Chapter 10

Ngā Ture – Hei pouārahi i ngā whāinga tahua tukunga hauwaro me ngā paetutuki 2050
Rules for measuring progress towards emissions budgets and 2050 targets

Summary

As part of its role, the Commission has a responsibility to monitor progress towards meeting the emissions budgets and the 2050 target. To do this, we have developed and recommended accounting rules.

Our priority is to ensure accuracy and integrity in accounting and reporting. We want to make sure Aotearoa is responsible for its emissions and can track genuine gains.

We have made several choices to achieve this. This chapter outlines these choices and explains how the Commission has developed its rules for measuring progress. These rules have also been used in developing our recommended emissions budgets.

Greenhouse gas accounting – consumption or production based?

One of the most fundamental choices in greenhouse gas accounting is whether to calculate emissions on a production or a consumption basis. We have chosen production-based accounting, using the Greenhouse Gas (GHG) Inventory, because the Inventory provides the most comprehensive and robust emissions estimates for Aotearoa.

We have heard feedback that we should be using consumption-based accounting. This has been considered but consumption-based emissions estimates do not cover important emissions sources and sinks such as forests and are just being developed for Aotearoa. We recognise the usefulness of applying a consumption lens to think about emissions so have recommended that consumption-based emissions estimates continue to be prepared and continually improved, as a complement to the GHG Inventory.

Accounting for land emissions

It is important to adopt a robust approach for accounting for land-based emissions, because of forests' role as a sink and source of emissions in Aotearoa. There are two frameworks to choose from – an activity-based or a land-based approach.

The Commission has recommended a modified activity-based approach, including averaging for post-1989 forests. This focuses on the impact people's decisions have on emissions now and into the future, rather than rewarding or penalising decisions made in the past. It is the same as the approach that will be used in the first Nationally Determined Contribution (NDC) for Aotearoa.

We have a large area of forests that produce timber in Aotearoa, which are cut down at regular intervals. Averaging accounting provides steady and predictable emissions estimates for these forests that reflect their enduring, long-term effect on carbon stocks, rather than temporary fluctuations.

Future work to improve accounting for land emissions

We recommend that the Government improve accounting in the future. This should include developing methods to extend accounting to carbon emissions and removals by peat soils, small lots of trees and vegetation; sound and transparent methods to account for voluntary mitigation and offsetting claims; and improving accounting for harvested wood products.

Changes in our final advice

We have strengthened our advice on further work the Government should do to improve accounting. We heard strong support for this from a range of submitters.

Based on interest from stakeholders, we have also included more explanation of how we have considered emissions from international transport, and outlined the Commission's view of how method updates to the GHG Inventory should be addressed when assessing progress towards meeting emissions budgets.

Introduction

1 'Rules for measuring progress' refers to the system of accounting for greenhouse gas emissions that will be used to track the progress Aotearoa makes towards emissions budgets and the 2050 emissions reductions targets (2050 targets).

2 In Aotearoa, various emissions accounting methods are already in use, for example to prepare *New Zealand's Greenhouse Gas Inventory* (the GHG Inventory), to track the Nationally Determined Contribution (NDC) and other targets, and to produce emissions accounts that align with economic statistics. Our task is to determine which of these existing methods are best suited for setting emissions budgets and deliver the 2050 targets.

3 In this chapter, we first outline our role and approach to thinking about accounting for emissions budgets and the 2050 targets. We then discuss accounting choices related to:

- Production- and consumption-based emissions estimates.
- Accounting for land emissions. By 'land emissions', we mean emissions and removals from land sources and sinks such as forests, vegetation, soils, and wetlands. This does not include any direct agricultural emissions such as those from livestock or fertiliser.
- Voluntary offsetting and carbon neutral claims.

4 Many submissions noted that greenhouse gas emissions accounting is a complex and unfamiliar topic. Nevertheless, there was strong support for ensuring that emissions budgets are accounted for with integrity and in a way that holds Aotearoa responsible for its emissions.

