Chapter 22

Ngā herenga matua kia tika ai te ekenga a Te Ahungaroa o Aotearoa
Factors relevant to setting the level of the Nationally Determined Contribution

1 As noted in the previous chapter, in its first NDC, Aotearoa committed to reduce net greenhouse gas emissions to 30% below 2005 gross levels by 2030. This means Aotearoa can emit net emissions of no more than 596 $MtCO_2e$ over the 2021-2030 period.

2 The Minister of Climate Change requested advice from the Commission on the current NDC, including on:

> *recommendations on any changes to the NDC, required to ensure it is compatible with global efforts to limit the global average temperature increase to 1.5°C above pre-industrial levels.*

3 In the previous chapter we concluded that an NDC for Aotearoa that is compatible with global efforts to limit warming to 1.5°C would require emissions of much less than 568 $MtCO_2e$, equivalent to a reduction of much more than 36% on 2005 levels by 2030.

4 There would be significant challenges reducing emissions in Aotearoa beyond what we have recommended in the first two emissions budgets. For this reason, offshore mitigation will be required to meet the NDC. More offshore mitigation will be needed if the NDC is strengthened.

5 Decisions about the level at which the NDC is set require judgements about the potential social and economic impacts of extending the NDC, the expectations of other countries and their governments, tolerance for climate risks, and the relative importance of investing in greater levels of climate change action compared to other domestic or international priorities.

6 We consider that these judgements are outside the Commission's remit and should be made by the elected Government of the day. However, the Commission can comment on some of the factors the Government should consider in deciding on the level of the NDC.

7 This chapter describes a range of different matters that should be considered. It discusses specific challenges in meeting the NDC, and addresses some questions raised by submitters about the form of the NDC.

22.1 How Aotearoa could meet the NDC

8 The NDC sets limits on net emissions over the period. This comprises all gross emissions, any domestic emissions removals (such as from forestry), as well as any international mitigation that Aotearoa decides to purchase (offshore mitigation).

9 Emissions reductions to meet the NDC will come from a combination of action within Aotearoa and offshore mitigation. This is illustrated in Figure 22.1 below.

10 This is different from emission budgets, which must be met as far as possible through domestic action. The Climate Change Response Act (the Act) limits the use of offshore mitigation in emissions budgets to situations where there has been a major change in circumstances, not accounted for when the budgets were set, which affects the ability to meet the relevant emissions budget domestically.

11 Should Aotearoa wish to increase the ambition of its NDC, it could reduce domestic greenhouse gas emissions faster, increase removals of carbon dioxide, or purchase additional offshore mitigation. The Government would need to carefully consider the challenges associated with these options.

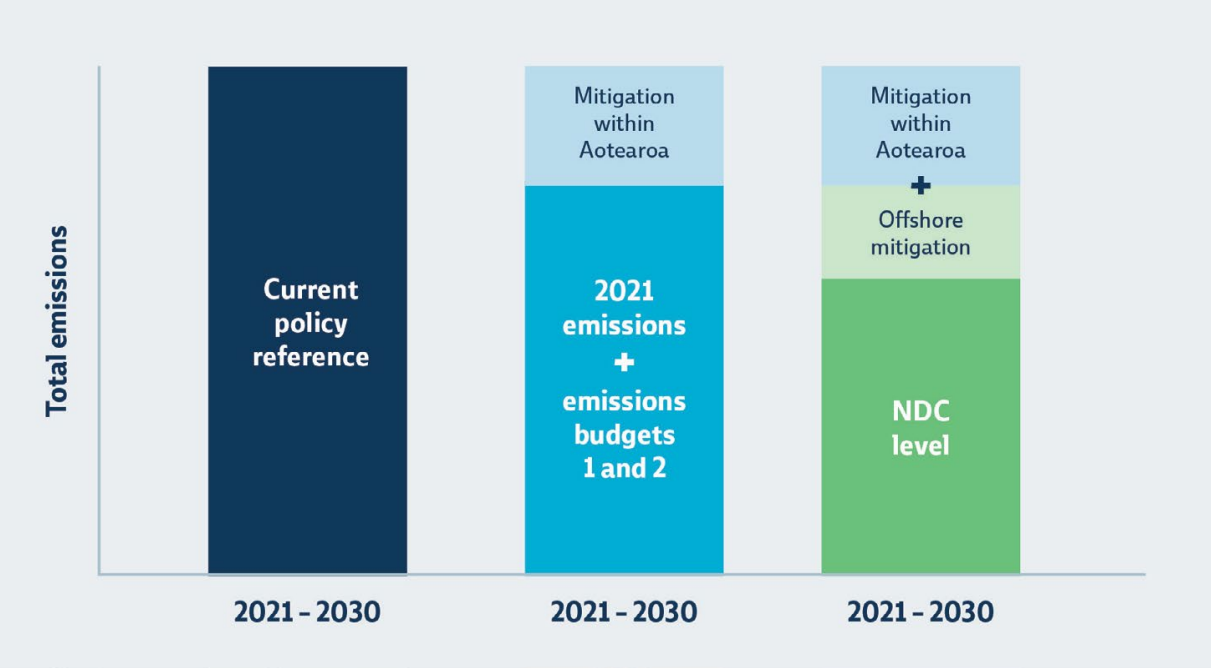

Figure 22.1: Illustration of the role of international mitigation in the NDC compared to emissions budgets

22.1.1 There is a growing gap between the NDC and net emissions in Aotearoa

12 The gap between the NDC and net emissions has arisen because past climate change targets have been met primarily using offsets from exotic production forestry (predominantly pine), rather than reductions in gross emissions.

