

Applicant's hand up: The Applicant's evidence that our net emissions are going up between 2010 and 2030 is neither "wrong" nor "misleading"

Context

1. It is common ground that the 2018 Special Report requires net emissions to rapidly decrease between 2010 and 2030 (50% rule of thumb). The 2018 Special Report is referring to what the atmosphere sees, including taking into account removals from forestry (that is, GHGI net, also known as national inventory reporting).
2. Against this background, Dr William Taylor has undertaken various calculations that convert the Commission's "demonstration path" (which uses MAB accounting) into GHGI net.
3. The Commission does not appear to disagree with Dr Taylor's methodology or the calculations, but nonetheless refers to the comparisons he makes between net CO₂ in 2010 and 2030 (and net emissions overall) as "wrong and misleading".¹ The Commission says that the increases he calculates (310% for net CO₂ from 5Mt to 20.7Mt, and 20% for net emissions from 48.6 Mt to 58.2 Mt) are the result of an "accounting artifice".² It says that the difference is because GHGI net includes tree harvesting cycles that are "effectively removed under target accounting" as a result of Kyoto.³ On 25 February 2022 the Commission provided the Applicant with two further hand ups which contain related analysis.
4. The Applicant stands by all of Dr Taylor's figures as an accurate representation of our net emissions in terms of "what the atmosphere sees" (and what we are required to report under the UNFCCC) and says that these figures are directly comparable with the reductions required by the 2018 Special Report.

Decade-by-decade chart

5. Figure 5.3 (bottom panel) in the Advice purports to show net emissions decreasing under the budgets.⁴

¹ See from paragraph [74] of the Commission's written submissions dated 14 February 2022.

² At paragraph [80].

³ At paragraphs [81]-[90].

⁴ This graph is in the Commission's Bundle of Advice at page 97: Advice Bundle/97.

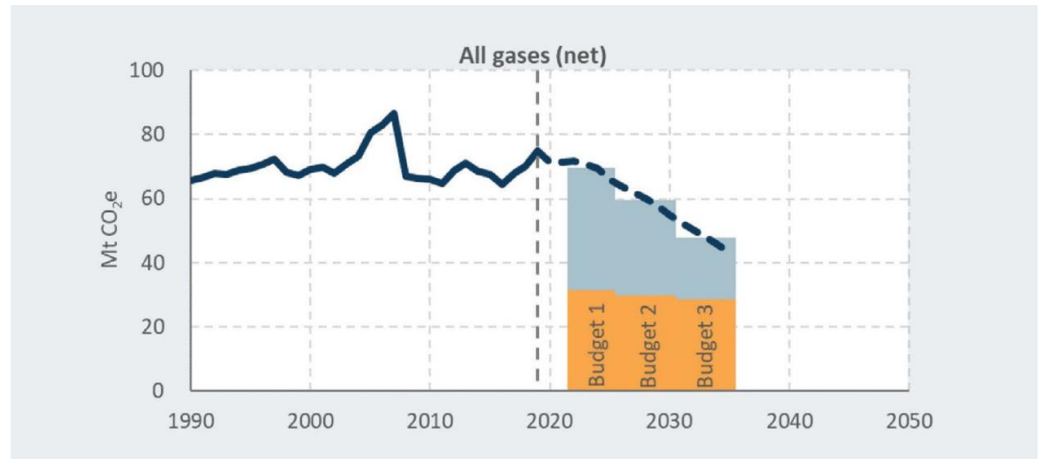


Figure 5.3: These three figures show how our proposed emissions budgets would step Aotearoa towards its emissions reduction targets. The top figure shows long-lived greenhouse gases, the middle figure shows biogenic methane, and the bottom figure shows all gases combined as CO₂-equivalent.

Source: Commission analysis.

