Cabinet Paper Sign Out Sheet

Sign out sheet

	Who	***Date***
Title and Tracking number:	CAB-274 Developing a Carbon Removals Strategy	
Date Due for Lodging:	John MacCormick	**22-Jun (for DEV 28 Jun)**
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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 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 New Zealand Emissions Trading Scheme (ETS) or other incentive mechanisms, and for the rules and criteria 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.

Relation to Government Priorities

3. 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 percent from 2010 levels by 2030 (reaching net-zero by 2050).

4. 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.

5. 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.

6. Recognition of more non-forest removals activities, including those with biodiversity benefits, could provide the agriculture sector with opportunities to offset emissions as an agricultural emissions pricing system is introduced (He Waka Eke Noa partnership).

Executive Summary

Developing a Carbon Removals Strategy for New Zealand

7. As we drive ongoing reductions in gross greenhouse gas emissions, New Zealand needs to build a broader portfolio of activities that sequester atmospheric CO_2. New Zealand currently relies on continually expanding forests to achieve the removals necessary to meet our emissions budgets and our Nationally Determined Contribution (NDC) under the Paris Agreement. To achieve New Zealand's legislated net-zero emissions target for 2050 and for the long term, we will need removals to offset hard-to-abate emissions in agriculture and other sectors. Ultimately, removals are the only way to achieve net-negative emissions and *reverse* the rise in global atmospheric greenhouse gas levels.

8. I propose to bring a draft Carbon Removals Strategy for Cabinet's consideration by December 2023, prior to public consultation as a part of 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. The strategy will set objectives for removals, provide alignment across existing workstreams, and identify where new action is needed. 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 or engineered chemical and geochemical methods to draw CO_2 from the air or ocean 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 criteria 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;

    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. [Final paper for Cabinet may reference the Recloaking Papatūānuku proposal for a national indigenous forest initiative].

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 (VCMs) may be suited to support some new carbon removals activities.

15. Others may require new or adapted mechanisms better suited to their characteristics and stages of development.

s 9(2)(f)(iv)

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

    17.1 **The Emissions Trading Scheme review** –considers options to incentivise gross emissions reductions, and options to change ETS settings for CO_2 removals by forestry.

    17.2 **Redesign of the NZ ETS permanent forest category** - to help align future afforestation outcomes with the Government's forestry and climate change objectives, as well as Māori aspirations for their land.

    17.3 **The Voluntary Carbon Market** framework development to support investment in high-integrity removals. Incentivising new removals activities may require new funding approaches suited to their scale, stage of development, cost structures, and differences in quality. A separate forthcoming Cabinet paper will seek agreement to next steps to develop a New Zealand VCM framework [CAB 293].

    17.4 **Development of the biodiversity credits system** must be aligned with design of funding mechanisms for carbon removals. A recent Cabinet paper titled *Approval of National Policy Statement for Indigenous Biodiversity* [CAB 227] seeks agreement to announce the Government's

intention to develop a biodiversity credits system and to release a discussion document. Nature-based solutions could draw revenue for both their carbon removal and biodiversity benefits.

18. I propose that the strategy become a part of the second Emissions Reduction Plan (2025-2030), providing detail and a system-wide 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

19. An innovation pathway workstream 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.

20. 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).

21. Current legislation governing the ETS has limited flexibility to recognise removals activities other than forestry that capture and sequester atmospheric CO_2, whether in biological reservoirs or by engineered geochemical processes. I seek agreement to develop options for legislative and regulatory changes to:

    21.1 enable a broader range of atmospheric CO_2 removal activities to be included in the ETS, or other incentive mechanisms that may be developed following decisions on options currently under consideration for the future of forestry within the ETS, and

    21.2 enable rules and criteria for removals activities to be set out in regulations rather than in primary legislation, to allow faster and more responsive changes to ETS.

