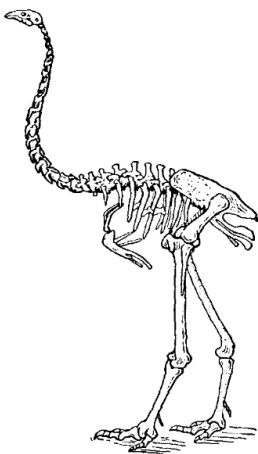




**Submission of
Wise Response Society Incorporated**

**New Zealand's
Climate Change Target and
Intended Nationally Determined
Contributions (INDCs)**



June 3rd, 2015

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June 3rd 2015

Summary of Wise Response submission

1. A low carbon future offers a huge opportunity for NZ if we follow our suggested 'Kea' policy pathway. If we retain the view that we should only be a 'Moa' (the other pathway we describe), then we risk being left behind in what is likely to be a rapid global transition.
2. NZ's mix of renewable energy resource and innovation potential means that it could potentially be a leader in some aspects of mitigation – for example, in reducing agricultural GHG emissions, geothermal energy, an electricity grid running on close to 100% renewable energy, swapping coal for wood-based industrial heat, and an electric vehicle fleet which (unlike other countries which largely rely on coal and gas-generated electricity) makes a huge amount of sense in New Zealand.
3. The shift to a low-carbon future is not simple. It involves on the one hand a change in 'culture' (norms, practices, technologies) amongst households and businesses, as well as changes in the broader structures such as policies and physical infrastructure to support the change. This wider structural change needs to be orchestrated so as to ensure that they are aligned rather than working against each other, and support change at the individual and business level. Many of the changes required to achieve a low-carbon future require investment today in order to achieve change in 5-15 years time (eg mobility infrastructure) so we cannot afford to wait until climate problems worsen. Again, this requires government leadership.
4. New Zealand risks being left behind if it does not adopt a credible position at the Paris talks, and sees that through with effective action domestically. On the other hand, there are huge advantages in being front-footed and actively transitioning to a low-carbon future. We have much to gain (and little to lose) from a positive and strong stance at Paris.
5. Science shows us that globally we may still have a small window of opportunity in which to alter an emissions trajectory to avoid catastrophe. New Zealand must be big enough to recognise that, given the magnitude of the reductions required, the only way we can fulfil our ethical obligations and responsibilities, is with a major shift in New Zealand's policy direction.
6. We are thus currently gambling with the future in a manner resembling a game of "Prisoner's Dilemma" - with a death penalty for losing.
7. Committing to truly ambitious and inspirational INDCs can set our Nation on a new and exciting path which conveniently now makes economic sense as well. This is what "being realistic" requires!

8. We must consider the climate change response in the context of the overall risk environment that we face. Our Society is calling for a comprehensive risk assessment across the broad spectrum of separate but interrelated risks. There are many other risks which we have to navigate concurrently as a nation, and species. We need to ensure that the climate change response is made in a manner that is cognisant of both the probability of occurrence and the severity of the impacts of the other risks we face. (Refer to the UK Institute and Faculty of Actuaries 2013 report on 'Resource constraints: sharing a finite world. The evidence and scenarios for the future' which is a comprehensive overview of the risks: <http://bit.ly/1Hr4epA>)

Wise Response Society Incorporated makes the following key recommendations for its 'Kea' pathway:

9. The Society calls on the New Zealand Government, "**Mo tatou, a mo ka uri a muri ake nei**" ("**For us and our children after us**") to **immediately commit to action of a scale commensurate with the risk that unabated climate change poses.**
10. That the government submit and fully commit to an INDC which assumes a path of global cooperation, that will see all countries including New Zealand play its full part in keep temperature rise under 1.5 deg C. The pathway that science is telling us leads to that target involves zero carbon emissions globally by 2045-2060.
11. Given the the level of risk posed by climate change and its irreversibility, NZs INDC must align with:
 - a. the Precautionary Principle which requires that:
 - i. GHG emissions be reduced to the extent, and at a pace, necessary to protect against the threats of climate change that can still be avoided; and
 - ii. the level of reductions of GHG emissions required to achieve this, must be based on any credible and realistic worst-case scenario generally now accepted by mainstream climate change experts.
 - b. The measures required by the Precautionary Principle should be adopted without regard to the cost, unless that cost is completely disproportionate to the reduction in emissions.
12. The Government sets up a permanent, standing consultative body to interact with the community on climate change based on the principle of continuous dialogue rather than a one-off collection of submissions. This problem is going to require concerted effort, sustained across many generations, and it needs proper resourcing.
13. That all submissions to this consultation and the summary of the submissions be made publically accessible prior to the Government confirming the targets and a report be prepared giving reasons for the Government's decision.

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Introduction

14. Wise Response is a broad coalition of academics, artists, engineers, lawyers, scientists, sports people etc; who are calling on New Zealand's Parliament to comprehensively assess imminent risks to New Zealand and to draw up plans to deal with them.
15. Essentially the Wise Response appeal seeks to have addressed the question: "As demand for growth exceeds earth's physical limits, causing unprecedented risks, what knowledge and changes do we need to secure New Zealand's future wellbeing? Refer to our website for the full appeal text: <http://bit.ly/wiseresponse>
16. Climate change is a symptom of surpassing a 'Planetary Boundary' - one of several global limits identified by modern science [<http://bit.ly/1G9BEu9>], specifically the atmosphere being unable to assimilate cumulative GHG emissions and remain stable.
17. Wise Response members and Royal Society Fellows, Sir Alan Mark, and Prof Peter Barrett submitted the following resolution to the Fellows AGM Forum of the Royal Society NZ in late 2014, which was unanimously accepted:
"to request that the RSNZ Academy Council convene a group of experts to review and assess the risks associated with recent and projected trends in greenhouse gas emissions, the likely consequences for New Zealand in future decades and centuries, and consider options for both mitigation and adaptation, taking into account environmental, social and economic considerations."

Refer to Appendix 2 for information.

Climate Consultation commentary and response

18. For a discussion of such critical importance to mankind's collective future, we wish to make it clear that both the consultation document and the timescales allowed for the consultation period have been wholly inadequate, and we are struggling to respond adequately and concisely.
19. The consultation appears to be ignoring previous advice regarding the nature and scale of the challenges and dangers of insufficient action, from the government's own advisors:
 - a. The 2014 'Briefing to Incoming Ministers' from MfE states that: "**We need to develop a stable and enduring policy setting that enables New Zealand to become a successful 'low-carbon society', which is resilient to climate change impacts and widely supported by society.**" <http://www.mfe.govt.nz/publications/about-us/briefing-incoming-minister-environment-and-minister-climate-change-issues-2014>
 - b. Sir Peter Gluckman's 2014 report on climate change states that: "**...Ominously, the extent of human-induced global warming may be magnified by feedback effects that release even more greenhouse gases into the atmosphere as the world warms (carbon dioxide is less soluble in warmer sea water, and more methane may be released as the Arctic permafrost thaws) and cause less of the sun's heat to be reflected by the melting polar ice caps.**

...There is a remote possibility that if we did little or nothing then the temperature would not rise to unacceptable levels. But we cannot gamble the future of the whole planet on the low probability of that occurring [refer to the 'Precautionary Principle' in Wise Response recommendations]."
<http://www.pmcsa.org.nz/wp-content/uploads/Climate-Change-website-printable-version.pdf>
20. The discussion document outlines some of the costs of mitigation but fails to discuss the **hugely greater costs of inaction**. The questions asked in the consultation document are by and large footling, unctuous and misguided. But for the sake of completeness we provide short responses to the questions in the table below before moving on to what we consider are the real issues regarding climate change targets:

Q1.

(a) Do you agree with the above objectives for our contribution? At face value perhaps but there are consequential questions too. "Fair" to whom and by what measure? Have the potential costs and impacts been objectively scoped and assessed? Where is the policy that shows Government recognises or commits meaningfully to the need for such a transition?

(b) What is most important to you? A future for our children that is not only survivable but has some level of fulfillment.

Q2.

What do you think the nature of New Zealand's emissions and economy means for the level of target that we set? We set it so that on the balance of probabilities life on this planet has some hope of continuing beyond 2100. 4 deg C plus change is 'catastrophic'.

Q3.

