Ministry for the Environment
Manatū Mō Te Taiao

BRIEFING NOTE

Supporting paper - methodologies for defining and accounting for New Zealand's NDC1

Date Submitted:	15 June 2021	Tracking #: BRF-211	
Security Level	In-Confidence	MfE Priority:	Not Urgent

	Action sought:	Response by:
Hon James SHAW, Minister of Climate Change	Feedback and direction	21 June 2021

Actions for Minister's Office Staff	**Return** the signed report to MfE. **Forward** this paper to Hon. Nash, Minister of Forestry.
Number of appendices and attachments # Nil	Nil

Key contacts

Position	Name	Cell phone	1st contact
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Director	Lisa Daniell	s 9(2)(a)	

Supporting paper - methodologies for defining and accounting for New Zealand's NDC1

Key Messages

1. The purpose of this paper is to set out the decisions required on how New Zealand expresses and accounts for its NDC1 target. This paper builds on the deep-dive discussion on accounting that we held with you on 5 May, which primarily focused on accounting and reporting for forestry activities toward climate targets. It also covers other aspects of NDC accounting.
2. Choices on accounting treatment are separate from the choice on NDC1 ambition. The headline target number will change in different accounting approaches (which could make ambition *appear* to be different), but the actual level of effort is not changed by the accounting approach.
3. The Climate Change Commission has proposed objectives for accounting and made recommendations on the accounting approach for domestic budgets. They have assumed this approach will also be used for NDC1.
4. The main accounting decisions to be made, alongside our recommendation for each decision, are:

   Decisions that must be made for communication of an updated NDC1

   - Decision 1: To use updated global warming potentials from the IPCC's fifth assessment report. This would be best practice and align with international reporting and the approach used in domestic budgets.
   - Decision 2: The methodology for relating the 2021-2030 budget of allowed emissions to a headline reduction percentage. The Commission has proposed an approach that is a minor modification to that used for New Zealand's 2013-2020 target (referred to as "Option 1" in this analysis). An alternative formulation starting from current emission ("Option 2" in this analysis) is also explored. We are seeking your views on which of these to present as part of NDC advice and when to best present them to your colleagues.
   - Decision 3: Whether to "fix" the NDC1 budget as an absolute quantity, or allow it to be updated to reflect methodological changes over time that do not affect ambition. We recommend taking a flexible approach that allows for updating, as other Parties with budget-type NDCs have specified.

   Decisions that could be made, changing the approach previously communicated

   - Decision 4: Whether to change the 2005 reference year for New Zealand's NDC1 target. We do not consider there is a reason to change this and do not recommend doing so.
   - Decision 5: Whether and when to consider an alternative approach to land accounting. An NDC option in a net-net basis ("Option 3") is presented in this analysis, however officials do not consider that this could be robustly implemented for NDC1 and the first domestic budget period. We support the staged approach recommended by the Climate Change Commission, of data

collection and policy development to inform potential revision of methodology for the second and third domestic budgets and advice on NDC2.

5. We recommend you forward this paper to Hon. Nash, Minister of Forestry, as forestry accounting decisions will impact both Ministry for the Environment and Ministry for Primary Industries.
6. We also seek your feedback on your preferred approach for presenting these decisions to your colleagues. This could include discussing these issues at the Climate Response Ministerial Group meeting on 23 June 2021 or subsequent meetings ahead of Cabinet decisions in August.

Recommendations

We recommend that you:

a. **Agree** that New Zealand's NDC1 use global warming potentials from the IPCC's fifth assessment report

Yes / No

b. **Agree** that a flexible budget approach be used for NDC1, to allow the budget quantity to be updated for methodological changes (not affecting ambition)

Yes / No

c. **Agree** that 2005 be retained as the reference year for the NDC1 target

Yes / No

d. **Either** agree that NDC advice be presented to your colleagues in the Climate Change Commission's recommended accounting approach (Option 1 in this analysis)

Yes / No

Or present NDC advice using the Climate Change Commission's recommended accounting approach (Option 1 in this analysis) and an alternative budget approach starting from current emissions levels (Option 2 of this analysis)

Yes / No

Or in addition to the two options above, present NDC advice expressed in a net-net accounting approach (Option 3 of this analysis), with an explanation of this option and its feasibility constraints

Yes / No

e. **Discuss** with officials your preferred timing and approach to presenting these issues to CRMG Ministers ahead of Cabinet decisions in August

Yes / No

f. **Note** that changes to accounting approaches, including further work recommended by the Climate Change Commission, has resourcing implications for both MFE and MPI

g. **Refer** this briefing to Hon. Nash, the Minister of Forestry for information

Yes / No

h. **Agree** that this briefing and appendices will be released proactively on the Ministry for the Environment's website after decisions on NDC1 have been made

Yes/No

Signature

Craig Salmon, Chief Advisor Climate Change	15/06/21

Hon James SHAW, Minister of Climate Change	

Supporting paper - methodologies for defining and accounting for New Zealand's NDC

Purpose

2. The purpose of this paper is to:

   a. Set out key decisions and recommendations for how New Zealand should express and account for its target as part of updating its first Nationally Determined Contribution (NDC1) under the Paris Agreement.

   b. Respond to your questions and concerns relating to forestry accounting methodologies, particularly in relation to gross-net and net-net accounting approaches.

Context

The Commission has recommended strengthening NDC1

3. In 2020, you requested advice from the Climate Commission on:

   a. whether the NDC1 is compatible with contributing to global efforts to limit global average temperature rise to 1.5˚C above pre-industrial levels

   b. recommendations on any changes to the NDC required to ensure it is compatible with global efforts to limit global average temperature rise to 1.5˚C.

4. In its final advice, the Commission recommends the NDC target be strengthened to "much more than 36% below 2005 gross levels by 2030". The Commission's advice assumes that the current gross-net accounting approach for NDC1 is retained, and does not recommend changing this. It further recommends that the accounting approach for domestic budgets is aligned with this, as the best current means to ensure accuracy and integrity in accounting and reporting. In coming to this view, the Commission considered how accounting options fulfil a set of objectives (discussed in the advice section below).

This advice builds on our previous discussions and seeks direction on accounting for NDC1

5. You have raised questions about the suitability of New Zealand's current gross-net accounting approach, from the perspective of wanting to capture the impact of all of New Zealand's emissions and removals. Building on the 5th May deep-dive session that focused on forestry accounting (but did not seek decisions at that time) this paper provides further analysis on whether and when to consider an alternative approach to land accounting, including reflecting the final advice of the Climate Change Commission.