10.1 Greenhouse gas accounting for emissions reduction targets

5 The methods used to calculate and attribute the amount of greenhouse gases emitted or removed from the atmosphere over time are a critical component of effective climate policy. Robust and accurate emissions accounting is essential for:

- setting emissions reduction targets
- monitoring and evaluating progress towards meeting targets
- judging compliance at the end of a target period

6 A key purpose of the emissions reduction targets that countries set themselves is to drive actions to reduce human impacts on the climate. The accounting methods for these targets need to deliver useful data to inform emissions reduction efforts, and influence which reduction activities are prioritised. This link to policy and to driving behaviour change is why emissions accounting for targets may differ from the methods used for national greenhouse gas inventories.

10.1.1 Our role

7 We must advise on the rules that should apply to measuring progress towards meeting emissions budgets and the 2050 targets. Our recommended accounting rules have been used to develop the recommended emissions budgets. We will also use them to report on the Government's progress towards emissions budgets, starting in 2024.

8 This advice relates to the first three emissions budgets, covering 2022-2035. In 2024, we will advise on the fourth emissions budget covering 2036-2040. At that time, we will have the opportunity to revise our recommendations on accounting for the second and third emissions budgets, if this is warranted by developments in knowledge or accounting methods.

10.1.2 Objective and principles to guide accounting choices

9 We have examined the accounting rules for emissions budgets from a first principles basis. To do this, we have set a high-level objective for emissions budget and 2050 targets accounting:

> *A robust, transparent accounting system that tracks genuine environmental gains while balancing completeness with practicality.*

10 We have also defined a set of principles underneath the high-level objective, to provide guidance on how to reach this goal. The principles help ensure we take a coherent approach to the range of issues covered by target accounting.

11 Accounting for emissions budgets and the 2050 targets should:

1. seek to cover all material human caused emissions sources and sinks;
2. be grounded in robust science and evidence;
3. send a clear signal for climate action;
4. be accurate and reduce uncertainty as far as practicable;
5. be transparent, practical and acceptable; and
6. be consistent and maintain the integrity of the targets.

12 Together, the objective and principles provide a framework to allow options and trade-offs to be understood and to inform decisions about accounting rules, including where the principles need to be balanced against each other. For more information on the reasoning for and meaning of each principle, see *Chapter 3: How to measure progress* in the *2021 Supporting Evidence*.

10.2 Production- or consumption-based greenhouse gas accounting

13 One of the most fundamental choices in greenhouse gas accounting is whether to calculate emissions on a production or a consumption basis.

14 Until now, production-based accounting has been the only option for tracking the country's emissions. In 2020 consumption-based emissions estimates were produced by StatsNZ for the first time. We have assessed these two approaches using the objective and principles for accounting set out above.

15 Our advice is that production-based estimates are more suitable for accounting for emissions budgets and the 2050 targets.

16 The production approach records emissions at the point where human activity causes their release to the atmosphere. It attributes the emissions to the original producer of the emission, for example a manufacturing plant burning coal in a boiler. Production-based accounting is the standard method used by countries for setting and tracking emissions reduction targets, and it is used to compile the national inventory for Aotearoa.

17 The consumption approach accounts for emissions 'embodied' in a good or service that result from the entire supply chain required to produce that good or service for final use. For example, in the case of vehicle transport, this approach would record all the emissions produced from making the materials, such as the metals, and from the assembly of a car, as well as the emissions from fossil fuel combustion generated when the car is driven. Under the consumption approach, Aotearoa would not be responsible for the emissions embodied in the goods it exports but would be responsible for those embodied in imports.

18 The consumption emissions estimates for Aotearoa are at an early stage of development and have significant downsides. These include:

- Lower coverage of material sources and sinks. The consumption estimates exclude land emissions, due to the technical difficulty and lack of methods for attributing land emissions to industry sectors and final use.
- Accuracy and uncertainty are negatively affected by assumptions made about emissions embedded in imports from other countries. For example, StatsNZ calculates the consumption estimates assuming imports have the same emissions content as outputs of the same industry in Aotearoa.
- Lack of an internationally agreed standard for calculating and reporting consumption emissions. This would make it difficult to compare the country's targets and progress in reducing emissions against those of other countries.
- Using consumption-based emissions estimates for accounting would differ from the analysis used to set the 2050 targets. This could undermine the integrity of the targets.

19 These challenges make the consumption estimates unsuitable for use as the basis for accounting for emissions budgets and the 2050 targets at this time.

