



PROACTIVE RELEASE COVERSHEET

Minister	Hon Simon Watts	Portfolio	Climate Change
Name of package	Feasibility Study into a Border Carbon Adjustment for the Cement Industry	Date to be published	22 September 2026

List of documents that have been proactively released

Date	Title	Author
27 November 2025	Briefing note: Findings of the Border Carbon Adjustment Feasibility Study and Next Steps	Ministry for the Environment
27 November 2025	Appendix 1: Terms of reference	Ministry for the Environment
27 November 2025	Appendix 2: Summary of results of the BCA feasibility study	Ministry for the Environment
27 November 2025	Appendix 3: Feasibility Study	Ministry for the Environment

Information redacted **YES**

Any information redacted in this document is redacted in accordance with the Ministry for the Environment's policy on proactive release and is labelled with the reason for redaction. This may include information that would be redacted if this information was requested under Official Information Act 1982. Where this is the case, the reasons for withholding information are listed below. Where information has been withheld, no public interest has been identified that would outweigh the reasons for withholding it.

Summary of reasons for redaction

Some information has been withheld from *Briefing note: Findings of the Border Carbon Adjustment Feasibility Study and Next Steps* under:

- 6(a) of the Official Information Act to prejudice the security or defence of New Zealand or the international relations of the Government of New Zealand.
- 9(2)(a) of the Official Information Act protect the privacy of natural persons, including that of deceased natural persons
- 9(2)(ba)(i) of the Official Information Act to protect information which is subject to an obligation of confidence or which any person has been or could be compelled to provide under the authority of any enactment, where the making available of the information would be likely to prejudice the supply of similar information, or information from the same source, and it is in the public interest that such information should continue to be supplied.
- 9(2)(f)(iv) of the Official Information Act to maintain the constitutional conventions for the time being which protect the confidentiality of advice tendered by Ministers of the Crown and officials.
- 9(2)(g)(i) of the Official Information Act to maintain the effective conduct of public affairs through the free and frank expression of opinions by or between or to Ministers of the Crown or members of an organisation or officers and employees of any public service agency or organisation in the course of their duty.
- 9(2)(h) of the Official Information Act to maintain legal professional privilege.

Some information has been withheld from *Appendix one: Terms of reference* under:

- 6(a) of the Official Information Act to prejudice the security or defence of New Zealand or the international relations of the Government of New Zealand.
- 9(2)(g)(i) of the Official Information Act to maintain the effective conduct of public affairs through the free and frank expression of opinions by or between or to Ministers of the Crown or members of an organisation or officers and employees of any public service agency or organisation in the course of their duty.

Some information has been withheld from *Appendix two: Summary of results of the BCA feasibility study* under:

- 9(2)(b)(ii) of the Official Information Act to protect information where the making available of the information would likely unreasonably to prejudice the commercial position of the person who supplied or who is the subject of the information.

Some information has been withheld from *Appendix three: Feasibility Study* under:

- 6(a) of the Official Information Act to prejudice the security or defence of New Zealand or the international relations of the Government of New Zealand.
- 9(2)(b)(ii) of the Official Information Act to protect information where the making available of the information would likely unreasonably to prejudice the commercial position of the person who supplied or who is the subject of the information.
- 9(2)(ba)(i) of the Official Information Act to protect information which is subject to an obligation of confidence or which any person has been or could be compelled to provide under the authority of any enactment, where the making available of the information would be likely to prejudice the supply of similar information, or information from the same source, and it is in the public interest that such information should continue to be supplied.
- 9(2)(f)(iv) of the Official Information Act to maintain the constitutional conventions for the time being which protect the confidentiality of advice tendered by Ministers of the Crown and officials.
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BRIEFING

Findings of the Border Carbon Adjustment Feasibility Study and Next Steps

Date:	27 November 2025	Priority:	Routine
Security classification:	Classificati	Tracking number:	BRF-7080

Action sought

Decision on whether to seek Cabinet agreement to undertake further work on a BCA.

	Action sought	Response by
Hon Simon Watts Minister of Climate Change	Make decisions on the recommendations in this briefing	1 December 2025
Hon Todd McClay Minister for Trade and Investment ; Hon Nicola Willis (Minister of Finance) ; Hon Shane Jones (Minister for Regional Development) ; Hon Chris Penk (Minister of Building and Construction) ; Hon Penny Simmonds (Minister for the Environment)	Copy for information	N/A

Contact for telephone discussion (if required)

Name	Position	Telephone	1st contact
Tabitha McMaster	Senior Policy Advisor (MfE)		
Jane White	Chief Advisor (MfE)	9(2)(a)	✓

The following departments/agencies have been consulted

MFAT, MBIE, Treasury, MPI, Ministry for Regulation, IRD, and Customs

Minister's office to complete:

- | | | |
|--|---|------------------------------------|
| ☐ Noted | ☐ Approved | ☐ Declined |
| ☐ Overtaken by Events | ☐ Needs change | ☐ Seen |
| | ☐ See Minister's Notes | ☐ Withdrawn |

Minister's Comments



BRIEFING

Findings of the Border Carbon Adjustment Feasibility Study and Next Steps

Date:	27 November 2025	Priority:	Routine
Security classification:	Restricted	Tracking number:	BRF-7080

Purpose

1. This briefing provides an overview of the key findings from the Border Carbon Adjustment (BCA) feasibility study for the cement sector. The study concluded that implementing a BCA in the cement industry would help to mitigate the risk of carbon leakage, though it also identified considerable trade policy-related challenges. Three possible courses of action are outlined for you to consider.

Key points

2. Reducing and phasing out Industrial Allocation (IA) increases the risk of carbon leakage¹ in the cement sector, which is characterised by hard-to-abate emissions. The feasibility study evaluated whether a BCA could better address carbon leakage than current IA settings, while maintaining trade compliance and minimising costs. A BCA aims to equalise carbon costs for domestic producers and importers by imposing a comparable carbon charge on imports.

9(2)(g)(i)

3. Indicative results² show a BCA could deliver environmental benefits, including reduced carbon leakage risk for the cement sector, marginally reduced global emissions, decarbonisation incentives and retained waste benefits. Results also show a BCA could have a small negative impact on cement demand, construction output and GDP.
4. A BCA may have a range of fiscal impacts on the Crown, from a net benefit of \$33m to a net cost of \$628m over the period 2024 to 2050, excluding BCA implementation costs. The key driver of the fiscal impact is a corresponding decision on how quickly IA is phased out alongside the introduction of a BCA. Potential revenue gains also depend on carbon pricing levels in the countries we import from.
5. The modelling shows that, **in the absence of a BCA, domestic manufacturing is likely to cease in 2030** and shift to an import-only model, whereas a BCA enables

¹ Carbon leakage is the shift of production and associated emissions from countries with strict climate policies to those with weaker or no policies, undermining global emissions reduction efforts.

² See Figure 2 in the body of the briefing and Appendix 2 for more detail.

domestic manufacturing to continue post-2030. These findings are based on commercially sensitive data provided by Concrete NZ members, which has not been independently verified. If work on a BCA were to progress, we would recommend obtaining independent verification.

6. The Ministry of Foreign Affairs and Trade (MFAT) will provide separate advice to the Minister for Trade and Investment on trade policy and trade law considerations of implementing a BCA at NZ's border. This advice will also be shared with you, and you may wish to discuss this with Minister McClay. Given the breadth of advice, and international trade sensitivities on BCAs generally, MFAT has not included any material in the cement sector feasibility study report. This is a departure from the terms of reference but became necessary for finalising the study.

7. 9(2)(g)(i) [REDACTED]
 [REDACTED]
 [REDACTED] 9(2)(g)(i) [REDACTED]
 [REDACTED] 6(a) [REDACTED]
 [REDACTED] the European Union's (EU) CBAM, which has already been challenged in formal World Trade Organization (WTO) dispute settlement proceedings prior to its full implementation.
 6(a) [REDACTED]
 [REDACTED] . 6(a), 9(2)(q)(i) [REDACTED]
 [REDACTED]

8. 9(2)(h) [REDACTED]

9. [REDACTED]

We present three strategic options for you to consider

10. Your options from here are:
- i **Seek a Cabinet mandate to undertake further cross-agency work on a BCA** for the cement industry, including suitability for other industries, its interaction with other carbon pricing schemes and implementation costs.
 - ii **Pause work on a BCA,** 6(a), 9(2)(g)(i) [REDACTED]
 [REDACTED]
 [REDACTED]

- iii **Undertake further work to assess the magnitude of carbon leakage risk** across industries under current IA settings and in light of carbon pricing trends internationally. This work would require prioritisation against other MfE workstreams but would help government prepare for potential carbon leakage, and international developments in BCAs, in advance.

Domestic cement manufacturing is under considerable pressure

11. At an officials' meeting on 3rd November, we informed you that Golden Bay (GB) has advised that the Fletcher Building Board is likely to decide on the future of the GB cement plant in May 2026. Closing the plant and shifting to an import-only model would have implications for supply chain resilience, impacts on the regional economy and fiscal implications stemming from reduced IA costs. You asked for advice on options to potentially support GB in the short-term. This is provided in BRF-7119.
12. Given the likely closure of GB in the absence of government intervention, we recommend Cabinet is made aware of the implications of this, along with any options to support GB. We recommend discussing this with the Minister of Finance and Minister for Regional Development in the first instance.

