Sensitivity classification

Cabinet Paper Sign Out Sheet

Sign out sheet

	Who	***Date***
Title and Tracking number:	CAB-274	
Date Due for Lodging:	John MacCormick	**22-Jun (DEV)**
Analyst/Drafter(s):	John MacCormick, Holly Cowper,	
Legal review: *(If applicable)*		
Peer review:	Bruno Aldaz	
Proof read completed:	Deb Struthers	
Manager sign out:	Kara Lok Simon Mandal-Johnson	
Director sign out:	Hemi Smiler 	
Deputy Secretary sign out:		

Sensitivity classification

Office of the Minister of Climate Change

Cabinet Economic Development Committee (DEV) (for meeting of 28 June)

DRAFT

Developing a Carbon Removals Strategy

Proposal

1. I seek Cabinet's agreement to develop a Carbon Removals Strategy. The strategy will guide near-term and long-term actions to build a more diverse portfolio of carbon dioxide removal activities in New Zealand. Cabinet will receive a draft strategy by December 2023, to approve for public consultation in early 2024 as part of consultation on the second Emissions Reduction Plan.

2. Aligned with the proposed removals strategy, I seek Cabinet's agreement to the following measures to strengthen New Zealand's climate change response:

   2.1 preparing options for legislative and regulatory amendments to enable more carbon removals activities to be recognised in the Emissions Trading Scheme (ETS) or other incentive mechanisms, and for the rules and standards for removals to be set by regulation; and

   2.2 promoting private investment in the research and evidence needed to bring new removals activities into the ETS or other mechanisms, with a clear market entry pathway.

3. [Note this paper may also need to pick up some text and recs about expanding the scope of the NDC to include non-forest land – agree in principle rec is in NDC strategy cab paper, but may have further decisions here as to timing]

Relation to government priorities

4. The Government declared a Climate Emergency in December 2020, following the findings of the Intergovernmental Panel on Climate Change (IPCC). To avoid a rise in global warming of more than 1.5°C, global emissions must fall by around 45 per cent from 2010 levels by 2030 (reaching net zero by 2050).

5. New Zealand has a legislated goal to achieve net-zero emissions by 2050, with intermediate targets to this goal set in emissions budgets. New Zealand has made more ambitious international commitments in its Nationally Determined Contribution under the Paris Agreement. Achieving these targets and commitments requires both reductions in gross greenhouse gas emissions, and the removal of carbon dioxide (CO_2) from the atmosphere.

Sensitivity classification

6. Promoting nature-based solutions within a more diverse portfolio of carbon removals and high-integrity carbon markets also contributes to the goals of Te Mana o te Taiao – Aotearoa New Zealand Biodiversity Strategy 2020.

Executive Summary

Developing a Carbon Removals Strategy for New Zealand

7. New Zealand needs to build a more diverse portfolio of activities to sequester atmospheric CO_2. This must complement a determined focus on reducing gross greenhouse gas emissions. This will help New Zealand to meet our legislated net-zero emissions target for 2050, and our Nationally Determined Contribution (NDC) under the Paris Agreement.

8. I propose bringing a draft Carbon Removals Strategy for Cabinet's consideration by December 2023, prior to public consultation. The strategy would be finalised and published alongside the second Emissions Reduction Plan in 2024.

9. This paper describes the rationale for the strategy and seeks Cabinet's agreement to its proposed scope. Draft objectives, principles and prioritisation criteria are outlined, and will be refined and applied as the strategy is developed.

10. Aligned with the IPCC's definition of removals, the strategy will focus on activities that use biological and engineered geochemical methods to draw CO_2 from the air or oceans and store carbon in geological, terrestrial, or ocean reservoirs, or in long-lived products.

11. Draft objectives for the strategy define what success means. These are:

    11.1 positioning removals as a complement rather than a substitute for economy-wide efforts to reduce emissions;

    11.2 setting clear goals for the mix and volume of removals contributing to New Zealand's emissions budgets and NDC commitment;

    11.3 developing a more diverse portfolio of removals activities;

    11.4 bringing more removal activities into national greenhouse gas accounting; and

    11.5 achieving removals that meet high quality standards and deliver co-benefits including environmental, climate resilience, wellbeing and economic benefits.

12. Draft principles are values statements to guide development of the strategy and the choices it informs. These are:

    12.1 to deliver on our domestic and international emissions targets and commitments;

    12.2 to value nature-based solutions;

Sensitivity classification

Sensitivity classification

Sensitivity classification

12.3 to think long-term, beyond net-zero by 2050; and

12.4 to empower Māori.

13. The strategy will inform decisions about the volume and mix of CO_2 removals New Zealand should pursue, in the near- medium- and long-term. Choices about the future scale and mix of exotic and indigenous afforestation are a key component. Should decisions affecting the future mix and scale of afforestation result in lower forecasted forestry removals, this will require a more ambitious track of emissions reductions, and/or substantial growth in other types of removals.

14. The strategy will inform decisions on the choice and design of policy mechanisms to incentivise removals. Existing mechanisms such as the ETS and voluntary carbon markets may be suited to support some new carbon removals activities. s 9(2)(f)(iv)

15. A number of interrelated decisions need to be considered and worked through as the strategy is developed:

15.1 Pending decisions affecting the ETS and voluntary carbon markets will have implications for their use to support new removals activities.

15.2 A more diverse portfolio of removals may require new contracting or funding approaches suited to their scale, stage of development, cost structures, and differences in quality.

15.3 Design of funding mechanisms for carbon removals must be coordinated with work to develop a biodiversity credits system (to add: Cab Ref). Nature-based solutions could draw revenue for both their carbon removal and biodiversity benefits.

16. I propose that the strategy, once completed, sit within the next Emissions Reduction Plan, providing greater detail and focus on removals. It can leverage existing climate change response initiatives and policy mechanisms across government and help to shape new initiatives.

Creating a regulatory and incentive environment that mobilises private investment in new removals activities

17. An innovation pathway under the strategy will support development of new removal activities and technologies as they progress from basic research and proof of concept through to implementation at scale. A priority for this is to create a clear path to market entry for removal activities that are near-ready for scaled deployment.

18. To help create this clear path to market entry, I propose mobilising private investment into the research and evidence necessary for new non-forestry removals to enter the ETS (or other incentive mechanisms).

19. I seek agreement to develop options for legislative and regulatory changes to:

Sensitivity classification

Sensitivity classification

Sensitivity classification

19.1 enable a broader range of removals activities to be included in the ETS, or other incentive mechanisms for removals that may be developed following decisions on options currently under consideration for the future of forestry within the ETS, and

19.2 enable rules and standards for removals activities to be set out in regulations rather than in primary legislation.

20. A clear path to market entry also requires:

20.1 clear standards and expectations for the research and evidence required for market entry, to provide certainty for investors;

20.2 a clear process for testing and verification of that evidence;

[to add: cross reference to VCM policy framework development]

Developing a Carbon Removals Strategy

21. A lot of work relating to carbon removals is underway across government. This includes:

21.1 proposed Emissions Trading Scheme changes to incentivise gross emissions reductions, including options to change ETS settings for CO_2 removals by forestry;

21.2 consideration of changes to the permanent forests category of the ETS, to encourage permanent afforestation with native species;

21.3 development of a biodiversity credits system;

21.4 measures to reduce greenhouse gas emissions and increase carbon sequestration in the agriculture sector; and

21.5 promoting nature-based solutions to holistically address biodiversity, climate change mitigation and resilience, and social wellbeing.