13 For production forests only the first rotation sequesters additional carbon (under international accounting rules). Subsequent rotations of harvesting and replanting maintain the forest's stock of carbon at its long-term average associated with the offsets that have already been used, but not offsetting further emissions. (See Box 22.3 in *2021 Supporting evidence Chapter 3: How to measure progress*). Only expansion to the area planted in forest will generate new offsets.

14 To meet previous emissions reduction targets, Aotearoa has principally relied on the large area of forests planted in the 1990s. However, the additional area of new forest planted between 2000 and 2020 was relatively small, compared to the level of planting between 1990 and 2000 (see Figure 22.2 below).

15 The last of the forests planted in the 1990s are now reaching their long-term average carbon stock, and are no longer contributing to emissions reduction targets. A smaller area of forest was planted in the 2000s and 2010s. This means that the total amount of emissions offset by forestry is going down. As the total offsetting effect of forests in Aotearoa slows, net emissions will rise significantly between 2019 and 2022.

16 Under the Paris Agreement, each new NDC target must represent a progression in ambition on previous targets – targets must become more stringent over time.

17 This means that at the same time as emissions removals through forestry are dropping off, the level of allowed emissions under the country's NDC is getting stricter compared to previous targets.

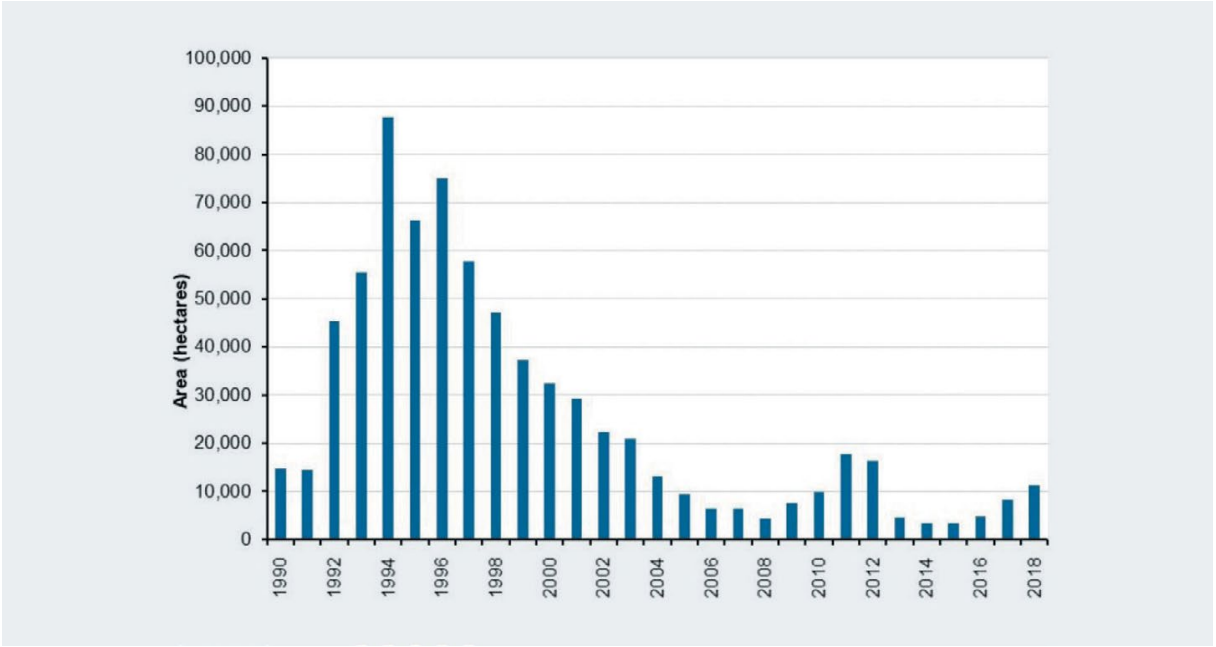

Figure 22.2: Areas of new forest planted in Aotearoa 1990 – 2018
Source: MfE, New Zealand's Greenhouse Gas Inventory 1990-2018

18 Our demonstration path includes the ongoing establishment of areas of new forest. This includes significant areas of exotic production forests in coming years, with increasing areas of permanent native forest over future decades. Native forests generally sequester greater amounts of carbon and over a longer period than exotic production pine so represent a more enduring carbon sink.

19 The current NDC emissions period has already started and runs to 2030. Increasing planting rates now will assist with meeting future targets, but will not contribute much to meeting the current NDC. This is because it takes around 5-7 years for newly planted forest to start removing significant amounts of carbon.

20 Figure 22.3 below shows actual net emissions in Aotearoa (dark blue line) and projected out to 2021 (dotted).

21 Net emissions increase as the amount sequestered by our forests drops. The coloured areas illustrate the country's international commitments, which are getting progressively stricter over time. This figure shows the growing gap between emission budgets and the NDC.

