IN THE HIGH COURT OF NEW ZEALAND
WELLINGTON REGISTRY

I TE KŌTI MATUA O AOTEAROA
TE WHANGANUI-Ā-TARA

CIV-2021-485-000341

UNDER	Judicial Review Procedure Act 2016 and part 30 of the High Court Rules 2016
IN THE MATTER OF	an application for judicial review
BETWEEN	**LAWYERS FOR CLIMATE ACTION NZ INCORPORATED** Applicant
AND	**THE CLIMATE CHANGE COMMISSION** First Respondent
AND	**MINISTER FOR CLIMATE CHANGE** Second Respondent

AFFIDAVIT OF RODERICK MARSHALL CARR

(Climate Change Commission Chair – Commission's role and approach, CBA/MCA and ambition)

Affirmed: 19 December 2021

Counsel acting: Victoria Casey QC
Clifton Chambers

Luke Cunningham Clere
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PO Box 10-357
WELLINGTON

I, **RODERICK MARSHALL CARR,** Chair of the Climate Change Commission, of Christchurch, affirm:

INTRODUCTION

1. My full name is Roderick Marshall Carr. I am Chairperson of He Pou a Rangi Climate Change Commission.

2. I was appointed Chair-designate for the newly forming Commission in October 2019 and confirmed as the first Chair of the Commission when it was established in December 2019.

3. I provide this evidence in response to the judicial review proceedings brought by Lawyers for Climate Action New Zealand Inc (LCANZ). Those proceedings allege errors in the Climate Change Commission's Advice to the New Zealand Government *Ināia tonu nei: a low emissions future for Aotearoa*, released in June 2021.

SCOPE OF EVIDENCE

4. In this affidavit, I cover the following:

   4.1 First, I describe the Commission's role in Aotearoa New Zealand's climate change response.

   4.2 Second, I provide an overview of the processes the Commission undertook in preparing its advice, *Ināia tonu nei: a low emissions future for Aotearoa*.

   4.3 Third, I respond to aspects of the evidence filed by LCANZ. In particular, I respond to the critiques offered in the affidavits of Dr William Taylor and Dr Ivo Bertram as to the methodology the Commission adopted to provide its advice and the level of "ambition" disclosed in the Commission's recommended emissions budgets.

5. In my evidence I refer to a number of documents. I understand that some of these have already been provided to the Court by LCANZ, and others will be collated with material referred to by other witnesses for the Commission into a paginated supplementary bundle. References in this affidavit will accordingly be to:

   5.1 The Commission's Advice and Support Volumes, referred to as "Advice Bundle" with the relevant page reference. The page references I will give will be to the

page number at the top of each page (not the original page numbers, as these were not continuous in the original volumes);

5.2 LCANZ' bundle of documents, referred to as "LBD" with the relevant page reference;

5.3 Commission's supplementary bundle of documents, referred to as "CBD" with the relevant page reference.

6. To the extent that my evidence includes matters of expert opinion, I confirm that I have read and agree to comply with the Code of Conduct for expert witnesses in Schedule 4 of the High Court Rules, and I confirm that the evidence I give is within the area of my expertise.

EXPERIENCE AND QUALIFICATIONS

7. I have significant experience in public and private sector governance and leadership, public policy development, leadership of academic and financial institutions, professional qualifications and experience in investment and risk management.

8. I have served as Deputy Governor, Acting Governor, non-Executive Director and Chairman of the Board of the Reserve Bank of New Zealand. I spent ten years as Vice Chancellor of the University of Canterbury.

9. I served five years as the founding chair of the National Infrastructure Advisory Board and for ten years as director of the Canterbury Employers' Chamber of Commerce. I was the Chief Executive of Jade Software Corporation for a period of five years.

10. I was a director of Lyttelton Port Company for ten years and am currently a director of Crown Entity Otakaro Limited, overseeing the billion dollar construction of the Christchurch Convention Centre and Metro Sports Centre.

11. I hold a PhD in Insurance and Risk Management and an MA in Applied Economics and Managerial Science from the Wharton School at the University of Pennsylvania. I have an MBA in money and financial markets from the Columbia University, Graduate School of Business and I also hold bachelor's degrees with honours in law and economics from the University of Otago.

12. My CV is at [•] of the CBD.

THE COMMISSION'S ROLE IN AOTEAROA NEW ZEALAND'S RESPONSE TO CLIMATE CHANGE

13. He Pou a Rangi Climate Change Commission was established in December 2019 by the enactment of the Climate Change Response (Zero Carbon) Amendment Act 2019, which amended the Climate Change Response Act 2002.

14. The role of the Commission is to provide independent, expert, evidence-based advice to government on climate issues. As set out in section 5B of the Climate Change Response Act, the Commission's purpose is to:

    14.1 provide independent, expert advice to the government on mitigating climate change (including through reducing emissions of greenhouse gases) and adapting to the effects of climate change; and

    14.2 monitor and review the government's progress towards its emissions reductions and adaptation goals.

15. The Commission undertakes this work in the context of rapidly changing science and global and domestic politics. Within this context, the Commission's challenge is to provide advice that supports greater stability and predictability of climate policy in New Zealand, and encourages sound long-term decision-making. In doing so, the Commission has an important role in helping to insulate New Zealand's long-term climate change response from short-term political pressures and sectoral interests.

16. The Commission is also focussed on improving the transparency of and accountability for climate action in Aotearoa New Zealand. In fulfilling its role of providing independent expert advice and monitoring and reviewing government action, the Commission contributes to better transparency with respect to New Zealand's climate action and allows more effective scrutiny of government decision-making.

17. Finally, the Commission's independence is key. It is the Commission's independence that means that it can provide impartial advice at arm's length to ministers and hold successive governments to account for action to achieve long-term climate goals. In this regard, the Commission's status as an independent Crown entity is important, and it is provided for in section 5C of the Climate Change Response Act.

COMMISSION'S FIRST PIECE OF ADVICE - *INĀIA TONU NEI: A LOW EMISSIONS FUTURE FOR AOTEAROA*

18. The first major programme of work for the Commission following its establishment was the preparation of the Advice to the New Zealand Government, *Ināia tonu nei: a low emissions future for Aotearoa*, which was delivered to the Minister of Climate Change and tabled in Parliament in June 2021. This was a major project that took approximately 17 months to complete. I note also that significant preparatory work had been done in advance of the Commission's formation by the Interim Climate Change Committee. Joanna Hendy, the Chief Executive of the Commission, discusses the work of the Interim Committee in more detail in her affidavit.

19. At the peak, we had approximately 45 staff and the members of the Board all working to prepare the Advice.

20. The Advice covered three separate matters. The first was Advice to the Minister to enable the preparation of emissions budgets including the advice required by section 5ZA on the levels of the first three emissions budgets, setting out the proposed total amount of greenhouse gas emissions allowed in Aotearoa New Zealand over three periods 2022 – 2025, 2026 – 2030 and 2031 – 2035, charting a course towards meeting the 2050 emissions reduction targets set by Parliament in the Act, and on how the emissions budgets and ultimately the 2050 target may be realistically met, including by pricing and policy methods.

21. The second was Advice to the Minister to enable the preparation of an emissions reduction plan in accordance with section 5ZH, being advice on the direction of policy required in the emissions reduction plan for the first emissions budget period (2022 – 2025).

22. The third part of the Advice was prepared in response to a request from the Minister of Climate Change on 20 April 2020 under section 5K of the Climate Change Response Act. That request sought advice from the Commission on:[1]

    22.1 New Zealand's Nationally Determined Contribution (NDC) under the Paris Agreement. In particular, on whether the NDC was compatible with contributing to the global effort under the Paris Agreement to limit the global

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1 Hon James Shaw *Letter requesting advice under s 5 K* (20 April 2020), CBD at [•]; and Hon James Shaw *Terms of Reference*, CBD at [•].

average temperature increase to 1.5°C above pre-industrial levels, and recommendations on any changes to the NDC to make it compatible.