20 We acknowledge, however, the strong interest in consumption emissions and consumption-based approaches expressed in submissions. Many submitters thought consumption-based emissions estimates give a truer representation of the overall impact of emissions caused by Aotearoa, and were more useful to inform consumption decisions, particularly by individuals.

21 We have taken on board this feedback by more strongly incorporating a consumption lens into our advice on policy direction. For example, we have included specific recommendations on increasing the circularity of the economy, on the bioeconomy and on buildings and urban form in our advice on the direction of policy for the emissions reduction plan.

22 We have also strengthened our recommendation on rules for measuring progress to more clearly highlight that consumption-based emissions estimates should continue to be prepared and continually improved. They are a useful complement to the national inventory. We intend to monitor and use them to provide insights into the wider impact Aotearoa has on global emissions, carbon-intensive supply chains and trade flows.

10.3 Accounting for land emissions

23 We need to decide on a framework for land emissions accounting, given the significance of these emissions for Aotearoa. Given the role forests can play meeting the net zero target in 2050 and beyond, a fit-for-purpose accounting framework is key.

24 There are two frameworks for land emissions accounting currently used in Aotearoa:

1. a 'land-based' approach that uses 'stock change' accounting for both pre-1990 and post-1989 forests (see Box 10.1). This is used in the GHG Inventory for UNFCCC reporting; or
2. a modified 'activity-based' approach that uses 'averaging' accounting for post-1989 forests. This is used in the country's NDC.

25 For the definition of a forest in greenhouse gas accounting in Aotearoa see *Chapter 3: How to measure progress* of the *2021 Supporting Evidence*. Smaller areas of trees not meeting the forest definition are mostly accounted for as biomass on grasslands or croplands.

10.3.1 A land-based approach, as used in the national inventory

26 'Land-based' accounting aims to cover all emissions and removals from soil, trees, plants, biomass, and wood products. Emissions and removals by forests are reported in a way that corresponds to tree growth, harvest and deforestation – known as stock change accounting. By trying to record emissions and removals when they occur, it gives a truer representation of 'what the atmosphere sees'.

10.3.2 A modified activity-based approach, as used in the NDC

27 This accounting approach uses a smaller subset of activities and land types than the land-based approach. It focuses on significant sources and sinks whose emissions can be most affected by changes to people's behaviour now. It does this by filtering out the effects of past actions, such as regrowth of previously harvested native forests.

28 This approach will be used for the country's first NDC. The NDC will account for land areas and uses corresponding to the *afforestation, reforestation, deforestation* and *forest management* activities accounted for in the country's 2020 target covering the second commitment period of the Kyoto Protocol, 2013-2020. It is not yet known if the NDC will include the land areas or uses related to the activities of *cropland management, grazing land management, revegetation* or *wetland drainage and rewetting*.

29 The NDC will use 'averaging' to account for afforestation and reforestation of post-1989 forests. This approach smooths out the cyclical peaks and troughs in emissions due to harvesting of post-1989 exotic production forests. It does this by accounting for removals only up until the forests reach their long-term average carbon stock. This occurs around 23 years after planting for a production pine forest on a 28-year rotation (if harvested wood products are included). Averaging focuses on the long-term effect of these forests on carbon stocks.

Box 10.1: Pre-1990 and Post-1989 forests

The country's activity-based target accounting has given rise to two broad classifications for forests:

- **Post-1989** forests are those established after 31 December 1989.
- **Pre-1990** forests are those established before 1 January 1990.

These classifications are due to the 1990 base year Aotearoa agreed to in the Kyoto Protocol. Activities occurring from 1990 onwards are 'additional' rather than business as usual.

In this approach, only emissions and removals due to additional human activities are counted. This means that emissions from *deforestation* are counted for all forests, but removals from *afforestation* and *reforestation* are only counted for post-1989 forests. *Forest management* aims to track the impact on emissions from changed management of pre-1990 forests.

The 1990 base year has been devolved into policy through the New Zealand Emissions Trading Scheme (NZ ETS). It contributes to a sense of unfairness among pre-1990 forest owners, including Iwi/Māori. This is because there is a deforestation liability constraining land-use change, but no reward for forest growth. This outcome results from the approach's focus on behaviour change now, rather than penalising or rewarding past actions.