22. A clear path to market entry also requires:

    22.1 clear expectations for the research and evidence required to enable entry to different markets or funding mechanisms, and to ensure standards are trusted as being independent, credible, and scientifically robust;

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

23. The need for a specific regulatory framework for carbon capture and storage (CCS) technologies (for capture of CO_2 both at the point of emission and from the air), and for decisions about ETS coverage has been noted by:

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

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

Appendix four provides extracts from both Commissions' reports.

Developing a Carbon Removals Strategy

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

24.1 the agricultural emissions pricing system being developed by the He Waka Eke Noa – Primary Sector Climate Action Partnership (the Partnership)

24.2 the ongoing Emissions Trading Scheme review process considering options to incentivise gross emissions reductions, and to change ETS settings for CO_2 removals by forestry;

24.3 redesign of the NZ ETS permanent forest category to help align future afforestation outcomes with the Government's forestry and climate change objectives, as well as Māori aspirations for their land;

24.4 development of a biodiversity credits system;

24.5 development of the native afforestation strategy, and related initiatives and proposals [such as the Recloaking Papatūānuku proposal for a national indigenous forest initiative];

24.6 responding to the Ministerial Inquiry into Land Uses in Tairawhiti and Wairoa (MILU);

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

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

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

24.10 developing a New Zealand VCM framework

24.11 New Zealand's engagement in the ongoing development of international carbon markets

24.12 developing an NDC strategy – including decisions on offset purchasing.

25. These programmes have different objectives and timeframes but have important interdependencies. The proposed strategy will help to coordinate and prioritise between carbon removal activities, including for investment by Government, iwi/Māori, the private sector, and communities.

26. Current government policies and strategies lack clear direction and agreement on the role that carbon removals should play in meeting New Zealand's targets and commitments. The strategy will address questions about 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. It will also consider how biodiversity, climate resilience and broader co-benefits can be realised.

What are carbon dioxide removals?

27. 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:

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

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

    27.3 the reversible emissions from drained organic soils (e.g., drained peatlands and coastal wetlands).

28. Engineered technologies, many of which are not yet mature, proven and economically scalable, 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]

29. This broad range of activities includes established practices and emergent technologies, varying in their potential scale, likely costs, co-benefits and risks. Some potential removals activities (e.g., offshore "blue carbon" sequestration) are not currently covered by New Zealand's greenhouse gas inventory or international reporting systems.

30. 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

31. 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 requires CAB Min reference].

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

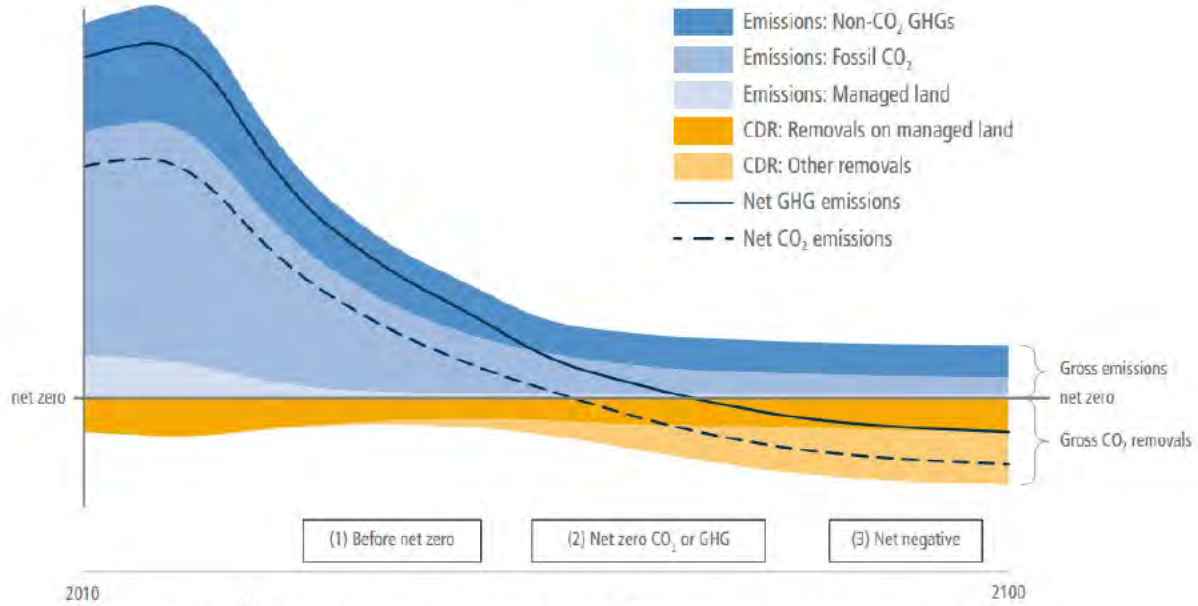
[1] Mitigation of Climate Change: Working Group III contribution to the IPCC Sixth Assessment Report, 2022.
[2] This definition excludes carbon capture utilisation and storage (CCUS) technologies applied for emissions *reduction* at the point of emission (eg, gas wells, industrial processes or waste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