22.2 Biogenic methane emissions. In particular, advice on the potential reductions in biogenic methane emissions which might eventually be required by New Zealand as part of the global 1.5°C effort under the Paris Agreement.

THE DEVELOPMENT OF THE COMMISSION'S ADVICE IN *INĀIA TONU NEI: A LOW EMISSIONS FUTURE FOR AOTEAROA*

23. I now turn to broadly outline the process by which the Commission developed its advice in *Ināia tonu nei: a low emissions future for Aotearoa*, as well as the key judgements that underpinned it. The Commission's published Advice and Supporting Volumes set this out in some detail: my purpose here is to focus on, and where necessary elaborate on, particular aspects that are relevant to the criticisms LCANZ now puts forward.

The 2050 target

24. It is important to make clear the significance of the 2050 target for emissions reductions, set out by Parliament in section 5Q of the Climate Change Response Act, for the Commission's advice on the emissions budgets.

25. While the target is referred to in the Act as the "2050 target", and this is the language I use in this affidavit, it is in fact two separate targets - one for greenhouse gases other than biogenic methane, and the other for biogenic methane:

25.1 The target for all greenhouse gases other than biogenic methane provides that net accounting emissions for those gases in a calendar year are zero by the calendar year beginning on 1 January 2050, and for each subsequent calendar year. It is therefore a "net zero" target for all greenhouse gases other than biogenic methane.

25.2 The target for biogenic methane requires that:

(a) for the calendar year beginning on 1 January 2030, biogenic methane emissions in Aotearoa New Zealand are to be reduced by 10 percent from their 2017 level; and

(b) for the calendar year beginning on 1 January 2050, biogenic methane emissions in Aotearoa New Zealand are to be reduced by 24 percent to

47 percent less than 2017 emissions, and for each subsequent calendar year.

26. The Commission was tasked with designing emissions budgets that would put us on a path to achieve those targets. Our advice on the emissions reduction plan advised on the direction of policy that would be consistent with achieving those budgets.

Methodology for determining recommended emissions budgets

Development of analytical frameworks, modelling tools and emissions reduction database

27. From its establishment in December 2019, the Commission immediately started work to develop this advice on emissions budgets and the first emissions reduction plan, building on foundations laid by the Interim Climate Change Committee. We refined our analytical frameworks and, in collaboration with external expert advisors and consultants, developed new modelling tools.

28. We also established a detailed database of emissions reduction potential from different technologies and actions. This was informed by extensive evidence gathering efforts which included a call for evidence, engagement with government and non-government experts via technical reference groups and other means. In developing the database, we drew on a wide range of research and analysis from both Aotearoa New Zealand and overseas.

29. The analytical frameworks, modelling tools and emissions reduction database all fed into the development of the demonstration path, scenarios and sensitivity analysis, which I explain further below.[2]

Key judgements underpinning the advice

30. At the beginning stages of the preparation of the Advice, at the same time as the Commission was refining its frameworks and tools and gathering data, the Commissioners went about identifying the key areas of the Advice that would rely on judgement calls by the Commissioners. That included those areas where the key

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2 The evidence and modelling relied on by the Commission is explained in Advice, in particular in Chapter 4: see Climate Change Commission *Ināia tonu nei: a low emissions future for Aotearoa* (June 2021), Advice Bundle at 67 – 75, and in particular at 70 – 75.

considerations required by the Act were engaged and a weighing up of competing considerations or trade-offs, informed by the evidence, was required.[3]

31. The Commissioners determined that the areas of the Advice that were primarily scientific and evidence-based would be the focus of the Commission staff, who would present evidence based analysis to inform the Commissioners' decisions. The areas that required judgement calls were however for the Commissioners to assess and make decisions on, having received the evidence-based work. As I explain further below, the decisions made by the Commissioners in these key judgement areas were fundamental in shaping the Commission's Advice.

32. We identified a number of key judgement areas, including the following.

Pace[4]

33. That is, the pace at which New Zealand should reduce its domestic emissions in the first three budget periods, or the initial "steepness" of the curve of reductions down to the 2050 target. This was a challenging assessment. Our analysis showed that in part due to previous short-term thinking and limited action, achieving the emissions reductions needed to get to 2050 would require elected officials to move fast to implement a comprehensive plan, and updates to our Greenhouse Gas Inventory confirmed that we have a tough starting point. Fast and hard reductions might seem attractive in that context, and we know that reducing emissions sooner would mean total emissions would be lower, in theory reducing the risk of overshooting the 2050 target.

34. On the other hand, we were aware that to achieve steady and sustained reductions, Aotearoa New Zealand needed to build a system that would support and drive those reductions, and that once we started, it would take time to build momentum and make changes across the system. We were conscious of the need to be careful that in the haste to achieve more immediate emissions reductions, we did not compromise the ability of the economy to support deeper reductions later.

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3 With respect to the factors that the Commission was required to consider under the Climate Change Response Act 2002, see Chapter 5.1 and 5.2 of the Advice: Advice Bundle at 76 – 88, in particular at 79.

4 We discuss the relevance of "pace" throughout our advice, including its effect on the final recommendations of the Commission. See discussions on pace in the Advice Bundle at 30, 39 – 40, 77, 962 and 963, and more generally Chapters 5 (76 – 101), 7 (114 – 153) and 8 (154 – 299).

35. We were also conscious that for budgets to be ambitious and achievable, they needed to be economically affordable and socially acceptable, and they needed to be met in a way that is fair, equitable and inclusive. Moving too slowly would push the burden of addressing climate change onto future generations, and moving too fast will also impact on people: jobs could be lost unnecessarily and some industries and businesses forced to close even though there may have been other solutions if more time had been taken. What might on a short-term or simplistic view look better for the environment – fast and hard cuts in emissions – could well prove not to be over the longer term.

Distribution of impacts[5]

36. We also had to consider the distribution of impacts across communities and generations, and the impacts of action and inaction not just on today but over the whole transition period and beyond. This involved consideration of the impacts of change on vulnerable communities, not all of which might be obvious. For instance, a vulnerable community may be affected less than another community in one sense, but the impact may be felt more because they have less capacity to respond: job losses or increased fuel prices might be less able to be absorbed, because the community is already at its limits.

37. By way of example, an increase in petrol price of six cents per litre will be felt differently in marginalised communities, where the cost of filling the family car represents a much bigger proportion of that family's income each week than that it does of a wealthier family. Intergenerational considerations were also at play here, and judgement calls were also required in respect of social costs for both present and future generations. Again, this is not solely a matter of arithmetic or economic models.

Reliance on carbon sequestration/afforestation[6]

38. We had to carefully consider the balance to be struck between gross emissions reductions (that is, actually reducing our emissions) versus reliance on carbon sequestration and afforestation (that is, the planting of new forests) to lower our overall net emissions to meet emissions reductions targets. On the one hand, forestry offers

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5 See the discussion on the Commission's consideration of intergenerational equity and distribution of impacts in Chapter 8 (154 – 299 of the Advice Bundle), Chapter 19 (341 – 353 of the Advice Bundle) and Chapter 20 (354 – 363 of the Advice Bundle) and throughout the Supporting Volumes in Chapter 15 (Advice Bundle at 943 – 1011) and Chapter 16 (Advice Bundle at 1012 – 1048).

