



Climate Change Response (Zero Carbon) Amendment Bill – Draft responses to the Environment Committee’s questions on science

Date Submitted:	26 June 2019	Tracking #: 2019-B-05733	
Security Level	██████████	MfE Priority:	Urgent

	Action sought:	Response b'y:
To Hon James Shaw, Minister for Climate Change	Provide feedback on the draft responses	5pm, 26 June 2019

Actions for Minister's Office Staff	Return the signed report to MfE with your feedback.
Number of appendices and attachments #1	Titles of appendices and attachments (ie separate attached documents): 1. Draft responses to the Environment Committee's questions on science – for your review
Note any feedback on the quality of the report	

Ministry for the Environment contacts

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Climate Change Response (Zero Carbon) Amendment Bill – Draft responses to the Environment Committee’s questions on science

1. This briefing provides you with draft responses to 14 questions received from the Environment Committee on Thursday 20 June 2019 (see Appendix 1).
2. These questions relate to the science underpinning the Climate Change Response (Zero Carbon) Amendment Bill, in particular with respect to:
 - advice on nitrous oxide
 - the split gas approach
 - the pathways under the *Special Report on Global Warming of 1.5 °C* by the Intergovernmental Panel on Climate Change.
3. We seek your feedback on these draft responses **by 5pm today, 26 June 2019**.
4. Note that we will also seek comments today from the Parliamentary Commissioner (PCE) for the Environment on these draft questions.
5. We aim to provide our responses back to the Committee by Friday 12 July 2019, as agreed with the Environment Committee.

Recommendations

6. We recommend that you:
 - a. **read** the draft responses provided in Appendix 1 and **provide any comments** back to MfE officials by 5pm today, 26 June 2019
 - b. **note** that we are forwarding these questions to PCE today for comments.

Signature



Lewis Stevens
Acting Director
Climate Change Directorate

Date 26/6/19.

Hon James Shaw
Minister for Climate Change

Date

Appendix 1. Draft responses to the Environment Committee's questions on science – for your review

**Climate Change Response (Zero Carbon) Amendment Bill
Supplementary Information for the Environment Select Committee
Prepared by the Ministry for the Environment**

On 24 June 2019, the Environment Committee asked the following questions of officials:

	Question	Answer
1	The Explanatory Note for the Bill (page 4) states that the IPCC 1.5C report concluded that in the central range of global scenarios consistent with staying within 1.5C, with limited or no overshoot, required CO ₂ to reduce to zero and methane to reduce 24 – 47%, what did the IPCC report say for nitrous oxide?	<p>The IPCC assessment describes scenarios consistent with limiting global warming to 1.5 degrees Celsius with limited or no overshoot. As stated in the quote from the report in your Q9, they do not indicate requirements.</p> <p>In these scenarios, the central range of reductions in nitrous oxide emissions is -26% to +1% relative to 2010 levels by 2050</p>
2	Why has the IPCC report not been used to set the target for nitrous oxide?	Nitrous oxide is included alongside the other long-lived gases in the target for “all other gases”, reflecting that emissions of these gases need to be reduced to net zero overall in order to limit their effect on the climate. Combining these emissions into a single target also allows flexibility in how the target is met.
3	Why have we split short and long lived gases in setting a target?	Short and long-lived gases behave differently in the atmosphere and have different contributions to warming. Splitting the gases into two groups allows us to ensure our targets are consistent with the 1.5°C temperature target. The long-lived gases are exchangeable with regard to their effect on temperature. Combining them in a single target allows the emissions reductions to be made in the most cost-effective way.
4	In calculating the pathways for different gases, does the IPCC use a split gas approach for short and long-lived gases?	No, the scenarios assessed in the IPCC report treat individual greenhouse gas emitting activities separately. These are then aggregated to produce the reported pathways for each gas.

5	<p>Has the belief that short-lived gases do not need to reduce to zero been based on the IPCC 1.5C report, if so, what page number?</p>	<p>The understanding that emissions of short-lived gases do not need to reduce to zero pre-dates the IPCC 1.5 C report. But it is also clearly stated there in Cross-Chapter Box 2: “Measuring Progress to Net Zero Emissions Combining Long-Lived and Short-Lived Climate Forcers”, on page 66.</p> <p>An extract from this box says: “Natural processes that remove CO₂ permanently from the climate system are so slow that reducing the rate of CO₂-induced warming to zero requires net zero global anthropogenic CO₂ emissions, meaning almost all remaining anthropogenic CO₂ emissions must be compensated for by an equal rate of anthropogenic carbon dioxide removal (CDR). ... In contrast, sustained constant emissions of a SLCF such as methane, would (after a few decades) be consistent with constant methane concentrations and hence very little additional methane-induced warming.” (extract simplified by removing references)</p>
6	<p>Does the IPCC report state that nitrous oxide emissions need to reduce to zero to avoid 1.5C of warming, if so, what page number?</p>	<p>The report does not make that statement.</p>
7	<p>If the assumptions in the IPCC models were changed to assume nitrous oxide could be mitigated at a lower cost, would that impact the calculated pathway for methane? (i.e. are reduction inter changeable)</p>	<p>There are a number of pathways outlined in the report, all with different inputs and assumptions, and all producing different trajectories for each gas. The biogenic methane target in the Zero Carbon Amendment Bill is based on the ensemble of model pathways in the IPCC report limiting warming to 1.5 C with no or limited overshoot, that takes into account a range of assumptions.</p> <p>There is a trade-off between the emissions reductions of different</p>