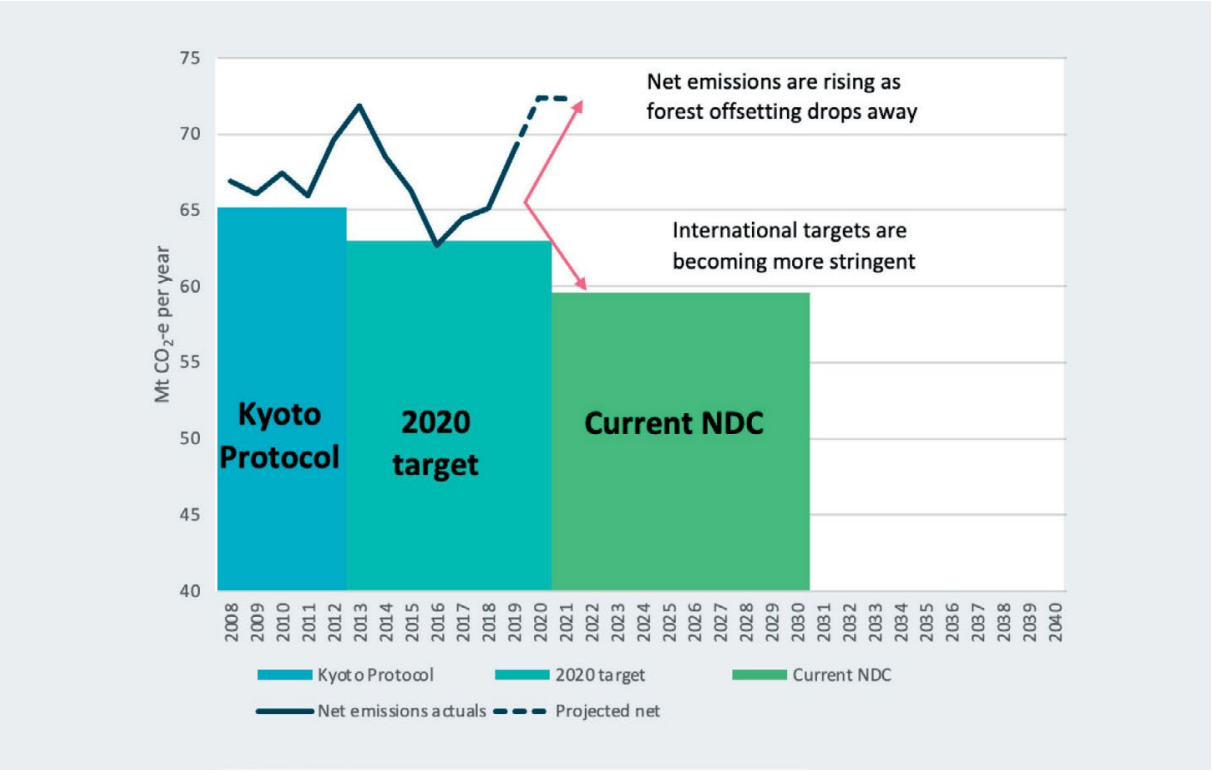

Figure 22.3: New Zealand's past emissions targets and current NDC and projected net emissions (target accounting)

Note: International commitments under past targets presented here have been recalculated to match the current GHG inventory for consistency of comparison.

22.1.2 Meeting the current NDC through domestic action alone would be highly challenging

22 The Act states that emissions budgets must be ambitious but achievable. It also states that emissions budgets must be met as far as possible through domestic actions.

23 Our recommended emissions budgets, described in our ***2021 Supporting Evidence***, ***Chapter 2: What are other countries doing?***, would limit net emissions in Aotearoa to 576 $MtCO_2e$ over the periods 2022-2025 and 2026-2030 together.

24 When forecast emissions for 2021 are included, emissions over the NDC period (2021-2030) would be 648 $MtCO_2e$ – if our proposed emissions budgets are adopted and achieved.

25 Our analysis shows that these emissions budgets are ambitious but achievable and will put Aotearoa on track to meeting the 2050 targets. In recommending these budgets, we have had regard to the matters set out in section 5M of the Act where relevant, and 5ZC (see also Table 3 in ***Chapter 3: The role of the Commission***).

26 If the Government were to commit to reducing greenhouse gas emissions faster than we propose in our emissions budgets, there is a risk that Aotearoa could lose production in areas where technological solutions to reduce emissions could be applied, if more time were available.

27 For example, in food processing, replacing a coal boiler with a biomass boiler requires finding a supplier, and undertaking design work to integrate it into the existing process. If time is not allowed for this to happen, some businesses may simply have to shut down.

28 The scale of emissions reductions needed to bridge the gap between emissions budgets and the NDC means that meeting the NDC domestically would likely lead to severe social and economic impacts on communities, people and businesses – far more than would be necessary to achieve the same amount of emissions reductions given more time.

29 The likelihood of achieving larger emissions reductions is another consideration. Our modelling shows that it may be possible to reduce emissions more than our budgets propose, but that this requires technologies that are not yet proven – particularly to reduce biogenic methane. Whether these technologies will be successfully developed and deployed is uncertain.

30 Committing to achieving greater emissions reductions domestically than we recommend through our emissions budgets introduces significant risks. However, if new technologies are developed and proven in time, Aotearoa would be able to meet a larger portion of its NDC through domestic action. It would also be in a better position to set a more stringent second NDC.

Box 22.1 Meeting the NDC through domestic action

A number of submitters from the public and NGO community have proposed setting the domestic emissions budgets at the same level as the NDC.

If we set domestic emissions budgets at the level of the NDC, the scale of the reductions needed mean they could not be met without rapidly shutting down many of our emitting activities. For businesses such as farms and factories, the scale of the closures would need to be severe for the budgets to be met. This is because net emissions are starting at a point much higher than the average NDC level and the trajectory is for projected net emissions to rise over the next few years.