6 See the discussion on the reliance on removals from forestry in the Advice: Advice Bundle at 107 – 108.

relatively low cost carbon dioxide removals which would therefore favour planting more forests, but this needs to be weighed against the fact that:

(a) when you put land in forestry as a carbon store, you have lost the ability to use that land for any other purpose forever until you figure out how to otherwise store the carbon that was stored in that forest; and

(b) this disincentives actual decarbonisation of the economy, and shifts the work to future generations who will need to keep planting new forests at the same pace to sustain compliance with the target.

39. Again, the numbers generated by modelling will not provide the answer to this question. Determining the right balance between gross emissions reductions and forestry is a matter of judgement, not just arithmetic.

The role of pricing[7]

40. We had to consider the role of pricing, including emissions pricing via the Emissions Trading Scheme (ETS), and the role that market should play in emissions reductions. We recognised that the market always has a role to play in the efficient allocation of resources, and pricing (in particular under the ETS) has an important role to play in incentivising emissions reductions. However, we had to balance this against the fact that history has demonstrated that the market does not always provide the most equitable or effective solution. Accordingly, the Commission had to use its judgement to consider the role that market mechanisms should play in driving emissions reductions.

Assumptions about the future

41. There were a range of judgements about the likely future scenarios that had to be made by the Commission that fed into the modelling and ultimately the demonstration path.

42. For example, we had to consider what to assume about the future of large industrial plants and industries – whether they would stay operating or whether our models should allow for closure as a means of reducing emissions. Just by way of one illustration, we had to decide whether the modelling should assume that the Tiwai Point

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7 The effect of "pricing" on emissions is considered throughout the consideration of policy direction. See in particular the Advice Bundle at 172 and 173; more generally the role of pricing to influence investments and choices is discussed in Chapter 11 (225 – 239), Chapter 13 (253 – 275) and Chapter 17 (319 – 329).

aluminium plant remains open or closes. That one decision involved a full one per cent of New Zealand's total emissions. The Commissioners made the decision that in the demonstration path it would close, but we then had to consider what would happen to the power generation that was no longer being used by the smelter. Meridian Energy has a number of options available to it: it could lower its generation to maintain prices, it could develop a hydrogen production facility that would allow it to sell the energy internationally which would mean that it is not available to the New Zealand market, or it could make the power available to the domestic market, increasing supply and potentially enabling New Zealanders to enjoy reduced prices. In the end we cannot tell Meridian what to do, but we had to make a judgement call about what might happen in our demonstration path and through the sensitivity analysis show the implications of alternatives.

43. We also had to consider what to assume about the uptake of emerging technologies that are not currently commercially available (such as methane reduction technologies for agricultural emissions, hydrogen processes for steel making and so on). The likely pathways for the availability of emerging methane reduction technologies in particular was a significant factor for determining the achievable level of biogenic methane reductions, and it was very much a judgement call given the high levels of uncertainty about how successful technologies might evolve, become commercially available and then be taken up.

44. The Commissioners were tasked with considering New Zealand as a whole, and all the huge range of variables and uncertainties that make up the pathways for its future. Those were all judgement calls made by the Commissioners which were debated, discussed and evolved throughout the preparation of the Advice.

Overall

45. I wish to emphasise that these, and other matters of judgement identified by the Commissioners, reflect the fact that the matters the Commission had to consider in giving its advice on the emissions budgets were far broader than what is simply the fastest path of emissions reduction or the least cost or lowest impact way to achieve it. The Climate Change Response Act did not mandate a particular path. Instead, Parliament set the 2050 target and the Commission was tasked with advising on the budgets and the emissions reduction plan to get there having regard to an extensive range of matters.

46. Modelling and evidence based analysis was an important part of our assessments, but can take matters only so far: balancing all these factors and formulating our final advice required the careful and considered exercise of judgement by the Commissioners working together as a collective body. LCANZ and in particular Dr Taylor and Dr Bertram appear to challenge a number of these key judgements, as I outline below.

Modelling the demonstration path

47. Following the development of our analytical frameworks, modelling tools and emissions reduction database, the Commission began the process of modelling the demonstration path.

48. The Commission's process was an iterative one, guided by the decisions on key judgement areas. The process in broad terms was as follows:[8]

48.1 First, the Commission developed a 'current policy reference case' – this set out what we expect to happen with no further action on climate, with only current policy settings playing out.

48.2 The Commission then developed a range of scenarios to encompass a plausible range of potential futures for the key drivers of how quickly emissions could be reduced. We assessed that the two key factors that would affect how quickly emissions could be reduced were the pace of technology change and the pace of behavioural change. These scenarios were bookended by the 'headwinds' and 'tailwinds' scenarios:[9]

(a) The tailwinds scenario was a scenario where the Commission considered that if behaviours changed faster and lower emissions technologies emerged and were taken up sooner, then faster reductions would be able to be achieved without dramatically rising costs and adverse impacts on specific sectors and regions.

(b) The headwinds scenario was a scenario impacted by delays in emergence and take up of lower emissions technologies and slower behaviour change.

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8 See also the summary of the demonstration path in the Advice: Advice Bundle at 118 – 121.

9 See the discussion of the headwinds and tailwinds scenarios in the Advice: Advice Bundle at 108 – 111.

48.3 The Commission then used insights from the scenarios we developed and our assessment of the level of uncertainty inherent in each aspect of those scenarios to develop a 'demonstration path'. The purpose of the demonstration path was to determine the level of emissions budgets which we believed could be met under a range of possible futures, and to show one illustrative path to meeting these budgets.

48.4 We then tested and refined the demonstration path through sensitivity testing and examining alternative paths to understand if the same budgets could be met with different combinations of actions. The sensitivity analysis allowed us to test and demonstrate how the budgets could be met in a range of different possible futures.[10]

49. Throughout the process of the preparation of the Advice, the Commissioners' assessments on the key judgement areas guided the Commission staff's work, and were fed into the modelling of scenarios. The Commission staff adjusted the modelling to reflect our feedback and then presented the results back for the Commissioners to understand the implications of those judgements, and where we believed it appropriate, to reconsider those judgements and assumptions. Commissioners were in routine communication with the staff to test the limits of modelling and its responsiveness to different changes in the judgements. In this way, the judgement areas were all significant factors in the building and testing of the scenarios and paths.

Our process

General

50. In general terms, we used a range of approaches to ensure the quality and robustness of our work. These included internal peer review processes as well as external testing with stakeholders and technical review by government officials. We commissioned external reviews of key analytical inputs, such as our economic modelling, by international experts. The results of these reviews are publicly available on the Climate Change Commission website.[11]

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10 See discussion of the sensitivity testing in the Advice: Advice Bundle at 115 – 116 and 164. See also the discussion in the Advice of the different ways Aotearoa New Zealand could meet the budgets: Advice Bundle at 139 – 142; and the discussion of the risks to meeting the budgets and opportunities to outperform: Advice Bundle at 143 – 146.

11 See: Climate Change Commission *Modelling and data* <https://www.climatecommission.govt.nz/our-work/advice-to-government-topic/inaia-tonu-nei-a-low-emissions-future-for-aotearoa/modelling/>.

Consultation process

51. Submissions received during the consultation period on the Draft Advice also played an important role in improving and shaping the Advice.

52. Joanna Hendy discusses in more detail the process of consultation of the Draft Advice in her affidavit. In brief though, the Draft Advice was released on 31 January 2021, and the Commission received over 15,000 submissions in response. Submissions ranged from template responses on behalf of organisations, submissions attaching reports and evidence, to in depth analysis covering multiple areas of the advice. Commission analysts processed the submissions, and developed papers for the Board that summarised the themes and content of these submissions.

53. We made a range of modifications and adjustments to the Draft Advice as a result of the submissions, the most substantive of which are detailed in the Final Advice.