		<p>greenhouse gases, with respect to achieving a warming goal. Different long-lived gases are directly exchangeable: for example, a reduction target could be achieved by reducing only CO₂ emissions, or only N₂O, or a combination of the two. All three options have essentially the same temperature benefit.</p> <p>But the trade-off between methane and nitrous oxide is not a straightforward exchange: the temperature contribution from long-lived gases depends on the total cumulative emissions, while the temperature contribution from short-lived gases depends primarily on current and recent annual emission rates. The complexity of this comparison (cumulative emissions vs recent rates) is a fundamental reason for adopting a split target.</p>
8	<p>Why have we on one hand made a decision to take a split gas approach, but on the [other] hand based the level of our targets (for some gases) on models that allow different reductions in different gases to be interchanged?</p>	<p>The question seems to be based on a misunderstanding about the interchangeability of gases in these models.</p> <p>As identified in the answers to Q3 and Q7 above, we have adopted a split gas approach in order to align our target with a global temperature goal. Global emissions of long lived gases need to be reduced to net zero in order to stay within a temperature goal. Emissions of short-lived gases can be maintained at a level above zero.</p> <p>The climate components of the models in the IPCC report represent our current understanding of the global temperature response to greenhouse gas emissions. We cannot pick and choose models/scenarios. There are many ways to reduce emissions. The IPCC report made this clear, and it is robust to base</p>

		mitigation pathways on the range of scenarios in that report.
9	In regards to all of the pathways presented in the IPCC report, why did the IPCC state, “These pathways illustrate relative global differences in mitigation strategies, but do not represent central estimates, national strategies, and do not indicate requirements”?	<p>That statement in the IPCC 1.5 C report refers to the four Illustrative Pathways in Figure SPM.3b. It is also generally true of any individual pathway.</p> <p>The emissions pathways, and IPCC products in general, are “policy-relevant but not policy-prescriptive”</p> <p>The IPCC states of its reports: <i>“They may present projections of future climate change based on different scenarios and the risks that climate change poses and discuss the implications of response options, but they do not tell policymakers what actions to take”</i></p>
10	What level of reduction in each of the three main gases would be required to have no further warming from 2050?	There is no single answer to that question, but the extract from the IPCC 1.5 C report provided in the answer to Q5 is a good explanation.
11	The IPCC report presents representative pathways for four different global scenarios, including one scenario described as a “Middle of the road scenario”. Some scenarios have ‘overshoot’ of a 1.5C and require negative emissions in the second half of the century. Why have we used only those scenarios that have “limited or no overshoot”?	<p>The “middle of the road” scenario refers to the underlying assumptions of this pathway, drawn from the so-called “Shared Socio-economic Pathways” (SSPs).</p> <p>See Table 2.3 of the IPCC 1.5 C report (page 110) for more information about the different pathways.</p> <p>The choice of referring to pathways with no or limited overshoot is not a question of science. The range for 1.5 C scenarios with “no or limited overshoot” is cited in the Figure SPM.3b of the IPCC 1.5 C report. This reflects the Government’s ambition for limiting global warming, as stated in Part 1 of the Bill.</p> <p>The central range of emissions reductions in 2050 for methane from agriculture in all 1.5 C scenarios including those with</p>

		high overshoot is 11 to 41 percent below 2010 levels.
12	Does the Paris Agreement address the issue of if temperature limits are to be achieved with limited or no overshoot?	No, there are no time constraints associated with the temperature goals in the Paris Agreement.
13	The IPCC 1.5 report states that available pathways that achieve a 1.5C limit with limited or no overshoot keep global CO ₂ e emissions to 25 – 30 Gt by 2030, this contrasts to median estimates for Paris targets (NDCs) of 52-58 Gt by 2030 (page 95) – in other words, in order to be on a pathway with limited or no overshoot global emissions would need to be near half those countries have pledged. We understand that countries will resubmit targets by 2020 following the Talanoa Dialogue, but is it reasonable to base New Zealand policy on a pathway that is so far off where countries have thus far indicated they are willing to go?	Signatories to the Paris Agreement committed to pursue efforts to stay within 1.5°C of pre-industrial levels. The target in the Zero Carbon Amendment Bill aims to set New Zealand on a path to reduce emissions consistent with this global goal.
14	Were pathways with overshoot considered and, if so, why were they rejected?	The range for 1.5 C scenarios with “no or limited overshoot” is cited in the Figure SPM.3b of the IPCC 1.5 C report. This reflects the Government’s ambition for limiting global warming, as stated in Part 1 of the Bill.