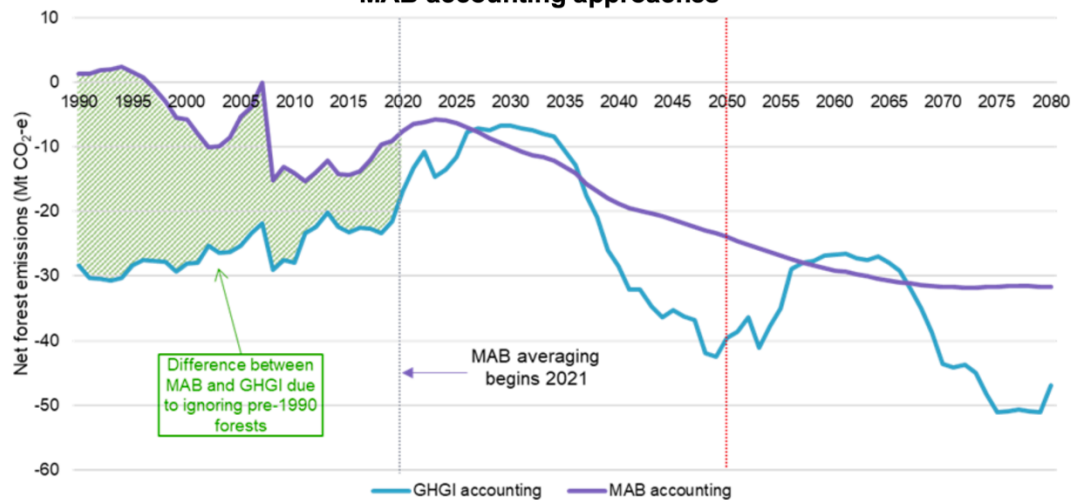
6. However, on this chart net emissions are expressed in terms of the MAB approach.
7. The differences between MAB and GHGI net are explained in Dr Taylor's first affidavit (**Taylor 1**) (see section 4).⁵ In particular:
 - a. GHGI net is an annual estimate of all anthropogenic emissions and removals as reported under the UNFCCC.
 - b. In contrast, MAB "factors out" plantation forests pre-1990,⁶ and introduces "averaging" for forestry removals from 2021 onwards (which has the effect of ignoring harvesting emissions, even for forests already above their long term average of removals).
8. Fig 4.2 of Taylor 1 compares net forest emissions under GHGI net and MAB (the numbers are negative which indicates removals):⁷

⁵ See First Affidavit of Dr William Taylor affirmed 7 December 2021 at page 21 – Taylor 1/21. [[201.0157]]

⁶ Dr Taylor uses the more colloquial term "ignores", but there is no substantive difference in meaning.

⁷ Taylor 1/23. [[201.0159]]

Figure 4.2: Comparison of national net forest emissions projections using GHGI and MAB accounting approaches



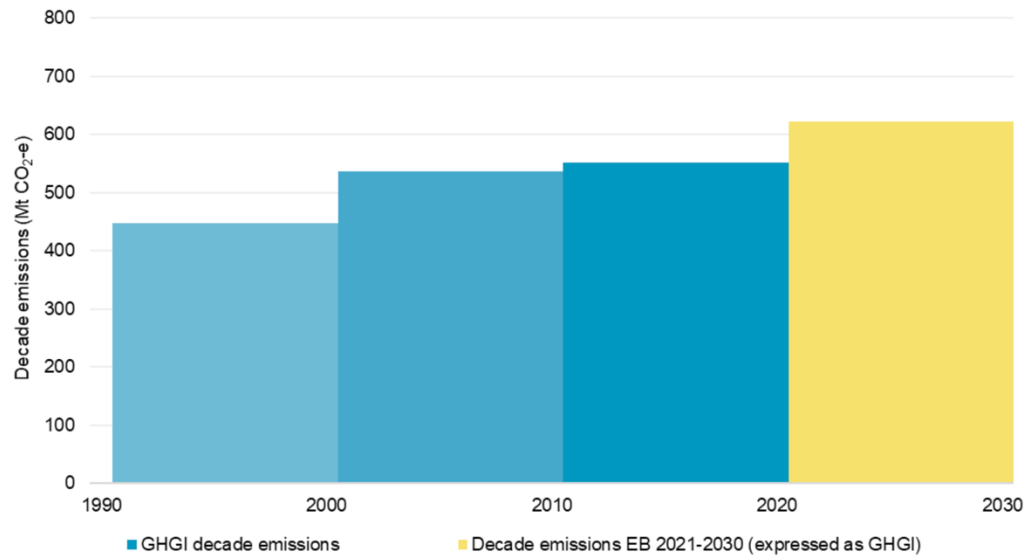
Source: NERA analysis of CCC Final Advice, Figure 10.1.