With this approach, there is still some potential for flexibility and recognition of pre-1990 forests:

- *Forest management* in theory enables counting of increased carbon stocks due to improved management. However, this is difficult to do robustly and has not yet been devolved from target accounting into the country's policies.
- Both target accounting and NZ ETS rules allow avoidance of deforestation liabilities if an equivalent forest is planted elsewhere.
- Emissions reduction policies for forests should broadly match target accounting, so costs sit with emitters rather than taxpayers. However, there is scope for policies to differ from target accounting. These differences can be justified for reasons of practicality or by other policy goals, if the benefits of doing so outweigh the cost to the taxpayer. In this context, consideration could be given to:
  - encouraging improved management of pre-1990 forests, even if enhanced carbon storage is not counted for targets, or
  - providing more flexibility for Māori owned land to avoid locking in historical disadvantages.

Finally, averaging reduces the differences between the two forest types. Under averaging, post-1989 forests that reach the long-term average carbon stock are treated similarly to pre-1990 forests, as further business as usual growth and harvesting are not accounted for.

10.3.3 Assessment of the land emissions accounting frameworks

30 Overall, we consider that the NDC's modified activity-based framework for land emissions accounting, with a 1990 base year and 'averaging' for post-1989 forests, is a more suitable accounting approach for measuring progress towards emissions budgets and the 2050 targets.

31 We assessed the two options outlined previously against our accounting principles, with key differences discussed below. A full analysis is provided in the *Chapter 3: How to measure progress* of the *2021 Supporting Evidence*.

32 **Coverage of material emissions sources and sinks:** The land-based approach's main advantage is that it covers more sources and sinks than the modified activity-based NDC approach. The NDC currently only includes forest-related activities, although its scope could be expanded.

33 **Sending a clear signal for climate action:** The land-based approach performs worse against this principle than the modified activity-based approach, primarily due to its use of stock-change accounting for forests. This results in significant fluctuations in net emissions due to harvest cycles. These are temporary and obscure underlying, more enduring trends, confusing policy and price signals about the action needed. These fluctuations also make it easier to reach net zero but difficult to maintain it after 2050. As shown in Figure 10.1, government projections indicate that after a peak in removals around 2050, harvesting would cause forestry emissions to increase. In the NDC's modified activity-based accounting, averaging smooths out the fluctuations. This makes it clear that Aotearoa needs to plant new forests and reduce deforestation to contribute to longer-term emissions reductions.

34 **Consistent and maintains integrity of targets:** Activity-based accounting is consistent with the analysis that informed the 2050 targets. Using land-based accounting would reduce the effort to achieve the targets, undermining the commitment made when it was set.

35 **Accuracy and reducing uncertainty:** The land-based approach results in emissions estimates with higher overall uncertainty. Reasons for this include: having to combine carbon stock gains and losses, each with their own uncertainty, to determine net change; estimating uncertain factors related to the management of production forests such as harvest age and area; and including some land areas with highly uncertain emissions factors such as wetlands. As an example, pre-1990 production forests introduced uncertainty of ±61.4% into the inventory land emissions estimates for 2019. Netting off significant amounts of land emissions with high uncertainties against gross emissions with much lower uncertainties is problematic.

36 A number of submitters queried our conclusion to recommend the modified activity-based accounting framework for land emissions. This was mainly on the basis that it leaves out several emissions sources and sinks. We recognise that this is a disadvantage of the recommended approach, but do not think it outweighs the land-based approach's significant disadvantage of stock-change accounting for forests, particularly for exotic production forests. The coverage of the modified activity-based approach can also be expanded. We comment on future work for this purpose in *Section 10.5* and have also included direction to the Government in our recommendation about improving land emissions accounting.