Recommended actions

The Ministry for the Environment recommends that you:

1. **Note** a feasibility study, undertaken in collaboration with Concrete NZ and government agencies, indicates a BCA reduces carbon leakage risk, incentivises decarbonisation and reduces waste to landfill, but has significant trade risks. *Noted*

EITHER

2. **Agree** to seek a Cabinet mandate to undertake further work on a BCA for the cement industry, including suitability for other industries, its interaction with other carbon pricing schemes, 9(2)(g)(i) *Agree / Disagree*
and implementation costs.

3. **Note** that due to the nature of BCAs, further work will require significant cross-agency resourcing. *Noted*

OR

4. **Agree** not to proceed with further work on a BCA, 9(2)(g)(i) *Agree / Disagree*

AND

5. **Direct officials** to assess the magnitude of carbon leakage risk across industries under current IA settings and consider carbon pricing trends internationally. *Agree / Disagree*
6. **Refer** this briefing to the Minister of Finance, Minister for Trade and Investment, Minister for Building and Construction, Minister for Regional Development and Minister for the Environment. *Agree / Disagree*
7. **Direct officials** to develop a Cabinet paper on the implications of the potential closure of Golden Bay's Portland cement plant and any recommendations to support after considering advice in BRF-7119. *Agree / Disagree*
8. **Agree** to discuss this briefing with officials, including how to communicate the findings of the feasibility study. *Agree / Disagree*



Jane White
Chief Advisor
 Climate Change Mitigation and Resource Efficiency
 Ministry for the Environment
 ____ / ____ / 2025

Hon Simon Watts
**Minister of Climate
 Change**
 ____ / ____ / 2025



Background

13. In May 2025 you directed officials to undertake a feasibility study into a border carbon adjustment (BCA) in collaboration with the cement sector [BRF-6259 refers]. This followed discussions with Fletcher Building Limited and its subsidiary, Golden Bay (GB), about industrial allocation settings, including the 5/10-year review of allocative baselines.
14. GB has advised it would not remain commercially viable as a domestic manufacturer in the absence of a policy to level the playing field, creating carbon leakage risk.³ New Zealand's three cement importers also support the opportunity to explore options to level the playing field, reduce leakage and provide a balanced approach to decarbonisation.
15. A BCA imposes a carbon cost on importers equivalent to that faced by domestic producers and aims to remove the need for industrial allocation. Its primary objective is to reduce carbon leakage where local producers face higher emissions mitigation costs than international competitors.
16. The UK and EU are implementing a Carbon Border Adjustment Mechanism (CBAM) and other countries are exploring the possibility. Australia's final report from their Carbon Leakage Review is due to be published before the end of 2025 and may recommend a BCA, starting with clinker, cement and lime sectors. Any decisions will be made as part of the 2026/27 review of their Safeguard Mechanism.⁴

The cement sector is trade exposed and hard to abate....

17. GB and HR Cement meet approximately 60% of NZ's demand for cement, with the rest imported by Holcim NZ and NZ Independent Cement. GB is a fully owned trading entity of Fletcher Concrete and Infrastructure Ltd, and operates the Portland Cement Plant in Whangārei, which is New Zealand's only fully integrated cement manufacturing plant, following the closure of Holcim NZ's Westport plant in 2016. Table 1 sets out the key drivers of carbon leakage in the NZ cement industry:

Table 1: Key drivers of carbon leakage in the NZ cement sector

Challenge	Description
Carbon pricing disadvantage	The price of imported cement sets the maximum price that local cement makers can charge. Because imported cement does not have to pay the same carbon costs as local producers, it makes it harder for NZ companies to cover their costs or invest in cleaner production methods.
Process emissions constraint	Emissions from limestone to clinker conversion are hard to abate, with no available solutions (~63% of cement emissions). As industrial allocation phases out from 85% coverage in 2025 to 30% in 2050, carbon costs will increase with no viable way to reduce emissions. ⁵

³ Providing regulatory predictability of the NZ ETS is a priority in the second Emissions Reduction Plan. Cabinet has recently agreed to remove the review of allocative baselines, which has been communicated to and welcomed by FBL [see CAB-578].

⁴ Australia's Safeguard Mechanism is their policy to reduce high emitting industry emissions and involves benchmarking sector emissions, with ETS surrender obligations if emissions fall above a benchmark.

⁵ The rate of assistance of IA reduces by 1% p/a until 2030, 2% p/a until 2040 and 3% p/a until 2050.

The feasibility study

18. The objectives of the feasibility study were to collaborate with the cement industry and agencies⁶ to assess whether a BCA is more effective at reducing carbon leakage in the cement sector, than current IA settings. Further detail on the scope, scenarios and approach can be found in the Terms of Reference (attached as Appendix 1).

Modelling indicates a BCA is effective at managing carbon leakage and incentivising decarbonisation, but has negative impacts on the economy...

19. To assess the carbon leakage impacts, Concrete NZ developed a model in collaboration with its members. A significant benefit of the model being industry-designed is that much of the input data for NZ production and emissions factors is taken directly from industry players. This improves the robustness and quality of the analysis, but the trade-off is that **much of the data is commercially sensitive so could not be verified.**
20. We also commissioned an analysis of broader economy impacts using the C-PLAN computable general equilibrium model.⁷ This was calibrated with the Concrete NZ model to ensure consistency in the analysis (i.e. domestic manufacturing stops in 2030).
21. Figure 1 shows the indicative impacts of a BCA from the modelling.⁸ More detailed results are provided as Appendix 2. The modelling shows that, **in the absence of a BCA, domestic manufacturing is likely to cease in 2030** and shift to an import-only model, whereas a BCA enables domestic manufacturing to continue post-2030. Domestic manufacturing stopping without a BCA is critical to the results as it provides the counterfactual against which emissions leakage and economic impacts are measured.
22. Indicative results⁹ show a BCA could deliver environmental benefits, including reduced carbon leakage risk for the cement sector, marginally reduced global emissions, decarbonisation incentives and retained waste benefits. Results also show a BCA could have a small negative impact on cement demand, construction output and GDP.
23. Cement importers have also signalled that cement prices would rise with a BCA, impacting an already subdued construction sector, and expressed concern at facing an uncertain carbon cost. Support will depend on how a BCA is designed, including likely compliance costs and decisions about the use of BCA revenue.
24. GB is the sole domestic processor of tyre-derived fuel under the Tyrewise stewardship scheme, which has been operational since September 2024. If domestic cement manufacturing stops, this would **trigger a review of Tyrewise's accreditation and funding model**, create reputational risks for government, and limit future innovation in

⁶ Key agencies: Ministry of Foreign Affairs and Trade, the Ministry of Business, Innovation and Employment, the Treasury, the Ministry for Primary Industries, Inland Revenue, Customs, the Environmental Protection Agency and the Ministry of Regulation.

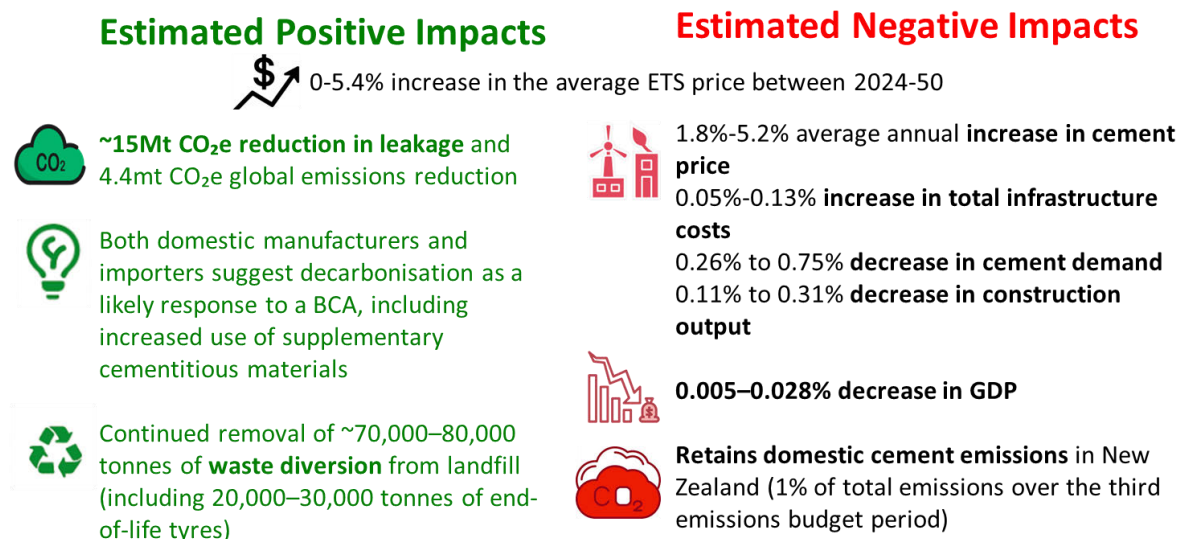
⁷ C-PLAN is a computational general equilibrium model developed for the Climate Change Commission. It is used for a wide range of analyses, including assessing options to achieve emissions budgets.