6. In addition we have identified other key decisions on accounting that are necessary as a part of updating NDC1:

   a. Updating for global warming potentials from the IPCCC's fifth assessment report

   b. The methodology for relating a headline reduction target to a given level of mitigation ambition

c. Whether to "fix" the NDC budget, or allow it to update for methodological changes over time

7. Decisions could also be taken on whether to change the reference year for the target.

What is "accounting"?

8. "Accounting" refers to the set of methodological approaches taken to defining, monitoring progress toward, and assessing achievement of emission reduction targets.
9. Choices on accounting treatment are separate from the choice on NDC ambition. This analysis assumes a fixed nationally-determined level of mitigation ambition/effort (i.e. the Climate Change Commission's final advice "Demonstration" scenario plus a fixed volume of offshore mitigation), and explores the implications of different accounting options for how this is expressed and accounted for.
10. Choices about accounting cannot be made independently from the NDC headline target (the percentage reduction number): together these deliver on the nationally-determined level of ambition. The headline number will change in different accounting approaches (which could make ambition appear to be different), but the actual level of effort is not changed.
11. The Paris Agreement provides flexibility for Parties to nationally determine their NDCs and to specify the metrics to track them. However there are certain requirements: accounting must use IPCC methodologies for estimating emissions and removals, strive to include all categories of emissions and removals in the NDC, and if any are excluded, explain why.
12. For NDC targets expressed in terms of levels of greenhouse gas emissions, the accounting process would typically combine information on gross emissions (from the national GHG inventory), land sector emissions and removals (from a nationally-specified approach included in the national GHG inventory), and the transfer and use of offshore mitigation toward the NDC under the Paris Agreement's Article 6.

New Zealand's current approaches to tracking emissions and targets

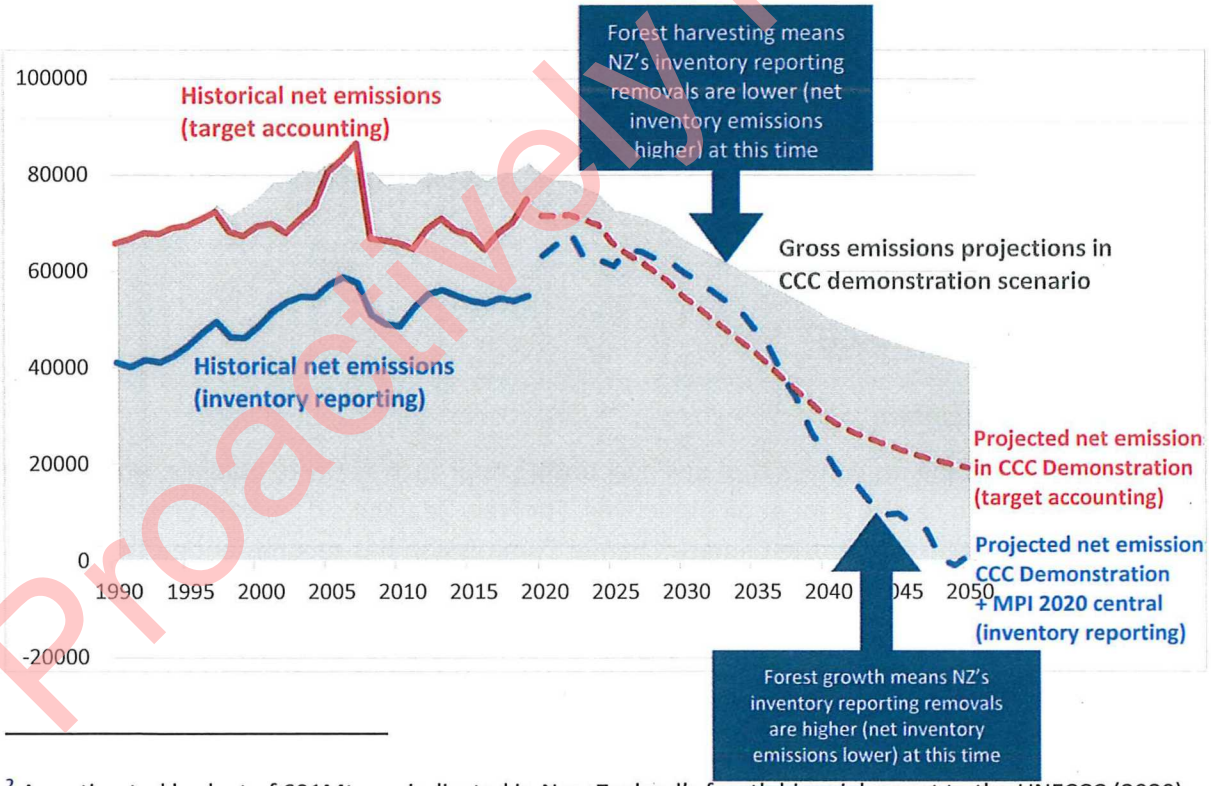
13. New Zealand produces emissions and removals data sets for different purposes using different methodologies:
    a. **New Zealand's National Inventory Report** provides an annual estimate of all anthropogenic (human-induced) GHG emissions and removals for each year since 1990.[1] This is an obligation under the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and the Paris Agreement. This information is published in the annual New Zealand Greenhouse Gas Inventory.
    b. **New Zealand's Target Accounting** information, to track and assess international targets set under the UNFCCC. The approach that has been communicated for New Zealand's NDC1 builds on the accounting rules of the Kyoto Protocol, which were used for New Zealand's 2008-2012 Kyoto Protocol target and its 2013-2020 target. Target accounting uses gross emissions estimates from the national inventory

[1] For forestry and other land uses, this is estimated by counting all emissions and removals from managed lands.

report but accounts for land emissions differently. The removals used for target accounting, a subset of total removals, are also published in the annual New Zealand Greenhouse Gas Inventory.

14. Projections of future emissions and removals in both of these bases are produced for UNFCCC reporting and to inform domestic policy. Separately, statistical data for New Zealand's production- and consumption-based emissions are also prepared. These use different classifications than are used for UNFCCC reporting and accounting.
15. New Zealand's current NDC1 target is for net emissions in 2030 (counting the subset of removals used in the target accounting approach) to be 30% below 2005 gross emissions. We have communicated that the NDC will be managed as a multi-year emissions budget and have referenced an indicative budget quantity[2], but not yet formally specified the methodology for setting this budget.
16. New Zealand has also communicated that it will apply an averaging approach to the emissions and removals from post-1989 production forests that are harvested and replanted, as well as using a reference-level approach for pre-1990 forest management. All deforestation is included in the accounting.
17. Because the different coverage and methodological approaches used, the "net" emissions calculated in the national inventory report and in the target accounting framework are therefore different (Figure 1).

