



# Marine Carbon Dioxide Removal: The Case for New Zealand

March 2026

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## Decisions requested

Gigablue is seeking the following decisions:

- (a) Support an EPA determination that the 2026/27 trials constitute marine scientific research under the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012, and are therefore a permitted activity.
  - (b) Direct MfE / MCERT officials to begin work on amendments to the regulations under the Act<sup>1</sup> to create a tailored pathway for marine CDR activities, with a view to enactment by early 2027.
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## Marine Carbon Dioxide Removal

Marine Carbon Dioxide Removal (mCDR) presents a strategic opportunity for New Zealand to address multiple national priorities through a single, science-based pathway. Marine CDR is emerging as a global commodity market projected to reach \$1.2 trillion, with the potential to create high-value jobs, develop local supply chains, and establish New Zealand as a leader in a new export industry.

Removing CO<sub>2</sub> directly from ocean water reduces acidification and helps stabilize temperature, supporting marine ecosystems, fisheries, and long-term ocean resilience. Removal of CO<sub>2</sub> from the atmosphere also contributes directly to global mitigation efforts and positions New Zealand as an active solution provider, not just a participant.

This effort is about positioning New Zealand at the forefront of a critical global capability, delivering environmental integrity, economic value, and national resilience in parallel.

## About Gigablue

Gigablue is a marine carbon dioxide removal (marine CDR) company, established and operating on a mission to reduce the global ecological footprint of carbon. Gigablue operates in one of the most promising sectors of global climate technology and ocean health. By verified tonnes sold, it is the market leader in its sector, with over 300,000 tonnes of future carbon removal sold and independently certified. It has been operating in New Zealand's Exclusive Economic Zone (EEZ) since 2024, and has completed two successful research trials in the Southern Ocean south-east of Dunedin. New Zealand is central to its global strategy. This is an opportunity for New Zealand to be at the forefront of an exciting new technology, which will create thousands of well-paid jobs and promote local science and innovation.

The company's technology — Microalgae Carbon Fixation and Sinking (MCFS) — is scientifically rigorous and commercially proven. It has been reviewed and validated by Earth Sciences New Zealand (ESNZ, formerly NIWA). Carbon removal is independently certified by Puro.earth, among the world's leading carbon credit verifiers, which has approved the MCFS methodology. Gigablue's strategic approach promotes regional economic development and strong regional and local community participation and collaboration.

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<sup>1</sup> Specifically the insertion of (a) a new permitted activity under the Exclusive Economic Zone and Continental Shelf (Environmental Effects - Permitted Activities) Regulations 2013 (equivalent to current Regulation 8A related to space vehicles), and (b) a new non-notified activity under Regulation 5 of the Exclusive Economic Zone and Continental Shelf (Environmental Effects - Non-notified Activities) Regulations 2014.

## How the technology works

Put simply, Gigablue's technology returns carbon back to where it came from, and from where it was taken by humans - the ocean sediment. The ocean's biological carbon pump captures around 50 gigatons of CO<sub>2</sub> each year through natural phytoplankton activity. Gigablue's technology mimics this natural process. Engineered mineral-rich substrates are deployed into the ocean, providing a surface for local phytoplankton to colonise. Once the phytoplankton has fixed carbon through photosynthesis, the substrate sinks rapidly to the deep ocean floor, carrying the carbon with it. There it is stored for centuries. New Zealand's EEZ alone has the theoretical capacity to support over 100 million tonnes of CO<sub>2</sub> removal per year (for reference, New Zealand's net emissions were 55 million tonnes in 2023). Gigablue's long-term target is one million tonnes annually.

The operational footprint is around 30 by 30 kilometres. Ocean currents disperse the material safely across a far larger area. Each cycle takes 18 days and relies on sunlight, gravity, and water — making the technology unusually cost-efficient relative to other carbon removal approaches. Gigablue deploys from Port Chalmers, operating between October and February. Its primary deployment zone is the Bounty Trough, approximately 170 kilometres south-east of Dunedin.

MCFS works with natural systems, not against them. Independent assessment by ESNZ and environmental consultants Tonkin+Taylor found preliminary evidence of environmental effects to be negligible to low at the current trial scale. A joint report is available on request.

## New Zealand's opportunity and risk

New Zealand's Southern Ocean is a High Nutrient, Low Chlorophyll zone, meaning it has the conditions for significant natural carbon sequestration but lacks the mineral inputs that trigger it elsewhere. Gigablue's technology is designed to unlock exactly that potential. New Zealand's EEZ is also the only jurisdiction where the company can operate at scale within national waters rather than international ones, giving both Gigablue and the New Zealand government far greater control over a responsible scale-up.

