Departmental Disclosure Statement

Climate Change Response (Zero Carbon) Amendment Bill

The departmental disclosure statement for a government Bill seeks to bring together in one place a range of information to support and enhance the Parliamentary and public scrutiny of that Bill.

It identifies:

- the general policy intent of the Bill and other background policy material;
- some of the key quality assurance products and processes used to develop and test the content of the Bill;
- the presence of certain significant powers or features in the Bill that might be of particular Parliamentary or public interest and warrant an explanation.

This disclosure statement was prepared by the Ministry for the Environment.

The Ministry for the Environment certifies that, to the best of its knowledge and understanding, the information provided is complete and accurate at the date of finalisation below.

3 May 2019.

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Part One: General Policy Statement

What the Bill seeks to achieve and why

The purpose of the Climate Change Response (Zero Carbon) Amendment Bill (the **Bill**) is to provide a framework by which New Zealand can develop and implement clear and stable climate change policies that contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5° Celsius above pre-industrial levels.

The overarching purpose represents a balance of the guiding principles agreed by Cabinet to frame the development of climate change policy: leadership at home and abroad; a productive, sustainable, and climate-resilient economy; and a just and inclusive society.

The Bill sets out a durable framework, and stable and enduring institutional arrangements, for climate change action that will help keep New Zealand on track to mitigate and adapt to climate change. It also contains mechanisms for increasing transparency of decisions relating to climate change. This includes processes, timeframes, reporting-obligations, monitoring, and considerations to take into account.

The Bill seeks to strike a balance between flexibility and prescription in New Zealand's long-term transition, as well as building in considerations for how impacts are distributed.

How this Bill will provide the framework for New Zealand to develop and implement clear and stable climate change policies

The Bill will achieve its purpose by—

- establishing a new independent Climate Change Commission (the Commission)
 to provide independent expert advice and monitoring, to help keep successive
 governments on track to the long-term mitigation and adaptation goals.
- setting a new greenhouse gas emissions reduction target to—
 - reduce gross emissions of biogenic methane are at least 24 to 47% below 2017 levels by 2050, with an interim requirement to reduce emissions to 10% below 2017 levels by 2030:
 - reduce net emissions of all other greenhouse gases to zero by 2050:
- establishing a series of emissions budgets to act as stepping stones towards the 2050 target:
- establishing a range of climate change adaptation measures to make sure New Zealand understands the risks we face, and has a plan to address them:

Specific details of Bill's elements

Climate Change Commission: designed to provide independent expert advice and hold the government to account

The Climate Change Commission will provide ongoing, independent expert advice to the government on mitigating emissions and adapting to the effects of climate change. The Commission will monitor successive government's progress toward emissions-reduction and adaptation goals.

The Bill sets out the Commission's functions in relation to the target, emissions budgets, emissions-reduction plans, and adaptation measures established by the Bill. It provides

for the Minister to request other advice from the Commission. The Bill refers to the Commission's function in recommending unit supply settings for the New Zealand Emissions Trading Scheme, which will be operationalised by proposed legislative changes to improve the New Zealand Emissions Trading Scheme.

2050 emissions reduction target: to signal an economy-wide transition

Setting a greenhouse gas emissions reduction target in primary legislation will provide a clear signal on New Zealand's long-term emissions reduction goals. It will give New Zealanders confidence that climate change policies and the long-term emissions reduction pathway will remain stable and predictable and continue delivering prosperity.

The Bill allows the target to be revised, but only in specific circumstances. This includes requiring that the Commission be satisfied certain conditions are met before recommending a change. This is to ensure the target's long-term durability. The Bill does not prescribe what the government's response to a target recommendation would be. If the Commission recommends amending the target, this would involve a new amendment Bill being introduced to the House of Representatives, following adequate policy development and consultation.

Emissions budgets: stepping stones to low-emissions New Zealand

Emissions budgets can be understood as interim targets or "stepping stones" to New Zealand's emissions reduction target. A system of emissions budgets will help to manage the transition to a low-emissions New Zealand and avoid any abrupt changes in policy. They will also serve as a valuable tool for tracking progress and determining whether New Zealand is on track to meet the emissions reduction target established under the Bill. In doing so, they will also create accountability across successive governments.