22. These programmes have different objectives and timeframes but have important interdependencies. The proposed strategy will help to coordinate and prioritise carbon removal activities and investment by Government, the private sector, and communities.

23. The strategy will address key questions around the volume of removals needed to complement ambitious gross emissions reductions, what types of removals are prioritised, and how new removal activities can be recognised and rewarded over time. It will also consider how biodiversity, climate resilience and broader co-benefits could be realised.

Sensitivity classification

Sensitivity classification

Sensitivity classification

What are carbon dioxide removals?

24. Carbon dioxide removals are human-induced activities that draw CO_2 from the air or oceans, and durably store it in geological, terrestrial, or ocean reservoirs, or in products. Consistent with the IPCC definition of removals[1], this includes:

    24.1 biological processes that store carbon in vegetation, wood products, marine sediment and organic soils;

    24.2 engineered geochemical processes that capture atmospheric CO_2 and store carbon in minerals, geological formations or ocean sediments; and

    24.3 the reversible gross emissions from drained organic soils (eg, drained peatlands and coastal wetlands).

25. Engineered removal technologies include: direct air carbon capture and storage (DACCS), drawing CO_2 directly from air; and bioenergy with carbon capture and storage (BECCS), which stores carbon drawn from the air by biological feedstocks.[2]

26. Appendix one illustrates the range of removal activities, provides detail on their characteristics and potential scale, and describes some key technologies.

Removals play an important role in our climate change response

27. In December 2021, Cabinet agreed to prioritise gross emissions reductions in the emissions reduction plan, while maintaining support for net emission reductions, in line with the Climate Change Commission's analysis and advice on emissions budgets [DEV-21-MIN-0277 refers].

28. Removals cannot substitute for deep emissions reductions, but can play three complementary roles in the near-, medium- and long-term.

Timeframe	**Action examples**
Near-term Lowering net emissions to meet our carbon budgets and NDC commitments	• Bring non-forest land uses into emissions accounting, incentivising more emission reduction and removals activities. • Identify and act to scale up opportunities for quick gains, (eg, rewetting peatlands and other drained organic soils).
To net-zero 2050 Offsetting residual emissions in hard-to-abate industries (eg, agriculture and some industrial processes)	• Sustainable mix and scale of afforestation for ongoing long-term removals while achieving biodiversity, climate resilience and other priorities.

[1] Mitigation of Climate Change: Working Group III contribution to the IPCC Sixth Assessment Report, 2022.
[2] This definition excludes carbon capture utilisation and storage (CCUS) technologies applied for emissions *reduction* at the point of emission (eg, gas wells, industrial processes or waste processing).

Sensitivity classification

Sensitivity classification

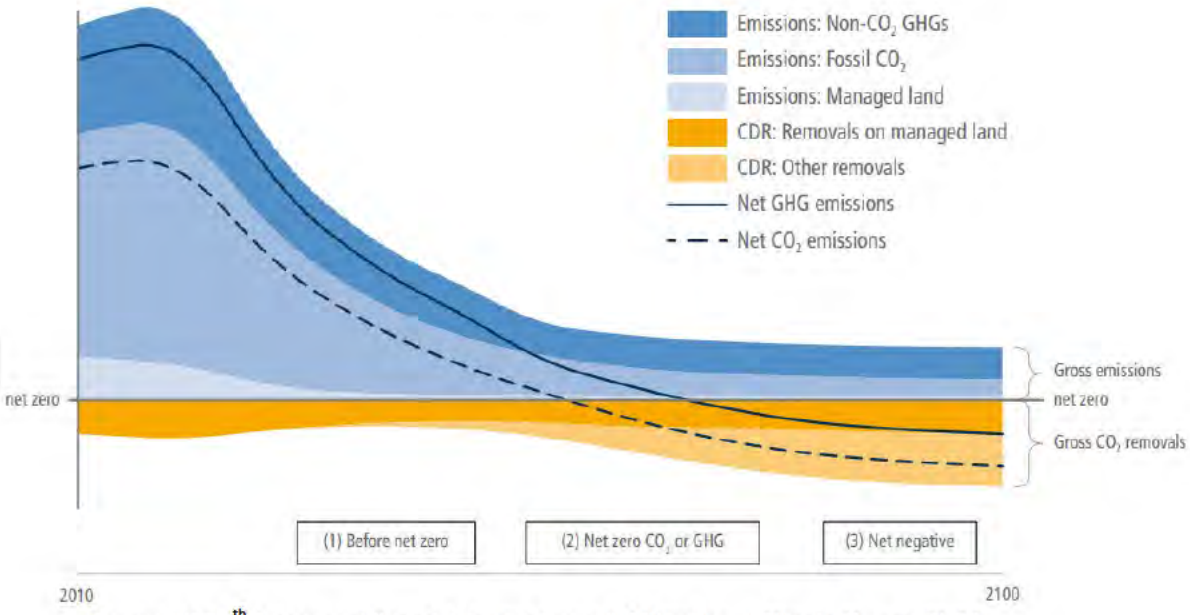
Sensitivity classification

	• Scale up other proven removal activities, adding these into our emissions accounting, markets, and other policy mechanisms.
Beyond net-zero Achieving net-negative emissions in the long term, if deployed at levels higher than residual emissions	• Foster innovation in new removal activities and technologies, bringing them to scale as they are proven and mature. • Utilise permanent, secure sequestration (eg, mineral/geological sequestration).

29. The IPCC's 2022 6th assessment report states that, '*all global modelled pathways limiting warming to 1.5°C or 2°C include large-scale carbon dioxide removal methods to counterbalance residual greenhouse gas emissions'*. This requires both biological removals such as forests and wetlands and the scaling up of new removals technologies potentially including engineered carbon capture and storage and 'blue carbon'.

30. Figure 1 below illustrates the growing contribution removals must deliver globally under the IPCC's stylised pathway to achieving net-zero and then net-negative emissions over the course of this century.

Figure 1. Greenhouse gas emissions and removals, stylised pathway



Source: IPCC 6th Assessment Report, Working Group III Mitigation of Climate Change, Ch 12

31. [To add: Discuss likely need over long term to increase removal volumes to achieve net zero, and net-negative emissions]

Sensitivity classification

Sensitivity classification

Sensitivity classification

The CCC's draft ERP2 advice suggests a removals strategy is needed

32. In April 2023, He Pou a Rangi the Climate Change Commission published its draft advice to inform the second emissions reduction plan and 2026–2030 emissions budget. This includes recommendations to:

    32.1 set clear, separate targets for gross emissions reductions and carbon dioxide removals (recommendations 1,2); and

    32.2 amend the emissions pricing system to support this by changing the emissions trading scheme (ETS) to separate incentives for gross emissions reductions from those for forestry removals and creating more durable incentives for net carbon dioxide removals by forests through to and beyond 2050 (recommendation 3).

33. The Commission's draft advice notes that the next emissions reduction plan is:

    "an opportunity for the Government to articulate the role of forests and other emissions removals, and how they will contribute to achieving emissions budgets and targets".

A more diverse portfolio of carbon dioxide removals activities is needed

[to add: a paragraph noting we are too reliant on exotic afforestation, that other known nature-based solutions can't currently contribute to NDC etc, and that new technologies are developing that NZ must be ready for.]

Te Tiriti o Waitangi

34. In developing the strategy, a partnership approach with Māori is needed to fully reflect Treaty of Waitangi principles and implications, and te ao Māori perspectives. Treaty interests will be engaged in policy choices that shape long-term land use decisions. Te ao Māori perspectives may vary, for example, between nature-based removals activities on land or sea, and engineered technologies injecting carbon from the air beneath the earth.