The timing is operationally urgent. Gigablue needs to conduct its next trials in the 2026/27 Southern Hemisphere summer. Missing that window means at minimum a twelve-month delay to the research programme. Accordingly, Gigablue needs regulatory change to enable those activities. Gigablue already lost its 2025/26 season trials due to an uncertain regulatory environment. 9(2)(b)(ii)

## Economic benefits

The economic case is substantial.

An independent assessment by Insight Economics identifies two components:

1. The development phase - covering infrastructure, manufacturing, and equipment - is estimated to generate 5,128 full-time equivalent years of work, around \$465 million in wages and salaries, and an \$818 million contribution to GDP.
2. At the operational scale, the annual GDP contribution is projected at \$585 million, with around 4,000 ongoing jobs and a further \$9(2)(b)(ii) in wages and salaries. Activity would be concentrated in the high-value sectors of maritime operations, science, technology, and environmental monitoring.

The operation runs out of Port Chalmers, and the economic benefits flow primarily to Otago and Southland. Gigablue already procures locally across shipping, engineering, logistics, and scientific services, with that footprint growing as operations scale.

The economic benefits extend beyond Gigablue's direct footprint. Insight Economics identifies a range of wider benefits: strengthening New Zealand's emerging blue economy through diversification into knowledge-intensive marine industries; creating pathways for domestic capability building in offshore operations, marine science, and carbon measurement and verification; and stimulating demand for local service providers across ports, logistics, engineering and research. Establishing New Zealand as an early mover in marine CDR builds the infrastructure that a growing global industry will need — in marine instrumentation, specialist vessel operations, and environmental consulting. These are

high-value, export-capable industries, and New Zealand's position in emerging international carbon markets strengthens alongside them.

## Environmental benefits

MCFS is ocean-positive, not merely carbon-neutral. Ocean acidification - driven by excess dissolved CO<sub>2</sub> - is degrading marine ecosystems globally. Gigablue's process removes CO<sub>2</sub> from the water column as well as the atmosphere, directly reducing acidification pressure. This is not a side effect; it is central to how the technology works.

## Ngāi Tahu engagement

Gigablue has been engaged in an active relationship with Te Rūnanga o Ngāi Tahu, whose takiwā encompasses the operational area. The engagement has focused on aligning Gigablue's planned activities with Ngāi Tahu environmental and climate research priorities, and on how Ngāi Tahu might participate in and benefit from operations in their takiwā. Dedicated advisers support this relationship. It is ongoing and will deepen as the programme expands.

## International developments

Internationally, governments are moving rapidly from broad environmental controls toward the development of tailored regulatory frameworks for mCDR that enable controlled research and early-stage deployment. Australia has introduced legislation for marine geoengineering research, while the United States and Canada are establishing dedicated programmes, monitoring standards, and coordinated regulatory pathways to support trials and scale-up. In parallel, jurisdictions including Canada, the United States, the United Kingdom, and European Union member states are enabling controlled pilot projects and trial environments under close regulatory oversight, in effect applying a "sandbox-style" approach to generate real-world data and inform future regulation.

There is also a clear trend toward enabling coastal and engineered marine CDR approaches, with a growing number of companies in the United States and Canada already progressing under existing permitting frameworks, while governments work to develop tailored regulations for offshore systems.

Across these developments, a consistent direction of travel is emerging: governments are creating fit-for-purpose, science-based regulatory pathways that enable innovation while managing environmental risk. New Zealand's current framework does not yet provide such a pathway, and without timely adaptation risks falling behind peer jurisdictions that are actively positioning themselves at the forefront of this emerging sector.

## Need for regulatory certainty

Gigablue is actively developing or evaluating operations in Australia, Canada, Alaska, and Chile. New Zealand has a head start - two completed trials, an established relationship with ESNZ and the EPA, an active Ngāi Tahu engagement process, and a proven site south-east of Dunedin. New Zealand's first-mover advantage is at risk.

The current regulatory framework was not designed for marine CDR. Gigablue's activities are not clearly classified, and the absence of a clear pathway is what has caused the delays to date. The regulatory fix being sought is not radical. It is an amendment to two existing regulations to create a defined 'permitted activity' and 'non-notified discretionary activity' pathway for MCFS. New Zealand took a similar permitted activity regulatory approach for the space launch sector with Rocket Lab, and it is considered that this, combined with a non-notified discretionary activity for future larger-scale activities, is the only viable option available.

If a workable permitted activity framework is not in place before the 2027 summer, Gigablue will not be able to proceed in New Zealand because the science requires ocean access at a scale current settings do not permit. The marine CDR sector will develop regardless of what New Zealand does. The question is whether New Zealand is part of it.

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