Note: The values presented in this figure appear in Figure 10.1 of the Final Advice. This figure also appeared as Figure 7.1 in the draft advice. In Figure 12.37 of Supporting Evidence Chapter 12, the CCC presents what appears to be an updated version of the MAB removals. As part of these proceedings, I understand that LCANZI requested an updated version of the time series represented by Figure 10.1 (that is, MAB removals and GHGI net removals) in order to allow conversions to be made between these two measures using the most up to date information possible and consistently with the CCC’s demonstration path. However, I understand the CCC’s response was that it was not straightforward to provide this data and that it was not readily available. I have therefore relied on the data in Figure 10.1 as presented in the final advice.

9. As Dr Taylor explains, using MAB to chart our net emissions makes our historic emissions look much worse than they actually were because removals from pre-1990 plantation forests are absent. The difference between GHGI net and MAB forestry removals in fig 4.2 can, however, be used to make conversions between the two measures as explained by Dr Taylor in the note below the table.
10. As shown by his fig 4.4, when expressed in GHGI net terms, the decade-by-decade chart shows emissions increasing.⁸

⁸ Taylor 1/24. [[201.0160]]

Figure 4.4: Annual historic GHGI net emissions by decade 1991–2020 and CCC Emissions Budgets 2021–2030



Source: NDC calculator; CCC Final Advice, p 363 and Table 22.1.

Note: See Appendix B.1 for calculations of decade totals. Values for 2020 emissions have not yet been published. I have estimated 2020 GHGI net emissions by taking emissions from the MAB accounting figures presented in Figure 5.3 of the Final Advice and backing out the difference in removals between MAB and GHGI presented in Figure 10.1 of the Final Advice (see Appendix B.4).

11. That is, in GHGI net terms, our net emissions have been increasing decade-on-decade and will continue to increase until 2030 under the proposed budgets. This is an accurate representation of what the atmosphere will see and what we will report under the UNFCCC GHG Inventory if the budgets are implemented as proposed. This result has nothing to do with “tree harvesting cycles” (which are present in both the MAB and GHGI net data as can be seen in table 4.2 above). Rather, Dr Taylor simply adds in the pre-1990 forestry removals factored-out by MAB so that we can see how our true net emissions are tracking over time. This causes the emissions in 1990-2020 to drop to their true levels. The 2021-30 emissions do not change materially because there is only a small difference between MAB and GHGI net removals over this decade (26 Mt) as explained in Taylor 1 at [116].⁹
12. The chart stops at 2030 because the focus of the Applicant’s case is on what the 2018 Special Report says is required by 2030 to contribute to limiting global warming to 1.5 degrees: see the reply affidavit or Dr Taylor 3 (Taylor 3) at paragraphs [40]-[41].¹⁰
13. This aspect of Dr Taylor’s evidence is discussed in detail in Paul Young’s evidence for the Commission (at [71]).¹¹ Mr Young defends the Commission’s approach of using MAB figures rather than GHGI net as a

⁹ Taylor 1/25. [[201.0161]]

¹⁰ Taylor 3/9. [[201.0982]]