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, (e.g., rewetting peatlands and other drained organic soils).
To net-zero 2050 Offsetting residual emissions in hard-to-abate industries (e.g., agriculture and some industrial processes)	• Sustainable mix and scale of afforestation for ongoing long-term removals while achieving biodiversity, climate resilience and other priorities. • Scale up other proven removal activities, adding these into our emissions accounting, markets, and other policy mechanisms.
Beyond net-zero to negative emissions 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 (e.g., mineral/geological sequestration).

33. 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'. These must be in addition to, rather than substituting for or allowing delays in achieving gross emissions reductions.

34. 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. This requires a global expansion of removals volumes by a mix of "managed land" biological removals and engineered technologies.

Figure 1. Greenhouse gas emissions and removals, stylised pathway



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

The Climate Change Commission's draft ERP2 advice suggests a removals strategy is needed

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

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

    35.2 amend the emissions pricing system to support this by changing the 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).

36. 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".

Developing the strategy in partnership with Māori under Te Tiriti o Waitangi

37. In developing the strategy, a partnership approach with Māori is needed to fully reflect Te Tiriti o Waitangi principles and te ao Māori perspectives. Treaty partners will be engaged in policy choices that shape long-term land use decisions and ascribe monetary value to taonga. Māori have significant interests in forests and other activities that can achieve removals: as rangatira, kaitiaki,

land and business owners, and workers. 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.

38. Māori engagement planning for the carbon removals strategy is underway, focussed on early broad engagement with treaty partners. This is being joined up with other work programmes where possible (including for the ETS review, VCM framework, NDC strategy, biodiversity credits system, and ERP2 planning).

39. Additional early engagement with the National Iwi Chairs Forum (NICF) and the Federation of Māori Authorities (FOMA) is planned. Feedback from these discussions will inform officials' early thinking ahead of engagement with a wider range of treaty partners planned in the coming months.

40. Initial treaty analysis is also underway and will continue to be developed, drawing on what is learned about Māori rights and interests in this work though the planned engagements.

Objectives and Principles for the Carbon Removals Strategy

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

    41.1 The draft objectives (Figure 2) define what success for the strategy means.
    Appendix two provides more detail on the draft objectives.

    41.2 The draft principles (Figure 3) are values statements to guide development of the strategy and the decisions it aims to inform. They are discussed below.

Figure 2. Draft objectives

Draft objectives for the Carbon Removals Strategy

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

B. Clear goals are set for the mix and volume of removals that can contribute to New Zealand's carbon budgets and NDC.

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

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

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

Figure 3. Draft principles

Draft principles for the Carbon Removals Strategy

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

B. Working with nature.

C. Think long-term to net-zero 2050 and beyond to achieving negative emissions.

D. Empower Māori.

42. These objectives and principles may be refined as the strategy is drafted, drawing from targeted engagements with Māori partners and other key stakeholders, and as work progresses to develop the Government's second Emissions Reduction Plan. Cabinet will be asked to confirm the objectives and principles when it considers the draft strategy in December 2023.