Figure 1: Target accounting and inventory reporting net emissions (historical and projections[3])



[2] An estimated budget of 601Mt was indicated in New Zealand's fourth biennial report to the UNFCCC (2020).

[3] The inventory reporting projection (dashed blue line) uses MPI's 2020 central scenario for land use removals, as projections for the Commission's demonstration scenario are not available in inventory reporting basis. MPI will shortly provide updated forestry projections in target accounting and inventory reporting basis. Methodological revisions made in the 2021 inventory report are not captured in the 2020 projections: the update will likely revise downward the projected net inventory-reporting emissions for the year 2020 and some years after.

18. New Zealand's intended NDC (I-NDC) was set in 2015, ahead of the Paris Agreement and its implementing decisions being finalised. It became New Zealand's first NDC (NDC1) upon ratification of the Paris Agreement in 2016, with only a few minor changes. At the time decisions were taken on the I-NDC, options for other target types were considered, such as conditional targets (e.g. the target ambition being conditional on availability of international markets) and split-gas targets. This context has now changed: absolute economy-wide targets are expected for developed countries, as is use of CO2-eq using IPCC AR5 global warming potentials for reporting of emissions.

Accounting for the warming impact of biogenic methane

New Zealand's domestic framework under the Climate Change Response Act recognises the different warming effect of biogenic methane through a split-gas target. In the set of emissions scenarios used in the IPCC special report on 1.5°C, biogenic methane emissions do not need to go to zero by 2050 but are reduced significantly.

However in the international context of the Paris Agreement, there is a clear expectation that New Zealand's NDC target will be expressed as an economy-wide all-gases target (expressed in CO_2-eq terms using AR5 global warming potentials).

This does not mean that the different role of biogenic methane is ignored: New Zealand can set the ambition of its NDC by considering reductions gas by gas, before aggregating these to an overall target. This approach of a gas-by-gas analysis was taken by the Climate Change Commission in deriving its recommendation that New Zealand should make much more than a 36% reduction on 2005 levels (in a gross-net basis).

Analysis and Advice

Objectives for accounting

19. There are multiple objectives that any accounting approach seeks to balance, and no single approach can best meet all objectives. For New Zealand's domestic emissions budgets and 2050 target, the Climate Change Commission has recommended that New Zealand aim for ***a robust, transparent accounting system which tracks genuine environmental gains while balancing completeness with practicality***, that should:
    - *seek to cover all material human caused emissions sources and sinks;*
    - *be grounded in robust science and evidence;*
    - *send a clear signal for climate action;*
    - *be accurate and reduce uncertainty as far as practicable;*
    - *be transparent, practical and acceptable; and*
    - *be consistent and maintain the integrity of the target.*

20. For New Zealand's NDC1 under the Paris Agreement, there are also international dimensions to consider including how the accounting approach:
    - affects how NDC1 complements New Zealand's domestic long-term strategy to transition to a low-emissions society
    - allows comparability with the efforts of other countries, and communicates New Zealand's progression of ambition
21. From a practical perspective, it is essential that the accounting approach is able to be implemented robustly for NDC1.

Choices for New Zealand's updated NDC1

22. There are still some unresolved details in the current accounting framework that need to be decided for NDC1. These are:
    a. Updating NDC1 to use the global warming potentials from the IPCC's fifth assessment report (Decision 1)
    b. the methodology for relating a headline reduction number to a budget for allowed emissions over the period (Decision 2)
    c. whether to "fix" the NDC budget quantity at the start of implementation, or allow it to be updated for methodological improvements (Decision 3)
23. Decisions could also potentially be taken to change other aspects of accounting previously communicated for NDC1:
    c. the base year for the target (Decision 4)
    d. whether and when to consider an alternative approach to land accounting. This relates to whether the headline target is set by a gross-net or net-net methodology, or a hybrid approach (and associated with this, the forestry accounting approach that would be used to assess achievement of the target) (Decision 5)

Decision 1: Global warming potentials from the IPCC's fifth assessment report

24. We seek your agreement to update NDC1 to use the global warming potentials from the IPCC's fifth assessment report[4]. This change would reflect best practice, align with international reporting requirements, and is the methodology recommended by the Climate Change Commission for the NDC and domestic budgets.
25. Any change in accounting approach could raise questions about the ambition of New Zealand's NDC. We will need to demonstrate transparently that the enhanced NDC1 is more ambitious (i.e. requires additional effort: more domestic action and offshore mitigation), and does not just look more ambitious via a changed accounting approach.

Decision 2: Methodology for relating 2021-30 budget to a headline reduction number

26. Managing our NDC target as a multi-year budget allows New Zealand to manage significant inter annual variability (e.g. dry hydro years), and simplifies how offshore mitigation is counted towards the NDC target. Managing the target as a budget has high environmental integrity as it is clear how emissions in every year are accounted for.

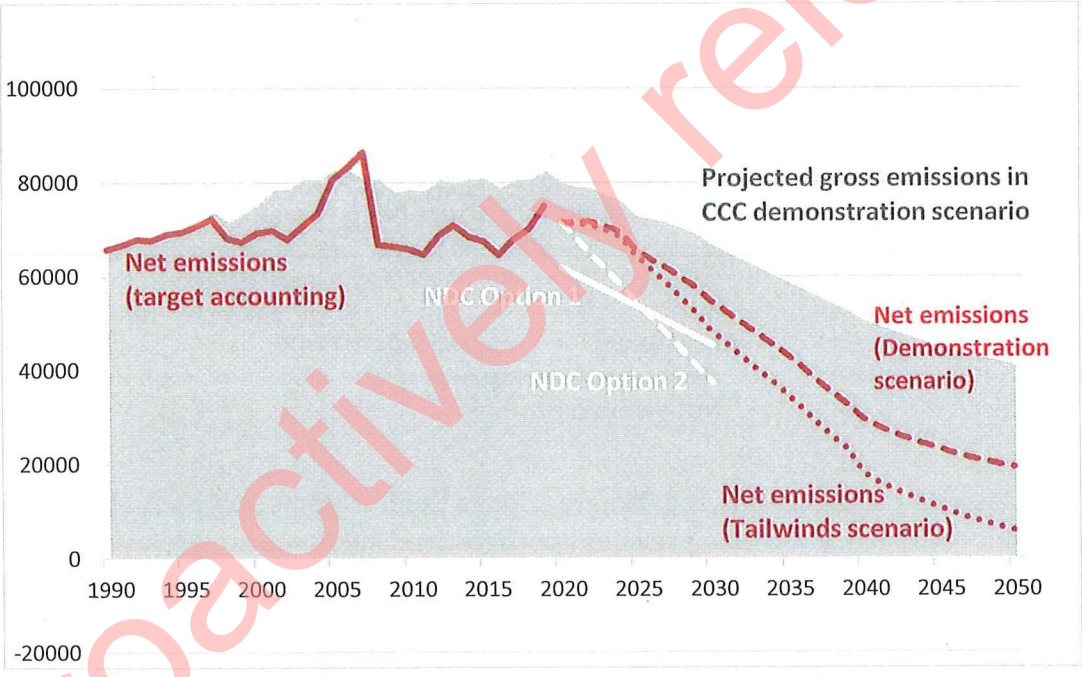
[4] New Zealand's current NDC1 uses GWPs from the IPCC's fourth assessment report. Inventory reporting under the Paris Agreement must use GWPs from the IPCC's fifth assessment report.