    [To add: Detail how we intend to reflect this in the draft CRS and the process to develop it.]

Objectives and Principles for the Carbon Removals Strategy

35. I propose that the draft strategy be developed with the following objectives and principles as its starting point.

    35.1 The draft objectives define what success for the strategy means. Appendix two provides more detail on the draft objectives.

    35.2 The draft principles are values statements to guide development of the strategy and the decisions it aims to inform. They are discussed below.

Sensitivity classification

Sensitivity classification

Sensitivity classification

Figure 2. Draft objectives

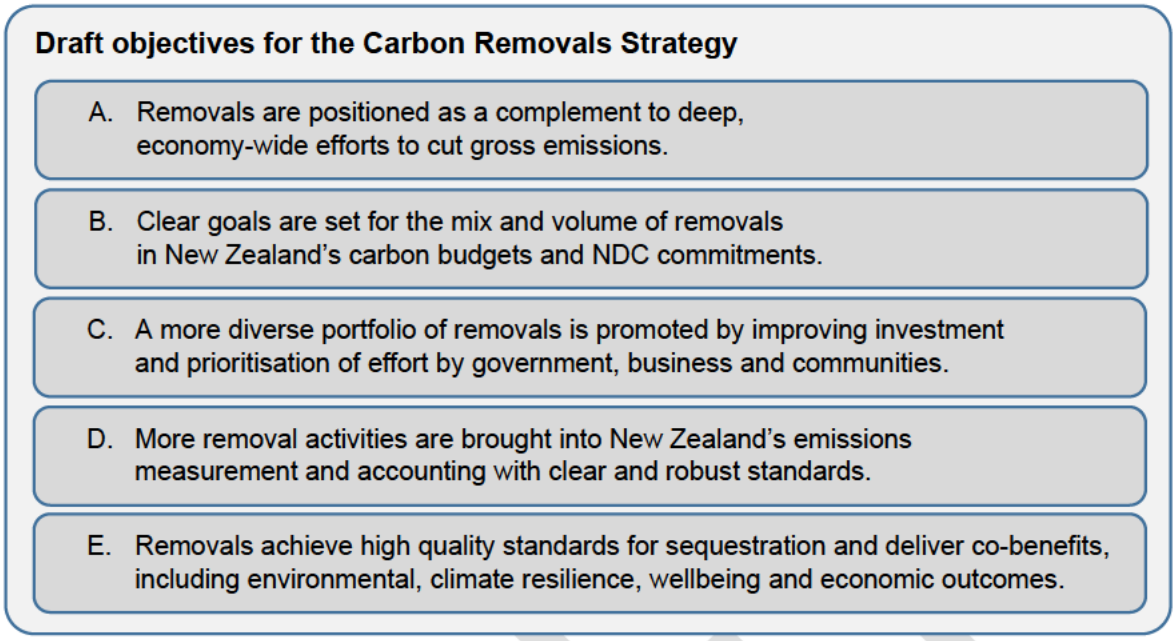
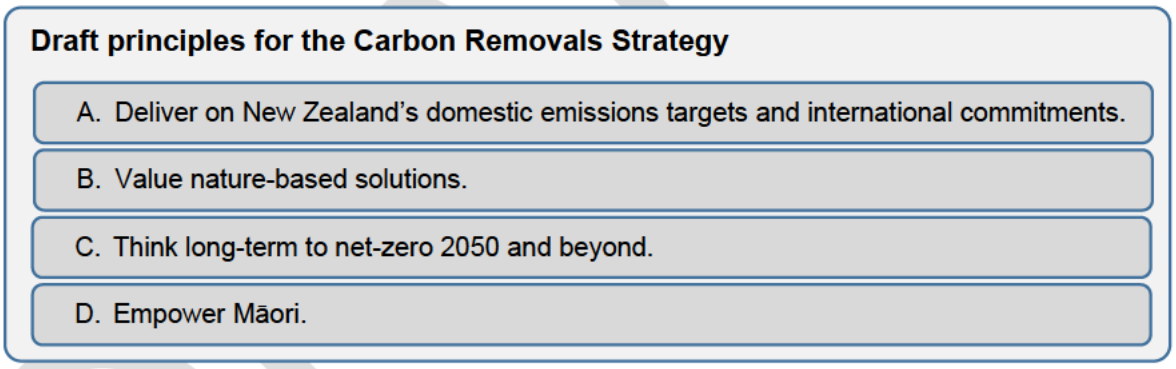


Figure 3. Draft principles



36. These objectives and principles may be refined as the strategy is drafted, drawing from targeted engagements with Māori partners and other key stakeholders. Cabinet will be asked to confirm the objectives and principles when it considers the draft strategy in December 2023.

A. Delivering on New Zealand's domestic emissions targets and international commitments

37. This principle will focus the strategy on removals activities that can 'shift the dial' on what we measure for New Zealand's net-zero 2050 target and NDC commitments. Reasons for this include:

    37.1 The law: the Government has a legal obligation to achieve the net-zero 2050 target, and the NDC target is a binding international commitment.

    37.2 International impact: New Zealand can contribute to the global community's climate change response by demonstrating that we can set and achieve ambitious and transparent national targets.

Sensitivity classification

Sensitivity classification

37.3 Potential cost: Carbon removals can only reduce New Zealand's potential liability to buy international offsets to cover any NDC shortfall if they can impact our national carbon accounting measures.

38. The proposal (outlined below, or cross-referenced to NDC cab paper) to expand the scope of New Zealand's NDC to include non-forest land use categories is an essential first step. This expansion of our NDC scope brings in agricultural and other non-forest land to create incentives for government, industry and communities to invest in a wider range of carbon removal activities.

39. The strategy will need to drive improvements in the measurement and science needed to verify carbon removals that can impact on our national-level climate change response targets. This includes, as part of the innovation pathway, ensuring that our regulatory settings and market entry rules create incentives for the private sector to invest in building this evidence.

[To add: link to VCM development - NZ and internationally – re rules and standards for "double-claiming" towards both individual firms' carbon neutrality and NZ NDC]

B. Value nature-based solutions

40. Nature-based carbon removal solutions, including in the agriculture sector and on the conservation estate, can advance the climate change objective of *Te Mana o te Taiao, the Aotearoa New Zealand Biodiversity Strategy 2020:*

> *Biodiversity provides nature-based solutions*
> *to climate change and is resilient to its effects*

41. The *Te Mana o te Taiao* goals for carbon removals are detailed in Appendix 3

42. Nature-based solutions are approaches inspired and supported by nature. They can achieve cost-effective CO_2 removal alongside broader environmental, social and economic benefits, and building climate change resilience.

C. Think long-term:

43. Choices about the carbon removals activities New Zealand invests in have intergenerational implications and involve trade-offs over decades, especially concerning long-term commitments of land for carbon removals – both for forestry and for new land-based removals activities.

44. Emerging technologies with the potential for permanent geochemical sequestration of CO_2 can involve long lead-times from testing and proof of concept to full-scale deployment at economically competitive unit costs. They also require an inclusive public conversation so investment and policy choices are underpinned by informed public understanding and debate of the benefits and risks of different approaches.

Sensitivity classification

D. Empower Māori: [to develop, reflecting ERP framing]

[the strategy will encourage alignment with te ao Māori and honour kaitiaki roles and relationships.]