Emissions budgets will signal the reductions required in the short to medium term and will be supported by a plan that includes strategies and policies to achieve the reductions required. In this way, emissions budgets will operate as a market signal, providing households, businesses, and industries with greater predictability and driving investment in low-emissions technology and innovation.

Adaptation: measures to increase New Zealand's resilience to changing climate

Understanding the risks, and what action is being taken to address them, will help New Zealand to co-ordinate efforts to adapt appropriately. This Bill will provide a framework for enhanced action on adaptation. This will consist of a national climate change risk assessment, a national adaptation plan, regular progress reporting on the implementation of the national adaptation plan, and an adaptation information-gathering power.

The national climate change risk assessment will be regularly prepared to improve understanding and prioritisation of the climate change risks that New Zealand faces. The national adaptation plan will outline the government's planned approach to addressing risks highlighted in the national climate change risk assessment. The Commission will regularly monitor and report on the implementation and effectiveness of the plan to ensure accountability.

An adaptation information-gathering power will enable the responsible Minister to require central government organisations, local government organisations, and "lifeline utility providers" to provide climate change adaptation information. The information will include the organisations' assessments of the risks climate change poses to their

functions, the organisations' proposals and policies for adapting to climate change, and their progress towards implementing the proposals and policies.

Why possible alternatives were ruled out

Primary legislation was considered necessary to ensure that New Zealand's commitments to mitigating climate change and adapting to a changing climate were appropriately prioritised. Non-regulatory options were considered but discarded.

Commission

An independent Crown entity is considered to be the most appropriate body to achieve the political accountability required for mitigating and adapting to climate change. An Officer of Parliament and an autonomous Crown entity were considered but would be limited in providing for this.

Further consideration was not given to options where—

- the membership of the Commission consisted of stakeholder representatives, as this was considered to jeopardise the ability of the Commission to provide independent advice:
- the consideration of adaptation was devolved to a subcommittee, as this was considered to pose a risk that adaptation would be treated as a secondary consideration to mitigation action:
 - the collective expertise required of the Commission was prescribed in more detail, as this was considered to allow insufficient flexibility for the considerations of the Commission to evolve over time:
 - the functions proposed for the Commission are performed as a statutory independent function in a government department, as this would not provide for an independent body.

Target

Extensive consultation on a 2050 domestic target took place in 2018, during which more than 15,000 New Zealanders and organisations had their say. The 2050 target in this Bill takes into account the results of the consultation (almost all supported a 2050 target), together with underpinning economic analysis, the latest climate science, and New Zealand's greenhouse gas emissions profile. In particular, the latest science in the IPCC special report on 1.5° Celsius concluded that in the central range of global scenarios consistent with staying within 1.5° Celsius of warming, as set out under the Paris Agreement, with limited or no overshoot—

- global emissions of carbon dioxide need to reduce to net zero around 2050, and below zero thereafter; and
- global emissions of agricultural methane need to reduce by 24-47% from 2010 levels by 2050.

To be consistent with this, a decision was made to include a target that distinguishes between biogenic methane (a short-lived gas) and all other greenhouse gases (such as carbon dioxide and nitrous oxide), rather than a single target for all greenhouse gases. The option of a separate target for the agriculture or land sector was considered to be inconsistent with the IPCC conclusions, which are based on the different impacts of different greenhouse gases rather than their sources.

Emissions budgets

Different options were considered for the length of an emissions budget period, whether, and in what circumstances, budgets could be revised, whether banking and borrowing across budget periods should be allowed, and the role of the Commission in relation to emissions budgets.

The model set out in the Bill was chosen because it will be enduring. It provides a stable policy environment that sends a strong signal to households, businesses, and industry, while remaining flexible and responsive to changing circumstances. It will allow governments to adhere to the optimal transition pathway and manage any adverse impacts of the transition to a low-emissions economy. The Commission's role will enhance the credibility, transparency, and accountability of the emissions budgeting system.

Adaptation

Including adaptation provisions in the Bill provides New Zealand with a clear, planned approach to climate change adaptation based on the best available evidence, information, and assessment of risks. It will enable actions to be planned, prioritised, and regularly undertaken, by clearly allocating responsibilities across various actors. Situating adaptation measures in the Bill alongside those for mitigation is designed to address their shared intergenerational implications. It will provide an integrated and holistic approach to the problem and ensure that policies and long-term decision-making are appropriately co-ordinated.