27. Only two other Parties (Australia and Switzerland) have explicitly committed to manage their first NDC as a multi-year budget. Norway had previously, but in its updated NDC has aligned with the EU single-year target. However the EU has economy-wide budgets in its domestic legislation, so their emissions pathway toward the single-year 2030 NDC target will in practice be constrained by a multi-year domestic budget. We also expect that some Parties will manage progress toward single-year targets along a "trajectory" to the end goal, effectively managing their targets as a budget.
28. New Zealand has not formally specified its methodology for relating the headline target reduction number to a budget quantity. An estimated budget quantity of approximately 601Mt for the current NDC was communicated in New Zealand's fourth biennial report to the UNFCCC. This estimate has also been included in domestic policy discussions, for example the consultation on New Zealand Emissions Trading Scheme settings.
29. This 601Mt estimate was made using a methodology developed for the Kyoto Protocol, whereby the budget is defined using line from mid-point of previous target period to the target year. New Zealand used this methodology for defining its 2013-2020 target. However this methodology is no longer used by any other Parties internationally, and we consider it to be unnecessarily complex. We recommend considering two approaches:
    a. **Option 1: Use a line from the previous target**. This is the approach recommended by the Climate Change Commission, which defines the budget using a line from the previous target (in this case, New Zealand's 2020 target of 5% below 1990 levels) to the 2030 target.
        i. This is only a minor modification to the approach used in New Zealand's previous targets, is simpler to understand, and would be easy to explain internationally. Both other Parties with NDCs managed as budgets (Australia and Switzerland) have specified this approach.
        ii. New Zealand's net (target accounting) emissions were higher than the previous target in 2020, so the "gap" to the NDC pathway is high at the beginning of the NDC period, but could be reduced by 2030 depending on how much domestic action is taken. This would allow future NDCs to have a lower commitment to use of offshore mitigation.
    b. **Option 2: Starting the budget from actual emissions** at the start of the period (2019 emissions are used here as the last available data, although the methodology could specify 2020 emissions as the base year).
        i. This would provide easier comparability of headline targets with Parties who have single-year targets (and who implicitly are managing these on a track from current emissions levels to the target).
        ii. This approach gives a significantly deeper "headline number" for the same level of ambition/effort. Note that this would require careful explanation internationally to show that real ambition is enhanced (i.e. that there is a decreased budget of allowed emissions).
        iii. As the NDC budget pathway starts from current emissions, then the same quantity of offshore mitigation results in the NDC target being well below domestic net emissions in 2030. This implies an ongoing greater requirement to

use offshore mitigation in future NDCs as the gap between the NDC and domestic pathways would persist for longer.

30. These two options are illustrated in Figure 2 below, for a common NDC ambition across the two options. These each assume domestic emissions follow the Climate Change Commission's final "demonstration" scenario (on which it based its domestic budget advice) as well as 120Mt of offshore mitigation being used toward the NDC. The difference between the pathway for domestic net emissions (red) and the NDC targets (white) is covered by the offshore mitigation. For this level of ambition:
    a. In the 2030 target year there is a headline reduction of 45% below 2005 levels in Option 1, and 55% below 2005 levels in Option 2.
    b. Under Option 1, the NDC path converges towards the domestic reduction path over time (converging more quickly if domestic action can reach the level of the Commission's "Tailwinds" scenario). This would potentially allow future NDCs to eventually be aligned with the domestic pathway. Under Option 2, the NDC path diverges from the domestic reduction path, so there is an implication of a high need for offshore purchase in future NDCs

Figure 2: Options for relating a budget quantity to the 2030 headline target level



31. These options can be assessed against the accounting objectives described above. As both these options are in a gross-net accounting basis, many of the objectives are common to both approaches, so only those for which there are differences are described in Table 1 on the following page.

Table 1: assessment of differences between the two gross-net accounting options

	Option 1 (CCC approach)	Option 2
Transparent, practical and acceptable	✓ • Minor modification to current approach, would be internationally acceptable	? • Rationale for change may be questioned internationally: would need careful communication to show ambition is raised
Consistent and maintain the integrity of the target	✓ • Consistent with approach used in previous target	×/✓ • Change from previous approach, however integrity of target is maintained
Complements NZ's long-term domestic transition strategy	✓ • NDC path converges more quickly with domestic emissions, allowing for greater focus on domestic pathway in future NDCs	× • NDC path diverges from domestic emissions path, implying requirement for offshore mitigation in future NDCs
Allows comparability of effort and communication internationally of NZ's enhanced ambition	×/✓ • Comparability with other countries' headline targets is more difficult: NZ's target has greater ambition than is apparent from the headline number • Maintaining methodology allows easy demonstration that NDC has been enhanced	✓/× • Easier international comparability with other countries' headline targets • Change in methodology makes it more difficult to show ambition of enhanced NDC vs current NDC.

32. This assessment suggests that the Climate Change Commission's approach (Option 1) maintains consistency with the previous approach, and aligns more closely with the domestic pathway over time. Option 2 may provide better comparability with other countries' NDCs, but would require careful explanation that underlying ambition has been enhanced. Based on this analysis we recommend Option 1, but we acknowledge that there are benefits to each approach.

33. Note that if Option 1 is used for the NDC target, the calculations for Option 2 could still be used to explain why the effort of New Zealand's NDC would be equivalent to a higher reduction when comparing on a more like-for-like basis with NDCs expressed as single-year targets.