⁸ An independent peer reviewer found the results to be sufficiently robust to inform policy advice. However, the results should be seen as indicative, and, if work on a BCA were to proceed, we recommend obtaining an independent verification and audit of the Concrete NZ data to confirm that domestic manufacturing is not viable without support from 2030.

⁹ See Figure 2 in the body of the briefing and Appendix 2 for more detail.

waste processing.¹⁰ In the worst-case scenario, it would require the scheme to be drawn to a close.

Figure 1: Impacts of a BCA on the environment and economy over 2030 to 2050 compared to current settings where domestic production ceases in 2030



25. Although not an objective of a BCA, full reliance on imports would expose New Zealand to global shipping routes and price volatility. Major disruptions (e.g. conflicts, natural disasters) could significantly impact supply and costs. Overall, **the risk of severe disruption to cement supply is low**. Over the long term, lessons from past shortages can be taken to build resilience - including promoting competition and diversity of supply, improving access to overseas products (currently underway), and encouraging use of substitutes.

Overseas carbon pricing trends and IA are key drivers of fiscal impacts

26. Based on current trade data, potential revenue gains through a BCA on cement will depend heavily on the settings of Japan's ETS, including pricing and any free allocations in place. §9(2)(ba)(i)
27. If domestic cement manufacturing stops in 2030 without a BCA, this will result in a reduced IA expense. A BCA may have a range of fiscal impacts, from a net benefit of \$33m to a net cost of \$628m over the period 2024 to 2050, excluding BCA implementation costs.¹¹ A faster phase out of IA means lower IA costs and higher BCA revenue. A such, the **key driver of the fiscal impact is a corresponding decision on how quickly IA is phased out alongside the introduction of a BCA**, along with the implementation costs (which remain uncertain without detailed design).

¹⁰ Golden Bay Cement diverts around 100,000 tonnes of waste from landfill each year, including wood waste, tyres, industrial sludge, and hard-to-recycle plastics, which it uses as fuel. This accounts for roughly 1.9% of New Zealand's landfill waste (based on 2024/25 estimates). While this significantly reduces landfill volumes, there is no available data on the amount of waste generated by Golden Bay's own operations.

¹¹ Figures include BCA revenue and IA expenses. They are based on the results of the Concrete NZ modelling and, as such, include the same assumptions and limitations as set out in the feasibility study.

Without detailed work on the design of a BCA, agencies and the cement industry cannot provide reliable estimates of implementation costs

28. Just focusing on the cement sector will make implementation more straightforward given cement is a relatively homogeneous product with only three main importers at present. While expanding a BCA to other more complex sectors will make the scheme more costly, most of the establishment costs are fixed regardless of participant numbers.
29. Many of the functions required for a BCA could be delivered by adapting existing government functions (though these functions still pose a new cost). Implementation cost is mainly driven by the registration system. 9(2)(f)(iv)

9(2)(g)(i)

30. MFAT is providing advice to the Minister of Trade and Investment on the trade policy and law impacts of a NZ BCA. This advice will be shared with you. This is a departure from the original Terms of Reference. However, given the broad scope (beyond cement) and sensitive nature of the analysis, they considered it appropriate to provide it separately to Ministers rather than including it in the feasibility study report, which has been shared with the affected industry. We understand Concrete NZ may correspond with your office with their own international trade views.
31. For some time, in both international trade and climate forums, NZ has been advocating for a multilateral or plurilateral approach to addressing carbon leakage to avoid countries imposing unilateral measures that adversely impact New Zealand exports. 9(2)(g)(i)
32. The status of BCAs in international law, including their WTO consistency, has yet to be tested. A BCA can take different forms, and WTO compliance will depend on how it is designed and implemented. Given BCAs are a relatively novel trade tool, they are liable to challenge. WTO Dispute Settlement proceedings have already been initiated against the EU in relation to its CBAM (a type of BCA), which has yet to fully enter into force.
33. Given the inherent trade risks associated with BCAs, the design principles would be critical. BCA design would need to consider the long-standing principles underpinning NZ's trade policy and global trade advocacy, and ensure consistency with NZ's international trade commitments, under the WTO and our various free trade agreements.
34. Decisions to advance to BCA design work must be grounded in a robust policy process that is underpinned by credible objectives to address carbon leakage. MFAT note that advancing to design work based on a single-sector study is unusual (no other country has carried out a process focused on a single-sector) and could attract criticism that the purpose of the BCA is not to address carbon leakage. This is especially the case where the study has been developed in partnership with the affected industry using unvalidated data from that industry.
35. Ensuring adequate periods for consultation with domestic and international stakeholders is also essential. 6(a)

6(a)

6(a), 9(2)(g)(i)

36. Appendix 4 provides legally privileged advice from MFAT on the United Nations Framework Convention on Climate Change and the Paris Agreement.

Importers will be increasingly exposed to carbon pricing...

37. New Zealand's largest source of cement imports, Japan, is implementing an ETS from 2027. Other countries in the Asia-Pacific, including Vietnam and Thailand are also exploring carbon pricing. This means cement importers will be exposed to a carbon price in the future, but the level of that price and when those impacts will occur is uncertain.
38. Whether these carbon pricing schemes will mitigate carbon leakage risk is unclear. This will depend on the details of the schemes, such as the carbon price and use of industrial allocation or industry benchmarks. Engagement with relevant jurisdictions would be required before we can advise on whether these trends would likely deem a BCA redundant in the medium term.

Advice

39. Table 2 outlines three potential options for how to proceed. These options are not all mutually exclusive. For example, you may decide to pause work on a BCA and undertake a carbon leakage review.
40. You may find it useful to discuss the potential trade implications with the Minister for Trade and Investment before approaching Cabinet for agreement if you want to proceed with further work on a BCA, 6(a), 9(2)(g)(i) Design work on a BCA is also likely to require significant cross-agency resourcing.
41. 9(2)(g)(i) you may wish to pause BCA work, 9(2)(g)(i) and further international developments play out 9(2)(g)(i) However, there is an opportunity to assess carbon leakage risk across industries under current IA settings and global carbon pricing trends. This would require prioritisation against other MfE workstreams but enable early identification of at-risk industries and allow sufficient lead time for a government response. If you are supportive, we can provide a proposed workplan in early 2026.
42. There is merit in continuing with multilateral and plurilateral approaches to address the risk of carbon leakage over the long term (such as the Green Economy Partnership Agreement and G7 Climate Club). NZ has been advocating for transparency and good regulatory practice in the design and implementation of such measures and for the need for coherence and interoperability to avoid unnecessary trade restrictions or costs.

Table 2: Pros and cons of possible ways forward

Options	Pros	Cons
Undertake further work on a BCA (detailed design and engagement with other industries and trading partners)	May prevent emissions leakage in the cement sector if additional support measures are implemented. Enables a better understanding of: • implementation costs • other sectors that may be suitable for a BCA. Progresses work on identifying a feasible alternative to IA.	6(a), 9(2)(g)(i)
Pause work and wait for further progress on similar measures within the Asia-Pacific region (~2027)	Aligns with NZ's long-standing approach of supporting plurilateral and multilateral solutions to trade issues. 6(a), 9(2)(g)(i)	Likely to lead to emissions leakage and higher emissions products in the cement sector if no alternative steps are taken (note that undertaking further work on a BCA on its own is also unlikely to address these impacts). Maintains a policy gap for industries with hard to abate emissions in the medium-long term.
Undertake a broader carbon leakage review	Represents a principled approach that would better justify a BCA in the future, if needed. 6(a), 9(2)(g)(i) Allows the Government to assess potential medium-term risks of carbon leakage and gives enough time to act before the IA phase-out rate rises significantly.	May be duplicative if the Government chose to undertake a review of phase out rates, as this review would consider carbon leakage risk. Still likely to lead to emissions leakage in the cement sector if no alternative steps are taken.

43. In the absence of any certainty about a BCA, the Fletcher Building Board may decide to close its Portland cement plant in May 2026. This would provide for a s 9(2)(b)(ii)

with closure happening in 2030. You requested advice on broad-based options to support Golden Bay in the short term. This advice is provided in briefing BRF-7119.

44. Given the likely closure of Golden Bay in the absence of a BCA, we recommend Cabinet is made aware of the implications of this, along with any options to support GB. We recommend discussing this with the Minister of Finance and Minister for Regional Development in the first instance.

Next steps

45. We recommend you share this briefing with the Minister of Finance, Minister for Regional Development, Minister for Trade and Investment, the Minister for Building and Construction and the Minister for the Environment.
46. We also recommend you discuss this briefing with officials at an upcoming meeting if desired. This includes discussing how you want to communicate the findings of the feasibility study. You may also like to meet with the Minister for Trade and Investment to discuss the trade policy and legal implications of a NZ BCA.
47. 9(2)(g)(i) [REDACTED]
[REDACTED] We can assist with communications to support any engagements you have.
48. If you want to do further work on a BCA, you could proceed to Cabinet as follows:

Timeframe	Action
Early February 2026	Draft Cabinet paper to Minister for review, seeking approval to undertake further work and engagement on a BCA
Mid-February 2026	Ministerial consultation
Late February/early March 2026	Cabinet committee/Cabinet consideration
March 2026	Communication of outcome to Golden Bay Cement

49. A draft of the feasibility study is attached as Appendix 3. Some minor changes may be made to the report following feedback from the cement industry. If so, we will provide you with an updated version.