We estimated that if the current NDC had to be met solely domestically, an additional 52 $MtCO_2e$ would need to be reduced over the period *in addition* to the effort required to meet our proposed emissions budgets. Any combination of actions to deliver so much mitigation in so short a time would require large scale cuts to economic output across Aotearoa.

For example, closing iron and steel production from 2025 would bridge less than a third of the gap. In addition, it would require either cuts to all agricultural output of the order of halving output by 2030. Alternatively it would require imposing tight restrictions on private transport use – beyond those that saw the need for carless days in the 1970s – alongside broad cuts to agricultural output.

From an intergenerational equity perspective, excessively fast cuts to emissions would have a legacy impact on the quality of life for younger generations as families are left without employment or essential services.

This pace of change would also disproportionately affect Iwi/Māori in terms of the Māori economy, given its large agricultural base, and Māori workforce who are disproportionately represented in agricultural and manufacturing industries.

We consider that the impacts on people and communities of setting our budgets at the same level as the NDC would be unmanageable.

22.1.3 Offshore mitigation will be required to meet the NDC

31 Offshore mitigation refers to where one country funds emissions reductions in another country and counts those reductions towards its own emissions reduction target.

32 This is a valid contribution to addressing climate change, as long as the offshore mitigation represents real, verifiable and additional emissions reductions. The benefit to the atmosphere of an emissions reduction is the same, regardless of where it happens.

33 In contrast to domestic emissions budgets under the Act, the NDC explicitly allows for offshore mitigation. This means that Aotearoa can contribute more to the global effort than it is currently able to domestically.

34 The Paris Agreement recognises that international cooperation through market mechanisms can serve the goals of increasing ambition and of promoting sustainable development and environmental integrity.

35 This is consistent with a mātauranga Māori view of the interconnectedness between the climate and global system, and tikanga – doing the right thing in the right way. The NDC represents the total mitigation contribution to the world, beyond just what we can do at home.

36 Due to the challenges, risks and likely impacts of meeting the NDC through domestic action alone, offshore mitigation will be critical to meeting the current NDC.

22.2 The first NDC is part of a broader, longer-term contribution to the climate effort

37 It is important not to isolate the ambition of the current NDC from the context of the country's longer-term climate objectives.

38 In advising on the first three emissions budgets we have placed them in their longer-term context out to 2050 and beyond. The first two emission budgets represent the Commission's recommendation of the emission reductions that are achievable within Aotearoa up to 2030. The current NDC covers the period 2021-2030.

39 It takes time to develop policies, and there is also a lag between when policies are developed, implemented, and when they affect behaviour and result in emissions reductions. This means that the policies established in the first budget period will drive the emissions reductions needed in later budget periods. To an extent, constraints on the current level of the country's ambition have been shaped by the policy settings of the previous several decades.

40 If the Government adopts the domestic emissions budgets we recommend, and implements a comprehensive set of policies to achieve them, it will unlock the possibility of greater ambition beyond 2030. Greater levels of emissions reductions will become possible as government, businesses and communities build momentum in reducing emissions. Aotearoa would then be well placed to adopt a more ambitious second NDC.

41 Our emissions budget demonstration path would see net emissions reduce significantly faster than a linear trajectory in line with IPCC 1.5°C compatible pathways would require (see Figure 22.4 below).

42 Focusing on unlocking greater ambition in our second NDC is not deferring or delaying action – it reflects the reality that policies implemented today will take time to take effect and require policy action now.

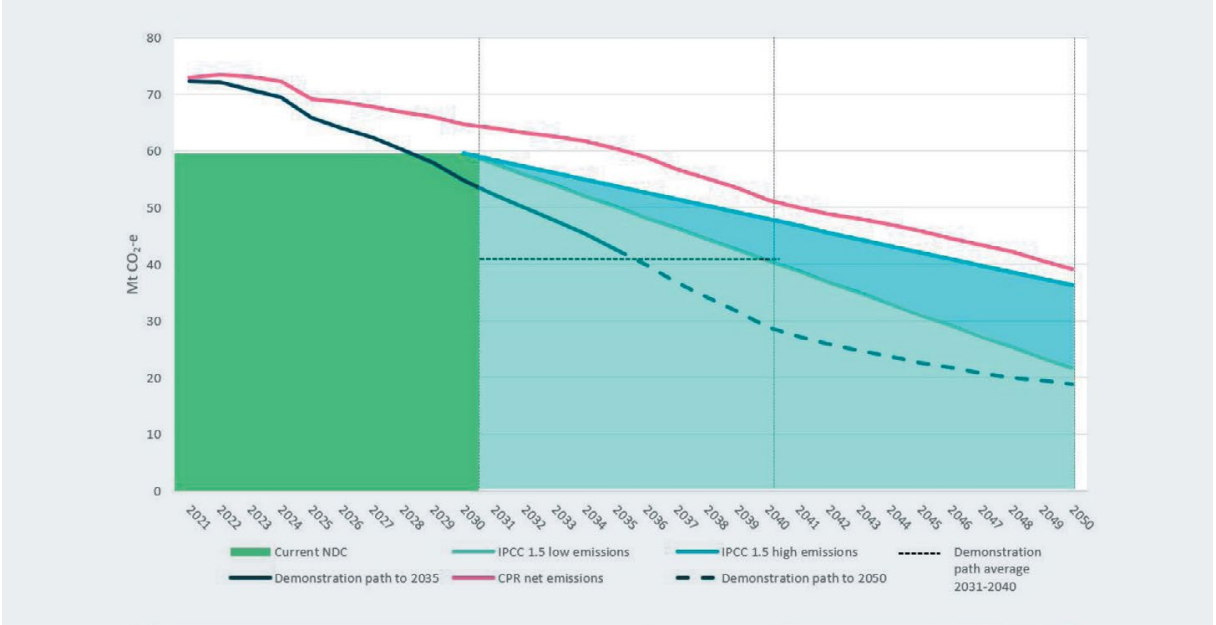

Figure 22.4: Domestic emissions budget demonstration path, against current NDC and linear trajectories to IPCC 1.5 range in 2050