Instead of producing a national adaptation plan, national direction could be developed under the Resource Management Act 1991 (the **RMA**) in the form of a national policy statement (an **NPS**). The national adaptation plan will need to go beyond what can be covered under the RMA. Note that the Bill does not preclude an NPS, which could still be developed to support the implementation of a broader national adaptation plan.

In terms of who prepares the national climate change risk assessment, several potential responsible bodies were considered, including other central and local government agencies. However, the Commission is best placed to carry out this function, as it is important that the national climate change risk assessment is understood to be based on the best available evidence and independent of the politics of the day.

The national adaptation plan aims to provide a strategic government response to the risks identified and prioritised in the national climate change risk assessment. Allocating responsibility for the plan to other organisations was considered, but only central government has the necessary authority and levers to undertake this function. Therefore, it is appropriate that it is prepared by the responsible Minister.

There is a strong argument for a 6-yearly cycle to line up with relevant investment cycle timings, including local government long-term planning time frames and land transport investment planning, both of which happen on 3-yearly cycles. A 5-yearly cycle was considered to align with the communication of nationally determined contributions (**NDCs**) under the Paris Agreement, but NDCs are mitigation rather than adaptation focused.

Adaptation information-gathering power

Requiring all organisations, companies, and firms to report on adaptation risks and efforts under the Bill was considered to be cumbersome at this time. Proposals for climate-related financial disclosures have also been ruled out at this time, as these sorts

of reporting requirements for the private sector are being progressed outside of the Bill.

This enables future governments to consider extending reporting requirements, if they choose to do so.

Voluntary, informal reporting was considered and remains a viable option alongside the Bill's proposal for mandatory provision of information. However, even voluntary information gathering is likely to be more successful if the Minister has the ability to require the provision of information.

Further information regarding the Bill to assist understanding

Limited use of offshore mitigation and the context of nationally determined contributions

The Bill aims to support New Zealand's domestic transition to a low emissions economy. The Bill allows the government to purchase reductions sourced from overseas to meet emissions budgets, but only as a last resort and not as a first choice. The Commission will set a limit on the number of reductions sourced from overseas that can be purchased, and include reasons for this limit. This is designed to place primary reliance on reducing emissions at home, while retaining flexibility to manage the uncertainty of making long-term projections.

The Bill does not impact New Zealand's commitment to communicating and achieving nationally determined contributions that contain absolute economy-wide reductions at the maximum possible level of ambition, and that demonstrate a progression in ambition over previous efforts. Limiting the use of reductions sourced from over- seas to meet the 2050 target does not preclude the ability for New Zealand to count reductions sourced from overseas towards achievement of its successive nationally determined contributions, if required, which has previously been agreed by Cabinet (CAB-18-MIN-0248 refers).

Interaction with the New Zealand Emissions Trading Scheme

The New Zealand Emissions Trading Scheme (the **NZ ETS**) will be a key tool in meeting emissions budgets and achieving the 2050 target. A number of improvements to the NZ ETS will be progressed through the Climate Change Response Amendment Bill, including price control measures. As noted by the Cabinet Environment, Energy, and Climate Committee, any release of units following the activation of these price control measures will not be taken from an emissions budget.

Statutory time frames

Timely and transparent implementation of the Bill will be essential in order to provide certainty and allow businesses, households, and individuals to start taking action to reduce their emissions and understand and address the risks of climate change. It will also establish much-needed market signals for New Zealand Emissions Trading Scheme participants on the emissions reduction pathway for New Zealand.

The statutory time frames will apply to the provision of advice and requirements to respond once the framework is fully operational.

Part Two: Background Material and Policy Information

Published reviews or evaluations

2.1. Are there any publicly available inquiry, review or evaluation reports that have informed, or are relevant to, the policy to be given effect by this Bill?