Appendices

Appendix 1: Terms of Reference

Appendix 2: Summary of results of the BCA feasibility study

Appendix 3: Draft Feasibility Study

Appendix 4: Appendix 4 withheld in full under section 9(2)(h) of the Act
[REDACTED]

Appendix 1: Terms of Reference for the feasibility study

Purpose

To provide an initial assessment of whether a Border Carbon Adjustment (BCA) could be a more effective policy instrument than industrial allocation (or other alternatives) for the cement sector.

The study will focus on the cement sector but will draw out learnings and insights relevant for other sectors. It will also enable the Government to keep pace with international developments on carbon border adjustment mechanisms.

Focus

The study will have a focus on the impact of a BCA for the cement sector on:

1. Carbon leakage: extent to which the policy reduces leakage risks and creates a more level playing field.
2. Decarbonisation: extent to which the policy promotes efficient investment decisions in decarbonisation and supports the 2050 NZ Net Zero Carbon Concrete Industry Roadmap.
3. Industry and economy: economic costs, including supply-chain and industry cost and competitiveness impacts. This includes looking at the impact on concrete's competitiveness in the NZ building materials market.
4. Fiscal impacts: impacts on Crown revenue.
5. Trade: 6(a), 9(2)(g)(i)
6. Administration: minimise administrative burden and compliance costs for both industry and government.

Context

BCAs are gaining traction globally as a tool to address carbon leakage. The EU and UK are implementing a Carbon Border Adjustment Mechanism (CBAM) (in 2026 and 2027 respectively), and Australia and Canada are exploring one.

The Concrete NZ Cement Sector Group (on behalf of all suppliers in New Zealand i.e. Golden Bay, Holcim, HR Cement and NZIC) has written to the Minister of Climate Change in March 2025 expressing in-principle support for policy work on a cement industry BCA or similar measure as a replacement for industrial allocation. The Group has offered to work with officials to progress a feasibility study.

The Climate Change Commission has also indicated support for exploring alternatives to industrial allocation, including a BCA. This is in response to known long-term challenges with industrial allocation, including it exceeding the ETS cap and remaining above zero post-2050.

Ministers have agreed to undertake an initial exploratory study of the feasibility of a BCA for the cement sector. This study will not get into details of policy design or recommendations, and no decisions will be taken in terms of implementing a BCA.

Scope

This is an initial exploratory study to consider whether a BCA for imports of cement is likely to be economically, legally, and administratively feasible (exports are excluded).

The study will consider the viability of alternative or complementary policy instruments to address carbon leakage risk for the cement sector. This could include, but not be limited to, strengthening the existing industrial allocation framework within the ETS or providing other forms of targeted support for an industry at high risk of carbon leakage.

Within scope is the following:

- Critical design choices for assessing the impact of a BCA on cement e.g. scope of coverage, carbon pricing benchmark, emissions measurement, comparison with other options including the status quo of no change.
- Wider economic, trade, political and strategic considerations of a BCA on cement.
- Whether it would be feasible to implement a single-industry BCA or whether that creates specific trade implications.
- Overview of how a BCA could be practically applied, including possible changes to industrial allocation, timing and transitional options.
- Likely required legislative provisions for a BCA.

Approach

International scan and literature review

A literature review will be undertaken to gain initial insights into the key matters that should be considered in the feasibility study and how other countries have considered these matters.

Analysis

We will analyse the impacts of a cement industry BCA compared with other alternatives (particularly changes to industrial allocation) and consider the following impacts:

Sector-specific impacts

Government officials will work collaboratively with the cement industry to estimate the impacts on production costs, availability of cement (including low-emissions cement) and other goods and supply-chain impacts (including the impact on concrete prices and its competitiveness against other materials). The study will also assess the carbon leakage risk for transportable finished goods like precast concrete goods. This will include possible market and policy reactions, and a high-level assessment of regulatory readiness. This will be considered in the context of the Net Zero Carbon Concrete Industry Roadmap to 2050.

Economic analysis

Government officials, in collaboration with the cement industry, will lead the analysis of economic impacts including changes in consumer prices, employment effects, market competition dynamics and the fiscal impacts on the Crown.

Alignment with climate change goals and targets

This will be led by the Ministry for the Environment, with the cement industry playing an advisory role. This will include considering alignment with New Zealand's emissions profile and consistency with domestic and international climate targets, and opportunities for low-emissions transitions across the wider economy, including innovation and investment pathways.

Trade implications

The Ministry of Foreign Affairs and Trade (MFAT) will lead the assessment of trade-related impacts, in close coordination with relevant agencies and with the cement industry playing an advisory role. 6(a), 9(2)(g)(i)

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Implementation options and implications

We will consider how a BCA could be practically applied. This will consider, at a high level, design options, transitional support, and other administrative considerations. This will include analysis of the potential scale of administrative burden, compliance costs and operational adjustments for both government and private firms.

The study will also explore, at a high level, opportunities to align a BCA with international best practice, particularly the mechanisms being implemented or considered in Australia, the UK and the EU to minimise trade friction and compliance complexity.

Other sectors

A high-level desktop analysis, along with targeted engagement, will be undertaken to consider the impact on sectors, other than the cement industry (e.g. steel and lime).

Peer review

The analysis (particularly the industry-level analysis) will be independently peer reviewed.

Governance

The study will be overseen by the Cross Sector Officials Group (CSOG), chaired by the Climate Change Chief Executives Board Unit. The Inland Revenue Department and Customs will be invited to attend this group when the BCA feasibility study is on the agenda.

An agency working group will meet from time to time to agree key inputs into the study and discuss results, working closely with the cement industry. The working group will be broken into smaller groups as required for the analysis.

The cement industry, fully represented by the Concrete NZ Cement Sector Group, will convene a designated Cement Working Group to work collaboratively with government officials and oversee the industry specific analysis.

A protocol will be developed for how government agencies and the cement industry will work together, including respective roles and responsibilities. The industry will not be privy to the

final advice provided to Government Ministers or Cabinet but will provide review the feasibility study report. Any material differing views may be noted in the feasibility study or Ministerial advice.

Engagement

The Minister of Climate Change has directed that no formal announcement will be made about the feasibility study. However, the cement industry can engage on a confidential basis with its members and downstream suppliers about the study, emphasising its exploratory nature and that no policy recommendations will be made at this time. The Ministry for the Environment will also undertake targeted engagement to inform the likely impacts on other sectors.

The Ministry of Foreign Affairs and Trade will lead all engagement with international counterparts on the potential implications of a BCA, 6(a), 9(2)(g)(i)

Ministers will likely engage at the 2+2 Climate and Finance Dialogue and the Climate Club.

Communications material, including Q&A, will be prepared in response to any media enquiries and this may include providing an update on the Ministry for the Environment's website.

Deliverables

A briefing to Ministers (most notably, the Minister of Climate Change and Minister for Trade and Investment) with the findings of the feasibility study. The feasibility study will be included as an appendix. A Cabinet paper may follow, subject to Ministerial decisions.

Timeline

June 2025: formalising governance structures, developing the analytical framework, data collection and completing the literature review.

July/August 2025: qualitative and quantitative analysis.

September 2025: drafting of feasibility study.

October 2025: finalise study with agencies and the cement sector.

November 2025: Ministerial consideration of feasibility study



KEY	
Large negative impact	Large positive impact
Medium negative impact	Medium positive impact
Small negative impact	Small positive impact
Little to no impact	

Appendix 2: Summary of results of the BCA feasibility study

Table 3: Summary of results

	Measure	Scenario 1 – BCA, current IA phase out rates	Scenario 2 – BCA, IA stops in 2030	Scenario 3 – BCA, IA phases out by 2040
Environmental impacts	Carbon leakage	-15.1Mt CO ₂ e- (by 2050)	-14.1Mt CO ₂ e- (by 2050)	-14.1Mt CO ₂ e- (by 2050)
	Decarbonisation incentives	May enable domestic cement production to become coal free by ~2035		
	Domestic emissions	+10.7Mt CO ₂ e- (by 2050)	+9.7Mt CO ₂ e- (by 2050)	+9.7Mt CO ₂ e- (by 2050)
	Global emissions	-4.3Mt CO ₂ e- (by 2050)	-4.4Mt CO ₂ e- (by 2050)	-4.4Mt CO ₂ e- (by 2050)
Economic impacts	GDP	-0.005% p/a	-0.028% p/a	-0.014%
	Cost of cement (tonne)	+1.8% p/a	+5.2% p/a	+3.3% p/a
	Cost of concrete (m ³) ¹²	Peak of +3% p/a	Peak of +8.6% p/a	Peak of 5.9% p/a
	Construction costs – infrastructure	Up to +0.05% of total infrastructure spend	Up to +0.13% of total infrastructure spend	Up to +0.08% of total infrastructure spend
	Construction output	-0.11% p/a	-0.31% p/a	-0.20% p/a
	Cement demand	-0.26% p/a	-0.75% p/a	-0.49% p/a
	Steel demand ¹³	-0.05% p/a	-0.19% p/a	-0.12% p/a
	Wood product demand	+0.10% p/a	+0.24% p/a	+0.17% p/a
Fiscal impacts	Fiscal impacts (2024-50) ¹⁴	+\$24.9m in BCA revenue -\$653.3m in IA expenses	+\$225.2m in BCA revenue -192.4m in IA expenses	+\$87.4m in BCA revenue -\$362.7m in IA expenses

¹² 9(2)(b)(ii)

¹³ Due to decreased construction output, offset by product substitution of cement to steel

¹⁴ Compared to baseline where domestic cement manufacturing shifts offshore in 2030.