Decision 3: Whether to "fix" the NDC budget quantity

34. New Zealand's national inventory is updated annually, a practical demonstration of the principle of continuous improvement. This includes recalculating as appropriate previous years' emissions or removals back to 1990 to take into account improved methodologies and data. This can change emissions in the base year(s) against which our targets are referenced, as well as changing the approach used in emissions

projections for future years. These methodological changes do not stem from any increase or decrease in mitigation action: they are re-expression of the same trends and data with different methodologies. The changes can be substantial, for example in the latest 2021 inventory update, 2018 gross emissions were revised from 78.86Mt (as reported in 2020) to 80.58Mt.

35. If the NDC budget quantity is fixed ahead of implementation (as was done under the Kyoto Protocol), methodological changes in the inventory over time could increase or decrease the quantity of offshore mitigation required to meet the NDC (for no increase or decrease in effort, but just because emissions are counted differently). This is particularly the case for improvements to estimates of agricultural emissions and the land sector, which dominate New Zealand's inventory. We anticipate that significant improvements will continue to be made over the decade to 2030, likely to substantially shift numbers. Each of New Zealand's domestic five-year emissions budgets under the Climate Change Response Act is fixed, but subsequent budgets can be revised if there have been substantial methodological changes.
36. New Zealand did not formally communicated a position on this issue in its NDC, but it did indicate in the fourth biennial report an intention to fix the NDC budget in time for including it in the first biennial transparency report under the Paris Agreement (due by December 2024).
37. Other Parties that are managing their NDCs as budgets (Australia, Switzerland) have indicated that they do not intend to fix the exact budget quantity of their NDC until after 2030, when the final emissions inventory for the full period is known. For tracking purposes there would be annual updates based on each year's updated inventory.
38. We recommend that New Zealand also follow this flexible approach (i.e. not fixing the NDC budget), so that methodological updates can flow through into both inventory emissions estimates and the target level in the same way. This would mean that there would not be windfall benefits (or disadvantages) due to methodological changes. This approach however has the disadvantage that the budget quantity would not be fixed and subject to change over the NDC period.

Decision 4: The base year for the reduction target

39. Countries use different reference years to express their NDC targets (Table 2). As with other accounting choices, for a given level of NDC ambition (domestic action + offshore mitigation), the choice of base year can give different percentage headline reductions in the target year. We have not identified a reason to change the current 2005 base year, and for continuity we recommend leaving this unchanged.

Table 2: Base years used by selected Parties for NDC targets under the Paris Agreement

Base year	Parties
1990	European Union, UK, Russia, Switzerland
2005	United States, Canada, Australia, Brazil, China, India
2013	Japan
2017	Republic of Korea

40. As New Zealand's 2008-12 and 2013-20 targets were expressed relative to a 1990 base year, we expect there will be interest in how New Zealand's NDC1 compares on this basis. The current NDC1 (30% reduction vs 2005) translates to an 11% reduction on 1990 levels (gross-net), while an enhanced NDC1 of 45% reduction vs 2005 would translate to a 30% reduction on 1990 levels.

Decision 5: Whether (and when) to consider an alternative approach to land accounting

New Zealand's current gross-net accounting approach

41. New Zealand's NDC1 currently uses a gross-net accounting approach, with averaging for post-1989 forestry as well as using a reference-level approach for pre-1990 forest management. All deforestation is included in the accounting.

42. The gross-net accounting approach continues the methodology used in New Zealand's previous international targets under the Kyoto Protocol and the UNFCCC. Net emissions in this approach are calculated using gross emissions plus a subset of forestry emissions and removals that relate to actions taken since the Kyoto Protocol's 1990 base year. There were two principal reasons for this approach to land sector accounting being taken in the Kyoto Protocol and being continued since:

    a. The purpose of the international targets was (and remains) to drive action, so the measurement framework was designed to count and provide an incentive for emissions-reducing actions. In New Zealand's case, there are large business-as-usual changes (e.g. planting and harvest cycles) in the level of removals from pre-1990 forests that if not "factored out" would dominate net emissions trends and delink the measurement framework from the results of actions taken.

    b. In the Kyoto Protocol, a gross-net approach provided a fairer comparison between countries whose pre-1990 land sectors were a source of emissions (e.g. they were deforesting) and those with land sectors that were removing emissions (e.g. additional forests had been planted). If the land-sector accounting were to include these pre-1990 activities, deforesting countries would have been allowed to continue deforesting with no penalty (as their net emissions would remain the same as the base year) while those countries that had previously planted forests would have to continually plant more forests to maintain the same level of removals.

43. NDC accounting enables new human effects to be differentiated from background trends (legacy effects) in emissions and removals. The rules ensure that our target accounting only recognises 'new and additional' changes in forest carbon relative to background rates towards our targets. NDC1 accounting has three objectives, to provide:

    a. a continued incentive to establish new forests

    b. a disincentive to deforest

    c. an incentive to increase carbon stocks of pre-1990 forest above BAU

44. A target accounting approach to the land sector also allows for exclusion of land sources/sinks that are highly uncertain, with an expectation that the coverage will expand to these over time as better data is gathered. New Zealand currently does not include emissions and removals from wetlands and grazing land management in its target coverage. With increased resourcing for data collection and modelling the targets

(and their accounting) could be expanded to cover these land classes in future. Target accounting also allows rules to be set for how the effect of natural disturbances (fires, pests) are addressed when accounting toward targets.

45. The averaging approach to post-1989 forests provides a better picture of the effect of land-use choices on global temperature. The cyclical harvest and re-growth of production forests results in temporary changes in the level of emissions and removals to/from the atmosphere, but these have no ultimate impact on global warming: only the long-term average sequestration of these forests results in an ongoing removal that affects temperature[5].
46. This accounting approach also has significant benefits for the practical management of targets. New Zealand's full inventory removals (and projections of future removals) are highly variable from year to year based on the annual harvest and planting decisions of foresters. The averaging approach allows for a smoother approach to counting overall forest changes and their impact on global temperature.
47. Most countries that previously had targets under the Kyoto Protocol continue to use a gross-net methodology for setting NDC targets: the European Union, Switzerland, Japan, Canada, and New Zealand all have versions of a gross-net target.

Setting targets based on net inventory emissions

48. Some countries (notably the United States, Australia, and United Kingdom) have communicated NDCs that are based on a percentage reduction in full net inventory emissions in a target year compared to a base year. This is described as a "net-net" target.
49. This approach has certain advantages:
    a. It captures "everything the atmosphere sees" on a year to year basis so is more comprehensive (including for example wetlands and grasslands that are not currently included in target accounting), although as noted above some of these annual changes may be cyclical or inter-annual variations that do not ultimately drive global warming
    b. It bases national climate policy on a single data set, instead of having separate data for inventory reporting and target accounting
    c. It could be seen as more intuitively in line with the concept of eventual net-zero emissions targets, i.e. the "balance of emissions and removals in the second half of this century" in the Paris Agreement's mitigation goal
    d. This approach would be more acceptable to certain stakeholders (environmental NGOs, some academics) who take the view that basing targets on a more complete picture of emissions and removals should be the priority. Owners of pre-1990 forested land have also argued that the distinction between pre- and post-1990 forests should be removed.