What level of cost is appropriate for New Zealand to reduce its greenhouse gas emissions? For example, what would be a reasonable reduction in annual household consumption? What will the cost be if we do not reduce our GHGs? The short answer is an uninhabitable planet where there will not be any households.

Q4 .

Of these opportunities which do you think are the most likely to occur, or be most important for New Zealand? You have not identified the real opportunities which lie in transition off a fossil fuel based economy, comprehensively identified in the 'New Climate Economy' report <http://newclimateeconomy.report/>, nor the true cost of inaction.

Q5.

How should New Zealand take into account the future uncertainties of technologies and costs when setting its target? Listen to mainstream science, backcast from the targets that must be hit, from that determine what annual emissions reductions are required and alter government policy accordingly.

Regarding uncertainties around such technologies as CCS, the economics need to be investigated on a full cost, net life cycle energy basis (including replacement <http://bit.ly/TOUHnN>). We must move forwards in a global system of interdependence, with significant risks based on the reality of biophysical limits ('Planetary Boundaries', peak conventional oil, etc). These will affect our economic, and energy systems choices, and need more investigation at a 'meta' level, to guide a response for our nation.

Identifying a Wise Response to climate change

21. Wise Response asserts that the precondition to accepting appropriate INDCs is for Governments to acknowledge the absurdity of pursuing a policy of maximum economic returns without giving sufficient credence to biophysical limits and adapting policy accordingly.
22. Thus we see two broad policy response strategies available for New Zealand:
 - a. **‘Moa’ - ‘Business As Usual’ with tweaking leading to probable extinction:** New Zealand can view the requirement to reduce emissions as a burden, drag our heels for as long as possible and continue to back the best short-term economic activity without concern about how emission-intensive they are or their true cost.
 - b. **‘Kea’ - an smart, aggressive model for a new economic direction:** Make a serious commitment in policy and follow up with action to fully explore the economic, social and environmental opportunities that the transition off fossil fuels offers.

Policy Response Strategy ‘Moa’

23. Based on the consultation document, **the status quo policy seems fixated on the expectation that there will be adverse effects on the national economy, wages and well-being with a more ambitious emissions target. What will be the costs and sense of well-being impacts be if global targets are not met?**
24. The costs of climate change, if left unchecked, will make it increasingly difficult to be able to afford adaptation, let alone mitigation, because it will depress economic activity. **And the longer it is left before acting, the more expensive it will be to change our systems to cope.**
25. This was a point made clearly by Nicholas Stern in his 2006 landmark report *The Economics of Climate Change*. An example is the **costs of drought to New Zealand** (predicted to become more frequent with climate change) – the 2007-9 drought reduced direct and off-farm outputs by \$3.6 billion. The drought in 2012-13 reduced New Zealand’s GDP by 0.3 to 0.6%.
26. Once we are on an economic back foot from the impacts of climate change, it will become **increasingly difficult over time** to have the financial capacity to adapt systems to climate impacts, let alone reduce emissions.
27. There is minimal talk of the substantial **health benefits** of strong mitigation efforts (refer to our appendices for more on health impacts).
28. We cannot continue to rely on **forestry sinks** here or overseas (with purchase of expensive carbon credits) that build emissions overshoot that can not be sustained or relied on. Moreover, the rest of the world is not going to be fooled by creative

accounting that makes us look as if we are pulling our weight when we are only self-serving.

29. Inaction also risks ruination of **New Zealand's 100% Clean Green brand**. The Climate Change Performance Index (CCPI) is a highly-reputable tool designed to enhance transparency in international climate politics. It evaluates and compares, using standardised criteria, the climate protection performance of countries responsible for more than 90% of global carbon emissions.
30. In the 2014 CCPI report, **New Zealand was ranked 42nd (and declining)** among 58 countries overall, and was also ranked among the bottom five countries in respect of their national climate change policies. New Zealand's poor performance, both in terms of increasing carbon emissions and of CCPI rankings, **reflects relative inaction since 2008** over the threat of human-induced climate change. This poor performance seriously compromises our reputation and potential markets.
31. The 'all of the above' energy policies currently being pursued acknowledge nothing of the huge **subsidies for fossil fuels** and exploitation there of - the externalised costs that are NOT charged to the polluter are actually an effective subsidy. The boomer generation have already enjoyed the energy from the Maui natural gas resource, and we must accept how we used it and learn from that, and pass that wisdom on. If there is another large oil and gas reservoir in the oceans off New Zealand, then it belongs to our grandchildren. It will be up to them to decide whether to use it or to retain it as an option for their grandchildren.
32. The signs are now clear that the **world is in a transition to a low carbon future** because the previous resistance to action, argued on economic grounds, will reverse to favour action on economic grounds. If New Zealand does not commit to the course of drastic emissions reduction action recommended in the various learned submissions from the likes of ourselves, Generation Zero, Engineers for Social Responsibility, and many other NGO's whose various public submissions (in the last few weeks) support our basic assertions, we will very soon find we have been left far behind.
33. Continued inaction is ill advised on the basis set out by Infometrics Ltd in their modelling report "A General Equilibrium Analysis of Options for New Zealand's post-2020 Climate Change Contribution for Ministry for the Environment – 13 April 2015" which states: "**Uncertainty should not be a reason for doing nothing. Instead policy should be cognisant of the risks (favourable and unfavourable) and seek to manage those risks.**" [<http://bit.ly/1HrIGKn>]
34. We note also the recently established set of legal principles collectively known as the 'Oslo Principles' [<http://bit.ly/1Aky7rK>] is forming the basis for citizens to challenge inadequate government action on climate change:

“These Principles, seeking to overcome the generally abstract nature of previous efforts to define the scope of legal obligations relevant to climate change, express both:

- a. the current obligations that all States and enterprises have to defend and protect the Earth’s climate and, thus, its biosphere; and*
- b. basic means of meeting those obligations.*

Fulfilling these obligations is necessary and urgent if we are to avoid an unprecedented catastrophe. The obligations set out here derive from broad fundamental principles and a wide range of well-established law.”

Policy Response Strategy ‘Kea’

35. **We must stop comparing the nature of New Zealand's emissions and economy with other countries and instead focus on what must be achieved collectively and what is "fair" in that context.** Move away from the myth that our expensive agricultural produce is going to feed the world and that the current enterprise is not negotiable.
36. The consultation document **does not consider the ethical dimension.** For example the value that New Zealand society puts on honour, valour, acting bravely and with dignity to protect and serve our home and others around the world who are being mistreated and exploited. We cannot let this be about the dollar value alone. Extinction and loss of the land, livelihood and heritage of our Pacific Islands (including ultimately large sections of our own) is not acceptable. Ultimate failure of the ecosystems and their many services we rely on for sustenance is not acceptable. There is not an acceptable price for failing to address the existential threat climate change poses to all species here on earth.
37. There are many more **potential jobs and wealth creation** in New Zealand’s domestic enterprises aimed at using less fossil fuels than there are generated by extracting more oil and gas exploration and production, with a much higher percentage of the revenue being retained in our economy. The government could unlock ‘Kiwi Ingenuity’ by sending a clear signal that New Zealand is a country looking beyond last century to the future and delivering new ideas and solutions to the world.
38. It is widely accepted that the greatest financial **opportunity exists for early adopters.** This path would represent true leadership on the international stage. New Zealand will attract more international talent and more investment in creativity and 21st century enterprises than it will in opening up to foreign extractive exploitation of the remaining fragments of New Zealand’s natural ecosystems.
39. We can **stop promoting emission-intensive activities** and hydrocarbon exploration, and make a serious commitment to fully explore the opportunities that transition off carbon offers. As UN climate chief Christiana Figueres says, climate change offers a “huge business opportunity” that ought to be embraced by both

sides of politics. “So it’s not necessarily a typical left-wing agenda, it actually has opportunities for everyone.” [<http://bit.ly/1KJA04T>]

40. This view is supported by the “New Climate Economy” (<http://newclimateeconomy.report/>) report which uses neo-classical economic thinking as the basis to demonstrate the **vast potential** that is there for those who choose to recognise it:

*“The next 15 years will be critical as the global economy undergoes a deep structural transformation that will determine the future of the world’s climate system. It will not be ‘business as usual’. The global economy will grow by more than half, a billion more people will come to live in cities, and rapid technological advance will continue to change businesses and lives. **Low carbon and climate resilient growth is possible. The capital for the necessary investments is available, and the potential for innovation is vast. What is needed is strong political leadership and credible, consistent policies. But without urgent action, warming could exceed 4 deg C by the end of the century, with extreme and potentially irreversible impacts. This report lays out how countries across the world can reduce the risks of climate change and achieve high-quality, resilient, and inclusive growth.**”*

41. There is a significant overlap between **actions required for adaptation and actions required for mitigation**. These are often discussed as binary opposites – with a strong voice in New Zealand suggesting that we should only focus on adaptation. But rather than seeing them as alternate actions we need to recognise that they are complementary and often involve the same or similar responses.
42. **For example, both involve the development of systems (farming, transport, etc) that are resilient, adaptable to change, and not highly dependent on resources that will significantly change in availability and cost over the period under consideration.** This option has the supposed benefit of no short term economic detriment (ignoring reputational risk), however long term, the projected detrimental effects of inaction are mounting with every year of weak policy and inaction.