YES

A Zero Carbon Act for New Zealand: Revisiting 'Stepping stones to Paris and beyond', Parliamentary Commissioner for the Environment, 2018 -

https://www.pce.parliament.nz/publications/a-zero-carbon-act-for-new-zealand-revisiting-stepping-stones-to-paris-and-beyond

Stepping stones to Paris and beyond: Climate change, progress and predictability, Parliamentary Commissioner for the Environment, 2017 -

https://www.pce.parliament.nz/publications/stepping-stones-to-paris-and-beyond-climate-change-progress-and-predictability

A note on New Zealand's methane emissions from livestock, Parliamentary Commissioner for the Environment, 2018 -

https://www.pce.parliament.nz/publications/a-note-on-new-zealand-s-methane-emissions-from-livestock

Low-emissions economy, New Zealand Productivity Commission, 2018 - https://www.productivity.govt.nz/sites/default/files/Productivity%20Commission_Low-emissions%20economy_Final%20Report_FINAL.pdf

Examining the UK Climate Change Act 2008, New Zealand Productivity Commission, 2017 - https://www.productivity.govt.nz/sites/default/files/Examining%20the%20UK%20Climate%20 Change%20Act%202008.pdf

10 years of the UK Climate Change Act, Grantham Research Institute on Climate Change and the Environment, 2018 - http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2018/03/10-Years-of-the-UK-Climate-Change-Act_Fankhauser-et-al.pdf

Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty, 2018 - https://www.ipcc.ch/sr15/

Adapting to climate change in New Zealand: Recommendations from the Climate Change Adaptation Technical Working Group, 2018 -

http://www.mfe.govt.nz/sites/default/files/media/Climate%20Change/ccatwg-report-web.pdf

Report of the Biological Emissions Reference Group (BERG), 2018 https://www.mpi.govt.nz/dmsdocument/32125-berg-report-final-for-release-6-dec

Relevant international treaties

2.2. Does this Bill seek to give effect to New Zealand action in	
relation to an international treaty?	

YES

The relevant treaty is the Paris Agreement. The treaty text can be accessed on the United Nations Framework for Climate Change Convention (UNFCCC) website, available at: https://unfccc.int/files/essential-background/convention/application/pdf/english-paris-agreement.pdf

2.2.1. If so, was a National Interest Analysis report prepared to inform a Parliamentary examination of the proposed New Zealand action in relation to the treaty?

YES

The National Interest Analysis: The Paris Agreement was authorised and published by the New Zealand Parliament in 2016. It can be accessed on the New Zealand Parliament website, available here: https://www.parliament.nz/resource/en-NZ/00DBSCH ITR 69746 1/78aeee3af9672be07fa005a3898fcba3e48f2e58.

Regulatory impact analysis

2.3. Were any regulatory impact statements provided to inform the policy decisions that led to this Bill?

YES

Regulatory Impact Statement for the Zero Carbon Bill. December 2018. Authorised by the Ministry for the Environment.

https://www.mfe.govt.nz/sites/default/files/media/Climate%20Change/regulatory-impact-statement-zero-carbon-bill.pdf

The Regulatory Impact Statement (RIS) can be accessed on the Treasury website, available here: https://treasury.govt.nz/publications/legislation/regulatory-impact-assessments

2.3.1. If so, did the RIA Team in the Treasury provide an independent opinion on the quality of any of these regulatory impact statements?

YES

The Regulatory Impact Analysis Team has reviewed the RIS and provided the following quality assurance statement:

The Regulatory Quality Team at The Treasury and the Regulatory Impact Analysis Panel at the Ministry for the Environment have jointly reviewed the "Climate Change Bill" RIS dated 19 October 2018. The joint review team considers that the RIS meets the quality assurance criteria for Regulatory Impact Assessments, based on: (a) the RIS being complete (b) the proposal having been publicly consulted on (c) the RIS being as clear and concise as possible, given the complexity of the subject (d) the inclusion of modelled economic costs and benefits.

2.3.2. Are there aspects of the policy to be given effect by this Bill that were not addressed by, or that now vary materially from, the policy options analysed in these regulatory impact statements?