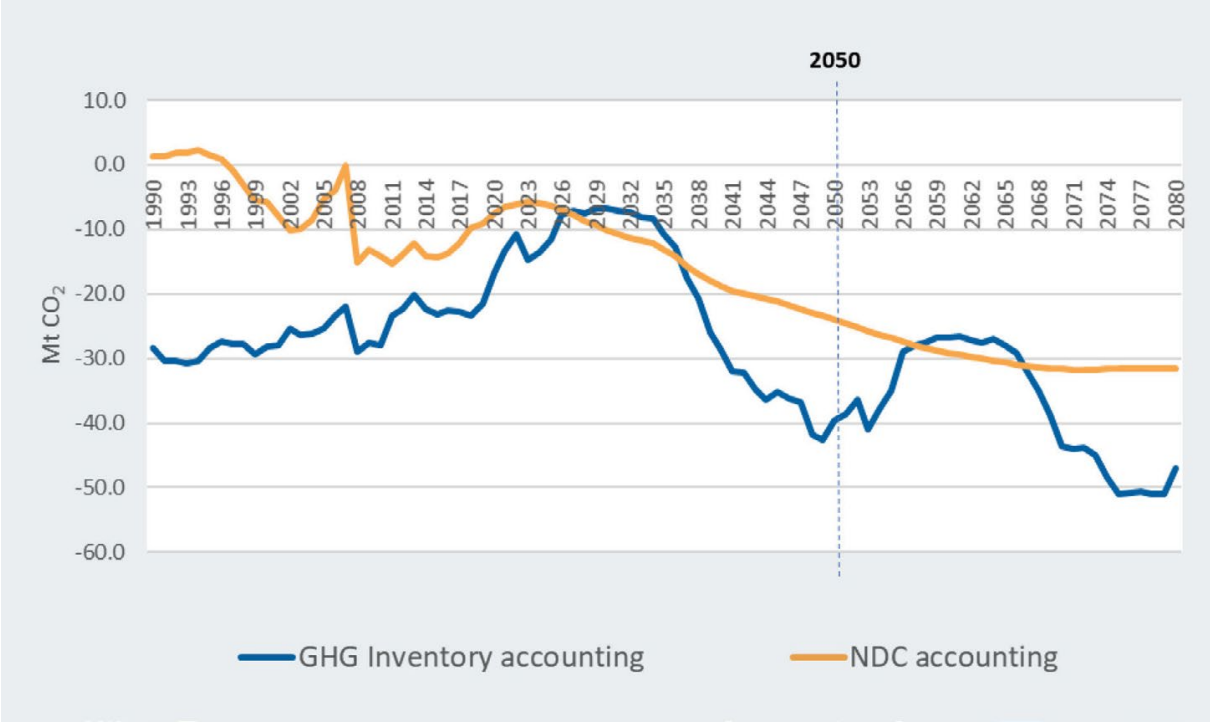

Figure 10.1: Comparison of national forest net emissions using New Zealand's Greenhouse Gas Inventory (stock change) and NDC (averaging) accounting.
Source: MPI October 2020 updated 'with existing measures' projection, $35 emissions price

10.4 Detailed choices within the modified activity-based accounting framework

37 We have assessed detailed elements of the NDC accounting approach to identify if it is fit for purpose for emissions budget accounting. This assessment is summarised below.

38 The NDC accounting is not yet fully defined. It may not be confirmed until late 2024 when Aotearoa is due to submit its first *Biennial Transparency Report* under the Paris Agreement. This incomplete definition limits what we can consider for this first package of advice. It is not feasible to use some elements of the NDC accounting approach in accounting for emissions budgets as we do not currently have enough information on how they work, or they do not yet exist.

10.4.1 Forest management

39 *Forest management* is the part of the NDC accounting system where the impact on carbon stocks of management practices affecting pre-1990 forests is counted. It is accounted for by estimating additional emissions and removals in pre-1990 forests above or below business as usual due to changes in forest management. It involves setting a reference level, based on a future projection of what would have happened with no change in management. Using counterfactual projections such as this has inherent accuracy and uncertainty challenges, with risks of both over- and under-estimation.

40 The Government has not yet defined the reference level that will be used for the NDC. We have been unable to assess how risks will be managed and how the reference level lines up against our accounting principles. This means we cannot include *forest management* in emissions budget accounting now. We will revisit this in 2024 to consider its inclusion in updated advice for the second and third emissions budgets.

41 Despite this limitation, we value the management of pre-1990 forests to enhance carbon stocks and deliver other benefits such as biodiversity. We urge the Government to encourage better management of these forests (see *Chapter 18: Policy direction for forests and other carbon stocks*), even if the carbon impacts are not accounted for in emissions budgets.

10.4.2 Harvested wood products

42 When a forest is harvested, some of the carbon is stored for a time in wood products, not released into the atmosphere immediately. Harvested wood products (HWPs) is the part of the accounting system that captures this effect and the benefit of using timber in the built environment.