Specific Policy shifts required for ‘Kea’

43. Wise Response considers that the only rational strategy is ‘Kea’ and offers the following specific ideas canvassed from our members to facilitate a move in that direction:
- a. Rely primarily on policy and regulation to ensure targets are met rather than market instruments and technological innovation. If one of these works it will be a break that we need anyway. We agree with LSE’s Lord Nicolas Stern who has called the current situation with respect to climate change “the greatest market failure in human history”.

- b. The scope of INDCs must cover equally all sectors relevant to New Zealand's greenhouse gas emissions and that anticipate lifestyle change by the general public in addition to industry.
- c. Integrate energy, transport, environmental, agricultural and forestry policies, including scope, assumptions, timeframes, targets, implementation milestones and more investment in research on renewables than in research on exploration of carbon-based fossil fuels.
- d. To the extent technically possible based on current evidence, anticipate decoupling any unavoidable economic growth from greenhouse gas emissions. CCS, for example, fails this test.
- e. Calculations for required contributions must be based on the standard methods and procedures of the Revised 1996 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories (IPCC 1997a, 1997b, 1997c) and IPCC Good Practice Guidance (IPCC 2000, IPCC 2003), as adopted by the UNFCCC.
- f. Contributions to be presented in a manner that genuinely facilitates clarity transparency and understanding.
- g. Current emphasis only on electric and shift to biofuel, the latter aspirational should be significantly strengthened to specific action recommendations. Refer to Generation Zero's 'Challenge to Our Leaders' report for more detail: www.generationzero.org/report_a_challenge_to_our_leaders
- h. No mention of curbing the huge proposed costs of motorway construction - billions per year under RONS compared with about \$10 million on the agricultural gas research investment.
- i. Electric vehicles touched on but no mention of the importance of a shift to electric rail, public transport and other ways of curbing fossil fuel burning.

Wise Response and Sustainable Dunedin City public meeting 18 May 2015

- 44. In response to the consultation document and our prior correspondence Wise Response Society Incorporated organised the above event to provide the community the opportunity to exchange views on appropriate INDCs. The speakers were from a wide range of interest groups and known for their knowledge in the subject area.
- 45. The papers that they provided are included in the Appendix 1 below. We would draw your attention particularly to Prof Bob Lloyd's paper which was highly

influential in confirming for the those present the need for very urgent and ambitions action.

Resolution for action.

46. The meeting was attended by approximately 200 persons. They passed the following resolution.

"That this public meeting strongly urges the New Zealand government to endorse both the moral imperative and the economic, social and environmental opportunities of a rapid transition to a low-carbon economy and society. To this end, it should adhere to the mitigation option proposed by the IPCC Mitigation Report 2014 that keeps us below a 2 deg. C. rise in global average temperature. This meeting moves that our government should propose effective GHG emissions targets, along these lines, at the Paris Climate Change Summit."

Moved Alan Mark; seconded Stuart Matheson: Carried unanimously.

Our target recommendation

47. We have updated the 2 deg. C. target in our summary to 1.5 deg. C. in line with the latest (post AR5) science on the matter. Ralph Chapman (Director, Graduate Prog In Environmental Studies - School of Geography, Environment and Earth Sciences, VUW), Martin Manning (Professor, School of Geography, Environment and Earth Sciences, VUW) and others at VUW have similar concerns, especially following the just published "Rogelj et al" paper <http://dx.doi.org/10.1038/nclimate2572> which states:

- a. *"Many impacts projected for a global warming level of 2 °C relative to pre-industrial levels may exceed the coping capacities of particularly vulnerable countries. Therefore, many countries advocate limiting warming to below 1.5 °C. Here we analyse integrated energy–economy–environment scenarios that keep warming to below 1.5 °C by 2100. We find that in such scenarios, energy-system transformations are in many aspects similar to 2 °C-consistent scenarios, but show a faster scale-up of mitigation action in most sectors, leading to observable differences in emission reductions in 2030 and 2050. The move from a 2 °C- to a 1.5 °C-consistent world will be achieved mainly through additional reductions of CO₂. This implies an earlier transition to net zero carbon emissions worldwide, to be achieved between 2045 and 2060. Energy efficiency and stringent early reductions are key to retain a possibility for limiting warming to below 1.5 °C by 2100. The window for achieving this goal is small and rapidly closing."*

48. Professor Chapman notes that the key messages are that:
- a. ***“1.5C is no longer feasible - it requires more than heroic assumptions about the rate of emission and energy reductions, as well as one helluva lot of negative emissions post-2050 (e.g. BECCS);”***
 - b. ***“If we are to be 'likely' (2/3 chance) to stay under the 2C guardrail, then we need to demolish any notion of zero carbon by 2100. The timeframe is around 2060, NOT 2100. This is a critical idea we have to get embedded in the public debate, as the notion of having till 2100 has been bandied about, and always seemed way too relaxed.”***
49. We submit these recommendations in all sincerity and trust that they will be treated seriously and responsibly, particularly in the name of future generations of humans and the many diverse ecosystems on which they, as we, depend for their existence, welfare and quality of life.

Yours sincerely,

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Appendix 1 : Background info for Wise Response submission.

These 8 papers were presented in support of this resolution to around 200 people in attendance. Presentations to the Climate Change Consultation meeting in Dunedin, May 2015. Sponsored jointly by Wise Response Society and Sustainable Dunedin City, University of Otago, Dunedin, 18 May, 2015.

- Prof Bob Lloyd, Physics Dept, on: “How much carbon can we burn?”
- Prof. Janet Stephenson, Sustainability Centre, on: “Transitioning to a low carbon future.”
- Dr Bill Lee, Landcare Research, on: “Effects of global warming on our biodiversity.”
- Rose Penwarden, Oil-free Otago & 350.org., on: “Why we must curb our fossil fuel use.”
- Dr Alex Macmillan, NZ Climate and Health Council, on: “Climate change & human health.”
- Emeritus Prof. Jim Flynn, University of Otago, on: “Our targets must look beyond New Zealand.”
- John Cocks, Chairperson, Sustainable Dunedin City, on: “Planning for a sustainable Dunedin City.”
- Letisha Nicholas, Generation Zero, on: “A GenZero perspective.”

Questions and comments to follow.

Learn about the issues ahead of the government’s consultation meeting in Dunedin on 21 May 6:30 Kingsgate Hotel in Smith Street.

Written submissions on the government’s proposal due 5pm Wednesday 3 June.

Sponsored by: Wise Response and Sustainable Dunedin City.

“How much Carbon Can We Burn?”