Role of the Commissioners

54. The Commissioners were deeply involved in the preparation of the Commission's Advice, at all stages of its development. This was consistent with the fact that each of the Commissioners have significant expertise relevant to the Commission's function as a source of independent expert advice on climate change issues.

55. When the Commission began its work on the Advice, the Chief Executive presented to the Board the critical path and the work streams that we required to deliver the body of evidence necessary to support our Advice. Once work began, the Chief Executive would routinely update the Commissioners by way of Board papers outlining the work that was currently being progressed. As work by the Commission's staff was completed, this was turned into Board papers presented to the Commissioners on various topics requiring our decision. The Commissioners met regularly and considered Board Papers running to hundreds of pages and took decisions on all aspects of the Advice. Final decisions and approvals of all sections of the advice occurred at Board Meetings. Staff would present to the Board their chapters and recommendation text for review.

56. The Commissioners are a very diverse group bringing a wide range of expertise and perspectives to the table. Together we have created a culture of robust debate, but also of collaboration, with the outcome being unanimous consensus on each of the recommendations contained in the Advice.

57. I am satisfied we ran a thorough and robust process, which took into account the best evidence and analysis available and made difficult but well-reasoned judgement calls where required. The Commission's Advice recommends budgets that in our judgement are likely to be technically feasible, economically affordable, socially acceptable and that are ambitious and achievable with solutions that are available to us today. It presents a range of possible futures and a range of different policy actions that in our judgement will allow the government to achieve the recommended budgets, and is consistent with meeting Aotearoa New Zealand's domestic targets and international obligations. It is now for the government to make its own decisions to set the budgets and a plan to achieve those emissions budgets, and to put in place the policy programme to achieve them.

RESPONSE TO CRITICISMS OF THE COMMISSION'S APPROACH

58. I have read all the evidence filed on behalf of LCANZ in this proceeding. I disagree with the criticisms made of the Commission's approach. I particularly disagree that we made a 'logical' or 'mathematical' error in our advice relating to the NDC. Commission staff will give more detailed evidence on that issue but, in short, the Commission made an informed and deliberate judgement to adopt the approach we did. We were aware of LCANZ's views on this topic but did not agree with them.

59. I also disagree that the modified activity-based accounting approach, recommended in our budget advice for accounting for land sector removals and emissions, is wrong or inappropriate. Again, others will address this in more detail but this was an informed judgement made by the Commission, for the reasons we set out in our Advice. Again, the Commission was aware of LCANZ' views on this topic but did not agree with them.

60. I confirm that the Commission paid close attention to the purpose of the budgets and the emissions reduction plan that we were advising on, including the importance of contributing to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5°C above pre-industrial levels. We believe that budgets set on the basis of our Advice, if implemented within the contemplated timeframes through an appropriate emissions reduction plan set by the government, would be consistent with that purpose.

Dr Taylor

61. In his first affidavit Dr Taylor presents a report titled *Report of Dr William Taylor – Lawyers for Climate Action NZ Incorporated vs the Climate Change Commission and Minister for Climate Change CIV-2021-485-341*.

62. Dr Taylor records that he was asked by LCANZ to address three questions:

    62.1 "What 2010 carbon dioxide emissions value is called for to properly apply the 2010 to 2030 percent reduction range of 40 to 58 percent contained in the SR18?";

    62.2 "How does the MAB approach used in the advice differ as a measure of net emissions compared with the Greenhouse Gas Inventory (GHGI) net measure? "; and

    62.3 "Has the Climate Change Commission assessed the costs and benefits of setting more ambitious budget levels?"

63. I wish to address that third question. Before dealing with specific criticisms of Dr Taylor's evidence, I set out my experience with the use of cost benefit analysis tools.

Experience with cost benefit analysis

64. A cost benefit analysis is, in brief, a way of estimating the future costs and benefits to determine which of a number of options provide the best approach to achieve an outcome with the highest net benefits. In my professional experience, I have used cost benefit analyses (and seen cost benefit analyses be used) in a range of different situations.

65. Over the course of my career I have seen the evolution of the use of cost benefit analysis tools. When I chaired the Taskforce on the Provision of Healthcare back in 1991, the idea of using cost benefit analysis was not yet well-established. However, by the time I took up my role as the Founding Chair of the National Infrastructure Advisory Board in 2009 it was well entrenched. More recently, it has become common to use a multi-criteria analysis to supplement a cost benefit analysis as a way of trying to mitigate some of the shortcomings of cost benefit analyses. I do not have personal experience of the use of the multi-criteria analysis tool, but I am aware that it is a tool used to

identify and compare different policy options by assessing qualitatively or quantitatively their effects, performance, impacts and trade-offs.

66. By way of specific example of my experience with cost benefit analyses, I was Vice Chancellor of the University of Canterbury following the earthquake in February 2011. We were required to put forward a business case to government for the provision of funding to the University to rebuild its campus. For those business cases we used the Treasury format and approach to cost benefit analysis. In that situation, the cost benefit analysis tool was helpful in providing a range of options to government that set out various ways of reaching the desired goal, either by refurbishment or demolishing and rebuilding. Each option had quantifiable costs, estimates of time and associated risks. Accordingly, we were able to provide government with a range of options and a framework for reaching a decision. This is an example, in a constrained engineering context, where there is a clear benefit in the use of the cost benefit analysis tool. Significantly, the decision-making process was largely removed from any social or societal considerations. Further, time frames were measured in years not decades. Technologies were known, no behaviour change was relevant.

67. From my experience, I certainly accept that a cost benefit analysis can be a very useful tool where there are a limited feasible set of choices from which you are picking, and where all of the relevant costs and anticipated future benefits are readily quantifiable and able to be expressed as monetary values.

68. Use of a cost benefit analysis tool will not always be appropriate. The cost benefit analysis also has a clear limitation in that it requires assigning a monetary value to all the potential benefits and costs of the options – many of which have no marked value for comparison. It also requires selecting a discount rate (that is, the rate at which you assess the present value of future costs and benefits). Where there is a high degree of uncertainty about future benefits or costs and their value, running a cost benefit analysis is really just another way of expressing your underlying assumptions. Further, a cost benefit analysis is pretty near useless where one of the potential outcomes is a low-probability catastrophic event. I saw an example of this during my time as Chair of the National Infrastructure Advisory Board, where consideration was being given to the risk to New Zealand of the failure of the Southern Cross Cable, the fibre-optic network connecting New Zealand with Australia and the United States, and the need for additional technology infrastructure. The cost benefit analysis could not cope with the

combination of very significant costs to avoid a very low likely event that would have catastrophic consequences across the whole economy.

69. Accordingly, a cost benefit analysis is only appropriate in the right context. The use of the tool in the wrong context can be likened to using a magnifying glass to look at a blade of grass: you may get a highly informed assessment of a narrow piece of the picture, but the rest of what is going on is entirely excluded.

70. A multi-criteria analysis attempts to address the narrowness of the focus of a cost benefit analysis by bringing into consideration factors that are not purely 'cost' or monetisable benefits, but it again suffers many of the same limitations. Like a CBA, an MCA evaluates a range of defined options against a defined set of criteria, which may be 'weighted' based on a relative assessment of value, to generate a comparative scoring for each option's likely ability to deliver the desired objective. Again, it is a useful tool when used in the right context.

Response to Dr Taylor

71. Dr Taylor's key proposition, set out at paragraphs 26 – 30 and 131 – 137 of his report, appears to be that the Commission, in providing its advice on the emissions budgets, should have conducted a cost-benefit analysis and a multi-criteria analysis, which requires the comparison of multiple policy options. In his view, this would have been the best way for the Commission to balance the different considerations that the Commission was required to take into account in determining its recommended budgets.