[5] There are legal obligations for land owners to replant after harvesting, or else be responsible for the emissions associated with deforestation (i.e. repaying the units earned associated with stored carbon). This legal obligation underpins the balance between growth and harvest cycles over time in an averaging approach.

50. For countries that have a small share of forestry removals in their total inventory (and/or have slower growing forests with less inter-annual variability), the distinction between the two accounting approaches has a minor effect overall, and using the full inventory may be seen as simpler. For countries that were deforesting land in their base year and as a result had net emissions from land use change, the choice of a net-net target is favourable as base-year emissions are higher than in a gross-net approach.
51. For New Zealand, a net-net approach would create significant challenges:
    a. Net emissions would be strongly affected by business-as-usual forestry cycles, masking outcomes from actions that affect global temperature (gross emission reductions and increased forest cover). If the metrics used to assess progress are not aligned with the action sought, then there could be confused signals for action. There is also the risk that in time periods where forests are growing rapidly (e.g. around 2050), there could be a temptation to use the low net emissions at that time to ease off on emissions reduction action.
    b. Large changes in inventory and projections from year to year would make managing budgets very challenging. In particular the levels, timing and age of harvesting (and the emissions from harvested wood) cannot be projected with certainty, as they are dependent on underlying economic and resource constraints. Decisions on timing of harvesting and planting from one year to the next would affect Budget/NDC achievement. The resulting uncertainty creates fiscal risk to the Crown.
    c. Sufficiently detailed data is not currently available for key land categories (e.g. wetlands, grazing lands) that are not part of the current target accounting framework. s 9(2)(f)(iv) [redacted] If an enhanced NDC1 target is set based on the less detailed and more uncertain default factors currently used for some land classes in the national inventory report, there could be large changes in the inventory (and hence in our position with respect to the NDC target) when updated information is available.
    d. Target accounting is currently embedded in many elements of New Zealand's domestic policy framework, for example in the way the ETS operates, including
        - post-1989 forest averaging: a difference between the incentives provided by the ETS and what is counted toward targets would result in fiscal risk to the Crown
        - the methodology for calculating auction volumes, which is based on net emissions projections
        - The separation of pre- and post-1990 forestry regimes, which determine how carbon property rights are currently devolved
        - ETS deforestation exclusions/exemptions
        - forest offsetting
        - natural disturbances
    e. Modelling based on target accounting was used in the analysis of pathways to the Zero Carbon Act's 2050 targets, and has been used by the Climate Change Commission in its analysis and advice on the first three emissions budgets.

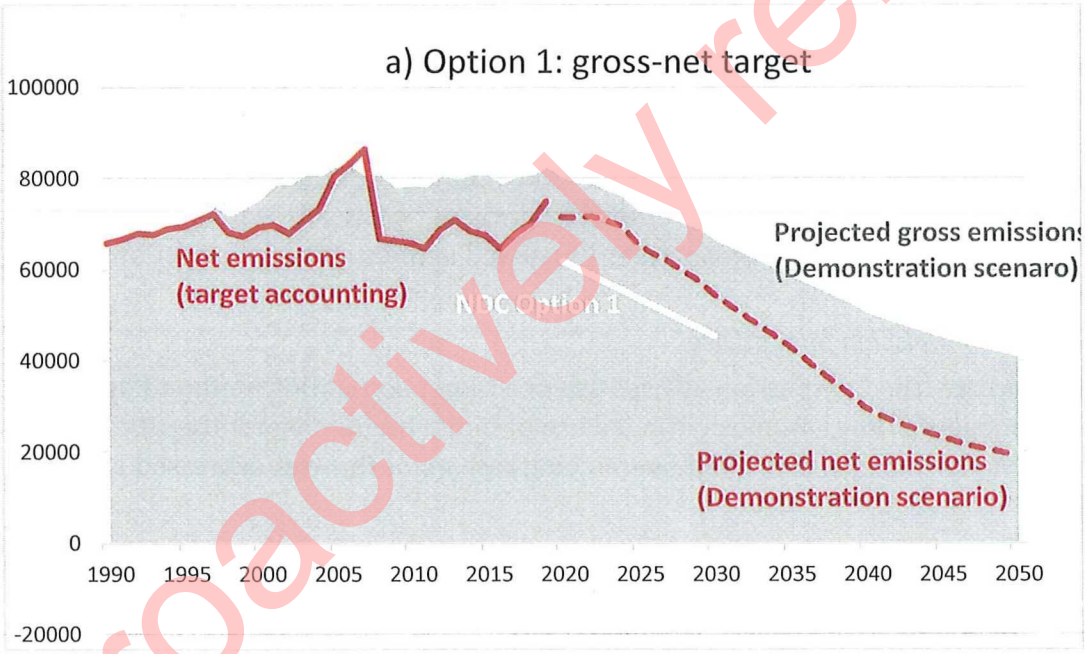
f. A multi-year process is already underway to enable reporting and accounting with the current approach in time for the 2023 submission of the inventory, which will report the 2021 greenhouse inventory, the first year of New Zealand's NDC under the Paris Agreement.