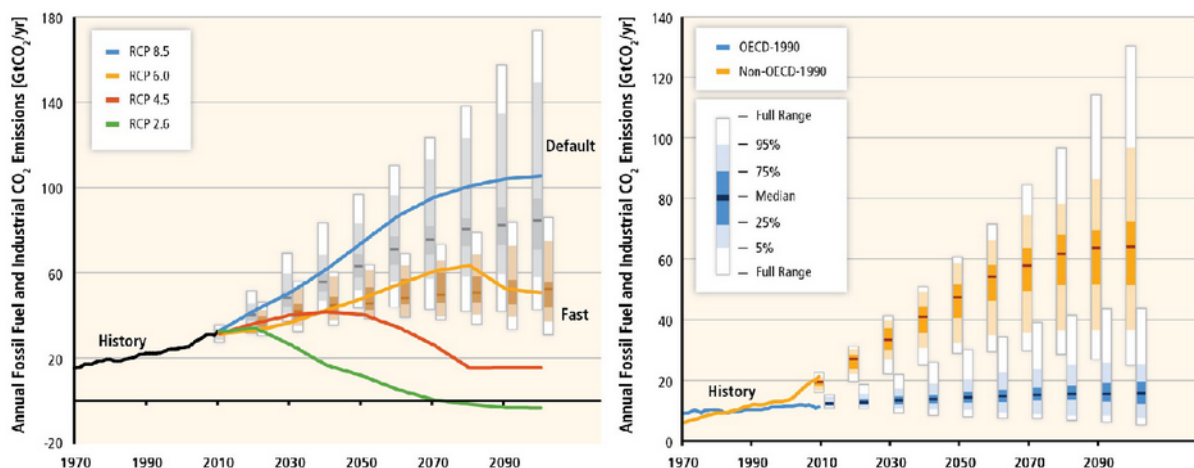
Professor Bob Lloyd, ex Physics Department, University of Otago.

We are lucky that the latest scientific advice is available in the set of 4 documents from the IPCC 5th assessment report.

These are the: scientific report, the adaption report, the mitigation report and the synthesis report. All can be found at <http://www.ipcc.ch/report/ar5/>

Each report has a main report, a technical summary and a summary for policymakers. Here the complexity and detail decreases to the right.

In terms of setting emissions reduction goals for NZ the key document is the mitigation report. Figure 6.4 chapter 6 (below) mitigation report page 18 shows the various representative concentration pathways RCPs from RCP2.6 to RCP 8.5. The numbers refer to the increase in radiative forcing in W/m². The average solar radiation reaching the earth is around 250W/m² so the projected increase due to increased atmospheric CO₂ is from 1% to 4% . The radiative forcing is complicated by the effect of the other Kyoto gases including methane nitrous oxides etc., and by the effect of aerosols which depress the radiative forcing (they get rid of some of the heat).



The summary of the various RCPs is given in table 6.3 which shows the predicted temperature rises for each RCP.

The only one which keeps us below 2 degrees with a two in three chance is RCP2.6. For this scenario the cumulative emissions of CO₂ from the year 2010 must be between 630 and 1180 GT. The average ie 50% percentile is 905 GT. I take 900 GT as the critical number. This number comes from averaging the various climate change models of which the MAGICC seems to be the most used.

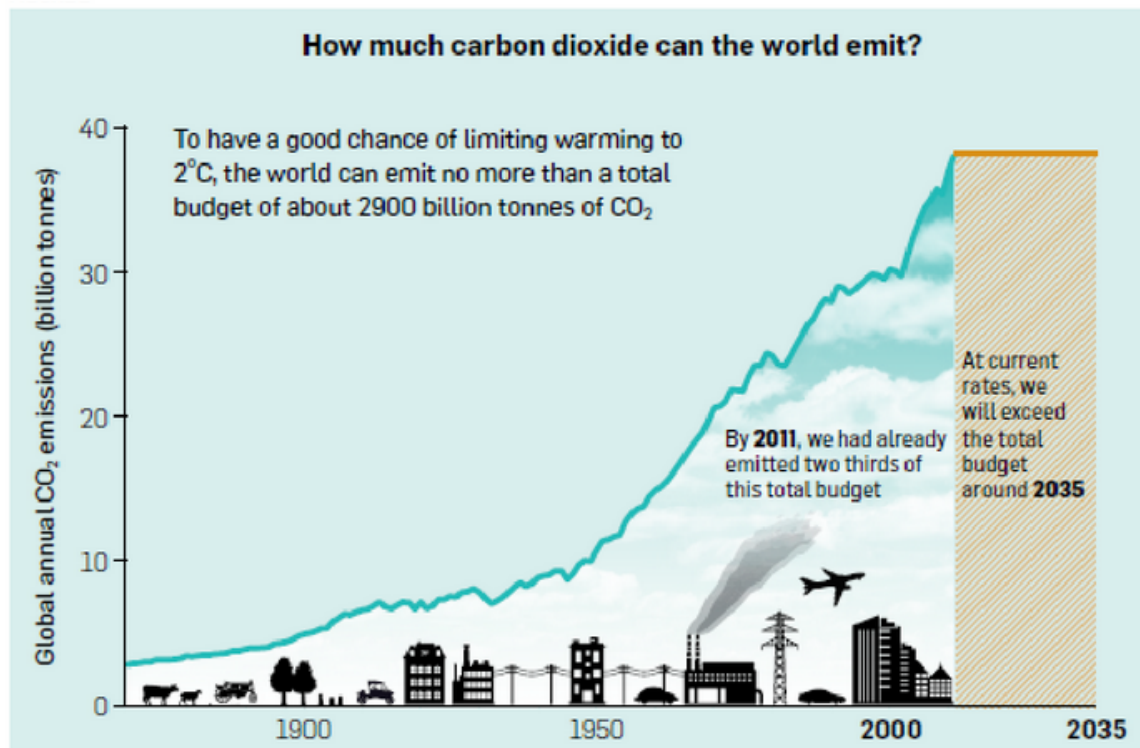
Thus from 2010 onwards we can only emit 900 GT CO₂ and even this will give us a 1 in 3 chance of exceeding 2 degrees.

This is the information in the NZ government's consultation document Figure 1 page 6 reproduced here. Note one third of about 2900 billion tonnes of CO₂ is 960 GT. The Govt. doc does not say what type of CO₂ as there are several types;

- CO₂ emissions from fossil fuels only
- CO₂ emissions from all anthropogenic origin (fossil and industrial)
- CO₂ emissions including above and forestry and other land use (FOLU)
- CO₂eq. emissions, includes all the 6 Kyoto Gases (Methane, Nitrous Oxides etc.)
- Then there are the negative emissions from forestry and land use which can be used to offset the real emissions LULUCF (Land Use Land Use Change and Forestry.)

From the IPCC chapter 6 mitigation report the CO₂ referred to appears to be the CO₂ emissions including FOLU. The FOLU contribution has varied with time but it is around 10% of the anthropogenic emissions

FIGURE 1



Source: Information is sourced from the IPCC's Fifth Assessment Report, Working Group 1 (emissions data, Figure 6.8; carbon budget, SPM E.8)

The NZ Consultation doc shows the emission budget running out in 2035. That is if we want to stay below 2 degrees with a 2 in 3 chance if we keep emitting at current rates (i.e. coal, oil and gas all have 0% increase from now on) we would have to reduce all emissions to zero in one year 2035. This scenario is clearly not possible so we have to devise pathways to reduce emissions so that the total emissions from 2010 stay below around 900 GT (900 billion tonnes) over some period of time.

I have modelled these pathways using fossil fuel data from BP statistics and the conversion factors from Boden et al. which turn 1 Kg coal to 2 Kg CO₂, 1 kg oil to 2.8 Kg CO₂ and 1 kg natural gas to 2.35 Kg CO₂ (note 1 kg pure carbon if burnt will produce 3.66 Kg CO₂).

Our 10 year averaged historical increase in fossil fuels have been: Coal 3.4% p.a., Oil 0.75% p.a. and Gas 2.5% p.a.

If these increases continue we will hit the budget by around 2030 i.e. 15 years from now.

To keep below the 900 GT budget we would have to reduce all fossil fuel consumption by 5% p.a. starting at the end of this year reaching zero emissions around 2050. Every year we wait will mean we will have to eventually decrease the consumption of fossil

fuels even faster. If we wait until 2020/2021 we will need to decrease by around 7% p.a..