Criteria for prioritising removal activities

45. The draft strategy will develop more detailed criteria to inform choices about the mix of removals activities New Zealand pursues and to prioritise investment and effort. The criteria will include:

    45.1 removal potential and permanence: potential volume of CO_2 removals, timeframe to achieve removal, and permanence/security of removal;

    45.2 potential for deployment, including: scientific evidence of effectiveness, technological readiness for deployment at scale, infrastructure and land requirements, current and expected future unit costs, and potential commercial value from products or services;

    45.3 potential co-benefits and risks, including: environmental, climate resilience, social wellbeing and economic;

    45.4 measurability: current and future potential ability for removal activities to make measurable contributions to New Zealand's emissions budgets, net-zero target and NDC commitments;

    45.5 opportunities to leverage existing government policy instruments and programmes, industry and community capabilities.

The scale and mix of exotic and indigenous afforestation are key choices

46. Decisions on the critical issue of the desired mix, volume and timing of afforestation must be informed by a carbon removals strategy. A range of work planned and underway will impact the scale and mix of forestry in New Zealand (eg, ETS permanent forestry category, ETS review, biodiversity credits, practical support for native afforestation initiatives).

47. New Zealand's current CO_2 removals are almost entirely achieved by the expansion of exotic forests. Exotic afforestation is a relatively fast and low-cost way to sequester carbon, and this makes an essential contribution to lowering net emissions and meeting New Zealand's emissions budgets. Alongside the economic contribution of the forestry industry, wood products can also substitute for products with higher emissions.

48. For the first emissions budget (2022-2025), forecast net removals by forestry were 24.3 megatonnes (CO_2-equivalent), offsetting 8% of New Zealand's gross greenhouse gas emissions. For the second emissions budget (2026-2030) forecast forestry removals increase to 49.6 $MtCO_2$-eq offsetting 13% of gross emissions.[3]

[3] Baseline projections for the first Emissions Reduction Plan.

Sensitivity classification

Sensitivity classification

Sensitivity classification

49. However, ongoing reliance on exotic forestry has risks and costs:

    49.1 Carbon sequestration in forests is vulnerable to reversal: by fire, disease, natural disasters, land use change, and global warming itself.

    49.2 Forested land area must continually expand, and remain forested long term. This can compete with other land uses including agriculture and horticulture.

    49.3 Planting the wrong trees in the wrong place and poor forest management can have wide-ranging negative economic, social, and environmental effects, and can undermine social licence for afforestation, as identified in the May 2023 report of the *Ministerial Inquiry in to Land Uses in Tairawhiti and Wairoa*.

    49.4 Exotic forestry offers few, if any biodiversity benefits compared to some alternative land uses such as indigenous afforestation, which can sequester carbon at a slower rate and higher cost.

    49.5 Over-reliance on afforestation to reduce net emissions for current emissions budgets and towards our 2050 net-zero target reduces options for the future. Future options include alternative uses for the land, and the ability to plant forests later to offset residual hard-to-abate emissions such as from agriculture and some industrial processes.

50. [Option to illustrate: Appendix four illustrates the scale of carbon removals and the long timelines involved in choices about the mix of forestry, by comparing the volumes of carbon removals by exotic and indigenous afforestation under the Climate Change Commission's modelled current policy reference and demonstration path. Key messages here – even a very ambitious (and uncosted?) programme to drive indigenous afforestation would struggle to fill the gap created by a significant deceleration in exotic afforestation – and everything takes a long time]

51. Should decisions affecting the future mix and scale of afforestation result in a forecast reduction in forestry carbon removals, this will require a more ambitious track of emissions reductions, and/or substantial growth in other types of removals.

Sensitivity classification

Sensitivity classification

Sensitivity classification

Restoring drained peatland: an example of an immediate opportunity

Rewetting and restoring drained organic soils such as drained peatland is a strong candidate for early priority under a Carbon Removals Strategy.

Drained organic soils emit large volumes of CO_2 and nitrous oxide (N_2O). These emissions can be rapidly reduced and reversed by rewetting.

[Ref paper] proposes to expand the scope of New Zealand's emissions accounting for our domestic net zero target and international NDC commitment to include non-forest land use categories. This change is necessary before the results of any action to reduce soil emissions, or any other non-forest land-based carbon removal activity, can contribute to achieving our national targets.

This is a nature-based solution that can deliver social, environmental and climate resilience benefits, in addition to net emissions reductions. These include benefits for biodiversity, flood and drought protection, water quality, and mahinga kai.

Opportunities exist on the conservation estate and on agricultural land:

- Public conservation land includes at least 10,000ha of drained peatland, emitting an estimated 24 tonnes CO_2-equivalent per hectare per year. Rewetting and restoring this area has a total potential for net emissions reduction of 0.24 Mt CO_2-equivalent per year, which equates to about a quarter of total annual net emissions by government agencies.
- Annual net emissions from all drained organic soils on all grassland and cropland are estimated to be approximately 4Mt CO2-equivalent per year. Emission rates vary widely depending on local conditions.

Reducing emissions from drained organic soils on productive agricultural land will involve costs, opportunity costs and trade-offs. The removals strategy can help to bring these trade-offs into focus, and help to identify the most suitable policy mechanisms to support cost-effective action.

s 9(2)(f)(iv)

The strategy can inform design of policy mechanisms and markets to support removals

52. The strategy will inform decisions on the choice and design of policy mechanisms to incentivise removals. Existing mechanisms such as the ETS and voluntary carbon markets may be well suited to support some new carbon removals activities. s 9(2)(f)(iv)

53. Pending decisions affecting the ETS and voluntary carbon markets will have implications for their use to support new removals activities.

Sensitivity classification

Sensitivity classification

53.1 For the ETS, decisions are pending about the extent to which gross emissions reductions are prioritised and how removals credits (currently only from forestry) are treated.

s 9(2)(f)(iv) [redacted]

54. A more diversified portfolio of removals may require new contracting or funding approaches suited to their scale, stage of development, cost structures, and differences in quality (eg, permanence and security of sequestration, and environmental co-benefits). A variety of models are in place or being tested internationally, which can inform further design work in New Zealand.

55. The design and choice of funding mechanisms for carbon removals needs to be coordinated with work to develop a biodiversity credits system [To add: cross reference]. Nature-based solutions could draw revenue for both their carbon removal and biodiversity benefits.

A carbon removals innovation pathway: from basic research to scaled implementation

56. A maturing, diverse portfolio of removal activities requires effective investment, coordination, institutions and regulatory frameworks at all development stages from basic research and development through to proof of concept and scaling and full deployment.

57. The strategy will include an innovation pathway, identifying priorities to address gaps in current incentives and support for the development and scaled implementation of carbon removal activities. This can draw extensively on existing strategies, partnerships and initiatives in the Research Science and Technology sector, in industry policy and venture finance.

58. A priority for the Carbon Removals Strategy is to provide a 'clear path to market' for removal activities that are near-ready for scaled deployment.

59. Private investment in new CO_2 removal technologies, and in the science and measurement effort required to prove their effectiveness, must be supported by clear legislative and regulatory frameworks. This includes clear quality and evidence standards and risk management rules, and greater certainty about the mechanisms through which removals will be recognised and rewarded.

60. A key aspect of this is the potential for a wider range of non-forestry removals to be included in the Emissions Trading Scheme, voluntary carbon markets, or other incentive mechanisms. The scope of the ETS is set out in the Climate Change Response Act 2002.