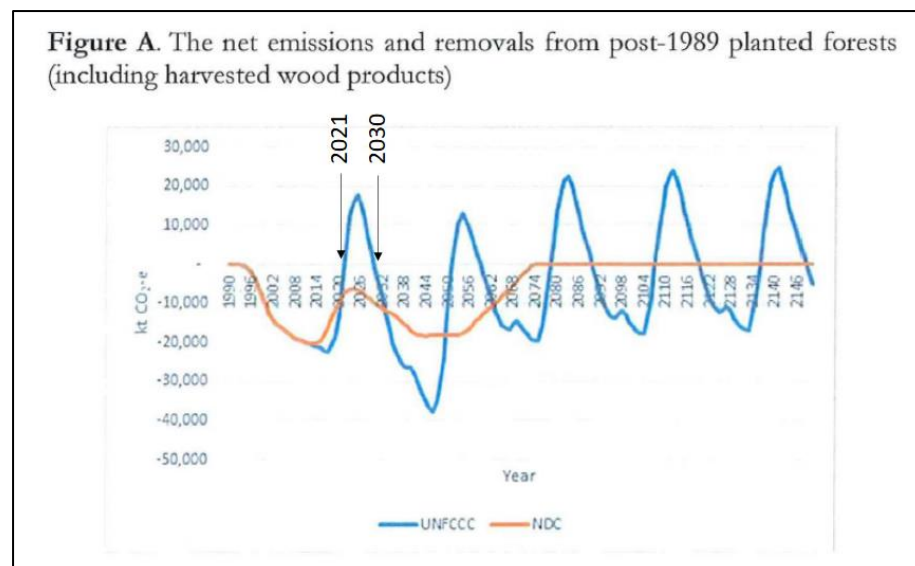
¹¹ Young/20. [[201.0361]]

better indicator of long-term trends but does not suggest that Dr Taylor’s GHGI net figures are incorrect, or that presentation of GHGI net figures is misleading.

Averaging

14. “Averaging” smooths out the harvest cycle, but it is a New Zealand innovation which applies from 2021. That is, the removal of “tree harvesting cycles” has nothing to do with Kyoto.
15. The primary issue with averaging is that it is being introduced at a time when carbon stored in forestry is above its long term average.
16. As explained by Dr Bertram in his reply affidavit at paragraphs [51]-[52]:¹²

The main innovation of MAB accounting is to change the timing of when forestry removals are recorded. Figure A in paragraph 59.1 of the affidavit of Dr Brandon, reproduced below, shows how removals from post-1989 forests under MAB differ from those recorded in the KP-4 CRF tables for years from 2013 on. Close inspection of the graph for the years 2021-2030, corresponding to the NDC’s first two periods, dramatically illustrates the way that abandoning GHGI inventory figures and adopting MAB will slash the target-accounting figure for forestry net emissions over the decade, making it much easier to meet the NDC commitment by claiming falling net emissions, when in fact GHGI net emissions will be rising.



¹² Bertram Reply/13. [[201.0944]]

Commission's NDC advice allows a 254% increase in net CO2 between 2010 and 2030

17. The Commission at [74.2] also takes issue with the Applicant's submissions that: (a) the NDC Advice purports to show that a doubling of net CO2 emissions between 2010-2030 is consistent with limiting global warming to 1.5 degrees and; (b) it is logically impossible for the Commission to claim to be following the IPCC pathways and have overall net emissions increasing in this period.
18. The calculation relates to the Commission's NDC advice and is straight forward arithmetic.
19. Dr Taylor's evidence is that to determine a 2030 level of net CO2 consistent with SR2018, the 40-58% reduction range must be applied to our 2010 net CO2 of 5 Mt with a result of 2.6Mt (average of the range).
20. What he then points out is that if the 40-58% reduction range is instead applied to 2010 gross CO2 (35Mt), as the Commission does, then that would allow net CO2 to increase from 5 Mt to 17.9Mt (average of the range) which is a 254% increase while still purporting to be consistent with the IPCC 40-58% reduction range. In aggregate, it would allow net emissions to increase from 2010 to 2030 by 8% (from 48.6 Mt to 52.6 Mt). See Taylor 1 at [78]-[86].¹³