The IPCC does not believe such drastic decreases are possible, at least not in the short term, so their pathways allow an increase of CO₂ levels out to 2020 (after which the Paris negotiated accords kick in) and then a decrease to zero by around 2070. But the decrease levels proposed would still leave us with a deficit (i.e. we will go above the 900 GT) the excess of which would have to be removed before the end of the century by carbon capture and storage (including forestry). The IPCC notes that the CCS options mostly are untried but they cannot bring themselves to adopt the reductions needed to achieve the model budgets without CCS. My opinion (and many others) is that we should not rely on CCS. Why is the IPCC sceptical of such high decreases in fossil fuel consumption? Because of the economic effects of the reductions and concurrent likelihood of a general collapse of society. And because almost all forecasts by the fossil fuel industry show an increase in fossil fuel use at least until 2035/40 (see for instance the [BP](#) and [Exxon](#) energy outlooks, or the [Saudi Oil Minister](#)). Exxon sees the world total CO₂ emissions rising by 20% between 2010 and 2040, by which time we will be comfortably over the 2 degree limit. The fossil fuel industry would lose out badly with around US\$100 trillion of stranded assets, should they be required to remain in the ground.

However a reduction of 7% p.a. would be very difficult to achieve both technically and politically which is why many people including the IPCC have virtually given up hope of staying below 2 degrees.

What happens if we go above 2 degrees? This target was agreed upon at Copenhagen as the temperature which if exceeded could lead to runaway climate change, due to the kicking in of the many climatic positive feedback effects (melting of ice, release of methane, burning of forests etc.). The 2 degrees is thought to be a tipping point after which the temperature will keep rising no matter what we do. This is why I am so keen to abide by the 2 degree limit. On the ground evidence from ice melting and methane emissions from tundra etc. suggest that the real tipping point temperature may in fact be below 2 degrees (refer to further evidence in 'urgency' section of this submission below). Oh dear!! Not only are we up shit creek we don't have a paddle. No one is game to suggest that we adopt a new temperature target of 3 4 or 5 degrees because there does not appear to be any scientific basis that such temperature could be maintained, as the positive feedbacks would ensure temperatures keep rising (see for instance Jim Hansen's book Storms of my Grandchildren).

The Climate Change game looks very grim indeed, which is where game theory plays a part. See the Prisoner' Dilemma - http://en.wikipedia.org/wiki/Prisoner%27s_dilemma . In the climate change game we have many international criminals (nations) each intent on preserving their own self-interest. The only outcome which gives us a future is one where we all (all of the largest emitters at least) cooperate. All other outcomes end in disaster (i.e. above 2

degrees). The trouble is that unlike the traditional Prisoner's Dilemma game the national criminals advertise their intentions via the UN protocol. The current statements by those countries that have tabled their intended commitments (INDCs - <http://bit.ly/1Foi8VC>) doesn't keep us below 2 degrees, so what incentive is there for the next tranche of nations (including NZ) to cooperate? Not a lot. Once we go above 2 degrees the game changes from mitigation to adaptation and while mitigation is a commons problem i.e. one which only has a successful outcome with cooperation, the adaption game can be viewed as every nation for itself (anti-cooperation). See for instance Irwin's 2009 paper (<http://bit.ly/114D7no>).

I have not yet discussed fairness but this discussion will introduce other dilemmas. We could agree to current equal per capita emissions i.e. this would be fair to all inhabitants on earth at this point in time. In addition because of the link between fossil fuel use (emissions) and wealth, the low emitters are at a significant economic disadvantage (think Nepal with 0.1 tonne CO2 per capita v US 19 tonnes per capita or Saudi Arabia around 30 tonnes per capita). Many of the poorer nations need assistance to improve their economies by increasing energy use (renewables). This matter was of course brought up at a recent Dunedin meeting with regards to NZ assisting Pacific nations. It is unlikely in my opinion that we can get cooperative agreement on climate change without first removing the vast inequality in the world.

In addition the new entrants i.e. those who have just reached high emission level (China for instance) could complain that it is the cumulative historical emissions which should matter. This would put the long term emitters at a disadvantage (i.e. Europe and the US).

Then there are the neoliberal arguments that reductions should be undertaken in an economically efficient manner i.e. best to reduce first in nations with a low energy efficacy and high energy intensity i.e. high energy use per GDP – e.g. China!!

In my opinion from an ethical and moral viewpoint we should commit the rich countries to much higher CO2 reductions than poor countries.

Finally it is likely that national security will always trump climate change negotiations. No nation would willingly put itself at risk of losing a potential war with another nation because of reduced economic output due to a (voluntary) decrease in fossil fuel use.

Wise response concurs with both the sentiment and detail of Professor Lloyd's argument, and this is used alongside the urgency evidence below in the formulation of our submission recommendations. Wise response concurs with both the sentiment at detail of Professor Lloyd's argument, and this is used alongside the urgency evidence below in our submission recommendations.

Summary of comments on Discussion Document: ‘New Zealand’s climate change target’

Janet Stephenson, Director, Centre For Sustainability • Kā Rakahau o te Ao Tūroa, University of Otago.

1. The government’s discussion document outlines some of the costs of mitigation but fails to discuss the hugely greater costs of inaction. The costs of climate change, if left unchecked, will make it increasingly difficult to be able to afford adaptation, let alone mitigation, because it will depress economic activity. And the longer it is left before acting, the more expensive it will be to change our systems to cope. This was a point made clearly by Nicholas Stern in his 2006 landmark report *The Economics of Climate Change*. An example is the costs of drought to NZ (predicted to become more frequent with climate change) – the 2007-9 drought reduced direct and off-farm outputs by \$3.6 billion. The drought in 2012-13 reduced NZ’s GDP by 0.3 to 0.6%. Once we are on an economic back foot from the impacts of climate change, it will become increasingly difficult over time to have the financial capacity to adapt systems to climate impacts, let alone reduce emissions.
2. There is a significant overlap between actions required for adaptation and actions required for mitigation. These are often discussed as binary opposites – with a strong voice in NZ suggesting that we should only focus on adaptation. But rather than seeing them as alternate actions we need to recognise that they are complementary and often involve the same or similar responses. For example, both involve the development of systems (farming, transport, etc) that are resilient, adaptable to change, not highly dependent on resources that may significantly change in availability or cost.
3. To argue that we contribute only a small portion of global emissions and therefore should not worry about taking action, is akin to me saying that I should feel OK about throwing my rubbish all over my street because I’m only one of many people who live in the street, and people with bigger houses should stop throwing their rubbish around before I do. Nonsense. We’re all in this together.
4. NZers have a high per capita emissions profile and many of the goods and services that we enjoy are produced using the fossil-powered energy in the largest emitting countries such as China and the USA.
5. A low carbon future offers a huge opportunity for NZ. If we retain the view that we should only be a ‘follower’, then we risk being left behind in what is likely to be a rapid global transition. NZ’s mix of renewable energy resource and innovation potential means that it could potentially be a leader in some aspects of mitigation – for example, in reducing agricultural GHG emissions, geothermal energy, an electricity grid running on close to 100% renewable energy, swapping coal for wood-based industrial heat, and an electric vehicle fleet which (unlike other

countries which largely rely on coal and gas-generated electricity) makes a huge amount of sense in NZ.

6. I [we] observe significant concern about our climate future, and interest and support for a low-carbon future amongst businesses, households, communities and some councils. They see benefits that include retaining NZ's clean green market status, improved resilience, improved public health, future-proofing, opportunities for innovation and new products and services. However NZ lacks clear leadership in this space (unlike UK, Scandinavia and EU more generally, for example). This means that efforts are currently fragmented and less effective than they might be if there was a more coherent and linked-up approach. NZ needs a clear government commitment and targets, and to show leadership that NZers will respond to.
7. The shift to a low-carbon future is not simple. It involves on the one hand a change in 'culture' (norms, practices, technologies) amongst households and businesses, as well as changes in the broader structures such as policies and physical infrastructure to support the change. This wider structural change needs to be orchestrated so as to ensure that they are aligned rather than working against each other, and support change at the individual and business level. Many of the changes required to achieve a low-carbon future require investment today in order to achieve change in 5-15 years time (eg mobility infrastructure) so we cannot afford to wait until climate problems are upon us. Again, this requires government leadership.
8. NZ risks being left behind if it does not adopt a credible position at the Paris talks, and sees that through with effective action domestically. On the other hand, there are huge advantages in being front-footed and actively transitioning to a low-carbon future. We have much to gain (and little to lose) from a positive and strong stance at Paris.

OraTaiao: NZ Climate & Health Council - part of a global movement of doctors and other health professionals.

Dr Alexandra Macmillan

Public Health Physician and Senior Lecturer
Environmental Health
Department of Preventive and Social Medicine
University of Otago.