22.3 Aotearoa should plan for how it will meet the NDC

43 As noted above, offshore mitigation will be required to meet the NDC (see section 22.4 for more detail on how much will be required).

44 Under Article 6.2 of the Paris Agreement, mitigation can be traded between countries by bilateral agreement so long as countries are clear as to how standards of environmental integrity and avoiding double counting will be met.

45 Article 6.4 also provides for a multilateral market mechanism. However, when it will become operational and what processes this mechanism will follow are still unclear. Its establishment depends to an extent on negotiations among all parties to the Paris Agreement. The multilateral mechanism may take some time to develop whereas the bilateral linkages can be established now.

46 The Government has not yet established the bilateral linkages necessary to make this mitigation available. Once these linkages are established, it will become feasible to achieve the current, or a strengthened, NDC.

47 Overreliance on forestry offsets when setting targets has contributed to Aotearoa being in its current position – where there is now a large gap between the country's net emissions and its international commitments.

48 To remedy the situation, the Government should prioritise reducing gross emissions and building a long-term carbon sink within Aotearoa.

49 It is important not to lose focus on putting the policies and measures in place that will drive emissions reductions within Aotearoa over the long term. In setting the NDC, we encourage the Government to also consider its ambitions beyond 2030.

50 The Government must ensure that policies are compliant with Te Tiriti o Waitangi/The Treaty of Waitangi and do not further compound historic breaches. Taking a long-term approach to planning for the NDC and future commitments would be consistent with the longer-term view of te ao Māori. By acting in partnership with Iwi/Māori to develop policies and measures to reduce emissions, the Government can ensure its approach upholds The Treaty and remains focused on the long-term.

51 Should the Government decide to strengthen the NDC, it should consider and describe how the NDC will be met, and put plans in place to do so.

22.3.1 It is not yet clear how Aotearoa will access offshore mitigation

52 As noted in the previous section, there is currently no centralised, UN-overseen market that Aotearoa can easily access – although negotiations are continuing in this area. In the meantime, it is incumbent on individual countries to negotiate market arrangements with each other. Some countries are already making progress – Switzerland, in particular, has already signed agreements to cooperate on reducing emissions with two partner countries.

53 The Government has signalled that it will hold itself to high standards of environmental integrity in the offshore mitigation it applies to the NDC. It is critically important that the Government follows through on this intent.

54 The need for offshore mitigation to meet the NDC also raises the question of how the purchasing will be paid for and managed. Purchasing could be undertaken by the Government or by emitters, and this will depend in part on how Aotearoa secures access to international emissions markets.

22.3.2 Accountability and reporting on the NDC will be critical

55 The credibility of the NDC relies on the Government showing its intent to achieve both the domestic and international emissions reductions required to meet it. Domestic emissions budgets and the emissions reduction plan will fulfil the former, but it is not yet clear how the Government will deliver on the latter.

56 The government should develop a plan for how it will access and purchase offshore mitigation and take steps to implement it. This will demonstrate a credible commitment to meeting the NDC both domestically, and to the international community. It would not be responsible for Aotearoa to wait for others to develop the markets for us, or to leave this until the late 2020s – this work needs to start now.

57 Our domestic and international reporting and accounting framework does not currently provide enough information on how meeting the NDC, including through purchasing of offshore mitigation, may impact on public finances. The NDC is not within scope of the Commission's annual monitoring reports, because these reports are about the 2050 target and emissions budgets.

58 Given that the Government intends to require a range of businesses to disclose climate change risks in their financial reports, it is not unreasonable to expect the Government to do the same. We therefore consider that the Government should hold itself accountable for meeting the NDC through regular transparent reporting, including the disclosure of any fiscal risks that may arise from the purchasing offshore mitigation and its strategy for managing those risks.

22.3.3 Broader contributions

59 NDCs communicate countries' mitigation commitments – how much each will contribute to the collective effort to peak global emissions and rapidly reduce them thereafter.

60 The contributions a country makes to addressing climate change can go beyond the actions taken to deliver the emissions reduction target communicated in the NDC. For example, climate finance to support developing countries to adapt to the effects of climate change and to mitigate their own emissions. Both contribute to the global climate effort.

61 The Terms of Reference for the Commission's review of the NDC refer to limiting warming to 1.5°C, so our analysis has focused on mitigation commitments. However, using the NDC to communicate broader efforts is one option the government could include in its considerations.

Recommendation 31

Planning and reporting on the NDC

We recommend that the Government should:

1. In making its decisions, continue to enable the NDC to be met through a combination of domestic emission reductions, domestic removals, and use of international carbon markets.
2. Report annually on how it plans to meet the NDC, including the balance of planned domestic emission reductions, removals, and offshore purchasing.
3. Clearly communicate its strategy for purchasing offshore mitigation to meet the NDC and how it will identify and manage fiscal and other risks and their consequences.