Appendix 3: Draft Feasibility Study



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Environment
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Border Carbon Adjustment for the Cement Industry

A Feasibility Study



Te Kāwanatanga o Aotearoa
New Zealand Government

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1. Executive summary

This feasibility study assesses whether a Border Carbon Adjustment (BCA) for the cement sector could more effectively manage carbon leakage risk than current Industrial Allocation (IA) settings under the New Zealand Emissions Trading Scheme (NZ ETS). A BCA is a policy instrument designed to level the playing field between countries with different emissions pricing policies. Its primary objective is to reduce carbon leakage, which can undermine New Zealand's emissions reduction efforts and increase global emissions. By imposing a carbon cost on importers equivalent to that faced by domestic producers, a BCA minimises the risk that production will shift offshore.

Internationally BCAs are gaining traction, with the EU and UK implementing CBAMs and Australia actively considering similar measures. There are expanding global trends towards carbon pricing. Japan, New Zealand's largest exporter of cement (according to the UN Comtrade Database), is implementing an ETS from 2027. Other countries in the Asia-Pacific, including Vietnam and Thailand, are also exploring carbon pricing.

The extent to which these schemes will mitigate carbon leakage risk is unclear. This will depend on the details of schemes, such as the carbon price and any use of industrial allocation or industry benchmarks. Engagement with relevant jurisdictions is needed to understand these trends and the details of proposed emissions pricing schemes.

1.1 The cement sector is trade exposed and hard to abate....

Golden Bay (GB) and HR Cement meet approximately 60% of New Zealand's demand for cement, with the rest imported by Holcim NZ and NZ Independent Cement. GB is a fully owned trading entity of Fletcher Concrete and Infrastructure Ltd, and operates the Portland Cement Plant in Whangarei, which is New Zealand's only fully integrated cement manufacturing plant, following the closure of Holcim (NZ)'s Westport plant in 2016.

GB provides direct employment to 210 staff and supports over 300 contractors and service providers.

The New Zealand cement industry faces two key challenges in decarbonising cement production:

- The price of imported cement sets the maximum price that local cement makers can charge and remain competitive. Because imported cement does not have to pay the same carbon costs as local producers, it makes it harder for NZ companies to cover their costs or invest in cleaner production methods.
- Emissions from limestone to clinker conversion are hard to abate, with no available solutions (~63% of cement emissions). As industrial allocation phases out from 85% coverage in 2025 to 30% in 2050, carbon costs will increase with no viable way to reduce emissions.

New Zealand supports trade-exposed and emissions-intensive industries through the provision of IA. This provides transitional and time limited support for emissions-intensive trade-exposed (EITE) firms to reduce leakage risk, in the absence of global carbon pricing schemes. Firms can use IA units to meet some of their emissions costs under the NZ ETS. IA is being phased out to reflect the general reduction in emissions from these activities as they become more efficient and decarbonise.¹

1.2 The feasibility of a BCA was assessed across several impacts

This report focuses on the quantitative analysis of environmental and economic impacts of a cement sector BCA, to understand the impacts on:

- Carbon leakage
- Decarbonisation incentives
- Broader industry and economy impacts
- Implementation requirements and associated costs.

The Ministry of Foreign Affairs and Trade will provide advice directly to the Minister for Trade and Investment (copied to the Minister of Climate Change) on the international trade-related aspects of a BCA.

We assessed the environmental and economic impacts across the following scenarios:

- i Maintaining status quo settings (no BCA and current phase out of IA)
- ii Introducing BCA in 2030² and current phase out of IA
- iii Introducing BCA in 2030 and IA stops in 2030
- iv Introducing BCA in 2030, with a faster phase down of IA to zero by 2040.

To assess the impacts on the cement industry, Concrete NZ developed a model in collaboration with its members. A significant benefit of the model being industry-designed is that much of the input data for NZ production and emissions factors is taken directly from industry players. This improves the robustness and quality of the analysis, but the trade-off is that much of the data is commercially sensitive so could not be verified. Sense Partners peer reviewed the results and found them to be sufficiently robust to inform policy advice.

We also commissioned an analysis of broader economy impacts using the C-PLAN computable general equilibrium model. This was calibrated with the Concrete NZ model.

¹ The rate of assistance of IA reduces by 1% per annum until 2030, 2% per annum until 2040 and 3% per annum until 2050.

² We chose 2030 as the implementation year for a BCA given it requires complex policy design, legislation and may require a transitional period for businesses to adjust.

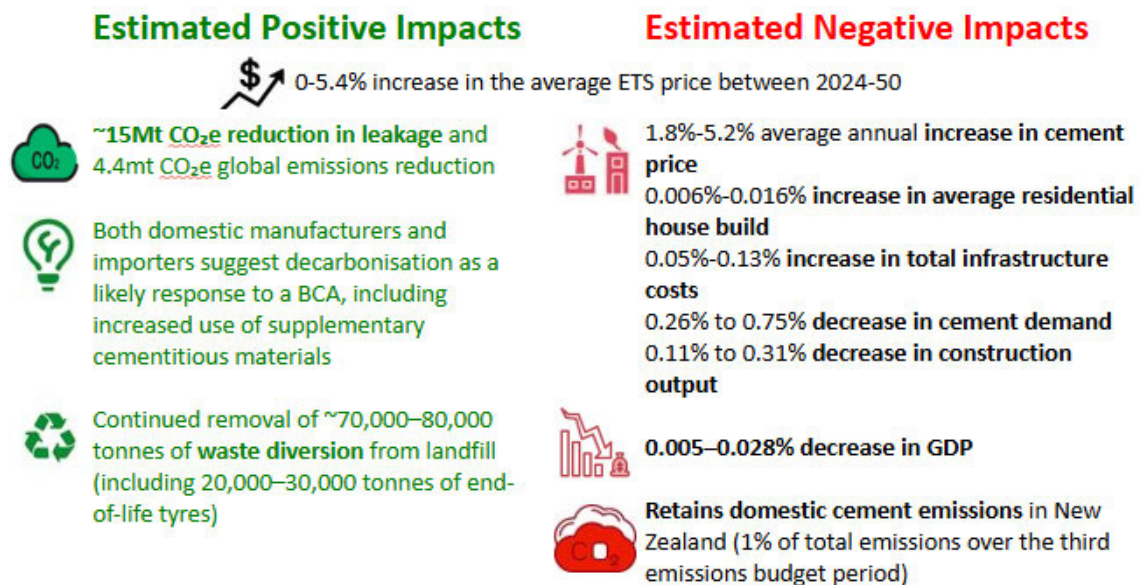


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Modelling indicates a BCA is effective at managing carbon leakage and incentivising decarbonisation, but has negative impacts on the economy

Figure 1 shows the environmental, economic and fiscal impacts of a BCA. The results of the modelling are driven by the fact that, **in the absence of a BCA, domestic manufacturing is likely to cease in 2030** and shift to an import-only model, whereas a BCA enables domestic manufacturing to continue post-2030. This is critical to the results because it provides the counterfactual against which carbon leakage and economic impacts are measured.

Figure 1: Impacts of a BCA on environment and economy over 2024 to 2050 compared to current settings where domestic production ceases in 2030



Although not an objective of a BCA, full reliance on imports would expose New Zealand to global shipping routes and price volatility. Major disruptions (e.g. conflicts, natural disasters) could significantly impact supply and costs. Overall, the Ministry of Business, Innovation and Employment consider **the risk of severe disruption to cement supply is low**. Over the long term, lessons from past shortages can be taken to build resilience - including promoting competition and diversity of supply, improving access to overseas products (currently underway), and encouraging use of substitutes.

Overseas carbon pricing trends and industrial allocation are key drivers of fiscal impacts

Based on current trade data, potential revenue gains through a BCA on cement will depend heavily on the settings of Japan's ETS, including pricing and any free allocations in place.

9(2)(ba)(i), 9(2)(b)(ii)

If domestic cement manufacturing stops in 2030 without a BCA, this will result in a reduced IA expense. A BCA may have a range of fiscal impacts, from a net benefit of \$33m (if IA is phased out in 2030) to a net cost of \$628m (if current IA phase out rate remains) over the period 2024 to 2050, excluding BCA implementation costs. A faster phase out of IA means lower IA costs and higher BCA revenue. As such, the **key driver of the fiscal impact is a corresponding decision on how quickly IA is phased out alongside the introduction of a BCA**, along with the implementation costs.

1.3 Detailed design is required to assess implementation costs

Without detailed work on the design of a NZ BCA, agencies cannot provide reliable estimates of implementation costs. Just focusing on the cement sector will make implementation more straightforward given cement is a relatively homogeneous product with only three importers at present. Expanding a BCA to other sectors with complex value chains would make the scheme more difficult to implement. However, there are fixed costs in establishing a BCA and it may be more efficient to spread this over multiple sectors.

