2050 target in legislation now
   - the Government sets a goal to reach net zero emissions by the second half of the century, and the Climate Change Commission advises on the specific target for the Government to set later.

   Optional comment

2. If the Government sets a 2050 target now, which is the best target for New Zealand?

   Pick one:

   - **net zero carbon dioxide:** Reducing net carbon dioxide emissions to zero by 2050
   - **net zero long-lived gases and stabilised short-lived gases:** Long-lived gases to net zero by 2050, while also stabilising short-lived gases
   - **net zero emissions:** Net zero emissions across all greenhouse gases by 2050.

   Optional comment

3. How should New Zealand meet its targets?

   Pick one:

   - domestic emissions reductions only (including from new forest planting)
   - domestic emissions reductions (including from new forest planting) and using some emissions reductions from overseas (international carbon units) that have strong environmental safeguards.

   Optional comment

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4. Should the Zero Carbon Bill allow the 2050 target to be revised if circumstances change?

   Pick one:

   - yes
   - no.

   Optional comment

Emissions budgets

5. The Government proposes that three emissions budgets of five years each (ie, covering the next 15 years) be in place at any given time. Do you agree with this proposal?

   Pick one:

   - yes
   - no.

   Optional comment

6. Should the Government be able to alter the last emissions budget (ie, furthest into the future)?

   Pick one:

   - yes, each incoming Government should have the option to review the third budget in the sequence
   - yes, the third emissions budget should be able to be changed, but only when the subsequent budget is set
   - no, emissions budgets should not be able to be changed.

   Optional comment

7. Should the Government have the ability to review and adjust the second emissions budget within a specific range under exceptional circumstances?

   Pick one:

   - yes
   - no.

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Optional comment

8. Do you agree with the considerations we propose that the Government and the Climate Change Commission take into account when advising on and setting budgets?

   Pick one:

   - yes
   - no.

Optional comment

Government response

9. Should the Zero Carbon Bill require Governments to set out plans within a certain timeframe to achieve the emissions budgets?

   Pick one:

   - yes
   - no.

Optional comment

10. What are the most important issues for the Government to consider in setting plans to meet budgets? For example, who do we need to work with, what else needs to be considered?

Comment

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Climate Change Commission

11. The Government has proposed that the Climate Change Commission advises on and monitors New Zealand's progress towards its goals. Do you agree with these functions?

    Pick one:

    - yes
    - no.

    Optional comment

12. What role do you think the Climate Change Commission should have in relation to the New Zealand Emissions Trading Scheme (NZ ETS)?

    Pick one:

    - advising the Government on policy settings in the NZ ETS
    - makes decisions itself, in respect of the number of units available in the NZ ETS.

    Optional comment

13. The Government has proposed that Climate Change Commissioners need to have a range of essential and desirable expertise. Do you agree with the proposed expertise?

    Pick one:

    - yes
    - no.

    Optional comment

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Adapting to the impacts of climate change

14. Do you think the Zero Carbon Bill should cover adapting to climate change?

    Pick one:

    - yes
    - no

Optional comment

15. The Government has proposed a number of new functions to help us adapt to climate change. Do you agree with the proposed functions?

    Pick one:

    - yes
    - no.

Optional comment

16. Should we explore setting up a targeted adaptation reporting power that could see some organisations share information on their exposure to climate change risks?

    Pick one:

    - yes
    - no.

Optional comment

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