43. The draft principles reflect those in the 2022-2025 Emissions Reduction Plan.

2022-2025 Emissions Reduction Plan Principles	Draft principles for a Carbon Removals Strategy
Playing our part	A. Deliver on New Zealand's domestic emissions targets and international commitments
Working with nature	B. Working with nature
Equitable transition A productive, sustainable and inclusive economy	C. Think long-term to net-zero 2050 and beyond to achieving negative emissions
Empowering Māori	D. Empower Māori

A. <u>Delivering on New Zealand's domestic targets and international commitments</u>

44. 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:

44.1 Legal commitments: the Climate Change Response Act requires the Government to achieve the net-zero 2050 target. New Zealand has international obligations to pursue measures to achieve the NDC target under the Paris Agreement and the New Zealand - European Union Free Trade Agreement.

44.2 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.

44.3 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.

45. 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.

46. Ongoing publicly funded science will also contribute. For example, the Max Forest Carbon Programme is exploring whether additional removals achieved by improved management practices in permanent forests can be measured and verified in a way that would allow this to be reflected in national emissions accounting.

B. Working with nature

47. Nature-based carbon removal solutions 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*

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

49. 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. There are opportunities to advance nature-based removal activities on public and private land including public conservation land, Ngā Whenua Rāhui, as well as in the agriculture sector.

50. While not all removal activities with significant potential to contribute at scale will be "nature-based" or offer broad environmental benefits, the principle of working with nature can help to inform design choices and prioritisation across a wide range of technologies.

51. Removal activities that also offer biodiversity benefits could potentially source revenue from both carbon markets and the proposed biodiversity credits system. Clear connections in design and implementation will be needed.

C. Think long-term:

52. 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.

53. Near-term actions will have long-term implications. For example, native forests planted today will take decades to reach their full sequestration potential, and will continue to sequester carbon over centuries.

54. 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.

D. Empower Māori:

55. Taking a partnership approach to developing the Carbon Removals Strategy will ensure Te Tiriti o Waitangi principles are upheld and te ao Māori perspectives are reflected.

56. Climate change, and our response to it, can affect all aspects of Māori life. Tangata whenua can be especially vulnerable to the effects of climate change and there are particular risks and opportunities for the Māori economy in the development of carbon removals. Opportunities include the potential to recognise non-forest carbon sequestration activities on Māori land, which Māori called for during public consultation on farm-level emissions pricing.

57. Mātauranga Māori and te ao Māori must inform decision-making under the strategy. An equitable transition for Māori, led by Māori and upholding their rights and interests under Te Tiriti o Waitangi requires building Crown–Māori relationships and capability to work together as equal partners in developing the Carbon Removals Strategy.

Criteria for prioritising removal activities

58. 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:

    58.1 removal potential and permanence: potential volume of CO_2 removals, timeframe of removals, and permanence/security of removal;

    58.2 potential for deployment, including: scientific evidence of effectiveness, and technological readiness for deployment at scale,

    58.3 costs, including infrastructure and land requirements, current and expected future unit costs, and potential commercial value from products or services;

    58.4 potential co-benefits, impacts and risks, including: environmental, climate resilience, social wellbeing and economic, and contribution to a low-emissions economy;

    58.5 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;

58.6 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

59. The critical issue of the desired mix, volume and timing of afforestation will be central to a carbon removals strategy. The strategy can provide a framework for working out the role of exotic and native afforestation in terms of removals, and can inform choices that affect the mix of afforestation over time.

60. A range of work planned and underway will impact the scale and mix of forestry in New Zealand (e.g., ETS permanent forestry category, ETS review, biodiversity credits, practical support for native afforestation initiatives).

61. New Zealand's current CO_2 removal efforts are achieved almost entirely by expansion of exotic forests. Carbon sequestration by exotic afforestation is relatively fast and low-cost. It makes an essential contribution to lowering net emissions and meeting New Zealand's emissions budgets.