“Continuation of high fossil fuel emissions, given current knowledge of the consequences, would be an act of extraordinary witting intergenerational injustice. Responsible policymaking requires a rising price on carbon emissions that would preclude emissions from most remaining coal and unconventional fossil fuels and phase down emissions from conventional fossil fuels.” James Hanson 2013

The main responsibility for this action must fairly fall on the wealthiest nations with the highest emissions. New Zealand is one of those.

The government's discussion document certainly does not represent "responsible policymaking".

Why health professionals?

CC is not a fringe environmental issue, but one that is central to human wellbeing and survival – it's at the heart of what we want as NZers... secure future for our children, less poverty, more fairness, social stability and safeguarding the things we rely on for our health and wellbeing – like freshwater, human-friendly weather patterns, adequate healthy and affordable food.

Both the British Medical Journal and The Lancet have called climate change the greatest public health threat facing us.

Health professionals have previously played a leadership role in taking action to reduce global threats to wellbeing, including the threat of nuclear war and we are starting to see this happen globally about climate change

Most hopefully, if we place human health at the centre of climate policy, re-framing it as an issue of health and wellbeing, we can build political will and put in place policies to combat climate change that also bring exciting co-benefits for health and fairness – I'll come back to these at the end.

Health impacts globally and in NZ

We can say with a high degree of certainty that climate change is already having important effects on health and wellbeing globally, including in New Zealand, with increasing heat waves, flooding, droughts and severe weather events, increasing food prices and loss of fish and shellfish stocks, increasing water and food-borne illness, and changing infectious disease patterns.

The future impacts of health depend heavily on our urgent actions to mitigate and are not currently being counted in the government's discussion document.

As well as worsening of the very direct physical health impacts I've already described, the prospect of a future of uncontrollable climate change will continue to bring worsening fear, anxiety and depression for many, especially young people – uncontrollable climate change would leave a legacy that would last uncountable generations.

The building blocks for health, a stable society and economy, healthy housing and safe, affordable, healthy food will also increasingly be affected through loss of climate-sensitive primary industry (we're already seeing this with summer droughts and loss of mussel stocks); sea level rise and coastal erosion; poor adaptation of

housing to increasing heat; and an increasing influx of climate refugees from the Pacific putting pressure on all our social systems.

Maori, Pacific and low-income groups are at risk of greater impacts of climate change. We also have the potential to increase or decrease existing systematic injustices for these groups through our choices about action – especially how we distribute the costs and the benefits.

But as I said before, there are also exciting opportunities for health, wellbeing and fairness from strong, well-being centred climate action in New Zealand.

Direct improvements for health are possible for heart disease, lung disease, cancer, obesity, joint problems, diabetes, road traffic injuries, and mental health, with big savings for the health system and the economy that aren't being counted in the government's document.

Burning fossil fuels has previously made substantial contributions to improving the lives of many in wealthy countries (often at the expense of the poor). However, we've reached a time when keeping our current level of wellbeing and improving health rely us to make big behavioural and policy transitions away from fossil fuels. Benefits to health would then fall into five main areas:

MOVING AWAY FROM COAL – will improve air and water quality reduce mining injuries and deaths, and could transition boom and bust communities to a more resilient and healthy future

A shift from car-dependency and road freight to active and public **TRANSPORT**, clean rail and shipping would bring exercise and neighbourhood connection back into people's daily lives, while reducing air pollution and road traffic injuries.
Warm, energy efficient **HOUSING** and transitioning to clean, climate-friendly home heating would reduce winter deaths from lung and heart disease and improve social justice by reducing days of school and work for the poorest families

A **LOW-RUMINANT ECONOMY** and **DIET** would reduce obesity, heart disease and cancer, improve the quality of freshwater and could improve the affordability of healthy local plant-based food

ASSISTING LOW INCOME COUNTRIES, through funding and technology transfer, to take a climate-friendly path of economic development could improve women's health by addressing unmet need for family planning services; achieve massive reductions in indoor air pollution deaths and reduce global health inequalities.

To avoid the health risks and achieve the potential gains fairly, NZ needs to include the costs and benefits to health and equality in its calculations; set consistent, clear, adequate targets and put human wellbeing and fairness at the centre of well-designed policies to meet those targets. I've supplied copies of OraTaiao's written submission

guideline, hot off the press – as well as three health questions to ask at the public meeting on Thursday.

“It makes no sense (to me) to spread fear and anxiety here and now, in order to reach a non-existent future where all our problems will be solved, allowing us to finally dispense joy.” Niki Harre

Let's ensure we are able to dispense joy now and into the future by speaking up loud for a New Zealand national climate commitment that is cross-party, ambitious, and centred on human wellbeing and social justice.

Tena koutou katoa

Effects of global warming on our native biodiversity

New Zealand's Climate Change Commitment

Dr Bill Lee, Landcare Research/University of Auckland

My research interests in climate centre on understanding the response of the indigenous biota to climate changes over the past 40 million years and to ways in which modern plants adapt to climate along resource availability gradients.

Our understanding of the potential effects of climate change on New Zealand's terrestrial biodiversity were nicely summarised in 2011 in a report for the Department of Conservation by Matt McGlone and Susan Walker of Landcare Research (<http://www.doc.govt.nz/Documents/science-and-technical/sfc312entire.pdf>).

On the climate side, we are looking at rising mean and particularly winter temperatures, rising sea levels (at least 1-2 m over the next century), increasing precipitation along the main axial ranges, and reduced rainfall in eastern and northern areas, and more regular extreme events.

- Terrestrial biodiversity declines in New Zealand are currently driven by mammalian predation (everywhere) and habitat loss (lowland-montane and coastal).
 - Warmer temperatures, particularly winters, are expanding predator ranges (increasing altitudinal rat line) and increasing densities, impacting both meso-predators and top predators. This will make predator elimination and control strategies more challenging while increasing loss rates of vulnerable native birds, lizards and invertebrates. Mega mast flowering in beech and tussock biomes may further exacerbate predator numbers and impacts, although there is debate about the likelihood of this occurring.
 - Habitat loss is currently via agricultural intensification (especially in threatened environments where little indigenous biodiversity remains or is protected), and there is concern that climate-change mitigation efforts

around expanded plantation forestry hydro-electricity and water abstraction will further reduce native habitats. In addition, the coastal squeeze where rising sea-levels hit against hard infra-structure is also displacing native habitats.

- New Zealand is experiencing some of the effects of global changes. For example, a global analysis of phenological changes in vegetation based on remotely sensed absorption of photosynthetically active radiation (Normalised Difference Vegetation Index) revealed strong shifts in the vigour of southern hemisphere forests, including those in New Zealand.
- Globally, forests are a major carbon sink, sequestering 26% of fossil fuel emissions. In New Zealand, with increased temperature, annual wood production could increase by 6-23% depending on rainfall, mostly confined to cool mountain environments. Maximum productivity and therefore carbon sequestration gains will require spatial shifts in structure and composition. Overall, the adjustment speed to temperature and rainfall shifts will depend on disturbance frequency.
- Freshwater systems are vulnerable to water warming where unbuffered by forest. Temperatures above 22 C may be lethal for stoneflies and eel migration. These habitats will also face more invasive fish and plant species from subtropical climates and will experience lower habitat quality in eastern catchments reflecting declining water flows from reduced precipitation and water abstraction for agriculture.
- Marine ecosystems changes are already occurring but the system is complex, depending on currents, Southern Oscillation Cycles etc. Most noticeable are recent declines in seabirds (9), including wandering albatross, red-billed gulls and titi. In some of these fishing is possibly a factor, but not all. A common influence seems to be the lower availability of krill or other food sources associated with locally warmer nutrient-poor surface water.
- Although there are few intrinsic constraints for indigenous biodiversity in the most realistic climate change scenarios for New Zealand, range readjustment to accommodate climate shifts are nowadays complicated by habitat fragmentation restricting migration and lack of suitable warm climate-adapted taxa to occur in northern areas.
- Conversely, many current and potential invasive species, both plant and animals, and including pathogens and diseases, will have increased opportunities in a warmer-climate New Zealand.
- Overall biodiversity is and will change to respond as the climate profile of New Zealand shifts. However, little of this is outside of the evolutionary climate envelope for most species. Climate change will exacerbate existing threats associated with predator pressure and habitat loss, and increase the potential for new invasive species. We need to maximise opportunities to maintain native

dominance in systems and this could involve assisted migration and protection against ecosystem transformation, although these approaches would only be a sustainable option for very small areas.