61. The need for a specific regulatory framework for carbon capture and storage (CCS) technologies (for capture of CO2 both at the point of emission and from the air), and for decisions about ETS coverage has been noted by:

Sensitivity classification

61.1 Te Kōmihana Whai Hua o Aotearoa, the Productivity Commission, in its 2018 low-emissions economy report; and

61.2 He Pou a Rangi, the Climate Change Commission, in its April 2022 draft of advice to the Government on the next emissions budget.

Appendix five provides extracts from both Commissions' reports.

62. I seek Cabinet's in-principle agreement that a more flexible approach enabling non-forestry removals to be recognised in the ETS is desirable. I propose to develop options for amendments to the Climate Change Response Act 2002, with supporting regulatory impact analysis, to enable:

62.1 the scope of the ETS to be expanded to include carbon dioxide removal activities other than forestry; and

62.2 use of regulations to define ETS-eligible removals activities, and to set the minimum standards and thresholds, monitoring requirements and other matters of detail that will apply to each removals activity.

63. Forestry is the only significant carbon removals activity currently recognised in the scope of the ETS.[4] The Government is currently considering policy options that could change the way forestry emissions and removals are treated within the ETS. Decisions on whether the ETS is the most appropriate mechanism to recognise and incentivise other removals activities should await the outcome of the current process reviewing ETS settings for forestry. However, work on legislative amendment options can start now.

64. The Climate Change Response Act allows for the scope of the ETS to be extended by Order in Council, to include storage of CO2 captured at source by net emitters. This would allow emitters to offset their ETS liability using Carbon Capture and Storage technologies to reduce their emissions.

65. However, the Act's current wording does not allow for the ETS to include storage of CO_2 captured *from the atmosphere* by technologies such as Direct Air Carbon Capture (DACCS) and Storage or Bioenergy Carbon Capture and Storage (BECCS).[5] These technologies are described in Appendix one.

66. Some non-forestry biological carbon removal activities may also be suited to future participation in the ETS. This may include agriculture sector activities that sequester carbon in vegetation that does not meet the ETS definition of forests (defined by area, canopy coverage and height), if this can be achieved at sufficient scale and with cost effective measurement and monitoring.

[4] The Act also allows ETS participation for activities that reduce greenhouse gas emissions by permanently (or temporarily if exported) embedding carbon or other substances in products.
[5] Climate Change Response Act 2002, Schedule 4, Part 2, Subpart 2. This provision, when brought into force by an Order in Council for specific removal activities, only applies to storage of CO_2 that would otherwise be emitted, where ETS emissions liability would arise, and where storage results in a reduction of emissions reported in New Zealand's international emissions reports.

Sensitivity classification

Sensitivity classification

Sensitivity classification

67. I propose to develop options for legislative amendments to allow the use of regulation rather than primary legislation to define new ETS-eligible removals and to set rules and standards for them. This will allow faster and more responsive changes to ETS settings as advances in science and technology enable new removals activities and provide evidence of their effectiveness.

68. Regulations would need to be consistent with the purpose of the Climate Change Response Act. In practice this means that removals would need to contribute toward New Zealand's emissions targets and budgets.

69. The Government would need to verify that any new removal activity met other standards and criteria set for ETS removal activities before that activity could be brought into the ETS through this process.

70. Once in-principle decisions concerning forestry are made through the ETS review, legislative changes to enable other removals activities to enter the ETS could be considered in early 2024.

71. ETS coverage is only one aspect of the regulatory environment for carbon capture and storage technologies, and for other biological removals activities. Other key issues include consenting and resource management regulation, and regimes to manage the potential risks and liability issues such as for leakage or reversal of sequestration.

72. Further work is needed to establish the standards, audit and verification requirements that new carbon removal activities would need to meet to enter into carbon markets. This may require domestic audit and verification capacity to be built up.

Next Steps

73. The carbon removals strategy will be developed by the Ministry for the Environment, in consultation with other agencies. The Ministry for Primary Industries, Department of Conservation and Ministry for Business, Innovation and Employment will be key partners. Officials will undertake targeted engagement with key sector stakeholders, including Māori stakeholders, as they develop the draft strategy.

74. I propose to report back in December 2023 with a draft carbon removals strategy, to seek Cabinet's approval for its publication and for consultation to proceed in the first quarter of 2024 alongside consultation on the draft of the Government's second Emissions Reduction Plan (ERP2). The strategy would then be finalised alongside ERP2.

75. I propose to report back to Cabinet in early 2024, with options for legislative change to enable a wider range of carbon removal activities to be recognised in the ETS, once in-principle decisions concerning forestry are made through the ETS review.

Sensitivity classification

Sensitivity classification

Financial Implications

76. (likely none, unless there's content and recs to add to this paper concerning potential fiscal risks from expanding NDC scope to non-forest land uses from a specific date)

Legislative Implications

Impact Analysis

Regulatory Impact Statement

77. Regulatory impact analysis will be undertaken as options are developed for legislative change to enable more removals activities to be recognised in the ETS.

Climate Implications of Policy Assessment

78. [to add: confirming none reqd at this stage in the decisions sought in this paper]

Population Implications

79. [to add: confirming none at this stage]

Human Rights

80. The proposals in this paper do not have any implications for human rights and are not inconsistent with the New Zealand Bill of Rights Act 1990 and the Human Rights Act 1993.

Treaty Analysis

81. [To be developed: Treaty analysis and engagement with Treaty partners began in X 2023 as part of a joint approach between VCM and CRS. Engagement with Māori (detail NICF engagement) included the objectives, challenges and opportunities, but did not include the design options presented here. Update following NICF technicians hui 24/5/23].

Consultation

82. The Ministry for the Environment has consulted the following agencies: Ministry for Primary Industries; Ministry for Business Innovation & Employment; Department of Conservation; Ministry for Foreign Affairs & Trade; The Treasury; …. (confirm list)

83. [to add: Ministerial consultations – be clear on Min of Forest's joint interest and role in VCM advice]

84. [to add: Detail NICF engagement and any other engagement with Māori stakeholders to date].

Sensitivity classification

Communications

85. [To add: brief statement of how the proposals are expected to be communicated, and who will be responsible.]

Proactive Release

86. I intend to release this paper within 30 days of its consideration by Cabinet.

Recommendations

The Minister of Climate Change recommends that the Committee:

Carbon removals strategy

1 **Agree** that the Ministry for the Environment develop a draft carbon removals strategy, in consultation with the Department of Conservation, Ministry for Business Innovation & Employment, and Ministry for Primary Industries.

2 **Agree** that activities within scope of the carbon removals strategy will be human-induced activities that:

2.1 draw CO_2 from the air or oceans, and durably store it in geological, terrestrial, or ocean reservoirs, or in products, including:

2.1.1 biological processes that store carbon in biological reservoirs such as vegetation, sediment and organic soils, and

2.1.2 chemical processes that capture atmospheric CO_2 and store carbon in minerals, geological formations or sediment, and

2.2 reduce emissions from land, especially drained organic soils.

3 **Note** this definition of removals aligns with that applied in the International Panel on Climate Change's 2002 sixth Assessment Report.

4 **Note** that draft objectives to define success are that:

4.1 Removals are positioned as a complement to deep, economy-wide efforts to cut gross emissions,

4.2 Clear goals are set for the mix and volume of removals in NZ's carbon budgets and NDC commitments,

4.3 A more diverse portfolio of removals is promoted by improving investment and prioritisation of effort by government, business and communities,

4.4 More removal activities are brought into New Zealand's emissions measurement and accounting with clear and robust standards, and

Sensitivity classification

Sensitivity classification

Sensitivity classification

4.5 Removals achieve high quality standards for sequestration and deliver co-benefits, including environmental, climate resilience, wellbeing and economic outcomes.