Cost-benefit analysis

72. I am of the view that a cost benefit analysis would not have been an appropriate tool for the task that the Commission was tasked with under the Climate Change Response Act.

73. In the first place, while the Act requires the Commission to provide advice to the Minister on the setting of emissions budgets, it does not specify <u>how</u> the task should be undertaken and in particular does not specify a set criteria against which a proposed budget should be assessed. For example, the Act does not require the Commission to consider objective criteria such as the least cost path, or to advise on how to achieve the fastest reductions or the lowest costs or the least risk. Parliament could have nominated any of those objectives. Instead, it asked the Commission to advise on the level of

budgets and how they may be realistically met to enable Aotearoa New Zealand to achieve the statutory targets, taking into account a multitude of factors.

74. Next, while I accept that it was open to the Commission to use the tools suggested by Dr Taylor, a cost benefit analysis was not a suitable tool for the analysis the Commission was tasked with undertaking. This includes for the following reasons:

74.1 While a cost benefit analysis might have been suitable had the Commission been asked to advise on a defined set of policy options, here the Commission's task was to chart a path towards targets set by Parliament. The outcome was not intended to be a single 'best' policy or path, given the judgements that the Commission was required to make about developments and decisions in the future impacting the whole economy and society, and spanning multiple decades. This was not a process involving a binary policy decision or a choice between a few defined options, nor was it the Commission's role to write a central plan for New Zealand.

74.2 A cost benefit analysis would not be helpful given the large number of non-economic objectives the Commission was required to consider and balance under the Act. A cost benefit analysis would not give us the insights that would be needed to provide the advice that properly took into account the matters that the Commission was required to consider, for example the relevant social, cultural, environmental, and ecological circumstances, including differences between sectors and regions (section 5M(d)), the Crown-Māori relationship, te ao Māori and specific effects on iwi and Māori (section 5M(f)) and distribution of those impacts across the regions and communities of Aotearoa New Zealand, and from generation to generation (section 5ZC(2)(b)(vii)). Incorporating considerations of this nature into a cost-benefit analysis would require that ranges of different outcomes on these issues be quantified and assigned relative monetary values for them to be factored into the analysis. It would not be appropriate for the Commission to make such assessments, and the artificiality of monetising such considerations would not reflect the reality of their importance.

74.3 Finally, in providing its advice, the Commission was dealing with extensive uncertainties, for example with respect to the advances in low emissions technology, the rate of take up of new technologies and behavioural changes,

the potential impact of changing global prices and demand for commodities such as oil, logs and milk solids and meat, and so on. As I have outlined above, where there is a high degree of uncertainty about future benefits or costs and their value, running a cost benefit analysis is really nothing more than just restating your underlying assumptions.

75. A cost benefit analysis does not account for the complexities and uncertainties involved in determining an emissions pathway and assessing an appropriate budget recommendation. It would also be positively unhelpful in creating an artificial sense of certainty in an exercise involving extremely high levels of uncertainty. Instead, the Commission chose to take a holistic approach to assessing the costs, benefits, impacts and risks. We believe that this was the better way for the Commission to take into account the broad range of factors it was required to consider.

76. I do note however that while we did not undertake a cost benefit analysis, the Commission did consider cost in its analysis. We considered cost on a macroeconomic level as seen in our demonstration path and on the modelled impact on GDP (gross domestic product) for the first three emissions budgets. Much of our analysis was also informed by the benefits and costs of different mitigation actions. Cost was however only one objective consideration and the Commission considered costs in the context of the other key judgements I already spoken about.

Multi-criteria analysis

77. I wish to address Dr Taylor's view that the Commission should have also used a multi-criteria analysis. As I understand it, Dr Taylor considers that this should have been done to supplement a cost benefit analysis, which I have already explained would not have been a useful tool.

78. My understanding is that, in the sense that Dr Taylor discusses a multi-criteria analysis, it is a tool used to mitigate to some extent the shortcomings of a cost benefit analysis, and is used to identify and compare different policy options by assessing their effects, performance, impacts and trade-offs against a defined and weighted set of criteria. Multi-criteria analysis still requires that the decision maker identify and assign levels or scores to each benefit and costs of an option.

79. In my view, a multi-criteria analysis in these terms may be suitable for assessing the suitability of a defined set of policy options, but that was not our task. Instead we were

asked to chart an emissions path to the 2050 target, to advise on the first three budgets and the direction of policy to enable the Government to develop and adopt an emissions reduction plan. A multi-criteria analysis does not assist us in identifying what options to consider and compare in an essentially infinite spread. Nor would it assist us in recognising and accommodating the huge range of uncertainties that are an integral part of the assessment we were undertaking.

80. In broad terms though, I can confirm that in charting an emissions path to reach the target set by Parliament, the Commission did undertake an analysis of multiple criteria, including those criteria that it was required to take into account under the Act. As I have explained, we applied judgements around the many required considerations to arrive at budget recommendations and advice on the direction of policy to develop a plan that in our view balanced these appropriately and fulfilled the core purpose. We did not formalise this into a standard format multi-criteria analysis, nor were we required to.

81. For similar reasons to those I've discussed above, I also consider that a standard multi-criteria analysis of the type apparently contemplated by Dr Taylor would have been unhelpful by creating an artificial sense of certainty in an exercise involving extremely high levels of uncertainty. The Commission's approach of undertaking a holistic assessment of costs, benefits, impacts and risks was better suited to our task and the broad range of factors we were required to consider.

Consideration of multiple policy options

82. The third "element" of Dr Taylor's preferred approach is that a cost-benefit analysis and multi-criteria analysis should have led the Commission to identify and undertake a comparison of multiple "policy options". Dr Taylor explains his reasons at paragraph 137, being that while a single option will tell you whether that option provides net benefits, it will not tell whether the *best* option has been adopted. Dr Taylor's view appears to be that the Commission's advice was flawed in that it did not set out and compare multiple different "policy options" and reach a view on which was "best".

83. It is not entirely clear how Dr Taylor anticipates his proposed "policy options" working in the context of the Commission's advice, and his proposition that the Commission should have considered multiple "policy options" indicates that he may have misunderstood the nature of the task that the Commission was asked to complete. The Commission was required to provide advice on emissions budgets for each budget period and advice on how the budgets and ultimately the 2050 target, may be

realistically met, including by pricing and policy methods. Accordingly, the Commission was required to demonstrate that the recommended emissions budget levels were likely to be technically and economically achievable as well as resilient to risk and uncertainties, not prescribe a detailed central plan for achieving them.

84. As I have already outlined, the Commission recommended emissions budgets, developed on the basis of a demonstration path that it considered could be met under *a range of possible futures* and *with different combinations of actions.* This point is also made in the Commission's Advice, where we set out that in setting the levels of the recommended emissions budgets, the Commission "aimed for them to be resilient to uncertainty and tested that they can be delivered by different paths".[12] The Commission was not recommending particular policy options in the way that Dr Taylor suggests.

85. Given this context, I do not agree with Dr Taylor that the Commission could or should have measurably defined the "best" option (with respect to the particular future and combination of policy actions to reach a particular target). This is simply not the exercise the Commission was tasked with under the Act, and indeed in my view, given the highly dynamic context we are considering and the high levels of uncertainty in any pathway, any approach that seeks to dictate a "best" option or pathway would be dangerous. In this regard, the Commission received multiple submissions from the pubic arguing that a central plan for Aotearoa New Zealand, dictated by the Commission, was not appropriate. We agreed with those submissions.