Note: A recent (2015) 'climate change research report' by M.C. Urban, entitled "Accelerating extinction risk from climate change" (Science 348; issue 6234: 571-3) concludes that New Zealand, Australia and South America have the highest risks of global biodiversity extinction.

Bill Lee
Landcare Research/University of Auckland

Oil Free Otago and 350.org

Rosmary Penwarden

Hi, I'm and I'm speaking this evening on behalf of OFO and 350.org

This week Simon Bridges is in Melbourne promoting New Zealand as an exploration destination to some of the world's largest petroleum companies. The NZ pavilion is being hosted by NZ P&M and New Zealand Trade and Enterprise. Govt-owned GNS Science is there too.

Asking us to help set a target for Paris while at the same time continuing with their fossil fuel expansion agenda is not, as Simon Bridges said, a "*mixed and balanced approach to our energy future*" but a sham.

More forests are being cut down than planted – to be mainly replaced with dairy pasture, only adding to our emissions. Our ETS is a farce – but even so, our highest emitting industry is exempt. We subsidised the fossil fuel industry to the tune of \$46 million in 2013 while we stifle growth in clean low carbon enterprises. Our per capita emissions are some of the highest in the world, more than double those of the EU. With our carbon emissions going through the roof, instead of 5% below we are on track to be 34% above 1990 levels by 2020.

On Thursday the government will try to use the 'cost' argument. That's what they've done in meetings so far – carefully framing action against climate change as a cost to households that we really probably can't afford. They have carefully analysed the cost of mitigation, but have not analysed the cost of inaction. For example, the 0.5% this year's February drought shaved off GDP growth, the estimated \$1.3 billion cost to GDP of the 2013 drought and the \$2.8 billion cost of the 2007-8 drought. That's only droughts. How much have last week's floods cost Wellington and Kapiti? The

government's intention seems to be to leave it to the next generation to pay. Continue fudging, playing around with carbon credits and forests, and leave true emissions reductions to them.

We can't allow that. It will be too late by then. It's crunch time. No room for pretence at action through creative accounting or figure fudging. We have to show the government that we have no time and no patience more flaky targets that they don't intend to meet. Oil Free Otago and 350.org urge Dunedin people to call the government out on Thursday *before* they try to fudge us with their one-sided cost argument.

Oil Free Otago and 350.org agree with Bob Lloyd and demand a target of **carbon neutrality by 2030** according to climate science. Anything less is committing our children to an uncertain, possibly unsurvivable future. This is achievable. NZ is in a unique position to do so, but it will take more guts than this government has thus far shown it is capable of.

Emeritus Prof. Jim Flynn, University of Otago, on: "Our targets must look beyond New Zealand."

I made five points:

- (1) To raise public awareness the government should hold a referendum proposing an environmental surtax - say at 1% extra on the tax you owe - this would do an enormous amount to get the public talking.
- (2) It should subsidise the use of biochar to make it competitive with phosphate fertilisers - and investigate osmotic power to replace coal.
- (3) it should issue a public statement of urgency - detailing decade by decade the consequences for NZ (and the world) of the present drift - thus putting itself on record as rejecting climate denial - it should hold a series of public meeting to get this statement debated.
- (4) I should detail a strategy of how nations in general can take the lead - and action its own contribution. This would include: financial contribution to at least one project to developing hydrogen fusion; the same to get Salter's ships on the water (to send up sea spray and retard global warming); the same to encourage Amazonian nations to forgo development of the rain forest in favour of compensation.

“Planning for a sustainable Dunedin City.”

John Cocks, Chairperson, Sustainable Dunedin City Inc

Was established over 8 years ago after a public meeting in the Museum’s Hutton Theatre. The theatre was packed with people interested in the issues of: 1) climate change; 2) declining energy security; and 3) sustainability, as they affect Dunedin City.

Of the many activities carried out by Sustainable Dunedin City – submissions, student education programmes, public talks, the Big Green Challenge, and its fortnightly newsletter – the single biggest event organised to date was a Resilience Summit in 2011. This was a day long event with approximately 100 people – people involved business, education, iwi, local government, community groups , health services, and more.

Future scenarios were discussed - climate change and transport, food supply, sea-level rise, energy price rises, downside of reliance on coal, ideas for creating self-sufficient communities.

Actions to reduce carbon emissions and means of adaption to climate change were documented under the headings of:

- Climate Change Impacts & Sea-Level Rise
- South Dunedin
- Wider community
- Energy and the Economy
- Transport to and within Dunedin
- Resilience in Food Supply
- Transition to low levels of consumerism & waste
- Need for community participation

The actions identified remain applicable, and increasingly so.

The MfE discussion document starts with statement that *Climate change is a truly global problem and all countries need to contribute to reducing emissions.*

The third objective states that NZ’s contribution *must guide New Zealand over long term in global transition to a low emissions world.*

But where does NZ focus on transiting to a low emissions world, **now** and in the long term?

Some guidance is given in the document, yet doubt about the level of our commitment is seeded by:

- raising uncertainty about technologies to assist in reducing emissions levels, and

- the costs to households by reducing emission levels.

Of many important unanswered questions, we raise three.

1. The document states that our key policy tool for reducing emissions is the NZ Emissions Trading Scheme. What has NZ achieved with in reducing emissions with the ETS to date? What are the implications for continuing with the ETS in a global market?
2. How do we redress our diminishing forestry carbon sink
3. What is the basis of determining costs to society both in terms of:
 - a. Costs and risks of not acting, and
 - b. Costs and risks and opportunities of acting to achieve a low carbon NZ.

John Cocks

Co-chair

Sustainable Dunedin City

Other points noted during the meeting.

Other key risks

- health impacts
- ocean acidification impacts – on our fishing industry for example, on biodiversity, on ocean ecology
- diminishing overseas marketing security
- global conflicts.

Need public engagement at an emotional level

In contrast to other movements involving others (eg Save Manapouri, Anti-Apartheid), reducing emissions will affect each of us and dramatically so.

What personal action can we take to reduce emissions – a guide.

We need government leadership.

Zero emissions by 2050. Reduction targets need to be set on a year by year basis

Think of / invest in our younger generations and their future.

A national forum on Climate Change and Zero carbon is needed.

A umbrella organisation to coordinate the many environmental groups petitioning for a low carbon NZ..

Need climate change awareness promoted through our education system.

Focus groups in Auckland are having success in influencing change to the housing market.

A Generation Zero Perspective

Letisha Nicholas

For the first time in six years the Government is asking New Zealanders for feedback on what New Zealand should be doing about climate change. They're consulting on the commitments they will present the rest of the world at the UN climate summit in Paris this November.

This is our chance to call for a plan to Fix Our Future:

Acting on climate change is an investment in our future.

The Government's narrow fixation on the short-term costs of taking action is flawed and damaging. This is about investing in a safe and prosperous future where we're all better off. Failing to act will cost us and the World Bank warns that the longer action is delayed, the more costs will rise for the next generation. Taking action to cut carbon pollution in New Zealand creates benefits like cleaner air, less dependence on foreign oil, better human health and more liveable cities. Our existing renewable electricity portfolio is an opportunity, not an excuse for inaction. By building on this we can be a positive example to other countries, pioneer solutions the rest of the world needs, and capture new economic opportunities.

I want the Government to act on climate change as an investment in our future.

New Zealand needs a target of zero carbon dioxide emissions.

Carbon dioxide is the main driver of long-term climate change. The discussion document highlights that for a good chance of limiting warming to less than 2°C, the world can emit less than one trillion tonnes of CO₂ from now on. At current rates of emissions, the world will blow this carbon budget by 2035. Regardless of what we do about other emissions from agriculture, every country ultimately needs to reduce CO₂ emissions to zero to stop climate change and avoid blowing the global carbon budget. That means shifting from fossil fuels to clean energy and planting forests to absorb carbon.

I want New Zealand to call for a global zero carbon target, and walk the talk by committing to a pathway towards zero CO₂ emissions by 2050 or earlier (alongside reductions in other greenhouse gases).

Targets need to be backed up with a credible plan.