62. Alongside the economic contribution of the forestry industry, wood products can also substitute for products with higher emissions, meaning that the forestry sector has an important role to play in a future low-emissions economy.

63. For the first emissions budget (2022-2025), forecast net removals by forestry were 24.3 $MtCO_2$-eq (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]

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

64.1 Carbon sequestration in any biological reservoir is vulnerable to reversal: by fire, disease, natural disasters, land use change, and global warming itself.

64.2 It requires on-going expansion of land area committed to forests for the long term. This can compete with other land uses including agriculture and horticulture.

64.3 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 into Land Uses in Tairawhiti and Wairoa*.

64.4 Exotic forestry offers lower biodiversity benefits than some alternative land uses such as indigenous afforestation. Depending on previous land-use, exotic forestry may negatively impact biodiversity.

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

64.5 Over-reliance on afforestation removals for our current emissions budgets and towards our 2050 net-zero target limits 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.

65. Exotic forestry creates long-term liabilities as forests need to be permanently maintained to contribute positively to climate outcomes. If a permanent forest is used for claims towards climate goals and targets and the forestry is reversed, there would be liabilities for the emissions that were released back into the atmosphere. In determining the desired future mix, volume and timing of removals, the strategy will need to consider the ability of other types of removals to scale up to compensate for any decrease in forestry removals.

Expanding the scope of New Zealand's NDC to include non-forest land uses

66. New Zealand's present accounting approach for our domestic emissions budgets and NDC international commitments excludes land-use related greenhouse gas emissions and CO_2 removals for all land use categories other than forestry. This means our emissions accounting is incomplete, excluding emissions and removals from roughly 60% of New Zealand's land area in non-forest categories such as grassland, cropland and wetlands.

67. Cabinet is currently considering a strategy to meet our NDC commitment [reference *NDC Strategy* CAB 215 – to DEV 7 June]. That paper recommends Cabinet agree in principle, subject to detailed advice on accounting implications:

67.1 New Zealand's NDC target covers all different types of non-forest land, and that we work towards including non-forest land use and management interventions by 2030; and

67.2 Non-forest abatement be encouraged in climate policy in advance of its eventual inclusion into New Zealand's NDC.

68. Expanding the scope of New Zealand's NDC to include non-forest land use categories is an essential first step to broadening our portfolio of removals that can impact on our domestic targets and international commitments. This expansion of our NDC scope brings in agricultural and other non-forest land to create incentives for government, iwi/Māori, industry and communities to invest in a wider range of carbon removal activities.

69. It responds to long-standing call from the agriculture sector for other types of scientifically robust carbon removal to be included in our targeted accounting. Māori also consider that expansion of sequestration categories supports greater recognition of Māori as kaitiaki[4].

70. An expanded NDC scope will also contribute to enhancing New Zealand's international reputation. It represents an increase in ambition, aligns with the

[4] Ministry for the Environment and Ministry for Primary Industries. 2022. Pricing agricultural emissions: Report under section 215 of the Climate Change Response Act 2002. https://environment.govt.nz/assets/publications/Pricing-agricultural-emissions-report-under-section-215-of-the-CCRA.pdf

Paris Agreement's intent that developed countries undertake "economy-wide emission reduction targets", and aligns with other developed countries' practices.

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 eventually reversed by rewetting.

This is a nature-based solution that can deliver social, environmental and climate resilience benefits as well as 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 CO_2-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 Carbon Removals Strategy can help to bring these trade-offs into focus and help to identify suitable policy mechanisms and funding approaches for cost-effective action on both public and private land.

Policy mechanisms could include direct procurement, use of voluntary carbon markets, and others. Funding options include leveraging biodiversity credits, direct government funding, s 9(2)(f)(iv)

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

71. The strategy will inform decisions on the choice and design of policy mechanisms to incentivise removals. Existing mechanisms such as the ETS and VCMs may be well suited to support some new carbon removals activities. s 9(2)(f)(iv) Other mechanisms such as grants, education, and regulation may also be appropriate.