43 HWPs for post-1989 forests are likely to be incorporated into averaging through adjusting the long-term average carbon stock. HWPs for pre-1990 forests are likely to be accounted for in the forest management reference level. As forest management cannot be included in emissions budget accounting now, there is no practical way to account for HWPs for pre-1990 forests in emissions budgets either.

10.4.3 Carbon equivalent forests

44 This provision allows pre-1990 forests that meet specified conditions to be converted to another land use without being classified as deforestation, if a new forest that would reach an equivalent carbon stock is planted elsewhere. We have not identified material integrity risks with this provision.

10.4.4 Natural disturbances

45 The country's first NDC will include a 'natural disturbances' provision to manage risks of natural events radically affecting land emissions. The provision can be invoked after a natural disturbance, e.g. a volcanic eruption, to allow the emissions from the disturbance to be excluded from accounting.

46 The provision is expected to follow the Intergovernmental Panel on Climate Change's (IPCC's) *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol,* but the details of how it will work are not yet clear. The risks of adopting the provision for emissions budgets before knowing the rules can be managed, as we can control whether it is invoked through our annual monitoring reports.

10.5 Future work on accounting for land emissions

47 In accounting for land emissions, the options available to us are limited to the methods that are used by government now. We must take the emissions data already produced by other government agencies, as the Commission does not have capability to produce these statistics itself.

48 In considering the rules for measuring progress and feedback from submitters, we identified scope to improve government accounting methods. We have revised our recommendation to provide more direction to the government on this. The identified improvements would improve land emissions estimates and enable us to better consider new options when we revisit advice on accounting in 2024, as part of providing advice on the fourth emissions budget.

49 First, government should consider how to appropriately account for the effect of using biomass for energy on the lifetime of carbon stored in forests and wood products. This was raised in some submissions, with questions about whether using biomass for energy actually reduces emissions compared to burning fossil fuels like natural gas, or if bioenergy is really carbon neutral.

50 Increasing the use of biomass, such as harvest residues and pulp logs, for biofuels can reduce carbon stored in above ground biomass or in the harvested wood products pool. This still leads to an overall emissions reduction as the emissions from avoided fossil fuel use are larger and longer lasting than the increase in forest and wood product emissions. Nevertheless, these effects should be factored into the emissions accounting for forests.

51 A second area for further work is looking at how to increase the coverage of target accounting. The development of methods to account for carbon in organic soils such as peat, and biomass on grasslands such as small lots of trees and regenerating vegetation should be prioritised. These are among the most significant emissions sources and sinks not currently covered (see Figure 3.3 in *Chapter 3: How to measure progress* of the *2021 Supporting Evidence*). There was also strong support in consultation feedback to start accounting for these in targets. Some stakeholders were also interested in accounting for carbon in soil more generally, but the evidence base for this is currently weak as noted in *Chapter 18: Policy direction for forests and other carbon stocks*.

52 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.

53 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.

54 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.

55 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.

10.6 Voluntary offsetting and carbon neutrality

56 Voluntary offsetting refers to mitigation beyond government requirements for the purpose of making 'carbon neutral' or 'net zero' claims. This could include the purchase and cancellation of emissions units such as New Zealand Units (NZUs). It aims to compensate for the emissions footprint associated with an organisation, product or service such as air travel.

57 There are several requirements that are widely recognised as necessary to enable a credible carbon neutral claim. One is that voluntary offsetting should contribute to *additional* emissions reductions or removals. This requirement means that voluntary offsetting should deliver something extra on top of what would occur anyway due to business as usual activities, including those due to government policies like the NZ ETS. Another is the avoidance of double claiming, a type of double counting where more than one entity counts an emissions reduction against an emissions reduction target.

58 In Aotearoa the issues of additionality and double claiming are linked. It is not possible to guarantee that an emissions reduction or removal is additional, unless it is not double claimed against the country's emissions reduction targets. In practice, this means that to deliver additional mitigation in any NZ ETS sector whose emissions are in scope for target accounting, both an NZU must be cancelled and an adjustment made to the accounting for targets, emissions budgets and the NDC.