NO

Extent of impact analysis available

2.4. Has further impact analysis become available for any aspects of
the policy to be given effect by this Bill?

NO

2.5. For the policy to be given effect by this Bill, is there analysis available on:	
(a) the size of the potential costs and benefits?	YES
(b) the potential for any group of persons to suffer a substantial unavoidable loss of income or wealth?	YES
See Appendix One	

2.6. For the policy to be given effect by this Bill, are the potential costs or benefits likely to be impacted by:	
(a) the level of effective compliance or non-compliance with applicable obligations or standards?	YES
(b) the nature and level of regulator effort put into encouraging or securing compliance?	YES

If New Zealand does not undertake the economic transition required to achieve the transition to meet the new emissions reduction target, the net economic cost will be less than those presented in the RIS.

Part Three: Testing of Legislative Content

Consistency with New Zealand's international obligations

3.1. What steps have been taken to determine whether the policy to be given effect by this Bill is consistent with New Zealand's international obligations?

MFAT has been consulted on the policy decisions and content of the draft Bill to ensure it is consistent with New Zealand's international climate change obligations.

The 2015 Paris Agreement was the result of a call for a new universal legal agreement under which all countries agree to address climate change from 2020 onwards. It represents a global commitment to avoid dangerous climate change by aiming to:

- keep global average temperature rise to well below 2 degrees Celsius above pre-industrial levels, and pursuing efforts to limit the temperature increase to 1.5 degrees
- enhance countries' ability to adapt and reduce vulnerability to climate change impacts
- make finance flows consistent with low-emissions and climate-resilient development.

Parties also agreed to aim to reach peak global GHG emissions, as soon as possible, and to aim for net zero emissions in the second half of the century.

The Paris Agreement creates obligations on New Zealand to prepare, communicate and maintain successive NDCs and implement domestic measures to meet its commitments, including planning for and taking action on adaptation.

The draft Bill aligns with these commitments by providing the framework for New Zealand's just and inclusive transition to a low-emissions, climate resilient economy. The 2050 domestic target is consistent with global efforts to limit global average temperature rise to 1.5 degrees Celsius above pre-industrial levels. Where possible alignment between the international and domestic was considered, for instance the timing of the budget cycles have been set to make the relationship between the NDC and domestic emissions budgets more transparent.

Consistency with the government's Treaty of Waitangi obligations

3.2. What steps have been taken to determine whether the policy to be given effect by this Bill is consistent with the principles of the Treaty of Waitangi?

The Bill gives effect to the Treaty principles through incorporating specific requirements to consult with iwi and Māori and to consider matters of interest to them. This occurs throughout sections relating to the emissions budget plans, adaptation measures and the Climate Change Commission.

Consistency with the New Zealand Bill of Rights Act 1990

https://www.justice.govt.nz/justice-sector-policy/constitutional-issues-and-human-rights/bill-of-rights-compliance-reports/advice/

Offences, penalties and court jurisdictions

3.4. Does this Bill create, amend, or remove:	
(a) offences or penalties (including infringement offences or penalties and civil pecuniary penalty regimes)?	NO
(b) the jurisdiction of a court or tribunal (including rights to judicial review or rights of appeal)?	NO

Privacy issues

3.5. Does this Bill create, amend or remove any provisions relating to the collection, storage, access to, correction of, use or disclosure of personal information?	NO
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External consultation

3.6. Has there been any external consultation on the policy to be	YES
given effect by this Bill, or on a draft of this Bill?	TES

Over 7 June-19 July 2018, the Government consulted with New Zealanders on a range of proposals for the Bill, which were approved by Cabinet and split into four distinct policy areas: 2050 Target, Emissions Budgets, Adaptation and Climate Change Commission (the Commission). Public consultation was extensive, including a comprehensive discussion document detailing the Government's proposals, as well as nationwide roadshows and technical workshops. There was a significant response of over 15,000 submissions, with a clear majority of New Zealanders in favour of strong and ambitious domestic action. Details of the consultation can be found in the Regulatory Impact Statement at pages 14, 28, 31-32.

Further, targeted consultation has been conducted with iwi/Māori. During consultation, specific hui were held with the Te Arawa Climate Change Working Group (hui coordinated by the Te Arawa Lakes Trust), the Federation of Māori Authorities (FOMA) and Te Rūnanga o Ngāi Tahu. Two further hui were held post-consultation, in August 2018 with FOMA and NZMC, and in December 2018 with FOMA, NZMC, Te Arawa Climate Change Working Group, Te Arawa Primary Sector, Ngāi Tahu, Ngāti Ruanui and the Māori Climate Commissioner.