72. Upcoming decisions affecting the ETS and VCMs will have implications for their use to support new removals activities.

72.1 For the ETS, decisions are yet to be taken about the extent to which gross emissions reductions are prioritised and how emissions units (currently only from forestry) are treated.

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

73. A more diversified portfolio of removals may require new contracting or funding approaches and other mechanisms suited to their scale, stage of development, cost structures, and differences in quality (e.g., 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.

74. The design and choice of funding mechanisms for carbon removals needs to be coordinated with other government interventions, particularly work to develop a biodiversity credits system [To add: ref to Cab Minute for paper CAB-227]. 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

75. A maturing 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.

76. A key workstream under the Carbon Removals Strategy will be to develop an innovation pathway. This will identify priorities to address gaps in current incentives and support for the development and scaled implementation of carbon removal activities. It can draw extensively on existing strategies, partnerships and initiatives in the Research Science and Technology sector, in industry policy and venture finance.

77. 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.

78. 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 criteria and risk management rules, and greater certainty about the mechanisms through which removals will be recognised.

79. One aspect of this is the potential for a wider range of non-forestry removals to be included in the ETS, VCMs, or other incentive mechanisms. The scope of the ETS is set out in the Climate Change Response Act 2002, which allows little flexibility to recognise removals activities other than forestry.

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

    80.1 the scope of the ETS to be expanded to include carbon dioxide removal activities in addition to forestry; and

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

81. Forestry is the only significant carbon removal activity currently recognised in the scope of the ETS.[5] The Government is currently considering whether the ETS should be changed to prioritise gross reductions while maintain support for removals. If so, that could change the way forestry emissions and removals are treated within the ETS.

82. Decisions on whether the ETS is the most appropriate mechanism to recognise and incentivise other removals activities should await the outcome of the ETS review. However, work on legislative amendment options to enable flexibility to add other removals activities should start now.

83. The Climate Change Response Act allows for the scope of the ETS to be extended by Order in Council, to include storage of CO_2 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.

84. However, the Act's current wording does not allow for the ETS to include storage of CO_2 captured *from the atmosphere* by non-forestry biological removal activities, or by new technologies that may mature over time such as Direct Air Carbon Capture (DACCS) and Storage or Bioenergy Carbon Capture and Storage (BECCS).[6] These technologies are described in Appendix one.

85. Both the Climate Change Commission and the Productivity Commission have advised that a legislative amendment would be necessary for DACCS and BECCS removals to be recognised within the ETS. Appendix four presents the Productivity Commission's 2018 recommendation for change and the Climate Change Commission's draft advice to inform the next Emissions Reduction Plan.

86. Some non-forestry biological carbon removal activities may also be suited to future participation in the ETS. This may include agricultural carbon sequestration in vegetation that does not meet the current ETS definition of

[5] 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.
[6] Climate Change Response Act 2002, Schedule 4, Part 2, Subpart 2. This provision, when brought into force by an Order in Council (under section 162) 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.

forests (defined by area, canopy coverage and height), if this can be achieved at sufficient scale and with cost effective measurement and monitoring.

87. Recognition of more non-forest removals activities, including those with biodiversity benefits, could provide the agriculture sector with opportunities to offset emissions as an agricultural emissions pricing system is introduced (He Waka Eke Noa partnership).

88. 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 criteria 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.

89. 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.

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

91. 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 2024.

92. The ability to be recognised in the ETS 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.

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

Next Steps

94. 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 engage with treaty partners to develop the strategy as well as undertake targeted engagement with key sector stakeholders.

95. 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.

96. 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.

Financial Implications

97. (To come: No direct financial implications, s 9(2)(f)(iv)

Legislative Implications

98. (To come: summarising next steps and potential legislative changes from the proposals under innovation pathway section)

Impact Analysis

Regulatory Impact Statement

99. 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

100. A Climate Implications of Policy Assessment is not required at this stage. Specific initiatives and policy changes that may be developed under the proposed Carbon Removals Strategy may require a CIPA.