5 **Note** the following draft principles as values statements to guide development of the strategy and the decisions it aims to inform:

5.1 Deliver on our domestic and international targets and commitments,

5.2 Value nature-based solutions,

5.3 Think long-term, and

5.4 Empower Māori.

6 **Note** the draft Carbon Removals Strategy will develop criteria to identify policy mechanisms most suited to support removals activities with different characteristics and at different stages of development.

7 [to add: **Note** approach to Treaty partner engagement]

8 **Invite** the Minister for Climate Change to report back to Cabinet by December 2023 with a draft Carbon Removals Strategy,

9 **Note** that public consultation on the draft Carbon Removals Strategy can be undertaken in early 2024, alongside consultation on the draft of the Government's second Emissions Reduction Plan and emissions budget for 2026-2030.

Developing an enabling regulatory environment and providing more certainty of a pathway into markets for new carbon removal activities

10 **Note** that a first priority in developing an innovation pathway under the proposed Carbon Removals Strategy is to create a clear path to market entry for removals activities that are near-ready for deployment at scale.

11 **Note** that clear legislative and regulatory frameworks for the recognition of carbon removal activities in markets can strengthen incentives for private investment in these activities and the science and measurement required to prove their effectiveness.

12 **Note** that current legislation governing the Emissions Trading Scheme in the Climate Change Response Act 2002 provides limited scope for non-forest carbon removal activities to be recognised in the ETS, and lacks flexibility to develop rules and standards for new carbon removal activities.

13 **Agree** in principle that a more flexible approach is desirable to enable non-forestry carbon dioxide removal activities to be recognised in the Emissions Trading Scheme and other incentive mechanisms.

Sensitivity classification

Sensitivity classification

Sensitivity classification

14 **Invite** the Minister for Climate Change to develop options for amendments to the Climate Change Response Act 2002, with supporting regulatory impact analysis, to enable:

14.1 The scope of the ETS to be expanded to include carbon dioxide removal activities other than forestry; and

14.2 Use of regulations to define ETS-eligible removals activities, and to set the minimum standards and thresholds, monitoring requirements and other matters of detail that will apply to each removals activity.

15 **Note** that the Minister for Climate Change [or Ministry for Environment], in consultation with [relevant ministers / agencies – or specified ministers / agencies] will develop processes to

15.1 set clear standards and expectations for the research and evidence required for market entry, to provide certainty for investors;

15.2 test and verify that evidence.

Authorised for lodgement

Hon James Shaw

Minister for Climate Change

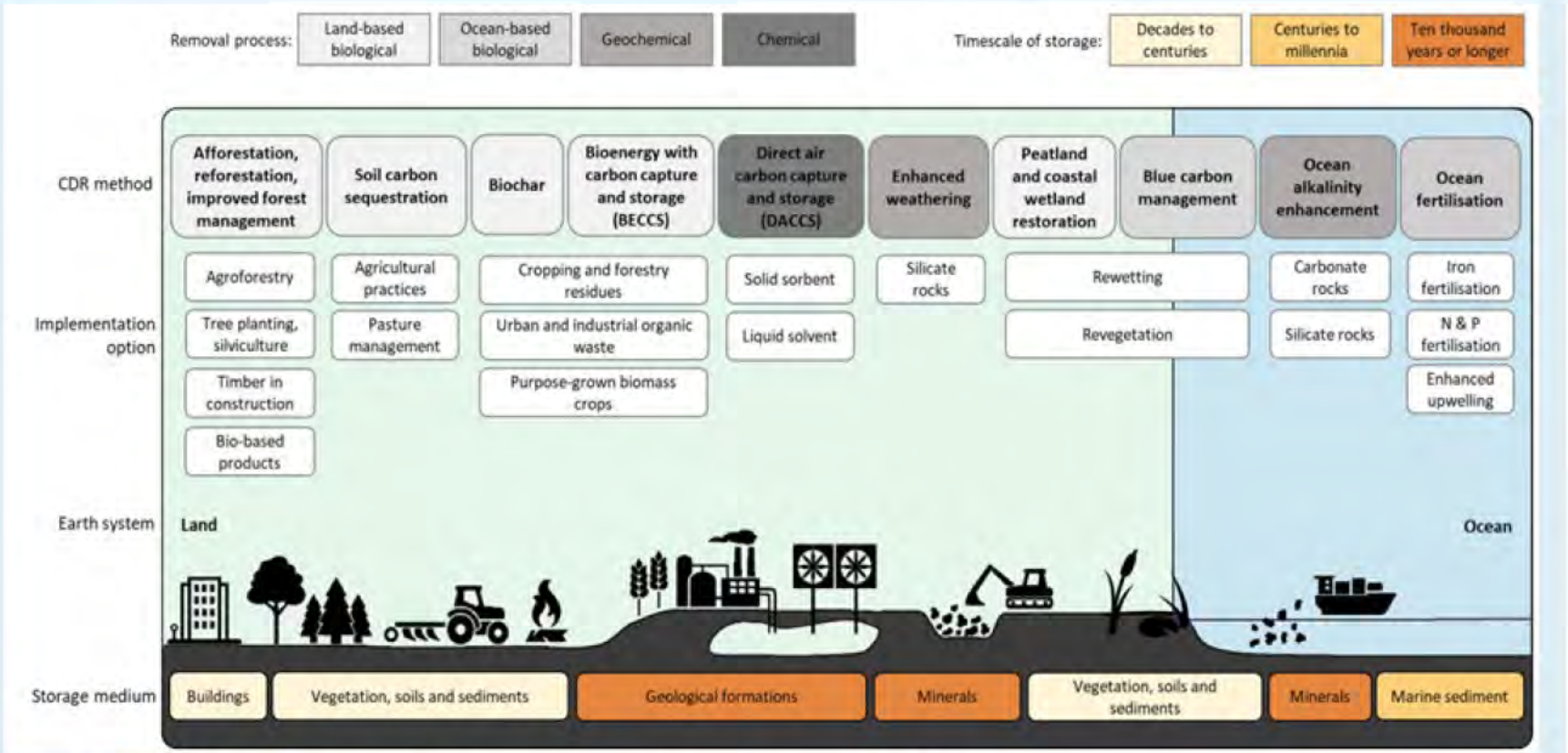
Sensitivity classification

Sensitivity classification

Sensitivity classification

Appendix One: Types of Carbon Dioxide Removal (CDR) activities

Figure One



Graphic from IPCC 6th Assessment Report, WG III report: Mitigation of Climate Change Ch 12, p.1261