Officials held discussions during the policy development process with the UK Climate Committee, and UK Government officials involved in the implementation of that country's climate change policy framework. The outcomes of these discussions informed the policy advice.

Other testing of proposals

3.7. Have the policy details to be given effect by this Bill been otherwise tested or assessed in any way to ensure the Bill's provisions are workable and complete?	NO

Part Four: Significant Legislative Features

Compulsory acquisition of private property

4.1. Does this Bill contain any provisions that could result in the compulsory acquisition of private property?	NO

Charges in the nature of a tax

4.2. Does this Bill create or amend a power to impose a fee, levy or charge in the nature of a tax?	NO

Retrospective effect

4.3. Does this Bill affect rights, freedoms, or impose obligations, retrospectively?	NO

Strict liability or reversal of the usual burden of proof for offences

4.4. Does this Bill:	
(a) create or amend a strict or absolute liability offence?	NO
(b) reverse or modify the usual burden of proof for an offence or a civil pecuniary penalty proceeding?	NO

Civil or criminal immunity

4.5. Does this Bill create or amend a civil or criminal immunity for any person?	NO

Significant decision-making powers

4.6. Does this Bill create or amend a decision-making power to make a determination about a person's rights, obligations, or interests protected or recognised by law, and that could have a significant impact on those rights, obligations, or interests?	NO

Powers to make delegated legislation

4.7. Does this Bill create or amend a power to make delegated legislation that could amend an Act, define the meaning of a term in an Act, or grant an exemption from an Act or delegated legislation?	NO

4.8. Does this Bill create or amend any other powers to make delegated legislation?

Clause 57 Regulations relating to requiring provision of information.

Regulations may be made to specify more detailed requirements relating to requesting information on climate change adaptation from certain organisations.

The provision includes matters the responsible Minister must consider when preparing regulations and requirements to consult the Climate Change Commission and reporting organisations that may be affected by the regulations before recommending the making of regulations.

Any other unusual provisions or features

4.9. Does this Bill contain any provisions (other than those noted above) that are unusual or call for special comment?	NO

Appendix One: Further Information Relating to Part Two

Extent of impact analysis available – question 2.5(a)

A suite of economic analyses and reports have been developed to support consultation on the options for a new 2050 target.

The modelling undertaken optimises the pathway to achieving the target, assuming certain innovations have taken place. There is a risk that the economic costs of transition could be greater than modelled if the assumed future innovation, technological developments and productivity gains do not come to pass. This is mitigated in the Bill through a number of 'safety valves' and flexibility mechanisms that, due to changing information or unforeseen circumstances, allow for the necessary revision of the target and budgets, as well as purchasing international units. This also provides flexibility in the face of insufficient climate change action by the rest of the world.

The economic analysis undertaken can give us a sense of what could happen under different scenarios. Overall, the economic analysis has looked broadly at three areas: the potential challenges for the economy, distributional impacts across sectors and households (and the differing impacts on emissions-intensive and on low-emissions sectors); how taking action to meet climate targets could both have implications for industry competitiveness and serve to drive faster innovation; and the potential upsides to climate action.

No single model can give a full picture of the costs and benefits of adopting a particular target for emissions reductions in 2050. Acknowledging this, officials commissioned and undertook a range of analysis to support advice on the target options. This work was led by the Ministry for the Environment, with input from other agencies including the Ministry for Primary Industries, Ministry of Business, Innovation and Employment, Ministry of Foreign Affairs and Trade, Electricity Efficiency and Conservation Authority and the Treasury.

This pre-Zero Carbon Bill economic analysis was divided into two stages in order to fit with the policy development process. Stage 1 was undertaken to support the development of the material supporting public consultation. Stage 2 builds on and refines the results of Stage 1 and informed final policy advice.

Assessing the economic impacts of emissions reduction targets out to 2050 is extremely complex and the results must be read with care; the models are not perfect predictions or forecasts. What will actually happen will depend on the actions of individual businesses and households, and future policy choices by governments.

There are plenty of ways New Zealand can take action. We can increase renewable energy 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. It is uncertain how the future will unfold. So we have looked at a series of economic analyses: models and other studies to assess the implications for the New Zealand economy and to get 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 several expert economic modellers, including independent external experts and officials.