86. Finally, at the conclusion of paragraph 137, Dr Taylor says that "In this regard, I note that the UK Climate Change Committee acknowledges that a key limitation of its impact assessment is that it did not consider the impact of adopting alternative pathways".

87. To the best of my understanding, UK Climate Change Committee have never undertaken a cost benefit analysis or a multiple criteria analysis to compare different options for emissions budget levels. Rather, their approach is similar to ours, applying judgements to develop a budget path that they are satisfied meets their statutory considerations. The sentence Dr Taylor is quoting here (page 268 of the UK Climate Change Committee's report *The Sixth Carbon Budget: The UK's path to Net Zero* (December 2020)) is specifically referring to a piece of macroeconomic modelling the UK Climate Change Committee commissioned. It is therefore a comment about only one component of their overall assessment of the impacts, rather than their advice as a whole.

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12 Advice Bundle at 100.

88. The UK Committee in its advice on the UK's Fifth Carbon Budget has in fact made it clear that it does not undertake a CBA on its budgets overall as it needed to assess a range of qualitative impacts. In its report it said: [13]

> The nature of climate change risks and the many unknowns make a simple cost-benefit approach to climate action untenable.

89. And further said: [14]

> These areas encompass a very wide set of potential costs and benefits. We provide individual conclusions in each case but no attempt is made to add up all the differing impacts. That is appropriate since it is not clear that a cost in one area, such as an increase in costs to households, can be offset with a benefit in another, such as reduced dependency on international fossil fuels. Instead, the Committee considers that the Act requires it to satisfy itself in each separate area whether there is a concern and, if so, an appropriate remedy.

90. In summary, with respect to Dr Taylor's views that the Commission should have used a cost benefit analysis, in conjunction with a multiple criteria analysis, to determine the "best" policy option, I consider that cost benefit analysis and multi-criteria analysis can be useful tools for assessing some aspects of the issues that the Commission was required to consider. They are however fundamentally poor tools for the overall task the Commission was assigned.

91. In my view, Dr Taylor has reached for tools familiar to him in his profession as a consultant economist specialising in regulatory and energy practice, and has attempted to apply them to a complex area to which they are not suited.

Multiple levels of ambition

92. Dr Taylor also criticises the Commission's Advice with respect to the question of ambition – that is, he says, whether it would have been "technically and economically feasible" to recommend more ambitious budgets.

93. In essence, Dr Taylor notes at paragraphs 146 – 151 of his report that while the Commission does compare costs between the demonstration path and the current policy reference, he would have expected a "rigorous options assessment" of different paths, which he says the Commission failed to do. I wish to make two comments in response.

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13 UK Committee on Climate Change *The Fifth Carbon Budget: The next step towards a low-carbon economy* (December 2015), CBD at [•].

14 CBD at [•].

94. First, I note that with respect to the ultimate level of ambition dictated by the 2050 target: this target was set by Parliament. It was not for the Commission to revise the targets set by Parliament in this Advice (although the Commission is specifically tasked with reviewing the 2050 target when preparing advice on the 2036 budget, or earlier if requested by the Minister). In this Advice, the Commission was tasked with setting a path on how to get to the target reflecting the long term level of ambition already set by Parliament. The Commission's role can be framed as this: Parliament decided which mountain to climb, and the Commission advised that this path was consistent with reaching the summit. It was not for the Commission to choose another mountain.

95. Second, with respect to the level of 'ambition' of each budget, which taken together determine the initial "steepness" of the path to the 2050 target, this is about the short-term pace of change, not overall ambition. Our advice reflected an approach that was as ambitious as possible while still ensuring that the options we were considering were likely to be technically feasible and economically affordable, and had due regard to the range matters that the Commission was required to consider.

Evidence which suggests that more ambition may be technically and economically feasible

96. Dr Taylor then goes on to say at paragraphs 158 – 160 of his report that due to what Dr Taylor considers to be the Commission's "failure" to conduct an options assessment around the level of ambition, the Commission has not considered whether a higher level of ambition in the emissions budgets would be technically or economically feasible.

97. First, I again note that in setting the 2050 target, it is Parliament that determined the level of ambition to which the emissions budgets must track.

98. With respect to the pace of change or short-term level of ambition of the emissions budgets recommended by the Commission, the Commission has assessed the amount of domestic action we believe, in our judgement, is consistent with the multiple criteria contained in the Act and with the targets set by Parliament, and gives a degree of certainty about the likelihood that they could be achieved. It was not simply a matter of considering the "highest ambition" that would be technically or economically feasible.

99. Having said this, questions of technical and economic feasibility were built in to the Commission's analysis and testing of the demonstration path. In particular, our use of the headwinds and tailwinds scenarios and the sensitivity testing of the demonstration path represents our view of the likely parameters of technical and economic feasibility.

100. At paragraph 159 of his report, Dr Taylor identifies the "numerous places" in the Commission's Advice, which he says it is suggested that it would be likely to be technically and economically feasible to be more ambitious. I address each of these in turn:

100.1 *Potential for government to outperform the budgets*. In our discussion of the sensitivity analyses undertaken, the Commission noted that it considered that the risks posed by the overall level of uncertainty in the demonstration path are manageable, and that in general the government can manage these risks through aiming to outperform the budgets in its emissions reduction plan.[15] Dr Taylor's view is that if the Commission thinks the government can outperform the budgets, then the budgets are too conservative. My response to this is that of course, it is open to government to aim to outperform the budgets. The reason that this *possibility* of outperforming is not reflected in the recommended budgets is that the Commission did not set its budget recommendations in reliance on technologies that are not yet available, nor modelled changes in consumer behaviour to a scale that has not been witnessed before or is unlikely. Put simply, the Commission did not want to bank on unlikely hypotheticals, or rely on fairy dust and floo powder, to reach our targets. Budgets that rely on luck to be achievable are not useful tools for good policy decisions, or to hold future governments to account.

100.2 *"Likely" to be technically achievable and economically affordable.* Dr Taylor argues that the Commission was focussed on developing budgets that "**are** technically achievable and economically affordable", in contrast to the requirement under the Act for budgets "that are ambitious but **likely** to be technically and economically achievable". This supposed distinction identified by Dr Taylor is semantic only: we are projecting into the future so we are always only assessing what is likely, even where we don't use that word expressly every time we mention the concepts of being technically and economically achievable. As we made clear in the Advice, the demonstration path is underpinned by complex interactions with high degrees of uncertainty. What the Commission means by 'achievable' is that change is within the government's power to make, including changes that can be achieved through influencing, regulating, pricing or prohibiting things. But, to emphasise again, this involves a number of

15 Advice Bundle at 145.

uncertainties and assumptions, including, for example, assumptions of how businesses and households might respond and how the international markets might change.

100.3 *Nature of the demonstration path.* Dr Taylor says that when the demonstration path is compared to the headwinds and tailwinds scenarios (noting, in particular, that the upside if the tailwinds assumptions play out exceed the downsides if the headwinds play out) it suggests there has been some conservatism in selecting the range of the demonstration path. Further, he says that the demonstration path tracks the midpoint of the scenario range over the first three emissions budgets, and then appears to switch to following the tailwinds scenario. Accordingly, he argues that the Commission's path incorporates less ambition in the immediate budgets, and more ambition in subsequent budgets. My response to these points is as follows:

(a) With respect to the first point as to where the demonstration path sits as compared to the headwinds and tailwinds scenarios, the fact that there is some asymmetry between the headwinds and tailwinds scenarios reflects that the demonstration path was built in a bottom-up fashion with a large number of judgements around individual factors, such as whether to assume the deployment of technologies to reduce agricultural methane emissions that are not currently commercially available. It is an over-simplification to equate the projected emissions outcomes with a level of ambition/conservatism. Further, that the tailwinds assumption can reduce much more than the demonstration path simply shows that there are technological and behavioural changes that could potentially reduce emissions further. The Commission agrees that technological changes are likely to only go in one direction (towards greater emission reductions), however, it is unclear how fast these technological and behavioural changes could occur and, as previously mentioned, the Commission has not recommended budgets based on an assumption that the less likely technological and behavioural changes will all happen.