Population Implications

101. There are no specific implications arising as a direct result of the proposals in this paper. Future decisions to be shaped by the proposed strategy will have flow-on impacts for communities, regions, iwi/Māori and other population groups. For example, choices about the desired scale and timing of land-based removals activities such as afforestation will have long-term land use implications that will vary across regions and communities.

Human Rights

102. The proposals in this paper are not inconsistent with the New Zealand Bill of Rights Act 1990 and the Human Rights Act 1993.

Treaty Analysis

103. Treaty implications and Māori interests in a Carbon Removals Strategy are discussed in paragraphs (37-40 and 55-57) above.

104. Treaty analysis and engagement with Treaty partners began in May 2023 with a joint approach to discussing development of a Carbon Removals Strategy and

framework for Voluntary Carbon Markets. Engagement with Māori included the objectives, challenges and opportunities. I intend on engaging with Māori further as the draft strategy is developed.

[Legally Privileged]: s 9(2)(h)

[redacted]

Consultation

106. 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; Environmental Protection Agency; and Energy Efficiency & Conservation Authority [to add: final confirmed list]

107. [to add: Ministerial consultations]

Communications

108. I intend the Carbon Removals Strategy to form part of the Government's second Emissions Reduction Plan (ERP2). Communications for public consultation on the draft strategy and for final publication will be coordinated through the ERP2 development process.

Proactive Release

109. I intend to release this paper within 30 days of its consideration by Cabinet, with any redactions considered as for a request under the Official Information Act.

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 **Note** that the Carbon Removals Strategy will become a part of the second Emissions Reduction Plan

3 **Agree** that activities within scope of the Carbon Removals Strategy will be human-induced activities that:

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

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

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

3.2 reduce emissions from land, especially drained organic soils.

4 **Note** this definition of removals aligns with the International Panel on Climate Change's 2002 Sixth Assessment Report.

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

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

5.2 Clear goals are set for the mix and volume of removals that can contribute to New Zealand's carbon budgets and NDC,

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

5.4 More removal activities are brought into New Zealand's emissions measurement and accounting with standards that are trusted as being independent, credible and scientifically robust, and

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

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

6.1 Deliver on our domestic and international targets and commitments,

6.2 Working with nature,

6.3 Think long-term, to net-zero 2050 and beyond to achieving negative emissions., and

6.4 Empower Māori.

7 **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.

8 **Note** that measuring and incentivising non-forestry land uses that sequester carbon is a key issue in developing an agricultural emissions pricing system.

9 **Agree** that the Minister for Climate Change and Ministry for the Environment, in consultation with other Ministers and agencies as appropriate, continue early engagement with Treaty partners during the Carbon Removals Strategy development process.

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

11 **Note** that public consultation on the draft Carbon Removals Strategy can be undertaken in early 2024, as part of 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

12 **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.

13 **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.

14 **Note** that current legislation governing the Emissions Trading Scheme (ETS) in the Climate Change Response Act 2002 provides limited scope to recognise activities other than forestry that capture and sequester atmospheric CO_2, and lacks flexibility to develop rules and criteria for new carbon removal activities.

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

16 **Invite** the Minister for Climate Change to develop options for legislative and regulatory changes, with supporting regulatory impact analysis, to:

16.1 enable a broader range of atmospheric CO_2 removal activities to be included in the ETS, or other incentive mechanisms that may be developed following decisions on options currently under consideration for the future of forestry within the ETS; and

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

17 **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

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

17.2 test and verify that evidence.