59 This requirement is due to the NZ ETS, which is managed in way that takes account of emissions from the whole economy, including from agriculture and forests that are not covered by the NZ ETS. If over time the country's total net emissions recorded in the Inventory are lower than what is needed to meet emissions reduction targets, more units will likely be added to the NZ ETS cap via the annual cap updates. This adjustment is to keep Aotearoa on track to achieve its targets, to avoid imposing more cost than necessary on the economy and New Zealanders.

60 If NZUs were cancelled for voluntary offsetting without removing the same volume from the target, it would simply make it appear that the NZ ETS is driving more reductions than necessary to meet the targets. The NZ ETS cap would then be adjusted upwards, permitting more emissions elsewhere in the economy, negating the impact of the voluntary mitigation.

61 The Government is considering what guidance to provide about voluntary offsetting from 2021 as Aotearoa moves to Paris Agreement accounting practices. It has not yet made any decisions about whether to allow adjustments against emissions budgets when NZUs are cancelled for the purpose of voluntary offsetting. Nor has it decided whether carbon neutral claims can be made when an NZU is cancelled.

62 The Government should explore options for enabling voluntary mitigation and clarify the types of claims that can be made about it in Aotearoa. This should aim to encourage the desire for voluntary action of the private sector, local governments and other institutions for the benefit of the climate. Clarification will also be needed on how the Government's carbon neutral programme will operate for accounting.

63 We consider that, given the way the NZ ETS currently operates, if there is no adjustment against targets when an NZU is cancelled, it is not legitimate to claim that any additional emissions reduction or removal has occurred. This is in line with our objective and principles for accounting that relate to transparency, consistency and tracking genuine environmental gains.

64 Feedback from submissions indicated that voluntary offsetting is of high interest to a range of people, businesses and institutions. This is both from the perspective of those who want to undertake voluntary offsetting for carbon neutral claims, as well as of those who question the validity of such claims or activities. This is another area where the Government should work to clarify what constitutes sound and robust accounting practices that track genuine progress in reducing emissions.

10.7 Legislative requirements, including out-of-scope sources and sinks

65 The Climate Change Response Act 2002 (the Act) sets out the framework for the system of emissions budgets to set the path to the 2050 targets, including some of the parameters for accounting. These relate to the scope of emissions budgets, which excludes emissions from international aviation and international shipping and from Tokelau, and that emissions budgets be expressed as a net quantity of carbon dioxide equivalent, calculated in accordance with international climate change obligations.

66 A significant number of submitters called for emissions budgets and the 2050 targets to include emissions from international aviation and shipping. This exclusion is set in law, so the Commission does not have the ability to include these emissions in emissions budgets now unless Parliament amends the legislation.

67 Like the submitters, we think that these emissions are significant and part of the overall emissions footprint of Aotearoa that should not be ignored. They are currently calculated and reported as a memo item in the national inventory. They also come under the jurisdiction of the International Civil Aviation Organization and the International Maritime Organization, which have or are developing measures to reduce or offset these emissions.

68 As required by the legislation, in 2024 we will review whether these international transport emissions should be included in the 2050 targets. In the meantime, we have tested to make sure that our recommended emissions budgets allow for Aotearoa to meet a 2050 net zero long-lived gas emissions target including international aviation and shipping emissions, in case a decision is made in future to include these in the 2050 targets.

69 A further out-of-scope issue raised by several submitters was carbon in the ocean ('blue carbon'). The ocean has a role as a source and sink of emissions, but limited data exists about this for the marine environment around Aotearoa. Furthermore, there is no internationally agreed greenhouse gas accounting guidance in respect of the ocean. More work needs to be done on the scale and permanence of these emissions and removals and how they could be accounted for before they could be included in emissions budgets. We recognise this is an important issue and will follow developments including any IPCC assessments or accounting guidance relevant to the ocean.

70 Overall, we maintain the view, expressed in our *2021 Draft Advice for Consultation*, that no changes to the Act are warranted at this stage, given the high bar for recommending legislative change. A more detailed explanation of some of these issues is provided in *Chapter 3: How to measure progress* in the *2021 Supporting Evidence*.

10.8 Method updates to the national inventory

71 Another issue raised during consultation relates to challenges that method updates in the GHG Inventory may create for achieving emissions budgets.