Sensitivity classification

Sensitivity classification

Table One: Characteristics of Carbon Removal Activities

Technology	Global Mitigation Potential $GtCO_2/yr$ [1]	Cost ranges US/tCO_2 [1]	Technical status 1 low to 9 high[1]	Economist Intelligence Unit findings [2]	Storage medium, permanence and security [1,2]	Social and environmental benefits and risks [1,2]
Afforestation & reforestation	0.5-10	0–240 Stable	8-9	Invest now to scale up the practice	Stored in vegetation, soil, sediments For decades to centuries Vulnerable to reversal from land use changes, fire, climate change, disease/pests	Employment, value from forestry industry, including potential for timber to substitute for cement and steel Environmental and climate resilience benefits and risks depend on management quality (soil stabilisation, flood/drought protection, etc) Biodiversity benefits (indigenous) Potential land use competition with food production. Moderate infrastructure requirements
Forest management	0.1-2.1	insufficient cost data Stable				Enhanced access to Mahinga kai. Environmental and climate resilience benefits in biodiversity, flood/drought protection, water quality, etc Cost of foregone agricultural land use CH_4 emissions from rewetting partly offset reduced CO_2 N_2O
Peatland & coastal wetland restoration	0.5-2.1	insufficient cost data Stable				
Soil C-sequestration in croplands & grasslands	0.6-9.3	-45–100 Stable				Soil fertility, water, biodiversity, food productivity. Possible increase of N_2O
Biochar	0.3-6.6	10–345	6-7	n/a	In soil/sediments for centuries to millennia Security depends on production quality and application	Soil fertility, water quality benefits, possible cut in N_2O emissions. Particulate/GHG emissions from production Feedstocks may create biodiversity risks and productive land use pressures
Bioenergy carbon capture & storage (BECCS)	0.5-11	15–400 Moderate reduction expected	5-6	Invest now to test and improve best practice in deployment	Stored in geological formations for millennia Secure	Energy supply, CO_2 for commercial use Particulate/GHG emissions from production Feedstocks may create biodiversity risks and productive land use pressures High infrastructure requirements
Direct air carbon capture & storage (DACCS)	0.5 – 5 with constraints Up to 40 without	100-300 Significant reduction expected	6	Invest now in critical RD&D		High energy and water requirements Does not require large or productive land area High infrastructure requirements
Enhanced weathering	2-4	50-200 Moderate reduction expected	3-4			Potential soil amelioration, nutrient source. Commercial potential in CO_2-sequestering building materials Ground/water pollution, mining and extraction, air pollution Moderate infrastructure requirements

1. Assessments from Intergovernmental Panel on Climate Change, Working Group III contribution to the Sixth Assessment Report 2022.
Technological readiness level ranges from 1 (basic principles defined) to 9 (proven in operational environment)
2. Economist Intelligence Unit assessments 2018, research sponsored by Climateworks foundation https://carbonremoval.economist.com

Sensitivity classification

Sensitivity classification

Descriptions of selected carbon removal activities and technologies

Peatland restoration

Restoring degraded peatlands through rewetting and revegetation increases carbon accumulation in vegetation and soils, and delivers co-benefits for biodiversity, water quality and flood protection. Rewetting drained peatlands achieves rapid decreases in CO_2 and N_2O emissions, which can be offset by increases in CH_4 emissions, depending on local circumstances. Peatlands make up only about 3% of the global terrestrial surface, but may store about 21% of total soil organic carbon.

Biochar

Biochar is produced by heating a feedstock (e.g. forestry and sawmill residues, manure or biosolids) in oxygen-limited environments (pyrolysis and gasification). Applied to soils, the carbon in biochar is biologically unavailable and may be sequestered from decades to thousands of years, depending on feedstock and production conditions. Biochar in soils can lower the need for fertilizer, slow down water runoff, and reduce soil N_2O emissions.

Direct Air Carbon Capture and Storage (DACCS)

Chemical processes bind atmospheric CO_2 to a liquid solvent or solid sorbent, which is then heated to release the CO_2 for use or storage underground. DAC is energy intensive and requires low-carbon energy sources to provide net carbon removal. Key benefits are: permanent geological sequestration; no clear upper bound to its technical potential; and not requiring use of extensive land area to scale up over time.

Bioenergy with Carbon Capture and Storage (BECCS)

BECCS uses biomass (trees, crops, or residues) to produce energy, capturing the biomass carbon for storage before it is released into the atmosphere. BECCS is a removal activity because the biomass feedstock continuously draws carbon from the air, for geological sequestration.

A primary benefit of BECCS is that it produces energy, where other technologies like DACCS need energy inputs that drive up their costs. A key consideration for BECCS is the land use requirements of the source feedstock, with consequent risks of displacing agricultural production or carbon storage in forests. Waste biomass feedstocks such as forestry and agricultural residues or municipal waste may reduce these potential negative effects.

Enhanced Weathering

This involves accelerating natural reactions between CO_2 and silicate materials or calcium- and magnesium-rich rocks. Applications can take place above or below ground; and may use already mined material or require mining of new material. Can capture and store CO_2 from the air, or store CO_2 captured by other means. Ocean-based applications are also being explored.

Some applications can also replace conventional production methods for materials like concrete which is used at a gigaton scale globally. Use of mineralisation for concrete production, both to cure cement and to produce aggregate, is already economically viable in some cases, and may improve the quality of the product and allow for use of less cement.

Sensitivity classification

Sensitivity classification

Appendix Two: Proposed objectives for the Carbon Removal Strategy

	Objective	Rationale
A	Position removals as a complement to efforts to cut gross emissions	Removal activities should not be viewed as a substitute for gross emissions reductions, but they can complement our climate mitigation efforts. In December 2021, Cabinet agreed to prioritise gross emissions reductions in the emissions reduction plan, while maintaining support for net emission reductions, in line with the Climate Change Commission's analysis and advice on emissions budgets [DEV-21-MIN-0277 refers].
B	Set clear goals for the mix and volume of removals	The Climate Change Commission's draft ERP2 advice recommends 'setting clear, separate targets for gross emissions reductions and carbon dioxide removals. Having clear, distinct targets will support the positioning of removals as a complement to deep, economy-wide efforts to cut gross emissions (Objective A). Providing certainty around the volume and quality of CO2 removals needed will help to foster greater innovation and private investment in carbon dioxide removals activities. Determining the right volume of removals will be driven by trade-offs in cost, quality, and reliance on internationally sourced units to meet our NDC.
C	Promote a more diverse portfolio of removals	New removal activities could cover biological reservoirs, and permanent geochemical sinks. A more diverse portfolio would reduce reliance on expansion of exotic forestry for removals and increase opportunities to deliver on co-benefits. The strategy will establish criteria to govern decisions on the quality of removal activities. This will help to understand where efforts for new types of activities should be focused.
D	Bring more removal activities into target accounting with clear and robust standards	Not all activities that capture and sequester carbon can be accounted for in a way that assists New Zealand in meeting its NDC commitment. To impact our NDC targets and emissions budgets, an activity must be able to achieve sequestration that is (a) measurable within the national GHG inventory and (b) within the scope of NZ's NDC commitment. The carbon removals strategy should prioritise removal activities that can contribute to NZ achieving our NDC commitment and towards our emissions budgets and 2050 net zero target.
E	Promote high quality removals that provide more permanent sequestration and deliver on co-benefits	In supporting a diverse portfolio of removals, the strategy will need to promote high quality removals with more permanent and lower-risk sequestration that also deliver broader benefits, including biodiversity, climate resilience, equity. The strategy will establish criteria to govern decisions on the quality of removal activities, including how co-benefits should be assessed and prioritised.