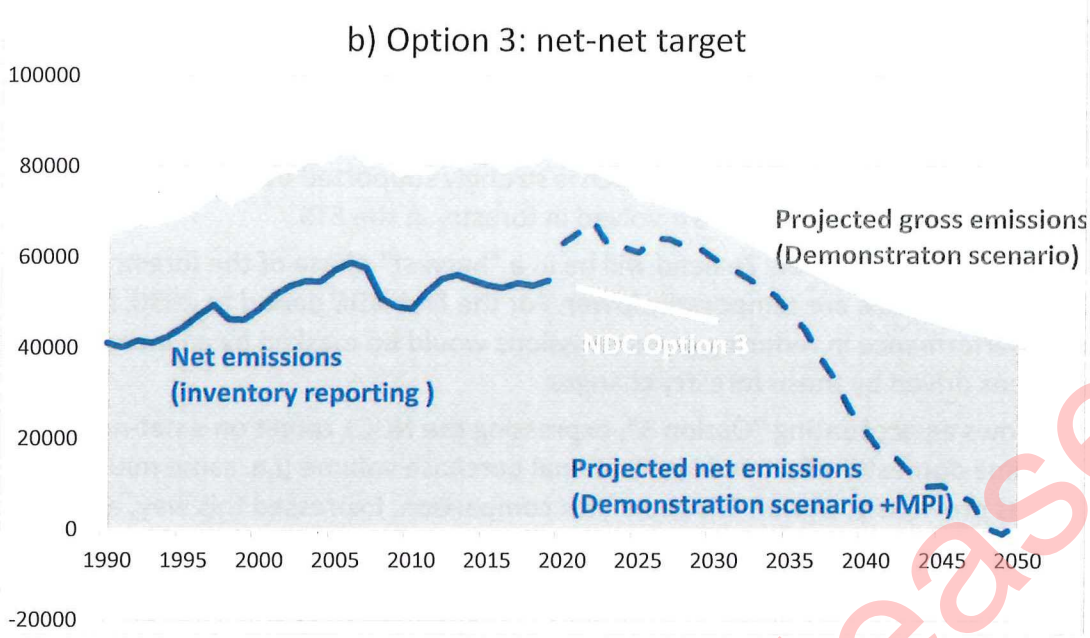
g. The current target-accounting approach is strongly supported by certain industry stakeholders, particularly those involved in forestry in the ETS.

52. Between 2020 and 2035, New Zealand will be in a "harvest" phase of the forestry cycle, meaning that removals are temporarily lower. For the first NDC period to 2030, New Zealand's performance in reducing gross emissions would be masked by an increase in net emissions driven by these forestry changes.

53. Figure 3 shows an accounting "Option 3", expressing the NDC1 target on a net-net basis, with the same domestic effort and international purchase volume (i.e. same mitigation ambition) as previously. Option 1 is shown for comparison. Expressed this way, a net-net NDC target would be a 16% reduction on 2019 net emissions in 2030. The apparently lower headline reduction would require careful explanation internationally to show that this is in fact a significant strengthening of mitigation ambition compared to the current target.

Figure 3: Gross-net vs net-net target appearance for same level of mitigation ambition





54. Note that because the target accounting approach only counts certain forestry removals (those above/below baseline for pre-1990 forests, and up to average carbon stock for post-1990), the quantity of removals counted for 2021-2030 in the target accounting approach is lower than in the full inventory approach. This means that the allowed NDC1 budget for net target-accounting emissions is slightly higher than for net inventory-reporting emissions, for the same level of ambition/effort. This is important when comparing an NDC budget expressed in a gross-net basis with equity calculations that are carried out using net-net analyses (discussed in the supporting paper on equity and consistency with 1.5ºC).

Climate Change Commission final advice

55. In its final advice, the Commission advises use of a target accounting methodology for domestic budgets[6]. They assume continued use of target accounting for the NDC and do not recommend changing this. Their overarching reason for this was expressed as follows:

    a. *A key purpose of the emissions reduction targets countries set themselves is to drive actions to reduce human impacts on the climate. The accounting methods used for these targets need to deliver useful data to inform emissions reduction efforts and influence which reduction activities are prioritised.*

    b. *This link to policy and driving behaviour change is why emissions accounting for targets may differ from national GHG inventories. An appropriate accounting approach would encourage better choices about reducing emissions and avoid wasting resources on misdirected efforts.* [7]

56. However the Commission also acknowledged strong stakeholder interest in inventory approaches for accounting, and has recommended that the government do further

[6] Recommendation 5: Rules for measuring progress

[7] Evidence Report

work to enable a broadening of coverage and assessment of alternatives in the Commission's next advice in 2024, as well as any consequent update to the 2050 target that a change in accounting method would require:

a. *We also acknowledge the ongoing interest from stakeholders in using the land-based approach to accounting from the national inventory. As noted earlier, our main concern with the land-based approach is related to stock-change accounting for exotic production forests. We remain open to the possibility of using the land-based approach in accounting for other sources and sinks.*

b. *We would, however, need to understand more about how this might work, including whether any problems would arise from combining land-based accounting with modified activity based accounting for forests. To do this, we would need to draw to an extent on land accounting expertise and analysis from within the government Ministries who prepare the national inventory and other emissions reports.*

c. *For this further work on expanding coverage we would therefore like the Government to look at both the activity-based and the land-based options. We encourage this to be done with consideration of the Commission's objective and principles to guide accounting choices. In particular, it is important to think about the role of emissions budgets and the 2050 targets in driving actions to reduce human impact on the climate, and the principle on sending a clear signal for climate action.*

d. *Finally, if accounting is expanded beyond the scope used to set the 2050 targets, this should trigger a review of the target to ensure its integrity. For example, if a land accounting scope change makes the target significantly easier to achieve, this would justify increasing the ambition of the 2050 net zero target for long-lived gases. This is a further reason why including new sources and sinks in the rules for measuring progress is most appropriately considered in 2024, when the 2050 targets can reviewed and there is an opportunity to update the second and third emissions budgets.* [8]

Assessment of options

57. Table 4 below compares Option 1 (as an example of a gross-net approach) and Option 3 (net-net) against the accounting objectives. For forestry accounting, the higher-level objectives can be further refined (refer para 19). The permanence of removals (vs cyclical effects) is important for the environmental integrity of the target. Sending a clear signal for climate action involves considering the additionality of actions and whether legacy effects contribute. The signal for climate action also relies on the alignment of the accounting approach with what can be driven by domestic policy (e.g. ETS settings).