In order to meet our targets we need a credible national strategy for how we can achieve them. Without a clear pathway, targets are just empty numbers. Despite existing targets for 2020 and 2050, New Zealand's emissions have continued to rise. Official projections say they will continue rising under current policies. Our international reputation can't survive that much longer - we need real results.

I want to see a real action plan that adds up.

We need a climate change law to keep government on track.

The UK Climate Change Act provides a model for government commitment and accountability that New Zealand should adopt. This Act puts national emissions targets in domestic law (which is not the case in New Zealand) and requires every government to produce credible plans to meet these. This will show other countries we are serious. The Act also sets up an independent Climate Commission to advise

government on its policies and hold whoever is in power accountable. This makes the issue of climate change less politicised by having an authoritative independent voice in the debate.

I want a New Zealand climate law that holds the government accountable for reducing emissions, and an independent Climate Commission.

We need political parties to work together.

This issue needs cooperation across the political spectrum and efforts to engage all New Zealanders in the solutions. Climate policy can't go on being a political football with major policy flip-flops every time there's a change in government. We need stable climate policy that steers us clearly towards a zero carbon society. This will allow businesses to make good long-term decisions and New Zealand will benefit by attracting investment in low carbon industries and innovation.

I want the Government to establish a cross-party climate working group and an ongoing programme to engage meaningfully with New Zealanders on climate change solutions.

We can't wait.

An exciting zero carbon future is waiting for us if we choose it. We need to start building it today. Previous generations didn't understand the gravity of the problem and didn't have the technologies to solve it, but the current generation in charge has neither excuse. Delaying action makes it harder to meet our targets and lumps more costs onto young people to deal with in the future. There are many beneficial actions the Government could take now together with businesses and communities to kick-start the transition.

I want to see meaningful policy changes that will start cutting New Zealand's emissions, during this term of government.

Appendix 2 : Letter to Royal Society

Original letter to Sir David Skegg:

Sir David Skegg, President, Date: October 13, 2014.
Royal Society of New Zealand.

Dear David,

We are writing as Fellows of the Royal Society of New Zealand (RSNZ), and as scientists (with one of us [AFM] convener) associated with the 'Wise Response' National Risk Assessment appeal (see Annex 1). One of the concerns of this group is the growing risks to New Zealand's environment and society resulting from rising greenhouse gas emissions.

Six years ago RSNZ released a Statement summarising serious and increasing concerns at rising greenhouse gas emissions expressed in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). Since then greenhouse gas emissions (both global and NZ) have continued to rise, and a Fifth IPCC Assessment Report has been released, expressing even deeper concerns. The IPCC AR5 Science report concluded "Continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system. Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions", with the Mitigation report noting "Mitigation requires major technological and institutional changes including the upscaling of low- and zero carbon energy" and "Delaying mitigation is estimated to increase the difficulty and narrow the options for limiting warming to 2°C." We suggest it is time for RSNZ to address the issue again in this light, and in a more comprehensive way than in 2008.

A number of sectors of New Zealand society have been responding to growing concerns with reports and plans for action to address the various consequences of rising greenhouse gas emissions, and we note among these the current investigation into sea level rise by the Parliamentary Commissioner for the Environment. However the evidence is now clear that our collective response has been ineffective and acknowledged to be inadequate (see notes in ANNEX 2). The Wise Response Society Inc. believes New Zealand, as a small, naturally well-endowed, independent nation, should provide some leadership, along the lines of Denmark's example, toward a sustainable future. We believe the urgency of the situation imposes a moral obligation on every country in the developed world, including New Zealand, to reduce their per-capita GHG emissions to achieve this and sustainable ways of responding to the inevitable impacts which have widespread societal implications for us. However we also recognise that every nation must find its own path for this, and that we currently lack effective overall guidance on how to make progress on this pervasive issue. We therefore strongly endorse the statement from the Executive summary of the Prime

Minister's Chief Science Advisor's report that "A risk management approach is needed when New Zealand faces the likelihood of significant impacts. .. Active and adaptive management is required."

To that end we believe RSNZ is uniquely placed for setting terms and framing a comprehensive discussion around the future risks of climate change, as well as for engaging the expertise needed for an informed assessment. We therefore seek your permission to move and second the following resolution under "Other Business" at the Fellows' Forum **"to request that the RSNZ Academy Council convene a group of experts to review and assess the risks associated with recent and projected trends in greenhouse gas emissions, the likely consequences for New Zealand in future decades and centuries, and consider options for both mitigation and adaptation, taking into account environmental, social and economic considerations."**

Yours sincerely,

Alan Mark FRSNZ, KNZM; Peter Barrett FRSNZ

Following adoption of the Resolution carried at the Fellows AGM Forum the Royal Society organised a Climate Change Workshop of 21 participants on February 16 and at its March meeting the RSNZ Council considered the recommendations of this workshop and agreed to undertake the two separate work streams suggested at the workshop:

A succinct summary digesting existing New Zealand information around the risks associated with recent and projected trends in greenhouse gas emissions, and the likely consequences for New Zealand in future decades and centuries (to be completed as soon as possible).

An in-depth look into mitigation options for New Zealand, with long term views, including risks, co-benefits, spill over impact, opportunities and barriers at local and national levels (taking 9 – 12 months).

(The third work stream around adaptation will be considered at a later date)

The Council also appointed convenors for the two panels, Dr David Wratt for the panel to summarise the risks and Professor Ralph Sims for the panel on an in-depth look into mitigation.

To ensure this work can proceed as rapidly as possible the Society will be engaging a part-time contractor to support the convenors.

ANNEX 1. Notes on the Wise Response Society www.wiseresponse.org.nz

The Wise Response Society was launched on March 8, 2013, because a group of New Zealanders believed that "Today New Zealand faces numerous risks, which are all the more risky for being largely unacknowledged. We believe Parliament should build on its proud tradition of foresighted collective response to risks, and initiate a risk assessment as the first step in achieving a more secure future."

We submitted a petition to Parliament last April with a request to address the perceived risks in their policy making. The petition to the House of Representatives reads:

"We the undersigned, request that the House:

- 1. urge Government to undertake a National Risk Assessment of: Economic / Financial Security, Energy and Climate Security, Business Continuity, Ecological / Environmental Security, and Genuine Well-Being; and:*
- 2. that from that Risk Assessment, develop and implement cross-party policies to avert any confirmed threats to future generations of New Zealanders."*

There are numerous unprecedented global trends and threats which, individually or in combination, could destabilize New Zealand's future wellbeing. We believe it an ethical imperative that NZ be proactive in assessing and avoiding these, rather than risk being caught unprepared.

"Mo tatou, a mo ka uri a muri ake nei: For us and our children after us."

ANNEX 2. Points underpinning both the need and the urgency for a national risk assessment of the future consequences of climate change for New Zealand and possible policy options for both adaptation and mitigation

1. The scientific consensus is approximately 97% in favour of the theory of anthropogenic climate change (<http://iopscience.iop.org/1748-9326/8/2/024024/article>). The evidence is summarised in a new climate change website sponsored by the American Association for the Advancement of Science (<http://whatweknow.aaas.org/>)
2. The Prime Minister's Chief Science Adviser, Sir Peter Gluckman's July 2013 report (<http://bit.ly/1rt8Vdb>) stated that: "There is unequivocal evidence that the Earth's climate is changing, and there is strong scientific agreement that this is predominantly as a result of anthropogenic greenhouse gas emissions. ...there is strong scientific consensus on the general trends and drivers of recent climate change. The most probable future scenarios are cause for concern."
3. The Fifth Assessment Report of the IPCC was released in three stages beginning with the science in September 2013, the consequences in March 2014 and policy options in April, 2014. Summaries for Policymakers are available from www.ipcc.ch. A 4-page summary with a New Zealand focus from the NZ Climate Change Centre: (<http://bit.ly/1rtcVdy>) stated that: "As temperatures increase so do risks of serious and irreversible damage."

4. Two independent global business groups acknowledge the urgent need for planning and action in recent reports on credible financial pathways to a low carbon world. (PriceWaterhouseCooper - <http://www.pwc.co.uk/assets/pdf/low-carbon-economy-index-2014.pdf> ; HSBC - <http://www.hsbcnet.com/gbm/global-insights/insights/2014/keeping-it-cool.html>)