(b) In regards to the second point (that the demonstration path tracks the midpoint of the scenario range over the first three emissions budgets, and then appears to switch to following the tailwinds scenario), this appears to reflect a misunderstanding on Dr Taylor's part. The Commission did not

select a "point" in the range, or "switch" from headwinds to tailwinds assumptions. Neither does the trend observed by Dr Taylor reflect a lack of "ambition" on the Commission's part. Instead, it reflects that there is a lot of emissions reductions work which has to be frontloaded in in the first period. Those reductions compound in the future once the infrastructure has been set up. The more action New Zealand takes on reducing emissions now, the further emissions will come down in the future as those actions bear fruit and build upon each other. That is why the demonstration path shows steeper reductions later in time, once new technologies are deployed and scaled up, supported by policy.

101. The important point to emphasise with respect to Dr Taylor's criticism as to the level of "ambition" is that, in setting the demonstration path, the Commission did not want to bank on less likely hypotheticals or rely on luck with respect to the achievability of the emissions budgets. Further, the Commission's approach was to recommend the level of budgets that we assessed would be ambitious and be able to be met under a *range* of possible futures.

102. We were aware of LCANZ' views that we should recommend deeper and steeper cuts in the short term, but we did not agree with these views, for the range of reasons set out in the Advice.[16] The position promoted by LCANZ' would involve a pace of change of the kind identified in our Advice as one which:

102.1 risks Aotearoa New Zealand losing production in areas where technological solutions to reduce emissions could be available, if more time were available;

102.2 would likely lead to severe social and economic impacts on communities, people and businesses, far more than would be necessary to achieve the same amount of emissions reductions given more time;

102.3 could not be met without rapidly shutting down many emitting activities, with closures of businesses such as farms and factories at a severe level;

102.4 would result in large scale cuts to economic output across Aotearoa New Zealand;

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16 See Advice Bundle, in particular at 30, 39 – 40, 77, 962 and 963, and more generally Chapter 5 (76 – 101), Chapter 7 (114 – 153) and Chapter 8 (154 – 299).

102.5 would result in intergenerational inequity and would have a legacy impact on the quality of life for younger generations as families are left without employment or essential services; and

102.6 would disproportionately affect iwi/Māori in terms of the Māori economy given its large agricultural base, and Māori workforce who are disproportionately represented in agriculture and manufacturing industries.

Emissions budget levels mean that offshore mitigation will be required to meet international commitments

103. Dr Taylor also criticises the Commission's Advice with respect to level of "ambition" of the emissions budgets by reference to the use of offshore mitigation to meet the NDC under the Paris Agreement. Dr Taylor's views on this are set out in paragraphs 138 – 146 of his report.

104. In particular, Dr Taylor identifies that the Climate Change Response Act requires the Minister to set emissions budgets "with a view to ... contributing to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5°C above pre-industrial levels". He says that because the emissions budgets allow greater total emissions over the NDC period (to 2030) than would be allowed under an NDC revised in accordance with the Commission's Advice, then the emissions budgets fall short of this requirement. Dr Taylor then makes a number of observations about what he considers would be the affordability of the budgets through domestic action compared with offshore mitigation, and queries whether unnecessary costs will be incurred if offshore mitigation is more expensive than domestic mitigation.

105. With respect to Dr Taylor's argument that the emissions budgets *alone* are not sufficient to meeting New Zealand's obligation under the Paris Agreement to contribute to the global 1.5°C goal, the way that Dr Taylor has framed this discussion fails to recognise that New Zealand's domestic emissions budgets are only one part of New Zealand's contribution. The Commission assessed how our recommended emissions budgets contribute to the global 1.5°C effort in Chapter 9 of the Advice.[17]

106. It is my understanding that LCANZ is no longer pursuing its previous ground of review relating to the use of offshore mitigation in satisfaction of our NDC. I understand that it

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17 Advice Bundle at 200 – 210.

is now accepted by LCANZ that New Zealand is able to use offshore mitigation in order to meet its NDC.

107. In addition to the use of offshore mitigation to meet the NDC, the emissions budgets and the (revised) NDC are also not aligned because they use different starting points.

107.1 The starting point for the emissions budgets is where net emissions actually will be at the start of the emissions budget period in 2022. This is appropriate, because they represent the changes that must be made from where we are actually at now, to be realistic budgets that New Zealand that are likely to be achievable through domestic action.

107.2 The starting point for the NDC budget however is the *end point* of New Zealand's 2013 – 2020 target (that is, the target taken under the UNFCCC during the second commitment period of the Kyoto Protocol), notwithstanding the fact that actual net emissions in New Zealand in 2020 will be higher than what was prescribed by the target. It is appropriate that the NDC start point is set in this way because under the Paris Agreement, NDCs set by countries must represent a progression on previous targets. To set a different starting point would be to allow governments to walk back on previous targets.

108. This difference in starting points, which Dr Taylor does not appear to have appreciated, in addition to the fact that offshore mitigation can contribute to the NDC, explains the difference between the contribution of the domestic budgets and the Commission's advice on the compatibility of the NDC with contributing to limiting warming to 1.5°C.

109. I now turn to Dr Taylor's discussion of the affordability of the budgets through domestic action compared with offshore mitigation, and his view that unnecessary costs will be incurred if offshore mitigation is more expensive than domestic mitigation. The first point to note is that the budgets are intended to be met by domestic action, so the relevance of the cost of offshore mitigation in setting the budgets is not particularly high.

110. My response in relation to these points is that Dr Taylor is seeking a level of precision in respect of the projected costing of the different actions in a way that is not possible. Both the domestic and international markets are subject to huge amount of variability and uncertainty and there is immense difficulty in forecasting and projecting.

111. The Commission did look at the relative costs of domestic and offshore abatement. However, the costs of offshore abatement are so inherently uncertain that any decision

on budgets cannot be made with reference to it. Indeed, the range in the advice was between $30 to $140 per tonne. This further highlights why a cost benefit analysis simply would not work in this context. A cost benefit analysis may be appropriate when working within a plus or minus 20 per cent, not 400 per cent.

112. Further, I note that the Commission's Advice does not lock the government into a particular course of action. If, in time, it transpires that offshore mitigation is indeed more expensive than additional domestic mitigation (which we do not and cannot yet know) and further domestic abatement proves possible, the government can seek to overachieve the emissions budgets and rely less on offshore mitigation to meet the NDC if it chooses.

Assessment of unconstrained carbon dioxide removals by forests

113. I wish to respond to Dr Taylor's arguments with respect to the Commission's advice on constraining removals by forests. In paragraphs 152 – 157 of his affidavit, Dr Taylor criticises the Commission's advice that an approach that does not constrain carbon removals by forests would not drive meaningful decarbonisation before 2050 and would instead use up land resources for the purpose of offsetting emissions from sectors where there are proven options to reduce gross emissions.[18]

114. The basic issue here appears to be a challenge to the Commission's judgement that it would be better to focus on decarbonisation of the economy (that is, actually reducing our emissions) as preferable to trying to meet budgets and targets through increasing sequestration of emissions through increased planting.