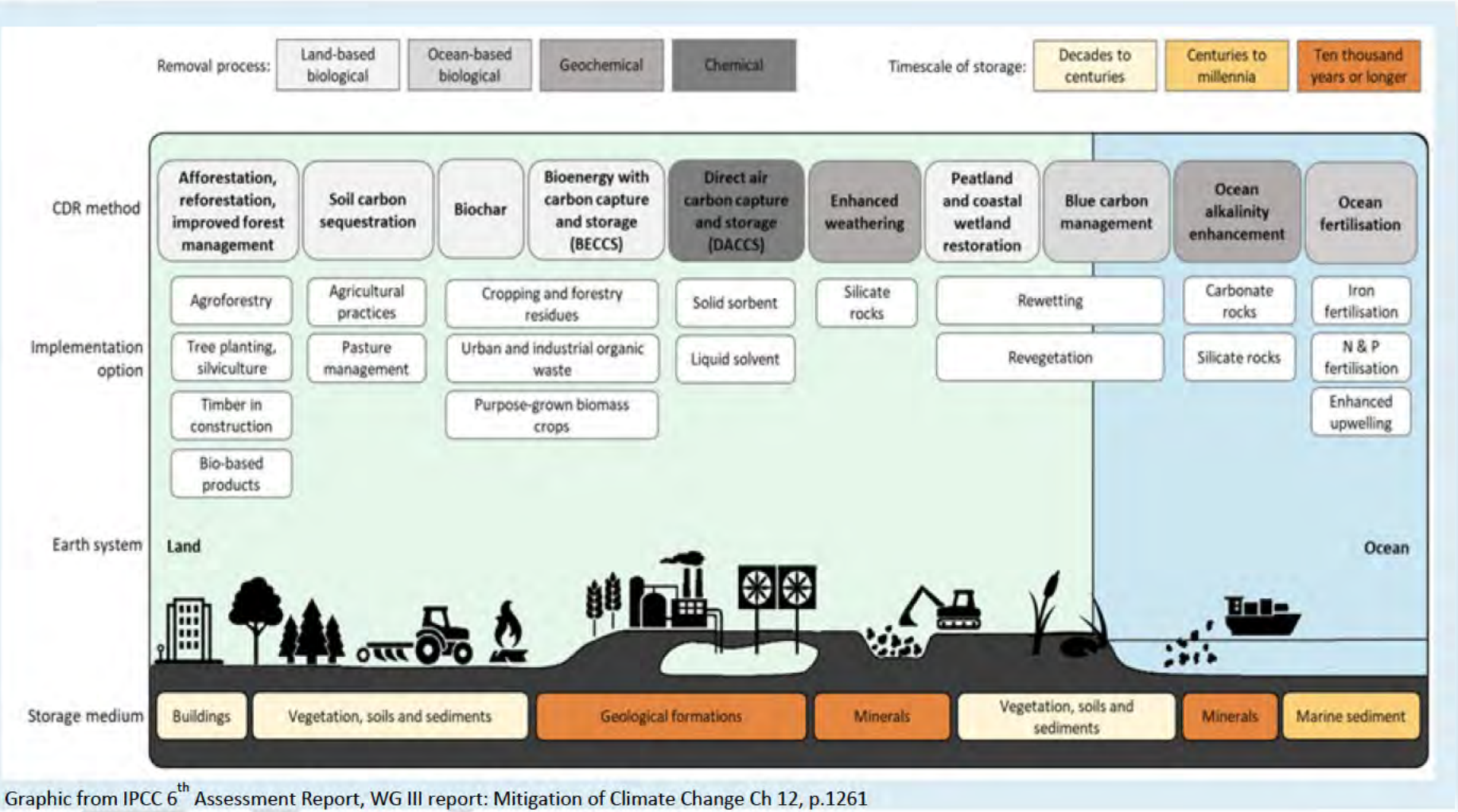
Authorised for lodgement

Hon James Shaw

Minister for Climate Change

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

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

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.

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 that can contribute to New Zealand's emissions budgets and NDC	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 CO_2 removals needed will help to foster greater innovation and private investment in carbon dioxide removals activities, as well as informing government interventions and priorities. 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 criteria	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.

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)

Appendix Four: 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.