Sensitivity classification

Appendix Three:

Te Mana o te Taiao, the Aotearoa New Zealand Biodiversity Strategy 2020

The climate change objective and goals related to carbon removals and sequestration

TIAKI ME TE WHAKAHAUMANU / protecting and restoring		
Objective: Biodiversity provides nature-based solutions to climate change and is resilient to its effects		
2025 Goals	2030 Goals	2050 Goals
13.1.1 The potential for carbon storage from the restoration of indigenous ecosystems, including wetlands, forests, and coastal and marine ecosystems (blue carbon), to contribute to our net emissions targets is understood	13.1.2 Carbon storage from the restoration of indigenous ecosystems, including wetlands, forests, and coastal and marine ecosystems (blue carbon), contributes to our net emissions targets	13.1.3 Carbon storage from the restoration of indigenous ecosystems, including wetlands, forests, and coastal and marine ecosystems (blue carbon), is a key contributor to achieving net-zero emissions for Aotearoa New Zealand
13.2.1 The potential for indigenous nature-based solutions is understood and being incorporated into planning	13.2.2 The restoration of indigenous ecosystems is increasingly being used to improve our resilience to the effects of climate change, including coastal protection against rising sea levels	13.2.3 The restoration of indigenous ecosystems is mitigating the effects of climate change and natural hazards (e.g. flooding)

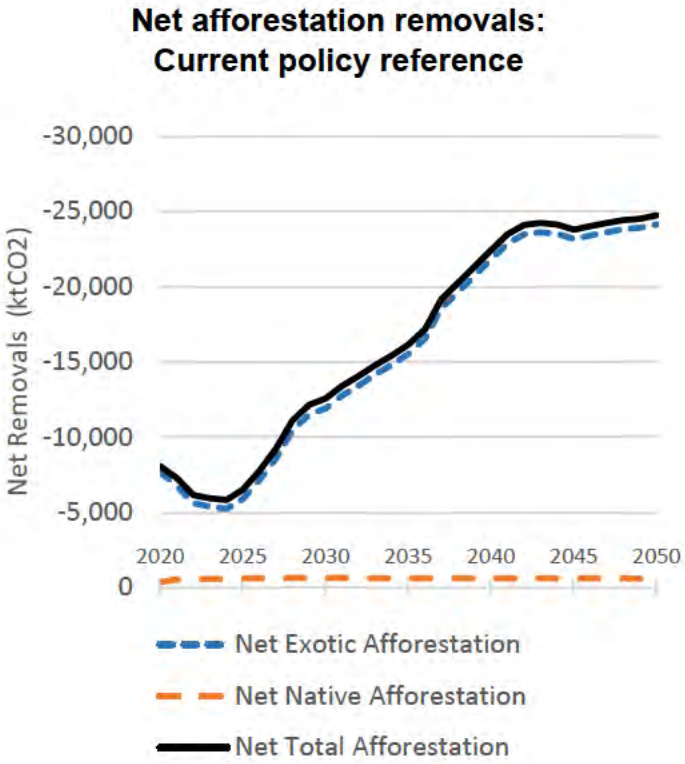
Sensitivity classification

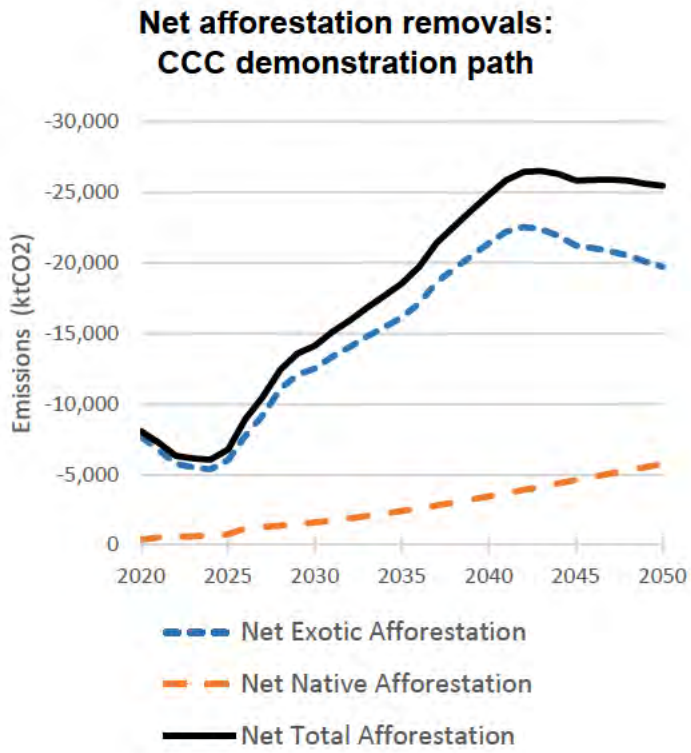
Sensitivity classification

Sensitivity classification

Appendix Four: Climate Change Commission modelling of net carbon removals by afforestation

(Option: Could use these charts or similar from MPI colleagues to show the scale of forestry removals, illustrate the time-lags involved in any impact of a change in afforestation mix. CCC demo path as an uncosted scenario. Detail the assumptions.)





Source: CCC current policy reference and demo path in data supplement to draft advice for 2nd emissions budget.

Sensitivity classification

Appendix Five: Productivity Commission recommendations and draft Climate Change Commission advice on regulatory frameworks and ETS coverage of carbon capture and storage (CCS) technologies.

Te Kōmihana Whai Hua o Aotearoa, the Productivity Commission Low Emissions Economy Report 2018	
Recommendations	**Government response August 2019**
R14.6 New legislation should be prepared to regulate carbon capture and storage activities (CCS). Regulation should address issues including the long-term regulatory supervision of CCS, including after an operation's closure, and procedures and assessment criteria for permits.	The Government believes that further investigation of the regulatory barriers into the use of CCS is warranted, although notes that transitioning away from fossil fuels is a high priority in the transition. Work in 2019 is focussed on encouraging greater use of renewable sources of energy and embedding the new institutional frameworks. A decision will be made in 2020 on whether and how to assess the legislative framework for CCS activities and the timing of any further work. **Timeline:** Decisions on scope and timing in 2020 *
R14.7 Once new CCS legislation is in place, the New Zealand Emissions Trading Scheme should be amended to make CCS a recognised removal activity, no matter the source of emissions being captured and stored.	The NZ ETS allows for entities with a surrender obligation to be credited for CCS activities. The likelihood of CCS being developed by entities without a corresponding surrender obligation under the NZ ETS is low. However, further work is required to understand gaps within existing legislation in regards to CCS and the NZ ETS. Work in this area would be part of any follow on work decided upon in response to recommendation 14.6. **Timeline:** After 2020

He Pou a Rangi, the Climate Change Commission draft advice on the second emissions budget (April 2023)
Box 9.3: Carbon capture, utilisation, and storage (CCUS)
Aotearoa New Zealand also does not have an enabling legislative framework for CCUS compared with Australia, Canada, or the United States, and existing legislation is not adequate to manage the risks and liability around CCUS. Under the Climate Change Response Act, carbon capture and storage is categorised as an 'other removal activity'. However, unless the activity is undertaken via direct air capture and storage (DACCS) or bioenergy with carbon capture and storage (BECCS), it is more an emissions reduction activity than a removal. Categorisation as a carbon dioxide removal would be dependent on Aotearoa New Zealand's emissions accounting rules. Until decisions are made on the NZ ETS's role in driving gross emissions reductions and removals, it may be premature to expand the NZ ETS scope to more removals. It will be important to think carefully and undertake a proper policy development process before deciding to include other types of removals. … … There could be a role for CCUS to play in addressing hard-to-abate residual emissions in the medium-term and achieving net negative emissions in the long-term. However, an enabling regulatory framework would need to be in place by the end of the second emissions budget period to take advantage of any potential opportunities.

* Work to assess the legislative framework for CCS in response to the Productivity Commission's recommendation 14.6 has not yet been undertaken.

Sensitivity classification

Sensitivity classification

Sensitivity classification