No single model can give a complete picture of all challenges and benefits that a new target might create, and not a single report comparing all the costs and benefits in an easy way is available. Instead, each of the underlying reports tells a different part of the overall story.

Overall the suite of economic research and analyses has looked broadly at three areas.

- Challenges for the economy growth, households and sectors: Two different modelling approaches have been used – 'top-down' NZIER model and 'bottom-up linked sector' Vivid model:
 - whole-of-economy computable general equilibrium (CGE) modelling to determine emissions prices and GDP impact of different targets (NZIER, 2018).
 The assumptions on emissions reductions options are, where possible, aligned with the modelling by Vivid

- bottom-up and linked sector modelling linking rural land use and energy sector models to investigate transition pathways and emissions prices from 2030–2050 to meet different target options (Vivid Economics, 2018).
- The competitiveness challenges businesses may face and the potential for others to innovate faster: climate action to meet the new 2050 targets could have competitiveness impacts on our businesses, but could also drive faster innovation.
- The wider co-benefits to climate action: there are potential co-benefits of policies designed to achieve lower emissions (eg, health outcomes), or the emissions benefits of other policies like transport policy to reduce congestion.

Table 1: The analytical approach to assessing the economic impact of climate action

Synthesis Report Part #		Part 2	Part 3		Part 4		Part 5
Fail#	CHALLENGES		OPPORTUNITIES				
What did we assess?	Emissions prices required to meet targets	Emissions prices required to meet targets and concurrent impacts on GDP growth, sector expansion and contraction. and distributional impacts (on income quintiles)	Com petit ive- ness chall eng es	Innovation opportuniti es Economic analysis and review of the internationa I literature Ministry for the Environmen t, 2018 Sense Partners, 2018		Wider co- benefit s	Avoiding damages caused by climate change
How did we assess the economic impact?	Bottom-up modelling and whole-of- economy modelling	Whole-of-economy modelling (CGE)	Eco nom ic anal ysis of EITE sect ors			Econo mic analysi s and review of relevan t literatu re	Short review of literature on economic impacts
Where can you find the full report?	NZIER, 2018 Vivid Economics (including Motu & Concept), 2018	NZIER, 2018	Sens e Part ners , 201 8			Ministr y for the Environ ment, 2018	No report published

Economic modelling is not a perfect science and cannot predict the future. Forecasting the economic impacts of climate change policies, including long-term emissions reduction targets, is extremely difficult due to the uncertainty of future projections, as well as the potential for major policy and/or technological changes between now and 2050.

Therefore, modelling in this area makes a range of assumptions about the economy to provide an idea of the plausible transition pathways for each option and their potential economic impacts. A range of qualitative economic studies also undertaken complement the modelled findings.

The Ministry has undertaken a thorough assessment of the economic impacts of the proposed target options in a constrained timeframe. Discussions with international counterparts indicate that by integrating the assessment of economic impacts of a low emissions transition across energy, transport and also land use, New Zealand is at the forefront of this type of analysis.

The RIS sets out the full economic modelling results for baseline, current domestic target and target options 1–4. These include:

- Emissions price annual average 2020- 50 (\$/tCO2-e)
- Emissions price at 2040 (\$/tCO2-e)
- Emissions price at 2050 (\$/tCO2-e)
- Annual average GDP Growth 2020-50 (% pa)
- Annual average GDP 2020-50 (\$ million per year)
- Absolute GDP at 2040 (\$ million per year)
- Absolute GDP at 2050 (\$ million per year)
- Annual average GNDI 2020-50 (\$ thousand per household per year)
- Cumulative 2018 NPV of GDP impacts over 2018-2050 (\$ billion)

Specific impacts (eg on a regional or individual household level) are not estimated. These will be calculated as part of the cost-benefit-analysis behind policies to achieve the target.

The NZIER modelling indicates that with Net Zero Emissions, per household national income would still increase by 40 per cent by 2050, compared to 55 per cent if we took no further climate action.

Modelling shows the impact of domestic climate action would be felt more strongly by lower income households, if the Government does not take action to mitigate the impacts, 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. Modelling by Infometrics for the NZIER study suggests the households 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 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.