22.4 The scale and cost of offshore mitigation needed to meet the NDC

62 The gap between the current NDC and our recommended emissions budgets is 52 $MtCO_2e$ over 9 years.

63 There is the possibility that this gap could reduce. For example, our modelling suggests that if a methane inhibitor or vaccine can be developed and deployed by the mid-2020s, this gap could be significantly reduced. As these technologies are not yet commercially available and their future availability is uncertain, we have not included them in our emissions budgets.

64 Table 22.1 below shows the likely quantity of offshore mitigation that would be needed to meet the NDC. It shows this for the current Aotearoa NDC, and for an NDC based on the middle or lower emissions end of the IPCC pathways to 1.5°C.

65 If Aotearoa were to strengthen the NDC to reflect international equity considerations, the resulting NDC would require much deeper cuts to emissions.

Table 22.1: The amount of offshore mitigation needed under different NDC levels

NDC approach	Level (Mt CO_2e)	Implied quantity of offshore mitigation (Mt CO_2e)
2017 estimate of the current NDC	601	47
Latest estimate of the current NDC (-30%)	596	52
Middle of the IPCC interquartile range (-36%)	568	80
Lower quartile emissions IPCC pathways (-45%)	527	121

22.4.1 It is uncertain how much offshore mitigation will cost

66 It is currently uncertain how much offshore mitigation will cost. Its cost will depend on which country, or countries, the Government partners with, the types of mitigation available there, and the volume the Government wishes to purchase.

67 Once the Government has formalised a partnership for offshore mitigation with another country, it will have to decide how the mitigation will be paid for. Offshore mitigation could be paid for by the Government, by emitters or a combination of the two.

68 The overall economic impact of expenditure on offshore mitigation will be greater than the purchase price (the direct cost), due to multiplier effects. Were an equivalent amount to be spent within Aotearoa, it would have a knock-on effect stimulating spending in downstream industries. With offshore mitigation these knock-on effects occur overseas, and so Aotearoa would not get these benefits (indirect costs).

69 However, Aotearoa would gain the benefit of cheaper emissions reductions, and greater availability of mitigation options while the country builds momentum in decarbonising at home.

70 It is uncertain both how much mitigation will cost and what multiplier would be appropriate to account for these terms of trade effects. This means there is a wide range of possible economic costs to offshore mitigation.

71 Our models have been set up to assess paths to meeting domestic emissions targets and are independent of the NDC. The cost of offshore mitigation is therefore additional to the costs modelled to meet recommended emissions budgets.

72 If Aotearoa were to change the NDC to reflect the middle of the IPCC range, or the upper quartile of the IPCC range, then the range of plausible economic costs of this component are described in Table 22.2 and Table 22.3 below.

Table 22.2: Possible economic costs of offshore mitigation used to meet an NDC enhanced to 36% below 2005 emissions

	Price ($/tonne)		
Direct/indirect costs included	$30	$70	$140
Direct cost only	$2.4b	$5.6b	$11.2b
Direct + indirect costs	$4.3b	$10.1b	$20.2b

Table 22.3: Possible economic costs of offshore mitigation used to meet an NDC enhanced to 45% below 2005 emissions

	Price ($/tonne)		
Direct/indirect costs included	$30	$70	$140
Direct cost only	$3.6b	$8.5b	$16.9b
Direct + indirect costs	$6.5b	$15.2b	$30.5b

Note: Estimates of the possible multiplier to account for terms of trade effects vary. Here in Table 22.2 and Table 22.3 we have used 1.8 based on work done by Infometrics to assess the impact of possible NDCs in 2015 – *A general equilibrium analysis of options for New Zealand's post-2020 climate change contribution*.

22.4.2 Offshore mitigation cannot replace domestic action, and should have high standards of environmental integrity

73 During consultation, some submitters raised concerns about the use of offshore mitigation in the NDC. They expressed two main concerns around the use of offshore mitigation:

1. Offshore mitigation could allow the Government to do less to reduce emissions within Aotearoa, delaying the transition.
2. A significant amount of the offshore mitigation in the 2010s was not backed by real emissions reductions.

74 We have considered these issues. We consider that circumstances have changed sufficiently such that both concerns are addressed or addressable, which gives us confidence that Aotearoa can continue to incorporate offshore mitigation into its NDC.

75 First, the way the Act is structured (particularly sections 5Z and 5W), means that the Government is no longer able to use offshore mitigation as a way to do less in Aotearoa.

76 The government must set emissions budgets and plan to meet them entirely domestically. The Act restricts use of offshore mitigation in emissions budgets to when there has been a significant change of circumstances that affects both the ability to meet the emissions budget domestically, and the considerations on which the emissions budget was set.

77 This is a high bar. It means that offshore mitigation cannot be used to compensate for failure to implement domestic policies. The government can only plan to use offshore mitigation to bridge the gap between emissions budgets and the NDC.

78 Second, when meeting its previous emissions reduction targets, Aotearoa relied on compliance with the rules of the centralised Kyoto Protocol framework to ensure the environmental integrity of purchased offshore mitigation. This proved insufficient, as despite compliance with the agreed rules, there were deficiencies in the environmental integrity of many credits that were issued.

79 Given this previous experience, the government must take responsibility itself for ensuring the environmental integrity of any offshore mitigation that contributes to the NDC. The government should also expect heightened international and domestic scrutiny of how Aotearoa uses offshore mitigation.