72 Emissions budgets are expressed as a specific, absolute volume of net emissions. This potentially creates challenges for maintaining consistency and integrity in accounting for emissions budgets over time, given that the national inventory is regularly updated as scientific knowledge evolves. We note that this is not a new issue, as the current and previous international targets adopted by Aotearoa have also been set as a fixed amount of emissions.

73 We heard concerns that these method updates could prevent the Government from meeting emissions budgets, through no fault of its own. Method updates could also make achieving emissions budgets easier, with no additional effort. Ideas raised to manage this issue included holding back on significant updates to the national inventory or presenting two sets of emissions estimates, with the one used for judging compliance with emissions budgets excluding method updates.

74 These options have significant downsides. For example, delaying science-based method updates is inconsistent with international obligations to continually improve the national inventory. Reporting two sets of emissions estimates in the inventory could create confusion among stakeholders. There might also be extra resource demands on the already limited resources within Government for preparing the GHG Inventory.

75 Another approach would be for the Commission to address inventory updates in its monitoring reports. We would assess the extent to which changes in emissions estimates are caused by method updates, as opposed to genuine progress or lack of progress in reducing emissions. This could then be factored into the Commission's advice and commentary on the adequacy of the emissions reduction plan, including in our report at the end of each emissions budget period.

76 On balance, we consider that accepting the risk of inconsistencies between an emissions budget and the national inventory emissions estimates is preferable to delaying science-based updates to the inventory or preparing two sets of estimates. We intend to proceed with our monitoring responsibilities on this basis. More information on this issue can be found in *Chapter 3: How to measure progress* of the *2021 Supporting Evidence*.

Recommendation 5

The rules for measuring progress towards emissions budgets and the 2050 targets

We recommend the following package of rules for measuring progress:

a. Use of the production-based approach from *New Zealand's Greenhouse Gas Inventory* as the basis for accounting for emissions budgets and the 2050 targets.
b. Use of the modified activity-based framework for land emissions accounting, with a 1990 base year and 'averaging' for post-1989 forests, substantially aligning emissions budget accounting with the approach used for accounting for the Nationally Determined Contribution (NDC).
c. Within the modified activity-based land emissions accounting framework, to:
    i. Include the land areas and uses corresponding to afforestation, reforestation, and deforestation, as confirmed for the first NDC.
    ii. Exclude forest management, the activity relating to the impact of management practices on pre-1990 forest carbon stocks. This is despite its inclusion in NDC accounting because the forest management reference level has not yet been set for the period through to 2030 and we have been unable to assess how it manages accuracy and uncertainty risks. Improved management of pre-1990 forests nevertheless remains important and should be encouraged through policy.
    iii. Include harvested wood products (HWPs) from post-1989 forests, but not HWPs from pre-1990 forests because they are accounted for as part of forest management which is excluded from emissions budget accounting.
    iv. Include a natural disturbances provision, aligned with the first NDC and the 2013 IPCC Kyoto Protocol Supplement. The Commission will judge whether to invoke the provision in its reports that monitor progress each year and at the end of an emissions budget period.
d. From 2021, if the Government allows voluntary offsetting for carbon neutral claims to take place in Aotearoa through cancelling New Zealand Units (NZUs), adjustments corresponding to the amount of NZUs cancelled must be made to the relevant emissions budget, or to the inventory, to avoid the emissions reductions claimed from being negated by increases to the New Zealand Emissions Trading Scheme (NZ ETS) cap.

We also recommend that the Government undertake the following work to improve emissions estimates and broaden the options available for emissions budgets accounting in future:

e. Continue to produce and improve annual reports on national consumption emissions estimates
f. Develop an appropriate method to reflect changes in carbon stored in above ground biomass and harvested wood products due to increased use of biomass for energy
g. Develop methods for tracking emissions and removals by sources and sinks not yet included in the country's domestic or international target accounting. This should include:
    i. Prioritising development of methods to account for carbon in organic soils (such as peat) and biomass (such as small lots of trees and regenerating vegetation), with a view to allowing them to be included in future target accounting.
    ii. Examining the feasibility of using the land-based approach in accounting for targets and emissions budgets for sources and sinks other than production forests, while managing the uncertainty and emissions fluctuations from the harvest cycles of production forests.
h. Develop sound and transparent practices for accounting for domestic voluntary mitigation and offsetting claims, in relation to the NZ ETS, emissions budgets and NDCs.