Many of the functions required for a BCA could be delivered by adapting existing government functions, such as Custom's border processes and the EPA's and MfE's roles under the NZ ETS. Costs will be driven by whether a new system of registration is needed or whether this could be added onto a new NZ ETS register.

Industry stakeholders have indicated the potential for high compliance costs, particularly in terms of gathering and verifying emissions data and recommend the use of existing data channels and systems, such as Environmental Product Declarations.

1.4 We need to understand the details of carbon pricing schemes in countries that export to New Zealand

New Zealand's largest source of cement imports, Japan (according to UN Comtrade data), is implementing an ETS from 2027. Other countries in the Asia-Pacific, including Vietnam and Thailand are also exploring carbon pricing. This means cement importers will be exposed to a carbon price in the future, but the level of that price and when those impacts will occur is uncertain.

Whether these carbon pricing schemes will mitigate carbon leakage risk is unclear. This will depend on the details of the schemes, such as the carbon price and use of industrial allocation or industry benchmarks. Engagement with relevant jurisdictions is required before we can advise on whether these trends would likely make a BCA redundant in the medium term.



1.5 No single alternative policy is likely to be effective as a BCA at addressing carbon leakage risk

We considered other policies such as excise taxes, mandatory product standards and multilateral approaches. None of these measures will be as effective as a BCA in reducing carbon leakage risk, at least over the short term.

There is merit in continuing with multilateral and plurilateral approaches to address the risk of carbon leakage (such as the Green Economy Partnership and G7 Climate Club). New Zealand has been advocating for promoting transparency, and good regulatory practice in the design and implementation of such measures and arguing the need to foster coherence and interoperability to avoid unnecessary trade restrictions, costs or fragmentation.

1.6 Limitations of the study and further work required

Modelling indicates that without a BCA, domestic manufacturing would likely end by 2030, shifting to imports only. With a BCA, local production could continue. However, due to the use of confidential industry data, officials could not fully verify the model's findings.

The paper sets out the different elements to be considered in designing a BCA but makes no recommendations about detailed design. Further work is needed, for example, to confirm the scope of a BCA, sectoral and product coverage, how to identify, measure and verify embodied carbon emissions, calculate BCA obligations, and to consider how BCA revenue would be used.

In the absence of detailed design, implementation costs remain highly uncertain. Costs are likely to be moderate for both the government and industry. However, costs will be higher if a new IT system is needed for registration, verification and monitoring, as opposed to using an existing platform. The ongoing operating costs would likely be covered by the BCA revenue generated, depending on the phase out of IA.

We also have not tested the findings of the study with the broader building and construction sector or tested the appetite for a BCA with other industries. We recommend this is undertaken if it is decided to progress work on a BCA. This includes considering what other sectors and commodities could be suitable for a BCA, beyond the initial analysis undertaken in this paper.

If a BCA is pursued, engagement with relevant international jurisdictions would be needed to understand trends, developments and details of proposed carbon pricing schemes. Further engagement would also help to understand broader climate policies that might mitigate the risks of domestic production being curtailed and carbon leakage occurring.

2. Definitions

Term	Definition
Border Carbon Adjustment (BCA)	A policy tool that applies a carbon price to imported goods to ensure they face equivalent emissions costs to domestic goods, helping to prevent carbon leakage and maintain domestic competitiveness.
Carbon Border Adjustment Mechanism (CBAM)	The specific implementation of a BCA, such as the EU's CBAM, which requires importers to report and pay for the embedded emissions in certain goods.
Carbon price	The cost per tonne of carbon dioxide (or its equivalent) emitted, imposed through mechanisms such as a carbon tax or an emissions trading scheme (ETS).
Emission-Intensive Trade-Exposed (EITE)	Firms that produce goods with high emissions and are exposed to international competition, making them vulnerable to carbon pricing without protective measures. When used in the context of the industrial allocation scheme, firms with emissions intensity at or higher than 800t CO ₂ e-/£1m in revenue.
Carbon leakage	The shift of production and associated emissions from countries with strict climate policies to those with weaker or no policies, undermining global emissions reduction efforts.
Industrial Allocation	The free distribution of emissions allowances to domestic firms under an emissions trading scheme, intended to address carbon leakage from EITE sectors.
Multilateral initiatives	Policy initiatives or agreements where all member countries of an organisation are bound by the same rules or standards.
Plurilateral initiatives	Policy initiatives or agreements where all <i>willing</i> member countries of an organisation are bound by the same rules or standards.
Resource Shuffling	A practice where companies reallocate cleaner resources to regulated markets while shifting dirtier resources elsewhere—without reducing overall emissions.
Safeguard Mechanism	An Australian policy that sets emissions limits for large industrial facilities, requiring them to keep emissions below a baseline or purchase carbon credits.
Scope 1 Emissions	Direct greenhouse gas emissions from sources owned or controlled by an entity (e.g. fuel combustion on-site).
Scope 2 Emissions	Indirect emissions from the generation of purchased electricity, steam, heating, or cooling consumed by the reporting entity.
Scope 3 Emissions	All other indirect emissions that occur in a firm's value chain, including upstream and downstream activities (e.g. transportation, product use, waste).
Trade-Exposed, Baseline-Adjusted Arrangements (TEBA)	A form of industrial allocation, used by Australia, where free allowances are adjusted based on a firm's production baseline and emissions intensity, used in schemes like the NZ ETS.



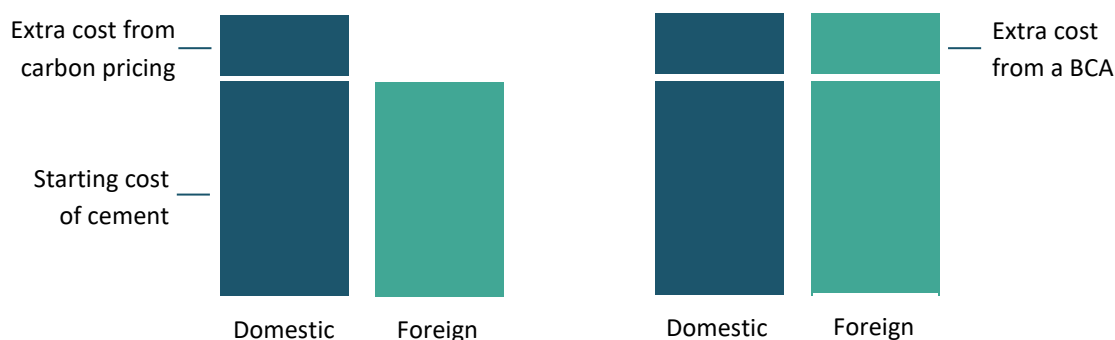
3. Introduction

3.1 Purpose of the study

This paper provides an initial assessment of whether a border carbon adjustment (BCA) could serve as a more effective policy instrument than IA — or other alternatives — for addressing carbon leakage in the cement sector. While the focus is on cement, the analysis draws on insights that are relevant to other EITE sectors, which are referenced throughout.

A BCA is a policy instrument designed to level the playing field between countries with different emissions pricing policies. The primary objective of a BCA is to reduce carbon leakage where domestic producers (supplying a domestic market) in hard to abate sectors face higher emissions mitigation costs than international competitors. By imposing a carbon cost on importers equivalent to that faced by domestic producers, a BCA removes the need for industrial allocation. This is illustrated in Figure 2.

Figure 2: Illustration of how a BCA levels the playing field



New Zealand has a strong interest in preventing carbon leakage, particularly where it leads to an increase in global emissions. In New Zealand, the IA scheme under the NZ ETS, is the primary tool for managing carbon leakage risk. However, there are challenges with New Zealand's IA scheme, especially over the medium to long term.

The study also supports the Government's efforts to keep pace with international developments in carbon border measures. Notably, the European Union and United Kingdom are introducing Carbon Border Adjustment Mechanisms (CBAMS) in 2026 and 2027 respectively, while Australia and Canada are also considering similar mechanisms.

In undertaking this study, we worked closely with several agencies³ and connected with 6(a) officials who led the policy work on carbon

³ Ministry of Foreign Affairs and Trade, the Ministry of Business, Innovation and Employment, the Treasury, the Ministry for Primary Industries, Inland Revenue, Customs, the Environmental Protection Agency and the Ministry of Regulation.

border adjustments. Following Ministerial direction, we did not engage more broadly with the building and construction sector or with other industries, only with Concrete NZ and members.

3.2 Scope of the study

The paper explores:

- Carbon pricing across jurisdictions and the implications for carbon leakage.
- What a BCA is and its potential impacts on industry and the broader economy.
- Indicative implementation costs.
- Alternative policy options to address carbon leakage.

The Ministry of Foreign Affairs and Trade will provide advice directly to the Minister for Trade and Investment (copied to the Minister of Climate Change) on the international trade-related aspects of a BCA.