80 We note that this is in line with use of offshore mitigation under Article 6.2 of the Paris Agreement, which requires that each country ensure the environmental integrity of any offshore mitigation it uses, and be scrutinised on it. It is the responsibility of individual countries to make sure the mitigation is real and has environmental integrity.

81 The Government has indicated strongly through public statements that it supports strict standards for environmental integrity in any offshore mitigation that it does use. We consider it essential that the Government uphold this commitment.

22.5 Key principles and approaches to inform decisions about what a fair contribution would look like

82 In seeking to make the NDC compatible with the global effort to limit warming to 1.5°C, the Government must, either implicitly or explicitly, make assumptions about how its NDC relates to the efforts of other countries.

83 There are a range of different approaches to thinking about sharing the global effort between countries (known as effort sharing, or burden sharing). Each implies a different level of NDC for Aotearoa.

84 There are a range of equity considerations that can be used to help guide decisions about suitable contributions from different countries. Each contains complexities and requires judgements to be made in its application. This means that the same approach can lead to different results if different assumptions, or parameters are used.

85 We provide a high-level overview of some of the considerations, but do not provide detailed figures. It is for the Government to decide which approach it wishes to use, and to describe the judgements it makes in doing so.

86 The IPCC described, in its Fifth Assessment Report, the main set of effort sharing approaches. This includes three main principles, which can be balanced in different ways:

- **Equality.** This principle focuses on equal access to the atmosphere. The remaining global emissions budget is shared between all people equally.

  There are a range of ways to interpret equality. For example, emissions reductions could be equal, with all countries reducing emissions at the same **rate. Alternatively,** per capita emissions could be equal, with emissions **per capita converging to the same level for all countries.**
- **Responsibility.** This principle focuses on countries taking responsibility for their historic emissions. Countries that have emitted more historically have to make deeper and faster emissions reductions.

  A key judgement to apply with this approach is the timeframe over which responsibility is to be taken.
- **Capability/need.** This principle focuses on a country's level of economic development. Higher levels of economic development imply a higher capability to reduce emissions. Lower levels of economic development imply a greater need for further development, and need for a greater share of the world emissions budget.

  Based on this principle, richer countries are required to reduce emissions further and faster while less developed countries take more time before cutting emissions, in order to develop economically.

87 In addition to these three main principles, there are a range of approaches that combine the elements in different ways. The two most relevant are:

- **Equal cumulative per capita emissions.** Emissions need to be reduced so that cumulative emissions, on a per capita basis, reach the same level.

  This allows countries with a large population and low historic emissions further time to develop. This approach combines elements of equality and historical responsibility.
- **Responsibility/capability/need.** Countries with the most historical responsibility, and the highest capability to reduce emissions make deeper and faster emissions reductions.

  A range of studies have explicitly used responsibility and capability as the basis for distributing emissions reductions. The approach taken will depend on the relative weighting given to responsibility vs capability.

88 Each of these approaches relies on an assessment of the global emissions budget that is compatible with the goal of limiting warming to 1.5°C, and dividing it between countries in ways that reflect equity considerations.

22.5.1 The emissions trajectory for Aotearoa would look different under different approaches

89 Careful judgements need to be made about how different gases are treated in different approaches to global effort sharing. In particular, care should be taken to consider how short-lived gases are treated in approaches that are based on calculating historic emissions.

90 Various organisations and researchers have analysed targets and NDCs specific to Aotearoa under different effort sharing approaches. This includes Climate Analytics and the New Climate Institute (Climate Action Tracker) and du Pont et al (Paris Equity Check).

91 These analyses generally exclude forestry emissions and removals, and so are not directly comparable with an NDC that includes carbon sequestration in forests. Rather, they are illustrative of the depth of reductions required if these equity approaches are applied.

92 Oxfam New Zealand (*A Fair Target for 2030 for Aotearoa*, 2020) provides a useful overview of the different equity approaches that can be applied, and what they would mean for the Aotearoa NDC specifically. They have noted methodological issues that need to be managed in each case.

93 In general, applying equity approaches implies that Aotearoa should make significantly deeper reductions than the global average.

94 For example, Oxfam estimated that an equitable NDC for Aotearoa would be 80-99% below 1990 levels by 2030. They acknowledge that achieving such high emissions reductions domestically are unlikely to be the most efficient or lowest cost way to reduce emissions from the global total.

95 A key observation in the Oxfam report is that Aotearoa should not set a lower international target because it is expensive to reduce emissions domestically, and then use offshore mitigation to meet it. If Aotearoa uses offshore mitigation, the argument that it is expensive to reduce emissions domestically is seen as no longer relevant by the report's authors.

96 For approaches that draw on the equality principle, the scale of emissions reductions needed depends heavily on just what is being held equal – whether it is the allowed emissions budget per person, or the proportional level of reductions.

97 Holding the proportional emissions reductions equal across all countries is not an equitable approach. It is also not compatible with the international commitments Aotearoa has made, because it ignores differences in national circumstances, including between developed and developing countries.

98 Emissions trajectories for Aotearoa based on the country's relative wealth generally lead to deeper reductions by 2030 than the IPCC 1.5°C pathway range. Emissions reductions would reach net zero all-gases between 2040 and 2050.

99 Emissions trajectories that account for historic responsibility follow a similar path towards net zero in the 2040s. However, net emissions would continue to reduce after reaching net zero (net negative) to address past contributions to climate change.