Converting the demonstration path in 2030 to GHGI net is robust and allows for a comparison to be made with the 2018 Special Report

21. In 2010, our net CO2 emissions were 5Mt and our net emissions overall were 48.6 Mt (GHGI net, as reported under the UNFCCC in our GHG Inventory [**see NZ GHGI summary emissions data, App's Key docs Tab 16 p 1711**]). Note: this differs from the figure of 22,554 kt CO2-e described as "Net CO2 emissions (Gross CO2 + Forestry)" in the table at paragraph 5 of the Commission's Hand-up 2 because removals from forests planted before 1990 have been excluded from the Commission's figure.
22. The Commission's recommended budgets are based on a demonstration path which includes projections for 2030 CO2 and net emissions measured by MAB. As explained in Taylor 3, [61]-[71] and Appendix B, these can be converted into GHGI net figures of: 2030 net CO2 of 20.7 Mt (310% increase from 2010) and 2030 net emissions of 58.2 Mt (20% increase from 2010).¹⁴ This is based on the figures available when the Advice was produced, but he also presents figures

¹³ Taylor 1/15. [[201.0151]]

¹⁴ Taylor 3/15. [[201.0988]]

based on updated data which show somewhat lower increases (145% and 9% respectively).

23. Importantly, these calculations allow a direct comparison between the Commission's budgets and the 2018 Special Report pathways. Compared with an IPCC pathway for net CO₂ of a reduction of 40-58%, our net CO₂ is projected to increase by 310%/145%.
24. The Commission's calculation for net CO₂ purporting to show a 55% reduction in table 9.1 reflects the error alleged in ground one of using 2010 gross CO₂ as the starting point for a net:net calculation (Taylor 3, [62]).¹⁵
25. The need for the conversion is also explained by Dr Bertram (Bertram Reply at [5]).¹⁶

The Commission's approach involves making a direct comparison between, as Mr Smith aptly puts it at his paragraph 99, "an orange" and "an apple". Mr Young in his paragraph 88.2 captures precisely the issue of gross-net versus net-net: "Differences in how something is calculated and recorded of course gives [sic] a different number, and trying to compare one directly against the other is meaningless. Numbers within each series can be compared, but not between the series, unless you first convert the data to a comparable accounting basis" [emphasis added]. I agree with this statement, which concisely summarises the nature of the error into which the Commission has fallen in directly comparing gross-net NDC numbers with the net-net Special Report ones. This is a fundamental error. The Commission has also committed the same error in table 9.1 in chapter 9 of the Advice in comparing its proposed emissions budgets with the Special Report pathways: the percentage carbon dioxide reductions under the Commission's demonstration path in this table are based on a 2010 gross starting point, not a 2010 net starting point.

GHGI net as a measure of emissions

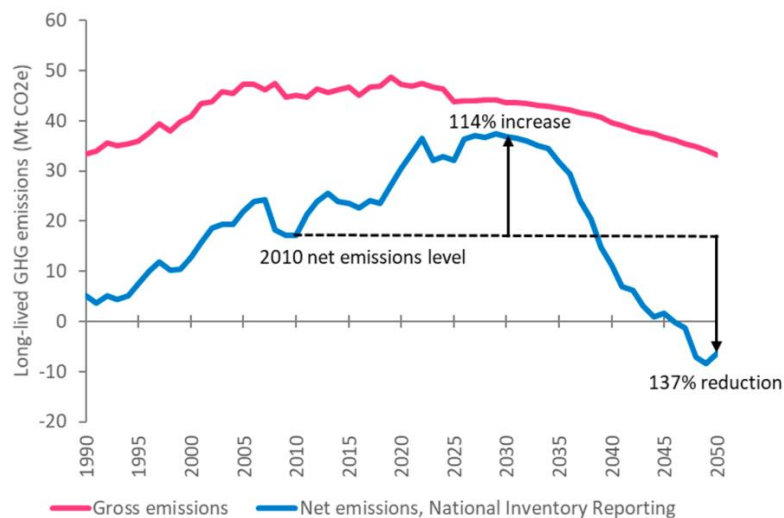
26. The Applicant's position is that the Act requires budgets to be set in terms of GHGI net (ground 3). That means, absent increased ambition, the first budgets would match the decade-by-decade graph set out above (that is, increasing net emissions).
27. Such an outcome would likely be seen globally and domestically as being unacceptable in the context of a climate emergency and in light of the findings in the 2018 Special Report. It is worth repeating that this is not an accounting artifice, this is the best measure of the net emissions that the atmosphere will see from New Zealand and will be