The study focuses exclusively on imports, not exports. A BCA is focused on levelling the playing field within a domestic market, as opposed to in international markets. While a BCA focussed on a domestic market imposes a cost on domestic importers, a BCA focussed on international markets would need to provide a rebate to domestic exporters. While a BCA on exports is possible, it diminishes incentives to reduce emissions and may result in producers diverting goods to international markets with less stringent climate policies. Giving exporters an effective exemption from emissions reductions obligations would be counter to national climate change objectives.

While the study considers implications for other EITE sectors, it does not assess the suitability of a BCA for sectors not covered by the NZ ETS.

The full terms of reference for the study are provided in Appendix 1.



4. Defining the problem

Chapter summary

- Carbon pricing is becoming more widespread globally. However, continued divergence in climate policies sustains carbon leakage risk.
- New Zealand's domestic cement sector is at risk of carbon leakage due to its hard to abate clinker emissions and because it competes with importers that do not face an equivalent carbon cost.
- New Zealand's industrial allocation policy is designed to prevent carbon leakage, however, it disincentivises decarbonisation and the legislated phase out creates challenges for hard to abate sectors.

4.1 Emissions trading schemes monitor, price and aim to progressively reduce greenhouse gas emissions

The NZ ETS was established in 2008 and is a market-based approach that assigns a cost to emissions. Under this scheme, specific sectors are required to pay for the emissions they produce annually. The NZ ETS is designed to support NZ in meeting both domestic and international climate change targets, including the 2050 target set by the Climate Change Response Act 2002,⁴ while also driving innovation in low-emissions technologies and encouraging a shift away from emissions-intensive practices.

Box 1: Emissions trading in New Zealand

The New Zealand Emissions Trading Scheme (NZ ETS), established under the Climate Change Response Act 2002, is the Government's main tool to meet emissions reduction targets. Firms covered by the NZ ETS must report their greenhouse gas emissions and surrender New Zealand Units (NZUs) for each tonne emitted. The amount of NZUs available is reduced over time to promote lower emissions, influencing carbon prices and encouraging a shift to low-carbon practices. Notably, agriculture—which accounts for 53% of New Zealand's gross emissions—is excluded, while forestry receives units for carbon sequestration.

Carbon pricing covers around a quarter of global emissions...

Carbon pricing mechanisms have been adopted as the preferred policy tool globally for regulating carbon emissions. Emissions trading schemes are one of the most widely used carbon pricing mechanisms globally, and the use of these is rapidly expanding. As of June 2025,

⁴ See [About the New Zealand Emissions Trading Scheme](#) | Ministry for the Environment

there were 38 emissions trading schemes in use worldwide, covering approximately 23% of global greenhouse gas emissions (ICAP, 2025). This exposes significant global differences between emissions coverage levels. Currently, there are another 20 ETS systems under various stages of development signalling an international shift toward increased coverage.

A range of low to middle income countries have accelerated their efforts to establish carbon pricing frameworks including Brazil, India, Chile, Colombia, and Türkiye. Many of these countries have indicated the newly established EU and UK CBAMs are key drivers in encouraging local emissions pricing systems. See Appendix 2 for an analysis of carbon pricing trends across New Zealand's main sources of cement imports.

Over the past 10 years, the average carbon price for implemented instruments has almost doubled in real terms—from just above USD 10 per tCO₂e in 2015 to around USD 19 per tCO₂e in 2025 (World Bank Group, 2025). Despite this, carbon prices have continued to diverge over the past five years, especially for the EU and UK, which have notably higher carbon prices than other jurisdictions (IISD, 2024).

As global climate ambition intensifies, research and policy discussions are increasingly exploring coordinated carbon pricing approaches to address carbon leakage risks. The OECD has noted a global emissions price as the most effective tool to address leakage (OECD, 2019). PwC modelling show that an international carbon price floor, when combined with existing ETS schemes, could help limit warming to 2°C and potentially support the 1.5°C target (PwC, 2021). In 2021, the IMF also proposed an International Carbon Price Floor, which suggested differentiated global carbon pricing by income level, starting with limited countries and sectors. However, the idea has since not been endorsed by G20 members.

4.2 Divergent climate pricing and policies across jurisdictions create carbon leakage risks

Different speeds of mitigation and carbon pricing create risks of carbon leakage. Carbon leakage occurs when production – and the associated emissions – shifts to countries with lower emissions obligations, undermining the competitiveness of domestic firms subject to stricter climate policies.

The Climate Change Response Act 2002 (section 86C) defines carbon leakage as “...increased emissions overseas as a result of emissions reductions in New Zealand, for example, an activity being relocated outside of New Zealand to reduce the emissions-related costs for the activity.” Thus, carbon leakage is said to occur if production shifts overseas, regardless of whether this results in an increase or decrease in global emissions. For the purposes of this study, we have assessed both carbon leakage (emissions shifting offshore) and the resulting change in global emissions.

Climate policies such as emissions trading schemes or carbon taxes increase production costs for domestic firms compared to those in other jurisdictions with lower or no carbon costs. This can result in firms relocating or losing market share to overseas competitors. Businesses are most vulnerable to carbon leakage in sectors that are highly traded, carbon intensive and subject to uneven climate policy implementation across jurisdictions (Department for Energy Security & Net Zero, 2024a).



Although carbon leakage manifests itself through competitiveness impacts, it is primarily an environmental concern (HM Treasury 2021). As HM Treasury (2024) notes, carbon leakage not only weakens national emissions reduction efforts but also undermines the global effort to reach net zero. However, the actual impact depends on factors such as:

- Domestic **carbon pricing schemes**
- The **emissions intensity** of imported substitutes
- Whether imports are produced under an **emissions cap**.

Economists argue that leakage undermines **global cost-effectiveness** in emissions reduction, while **emissions-intensive and trade-exposed (EITE) firms** highlight the **competitive disadvantages** they face compared to less regulated international counterparts (Bohringer et al., 2022). A NZ study by Sense Partners (2018) found that EITE firms will face reduced competitiveness as carbon prices increase domestically but remain low or non-existent elsewhere in the Asia-Pacific.

Estimates of leakage vary widely. The European Parliament (2020) found that, on average, 15% of domestic emissions savings are offset by leakage. However, the UK Leakage Review (HM Treasury, 2021) emphasised that sector-specific characteristics matter — a policy that works for one sector may not be suitable for another. It noted that parity of policy approach is important to avoid shifting demand between sectors. Changes in technology and levels of mitigation effort in trading partners could also change levels of leakage risk, sometimes abruptly.

4.3 The cement sector is hard to abate and trade exposed

Around two-thirds of the emissions from the production of cement are hard to abate process emissions as there is currently little available technology to reduce these emissions (see Box 2 for more detail). The combined impact of the phase out of IA and hard to abate emissions means the cement sector is at risk of carbon leakage. Section 6 assesses this in more detail.

Cement plays a critical role in modern construction and infrastructure development as it is a key binding agent used to produce concrete. Around 30 billion tonnes of concrete are used each year globally (Monteiro, Miller and Horvath, 2017). It is the most used man-made material, and the second most used material globally (with water being the first) (Global Cement and Concrete Association, 2025; Gagg, 2014).

Box 2: The production of cement

Cement is a binding agent which, when mixed with aggregates, forms concrete. Portland cement is the most common form of cement. To produce it, raw materials (mainly limestone) are quarried and then crushed. The crushed rock can then be combined with other materials and ground before being fed into a kiln at high temperatures. In the kiln, the material is broken down and converted into clinker. The clinker is then mixed with gypsum to form cement. Supplementary Cementitious Materials (SCMs) can also be added to form a blended cement mix.

The production of cement is highly emissions intensive. Portland Cement is the most common binder in construction, with an embodied emissions factor of 818 kg CO₂ per tonne (Arup, 2023). Around two-thirds of the embodied emissions of final cement are released during the production of clinker from the breakdown of limestone (process-based emissions). Elimination of this component is a global industry issue and requires the solution of carbon-capture. The remaining third of emissions are released from the combustion of fuels used in the production process (energy-based emissions).

Cement is vital for infrastructure, as it is used in in situ concrete, precast products, and masonry for construction.

Cement supply in New Zealand

Golden Bay (GB) and HR Cement supply approximately 60% of the cement used in New Zealand. Around 40% of cement is imported by Holcim NZ and NZ Independent Cement (NZIC). GB account for approximately 90% of domestic cement production. The remainder is produced by HR Cement, that imports clinker from Asia-Pacific and grinds it at a facility in Tauranga.

NZIC entered the NZ market in 2023, and Holcim NZ switched to an import only model in 2016, citing ageing equipment and broader economic factors. Both import cement from the Asia-Pacific region. Holcim operate nine cement terminals and depots across NZ and NZIC operates a terminal in Invercargill.

GB is a fully owned trading entity of Fletcher Concrete and Infrastructure Ltd and operates the Portland Cement Plant in Whangārei, which is New Zealand's only fully integrated cement manufacturing plant, following the closure of Holcim (NZ)'s Westport plant in 2016. GB provides direct employment to 210 staff and supports over 300 contractors and service providers.

Fletcher Building Group, the parent company of GB, is captured under the NZ ETS and faces carbon costs that cement importers may not face. Fletcher Building Group received 488,575 industrial allocation units in 2024 under the NZ ETS for the eligible activity of producing cementitious goods (this was a reduction from the 663,120 units it received in 2022).⁵

9(2)(ba)(i), 9(2)(b)(ii)

⁵ This difference is reflective of the updates to allocative baselines in 2023 and may also reflect changes in production.