100 The Government should be clear about any method it uses to determine a fair contribution under the NDC.

22.6 The form of the NDC

101 Under the Act, Aotearoa has a domestic emissions reduction target for 2050 that differentiates between biogenic methane and other greenhouse gases (a split-gas target).

102 Some submitters have questioned whether the NDC should also be expressed in a split-gas format or continue to be expressed as an all-gases target.

103 In considering this question, it is important to keep in mind that the NDC serves a different purpose from the domestic 2050 target. The NDC also includes an international contribution through purchasing offshore mitigation, in addition to domestic emissions reductions.

104 It is also important to keep in mind that the NDC is a commitment under the Paris Agreement, and so decisions on form should take into account the agreed rules and expectations under that agreement.

105 Several alternative forms of the NDC are listed below. These cover a range between a fully all-gas or fully split-gas format:

- **Fully all-gas.** Maintain an all-gas target, with no specific reference to the domestic split gas contribution either in the headline target or elsewhere in the NDC.
- **All-gas with acknowledgement of the split-gas domestic target.** Maintain an all-gas headline target but mention the domestic split gas contribution elsewhere in the NDC.

  This could involve either a general reference in the NDC's supporting information, or could include a more detailed reference that specifies in detail the 2030 biogenic methane sub-target and a gas-by-gas breakdown of emissions budgets one and two.
- **All-gas with the split-gas domestic target incorporated into the headline target.** Bring the split-gas domestic target up into the headline target statement, with the NDC also expressed in all-gas terms overall. The international contribution would remain all-gas.

  For the current NDC, this could be worded along the following lines: "*Aotearoa commits to reduce domestic biogenic methane emissions to 10% below 2017 levels by 2030, reduce domestic emissions of other gases by 42% on 2005 levels by 2030 and cooperate on international mitigation outcomes to reduce emissions overall to 30% below 2005 levels by 2030".*
- **Fully split-gas.** Have an overall split-gas headline target, applying to both the domestic and international contributions by Aotearoa.

  For the current NDC, this could be worded along the following lines: *"Aotearoa commits to reduce biogenic emissions biogenic methane to 10% below 2017 levels by 2030 and all other gases to 42% below 2005 levels by 2030".*

22.6.1 Moving to a split-gas NDC would have significant impacts

106 A NDC expressed as two separate targets would be unlikely to meet current international expectations that a developed country's NDC should be an all-sector, all-gas absolute emissions reduction target.

107 It is also important to be aware that under the Paris Agreement, NDCs can only be revised to enhance ambition, and each successive NDC must show progression on the previous contribution. This process is informed by 5-yearly global stocktakes of collective progress towards achieving the purpose of the Agreement and its long-term goals. The first global stocktake is scheduled for 2023.

108 An important implication of expressing the NDC in a split-gas format would be that these targets would be captured in this collective review process and by the requirement for targets to show increasing ambition over time. This could limit flexibility in how Aotearoa meets its international targets in future, and could place additional costs by requiring mandatory increases in the level of our methane reduction targets.

109 However, there may be some benefit in exploring whether Aotearoa should include information in the NDC that clearly sets out the contribution from the different constituent gases (while clearly maintaining a single, all gases target). This could have the benefit of highlighting to other countries the importance of recognising the different warming impacts between gases.

110 There could also be some reputational impact from this approach if Aotearoa is perceived to be signalling a future intent to move away from the norms and expectations on developed country NDCs.

22.6.2 The GWP values used to express the NDC should be updated if the NDC is revised

111 The submission Aotearoa made to the UNFCCC on its current NDC outlines that it "applies 100-year Global Warming Potentials (GWPs) from the IPCC 4th assessment report".

112 In describing the alternate NDCs based on IPCC pathways to 1.5°C, the Commission has also used GWPs from the ***Fourth Assessment Report*** for consistency of comparison.

113 If the Government revises the NDC, there is a strong rationale, as part of that update, to move to applying the 100-year GWPs (GWP_{100}) from the IPCC's ***Fifth Assessment Report***.

114 This is because for emissions in years from 2021 onwards (reported from 2023 onwards), GHG Inventory reports for Aotearoa must be prepared using that the GWP_{100} values from the IPCC's ***Fifth Assessment Report***, in accordance with guidance adopted under the Paris Agreement (Decision 18/CMA.1).

115 Progress towards meeting the NDC will be tracked using the GHG Inventory and GWP_{100} values for consistency and ease of understanding, in line with decisions under the Paris Agreement.

116 Moving to the use of GWP_{100} values from the ***Fifth Assessment Report*** will have some impact on the overall ambition of the NDC, as it is calculated on an all-gas basis against emissions in a base year.

117 The updates to GWP_{100} values in the ***Fifth Assessment Report*** will change the relative contribution of each greenhouse gas to the CO_2e amount of allowed emissions, if the reductions by gas in the IPCC pathways to 1.5°C are applied to Aotearoa. This effect should be factored into the Government's consideration of any changes it might make to the NDC.

Recommendation 32

Form of the NDC

1. We recommend that the Government should continue to define the NDC on the basis of all greenhouse gases using the most recent IPCC global warming potentials adopted by the Parties to the UNFCCC. If the NDC is updated, the Government should express it on a basis that is consistent with how emissions will be reported in the national greenhouse gas inventory from 2021-2030.
2. We recommend that the Government should continue to contribute to further global mitigation beyond the NDC through the provision of climate finance to developing countries and active participation in mitigation mechanisms, including for international aviation and shipping.