¹⁵ Taylor 3/14. [[201.0987]]

¹⁶ Bertram Reply/1. [[201.0932]]

reported annually under the UNFCCC accounting framework. It is also worth repeating that this pattern, which spans 40 years, is not simply a quirk of “tree harvesting cycles”. The effect of conversion to GHGI net removes the MAB distortion of excluding removals from pre-1990 plantation forests which make our 1990-2020-emissions appear worse than they actually were (and thus give the misleading impression of progress in 2021-30).

28. It is correct to say that forestry is overall forecast to generate fewer removals during 2021-30 due to increased harvesting (which is a source of emissions). However, it is wrong to compare this to a tidal cycle obscuring whether sea level rise is occurring [92]. The position we find ourselves in this decade is not external to our climate action policies. Rather, it is the direct result of past policies which have focussed on planting trees and buying offshore mitigation rather than tackling our emissions. The only way to bring our future emissions in line with the 2018 Special Report for this critical decade to 2030 is to urgently reduce our net emissions (either by reducing our gross emissions or increasing removals by planting more trees or by delaying harvesting of existing forests).
29. At [101] the Commission makes the claim that using GHGI net, “the tree cycle” would see New Zealand “meet and exceed the 2050 zero carbon [target] by changing nothing at all between now and 2050.” This is said to be illustrated by the blue line in the following diagram:



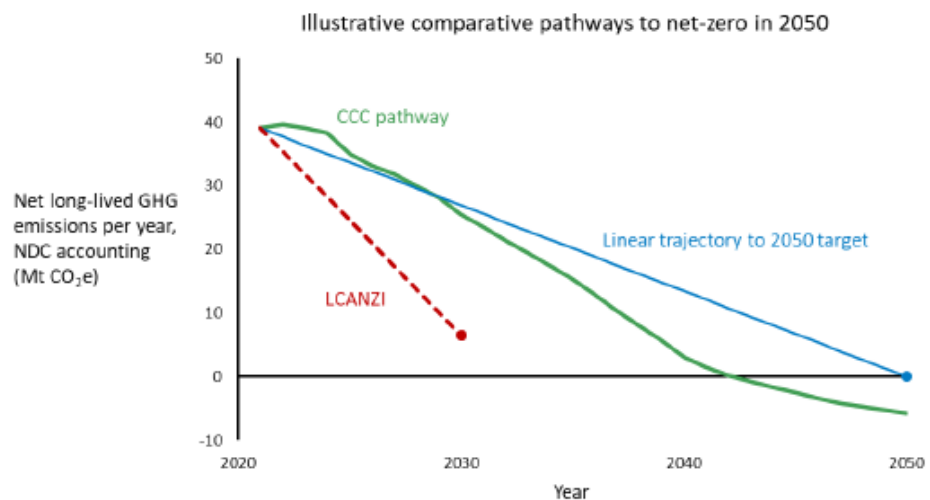
30. However, the reason the blue line falls is due to the “Current Policy Reference case” assuming 1.1m Ha of new forestry to be planted before

2050 (see Advice, page 89 [10]).¹⁷ MAB measured emissions follow a similar projected trajectory as a result of the new forestry as seen in fig 4.2 of Taylor 1 (reproduced above).¹⁸ In other words, the blue line falls due to tree planting not tree cycles.