115. At paragraph 153 of his report, Dr Taylor quotes from the Commission's Advice where we outline that:

> Significant further forest planting would be required after 2050 to maintain net zero long-lived greenhouse gas emissions. Figure 6.4 shows that *if there were no further forestry planting or policy changes*, net emissions would bounce back above zero before 2065 as the temporary exotic forest carbon sink declines.

On the basis of this passage, Dr Taylor says that the Commission's advice is based on an "assumption" that New Zealand stops planting trees in 2050, as soon as the target is reached. He says that the Commission has not *demonstrated* that net zero would not be locked in by relying heavily on forestry, but instead it "assumes" this to be the case.

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18 Advice Bundle at 107 – 108.

116. The Commission's advice on this point is set out in detail in the Advice, and it appears that Dr Taylor has misunderstood it.[19] The Commission was not "assuming" that there will be no further planting after 2050, but instead that sustaining net zero in a scenario where we relied on removals of greenhouse gases from the atmosphere by forestry would rely on continued afforestation on new land as well as maintaining and replanting all forested land in perpetuity or other actions beyond 2050, unlike if we actually decarbonised the economy. The effect of this is that if we were to meet the 2050 target in this way (that is, predominantly through removals by forests) it would require continued action beyond 2050 (that is, continued planting on an ever expanding footprint, at the same pace) to sustain it. That is, the job is not done and costs are shifted to future generations who are also restricted in their future land uses because they are obliged to maintain stores of carbon relating to past emissions. In our view, this was not a fair or equitable outcome.

117. Further, and as explained in the Advice, allowing for unconstrained removals by forests to meet the 2050 target and sustain net zero long life gas emissions thereafter would encourage much more exotic forestry to be planted – and, this does not come without cost and risk.[20] The Commission modelled a scenario under which exotic forestry would sequester a further 8.7 $MtCO_2$ in 2050 compared to the Current Policy Reference case. This would come from planting a further 400,000 hectares of new forest by 2050, in addition to the 1.1 million additional hectares expected under the Current Policy Reference case and while maintaining the more than 2 million hectares of existing exotic forests. What this modelling showed was that reliance on forestry removals to meet the 2050 target would mean that New Zealand would be using up land resources for the purpose of offsetting past emissions from other sectors, as an alternative to actually reducing emissions, even where there are proven options to do so.

118. The Commission did consider the role of forestry in designing our mitigation scenarios, and indeed, it was one of the key judgement areas that the Commissioners identified as requiring a weighing up of competing considerations or trade-offs, as I've already outlined.[21] Ultimately however, the Commission considered that relying on unconstrained removals from forests was not sustainable, would leave Aotearoa New Zealand out of step with the rest of the world, and would leave the next generation with the task of actually reducing our emissions at the same time as they will need to be

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19 Advice Bundle at 107 – 108.

20 Advice Bundle at 107 – 108.

21 See above at paragraphs 38 – 39.

adapting to escalating climate change impacts. Dr Taylor appears to take a different view, but we do not agree with his position.

Dr Bertram

119. I have read the affidavit of Dr Bertram dated 24 September 2021. I would like to comment in particular on the criticisms of the Advice that Dr Bertram makes with respect to the level of "ambition" of the recommended emissions budgets.

120. Most of my comments in response to Dr Taylor's evidence apply equally to Dr Bertram's evidence as well, and I do not repeat them here. Rather, I will respond to the additional criticisms put forward by Dr Bertram.[22]

The impact on GDP

121. Dr Bertram's key proposition (set out at paragraphs 108 – 114 of his affidavit) appears to be that the Commission has recommended emissions budgets for the first three emissions budget periods that he considers could be achieved "almost painlessly in terms of economic sacrifice" and that in his view, the Advice fails to propose a level of policy effort that would impose "any noticeable overall net cost at all on the New Zealand economy and community". Similarly, Dr Bertram says that the Commission has adopted a "zero-cost" approach. Accordingly, he says, the Advice "does not seem consistent with the notion of "maximum ambition" for a developed country", as required under the Paris Agreement.

122. In making this argument, Dr Bertram relies on the following passage from the Commission's Advice:[23]

> We have assessed, based on our modelling and other analysis, that our recommended emissions budgets are achievable at an overall reduction to the level of GDP in 2035 of around 0.5%. This considers only the mitigation costs associated with meeting the budgets and is not a cost-benefit analysis. It does not consider the significant co-benefits of action or the costs of delaying action (see Section 8.2.3). GDP also does not measure the impacts on wellbeing.

123. This passage appears in Chapter 8 of the Commission's Advice, which sets out the Commission's discussion of how its recommended budgets can be fair, inclusive and equitable.[24]

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22 Advice Bundle at 107 – 108.

23 Advice Bundle at 163.

24 Advice Bundle at 158 – 199.

124. I disagree with Dr Bertram's claim that the economic impacts of the budgets are "almost painless" or "zero-cost", and that this reflects a lack of ambition.

125. The first point to note is when we say "an overall reduction to the level of GDP in 2035 of around 0.5%", this means that the level of Gross Domestic Product (GDP) in 2035 will be 0.5 percent lower than under the continuation of current policy. In real terms, this amounts to a cumulative reduction in GDP between 2021 – 2035 of around 30 billion dollars, which is in the magnitude of the Christchurch Earthquake Recovery or the impact of COVID-19. That is the *real cost* in New Zealand of the transition, and it certainly is not "painless" or "zero-cost".

126. It is also important to explain what we mean by GDP, and the impact on GDP of different types of transition. GDP is, speaking generally, a measure of monetised "busyness" in the economy. It essentially measures activities of a society which society puts a dollar value on and trades in the marketplace. In the transition towards the 2050 targets, Aotearoa New Zealand will forgo busyness by reducing some economic activities, like coal mining and possibly steel production, while at the same time building new avenues of "busyness" through other initiatives, such as renewable energy sources.

127. GDP impact is smaller in a smooth well signalled and well-planned transformation, and larger in an abrupt and disruptive transformation that causes (for example): (a) people to be displaced faster than they can be re-absorbed into the workforce; and (b) assets to be stranded before the end of their technical and economic life. In setting the level of the recommended emissions budgets, the Commission has assessed a pace of change that seeks to allow labour and communities that are displaced by the transition enough time to find new ways of working. Dr Bertram's desired higher level of impact on GDP would not be measuring ambition, it would be measuring the care or lack of care in how the transition to a low carbon economy is managed.

128. Further, while we have taken the headline figure of 0.5 percent of GDP, if the range of policies necessary implement an effective emissions reduction plan and overcome barriers (such as encouraging farm practice changes and the use of electric vehicles) are not successfully implemented, or are unduly delayed, then the economic costs are likely to be much greater.

129. At paragraph 113 Bertram refers to the IPCC's 2018 Special Report, and the indication in that Report that to enable the required mitigation and adaptation investments to

keep average global warming below 1.5°C, it is likely to cost 1.7 – 2.5 percent of world GDP.[25]

130. There are a number of problems with comparing the IPCC 2018 Special Report findings to the Commission's Advice in this way, not least that the modelling in the 2018 Special Report is based on investments in both mitigation and adaptation. The Commission has not estimated adaptation costs and in no way are these costs reflected in the estimated 0.5 percent GDP impact. Simply put, comparing the 2018 Special Report to the Commission's Advice is not comparing like with like.

131. The Commission is currently preparing for its role monitoring and reviewing the Government's progress towards its adaptation goals. The Commission's first report on the implementation of the government's national adaptation plan is due in 2024, and in 2026 the Commission will be preparing a national climate change risk assessment.

Affirmed

Roderick Marshall Carr

at Christchurch this 14 day of December 2021
before me:

Sarah Jane Flett
Solicitor
Christchurch

A Solicitor of the High Court of New Zealand

25 IPCC *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), LBD at 13 – 642.