[8] Section 10.5 Climate Change Commission Final Advice

Table 4: Assessment of gross-net vs net-net accounting options

	Option 1 (CCC approach gross-net)	Option 3 (net-net)
Seeks to cover all material human caused emission sources and sinks	× • Includes all forests; could potentially be expanded to other land categories	✓ • Comprehensive coverage (although managed-land approach also leads to inclusion of some non human-induced effects)
Grounded in robust science and evidence	✓✓ • Internationally, based on IPCC guidance • In NZ, data systems set up to provide robust information	✓/× • Internationally, based on IPCC guidance • In NZ, appropriate data not currently available for sources/sinks not covered by current target
Sends a clear signal for climate action	✓✓ • Designed to align measurement with actions by a focus on additionality of actions (factoring out of legacy effects)	× • Results of climate action can be masked by BAU changes/legacy effects
Accurate and reduces uncertainty as far as practicable	✓ • In NZ, data systems set up to provide robust information • Averaging reduces uncertainty	×× • Significant uncertainty in projecting levels, timing and age of harvesting, non-forest emissions factors, harvested wood products, ETS-driven activity such as offsetting • , Current default factors may not be sufficiently accurate for use in target assessment • The exclusion of natural disturbances is a major risk and potential liability
Transparent, practical and acceptable	✓ • Minor modification to current approach, would be internationally acceptable • Not seen as appropriate by some stakeholders • Designed for practical implementation	✓/× • Simpler, given one set of numbers • Target more difficult to manage given uncertainties • More acceptable to some stakeholders, less to others
Consistent and maintains the integrity of the target	✓ • Consistent with approach used in previous target • Focus on permanence of removals counted supports environmental integrity of the target	× • Change from previous approach • Some emissions and removals counted are not permanent, reflecting cyclical forestry activity
Complements NZ's long-term domestic transition strategy	✓ • NDC path converges more quickly with domestic emissions, allowing for greater focus on domestic pathway in future NDCs	× • Domestic net emissions path is strongly affected by forestry cycles, so accounting approach masks transition actions.
Allows comparability of effort and communication internationally of NZ's enhanced ambition	×/✓ • Comparability with other countries' headline targets is more difficult: NZ's target has greater ambition than is apparent from the headline number • Maintaining methodology allows easy demonstration that NDC has been enhanced	× • In the NDC1 timeframe, NZ's effort would be higher than is apparent, as it is masked by BAU changes in net emissions
Is able to be implemented robustly for first domestic budget and NDC1	✓✓ Existing work programmes aligned to deliver	× Significant new data requirements (several years to collect and implement); significant knock-on consequences for domestic policy

58. This analysis confirms the value of a gross-net accounting approach, given New Zealand's large plantation forestry estate. In particular, it has strengths in expressing progress towards meeting targets, in managing uncertainties in timing of forestry activities and in cyclical harvest effects that do not ultimately affect global temperature. There are however strengths of net-net accounting that should be considered, in particular its comprehensiveness.
59. The Climate Change Commission has pointed to a way forward to try and integrate the best aspects of both approaches to land sector accounting. It has proposed that the government undertake policy work to consider whether a type of hybrid approach (retaining averaging for production forests, but using a net-net inventory basis overall) could be more appropriate for New Zealand. The possibility of this type of hybrid approach has also separately been suggested by MfE land sector experts, but would require extensive further development.
60. This policy development would need to be accompanied by expanded data collection, to have the information on which to base decisions about other land categories such as grasslands and wetlands ahead of the Commissions next round of advice in 2024. Such data collection would require additional resources, and it would take several years for the better data to be available. Even if the gross-net approach is eventually retained for future NDCs, it is important (and is an expectation under the Paris Agreement) to expand target coverage over time to other land-uses and activities, so this data collection will be of benefit whatever eventual accounting choices are made.
61. In MfE's view, the Climate Change Commission has proposed an appropriate way forward to assess options (for further consideration in 2024) for future domestic budgets and NDCs:
    a. Policy work to assess a "hybrid" approach including averaging for production forests and net-net target setting elsewhere. This would combine the full coverage of a net-net approach while still using an averaging approach to count only the quantity of forestry removals that ultimately affects global temperature (i.e. smoothing over growth/harvest cycles and inter-annual decisions on forestry activity).
    b. Development of enhanced data for land classes not currently covered by the NDC, as well as modelling for these land areas. This would enable future expansion of the NDC and domestic budget coverage to other land uses and activities. This work would have resource implications for both MfE and MPI.
62. We consider a full inventory-based "net-net" target for the NDC and/or domestic budgets is not deliverable in a robust way for NDC1, given the lack of sufficiently detailed data for sectors not currently covered by the NDC, the uncertainties that it would create, and the significant resulting misalignments with domestic policy that would need to be addressed.
63. If the current gross-net accounting approach is retained for NDC1, there are potential ways to give greater emphasis to full inventory emissions and removals, for example
    a. Assessing equity criteria and consistency with 1.5°C using full net inventory emissions as a reference for an appropriate budget for New Zealand's NDC1, and being transparent about how this net-net budget translates to an equivalent budget for a gross-net NDC.

b. Making reference in communications to inventory emissions and removals as well as target accounting emissions across the NDC period (noting that inventory net emissions are expected to be lower)

c. Potentially discussion the projected path for inventory net emissions toward 2050 as part of the LT-LEDs chapter of the ERP. This chapter could point out that inventory net emissions are projected to reach net-zero for all gases in 2050 (although this is a temporary cyclical effect).

Consultation and Collaboration

64. MPI, MFAT, MBIE and the Treasury were consulted on this paper. Comments were received from MPI.

65. MPI does not support changing our current NDC accounting approach. The CCC report outlines a very clear logic for this position. MPI supports a systematic data-led approach to the decision on how and when to expand the coverage of the NDC to include non-forest land uses (grasslands, croplands, settlements, and wetlands). Our state of knowledge on these non-forest land uses varies. Moving away from NDC accounting and prematurely expanding the land uses included in our NDC both represent potentially major changes to ambition, which is compounded by limitations in our base data and ability to project over the commitment period.

66. MPI is also concerned that change from averaging to inventory accounting would make our NDC1 target more ambitious than intended and increase any potential requirement to purchase offshore mitigation. They are also concerned with fiscal risks arising from mis-alignment between domestic policy and emissions targets.

Risks and mitigations

67. Any change of accounting approach (e.g. adopting Option 2) may lead to questions internationally over whether ambition has genuinely been enhanced. Transparent communication focused on the underlying emissions budget could address this concern.

68. Officials consider that Option 3 (an immediate move to a net-net accounting approach) is not able to be implemented robustly for NDC1 and the first domestic budget period. A staged approach, working toward the Commission's next advice in 2024, would allow for data collection and development of alternative approaches that would be implementable. This work would however require additional resources.

69. The accounting approach currently used for New Zealand's domestic budgets and NDC has been challenged by some stakeholders, including in submissions to the Climate Change Commission. Maintaining the current accounting approach for NDC1 will likely be criticised by these stakeholders. This risk can be mitigated by clear communication of the basis for decision (including the impracticality of making changes immediately), and reference to the work programme to develop options for the Commission's next advice in 2024.

Next Steps

70. The next step is to consider what options and choices relating to accounting will be presented to your Cabinet colleagues. This could include discussing these issues at the Climate Response Ministerial Group meeting on 23 June 2021 or subsequent meetings ahead of Cabinet decisions in August.
71. MPI has a strong interest and associated work programme supporting land-sector and forestry accounting. As such, we recommend that issues related to forestry accounting be discussed with the Minister of Forestry, as implementation would involve both MPI and MfE.