31. Finally, at footnote 122 the Commission says that the Applicant's witnesses suggest that the Government of the day "should" switch to GHGI net when it shows greater removals. This is a misleading summary of the evidence which is that MAB is unlikely to be a durable/politically feasible metric for tracking New Zealand's emissions because it is projected to understate true forestry removals between 2037 and 2055. The risk is a "flip-flop" to whichever measure makes our targets easiest to meet (MAB till 2037 then GHGI net). See Taylor 1, [23]-[25];¹⁹ and Bertram reply [51]-[52].²⁰

Where does the 2018 Special Report imply we should be in 2030?

32. Commission "hand up 1" contains a chart and calculations suggesting that Dr Taylor's approach requires net emissions to be no more than 6.5 Mt by 2030.



33. In fact, Dr Taylor's evidence is that correctly applying the 2018 Special Report global pathways to New Zealand implies a 2030 target of 37.3 Mt (to be compliant with global average pathways to limit warming to 1.5 degrees). This compares with 2010 net emissions of 48.6 Mt (and

¹⁷ Advice Bundle/105. By way of comparison, plantation forests currently occupy approximately 2.1m Ha: <https://www.mpi.govt.nz/forestry/new-zealand-forests-forest-industry/new-zealands-forests/>

¹⁸ Taylor 1/23. [[201.0159]]

¹⁹ Taylor 1/3. [[201.0139]]

²⁰ Bertram Reply/13. [[201.0944]]

2020 net emissions of 54.9 Mt).²¹ See Taylor 1, [78]-[86].²² This is obviously a much less steep trajectory in reality than implied by the Commission's chart.

34. The differences are that the Commission's analysis and chart excludes methane (without explanation), and the Commission's figures are in MAB which makes the 2020 starting point look higher than it actually is and the 2030 end point look lower than it actually will be.

The claim that New Zealand's net emissions will have halved by the early 2030s

35. At [76], the Commission says that "by the early 2030s net CO2 emissions will have reached the IPCC 'rule of thumb' of a 50% reduction from 2005/2010 emissions". A footnote explains that: "On a gross-net basis net CO2 reduces to 55% below 2010 levels by 2030, and on a net-net basis reaches to 50% by 2033."
36. The Applicant responds that neither statistic in the footnote is comparable to the reduction ranges in the 2018 Special Report:
- a. The 2018 Special Report refers to a net:net reduction, so a comparison with 2010 gross CO2 is not valid as explained at [21]-[25] above.
 - b. The "net:net" comparison referred to by the Commission uses MAB whereas the 2018 Special Report refers to net CO2 in terms of what the atmosphere sees. As explained in Taylor 1 [20]-[25],²³ the use of MAB will (compared with what the atmosphere sees) make our 2010 starting point worse (higher CO2 emissions) and our 2030 end point look better (lower CO2 emissions) due to factoring out pre-1990 forestry and disregarding harvesting emissions from 2021. This "tilt" from using MAB means that the comparison with the 2018 Special Report figures is not valid.
37. Commission "hand up 2" purports to show that net CO2 and net emissions will decrease by 71% and 53% respectively between 2010 and 2035 under the proposed budgets. However, these figures are also the result of the "tilt" described above which makes 2010 look worse than it was and 2035 look better than it will be. Using MAB means these figures do not reflect our actual annual estimate of emissions and removals (GHGI net) and nor are they comparable with the global pathways in the

²¹ The 2020 net emissions figure of 54.9Mt is from the Greenhouse Gas Inventory (App Key Docs, tab 16).

²² Taylor 1/3. [[201.0151]]

²³ Taylor 1/3. [[201.0139]]

2018 Special Report which includes plantation forestry in the base and target years. The Applicant stands by the increases set out at [21]-[23] above as the best estimate available of the impact of the recommended budgets. That is, net CO₂ and net emissions are projected to increase by 310% and 20% respectively between 2010 and 2030 under the proposed budgets (or by 145% and 9% respectively using updated data).