9(2)(ba)(i), 9(2)(b)(ii)

In New Zealand in 2024, cement production generated **350kt CO₂e in process emissions and 200kt CO₂e in stationary energy emissions**. This amounted to 0.7% of reported gross emissions that year.⁶ Based on modelling set out in Section 6, this increases to 1.5% when accounting for imported cement (representing total cement demand). Globally, cement manufacturing is responsible for about **8% of the world's total CO₂ emissions**. If the cement industry were a country, it would be the world's third or fourth-largest emitter of CO₂.⁷

The cement industry's decarbonisation aspirations are set out in its Net Zero Carbon Concrete 2050 Roadmap

Over the last 20 years, there has been evidence of reduced emissions intensity in the cement sector. In New Zealand, an independent analysis by Thinkstep-ANZ showed there has been a 15% reduction in carbon emissions associated with Portland Cement production and consumption since 2005 despite concrete production increasing by 13% during the same period (Mackechnie, 2021). This has been achieved by better process efficiencies during cement production and replacing less efficient cement operations.

The NZ cement industry has developed a roadmap to achieve net-zero carbon concrete by 2050 ([Net Zero Carbon Concrete - 2050 Roadmap](#)). The roadmap outlines how the sector plans to reduce Scope 1 and Scope 2 emissions⁸ by 44% by 2030, using 2020 as a baseline. Key decarbonisation strategies set out in the roadmap include:

⁶ See ETS participant emissions data here: [Emissions returns report | EPA](#)

⁷ [Sustainable concrete is possible – here are 4 examples | World Economic Forum](#)

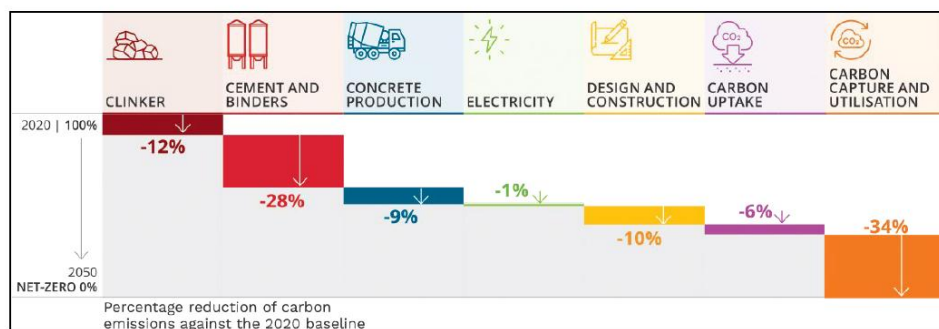
⁸ Scope 1 emissions are direct emissions from sources that a company owns or controls — like fuel burned on-site, emissions from manufacturing processes, or company vehicles. Scope 2 emissions are indirect emissions from the generation of purchased electricity, steam, heating, or cooling that the company uses.

- **Alternative Fuels:** Replacing coal and other fossil fuels with lower-emission alternatives. For example, waste tyres or plastics are being used to replace fossil fuels. Currently 56% of GB's fuels are alternatives, which is three times the average used in the United States.
- **Supplementary Cementitious Materials (SCMs):** Increasing the use of materials like fly ash and granulated blast furnace slag to reduce the clinker content in cement, which is the most carbon-intensive component.⁹
- **Carbon Capture and Storage Technologies:** Exploring and investing in technologies to capture and store CO₂ emissions from cement production.
- **Energy Efficiency:** Improving production processes and infrastructure design to reduce energy use.

Circular Economy Practices: Using industrial by-products and recycled materials to reduce embodied carbon. Clinker substitution through SCMs is considered a comparatively lower-cost mitigation option relative to carbon capture and storage, which can increase production costs by 50-85% and requires infrastructure investments (Miller et al., 2018; Griffiths et al, 2023).

Figure 4 summarises the emissions reduction pathway in the NZ Concrete Industry 2050 Roadmap.

Figure 4: Percentage reduction in carbon emissions from NZ Concrete Industry Net Zero Roadmap to 2050



The cement sector competes – directly or indirectly – with several other sectors

The primary “competition” for the cement sector comes from alternative building materials that can substitute for concrete in construction. These include:

- timber and engineered wood sector, as wood can replace concrete in structural applications, for example, by using a suspended timber floor on timber piles instead of a concrete slab in residential construction.
- masonry and brick sector
- steel and modular construction sector

⁹ For example, research by BRANZ (2021) found the use of SCMs in concrete at 30% replacement of Portland Cement has the potential to reduce embodied carbon by as much as 20% in several cases. In NZ, the current replacement rate is below 10% for SCMs. Combining good practices in cement kiln efficiency and process control with increased use of SCMs could reduce NZ concrete emissions by a further 15% by 2030 (in addition to the 15% reduction between 2005-2021).



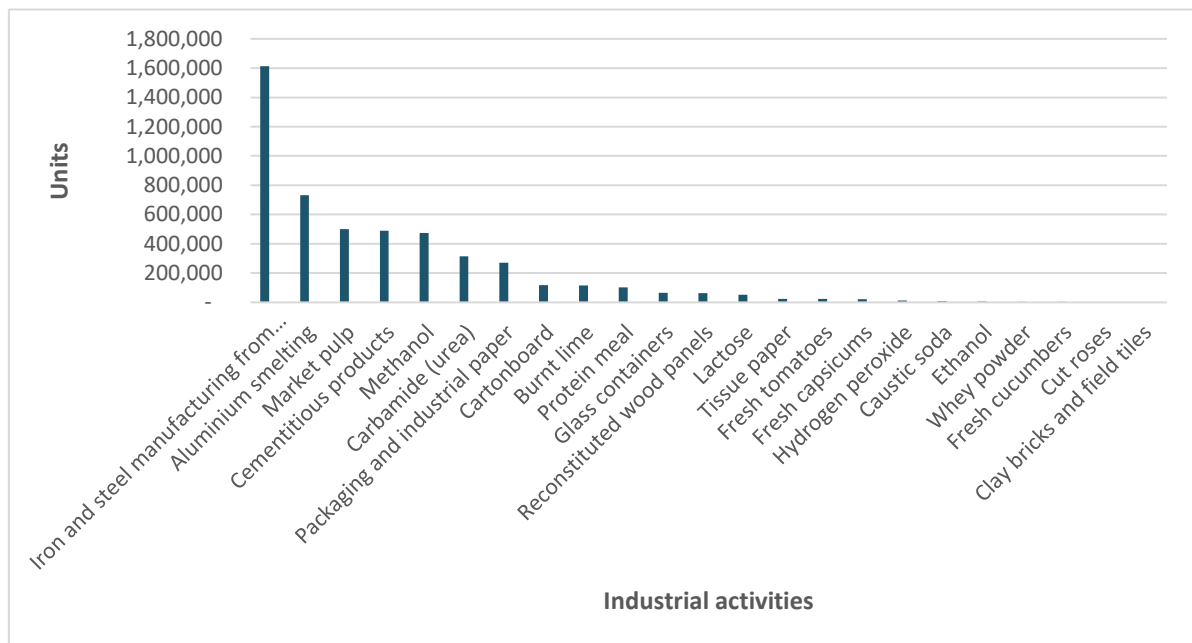
- the sustainable and bio-based materials sector, such as mycelium composites and straw bale construction.

If the price of cement increases due to the cost of carbon, some of these alternatives may become more attractive options.

Industrial allocations are provided in NZ to reduce the risk of carbon leakage...

A major challenge for ETS schemes is incentivising cost-effective emissions reductions, while ensuring fair competition between domestic producers and overseas producers. Industrial allocation (IA) provides transitional and (since recent reforms) time limited, support for EITE firms to reduce leakage risks.¹⁰ Firms are allocated free NZ ETS Units (NZUs) according to a legislated formula.¹¹ Firms can use these IA units to meet some of their emissions costs under the NZ ETS. The relative shares of the 2024 allocations are shown in Figure 5.

Figure 5: 2024 industrial allocation unit allocations



Source: Ministry for the Environment and Environmental Protection Agency

¹⁰ Carbon leakage is the result of production moving offshore, where the associated emissions are shifted to a jurisdiction with lesser or no emissions reductions regulation.

¹¹ Industrial allocation is calculated as: Industrial Allocation = Production x Allocative Baseline x Level of Assistance, where production = quantity of eligible product produced; allocative baseline = emissions per unit of product (t/CO₂e/unit) based on historical data from a five-year period; level of assistance = percentage of emissions eligible for free allocations.

... but the current industrial allocation policy disincentivises decarbonisation

IA allows EITE firms to reduce their emissions when it is profitable to do so, like other firms that do not receive IA. However, IA firms must also consider whether their emissions reductions would result in lower allocations when assessing their expected return on a decarbonisation investment.

There is a disincentive for IA firms to reduce their emissions, where doing so would, or could, reduce their allocation. An investigation following the second emissions reduction plan (ERP2) found several disincentives – most significantly caused by the Minister of Climate Change’s powers to review allocative baselines after 5 years and no later than 10 years, an over-allocation test, and separate eligibility reviews.

The general effect of the disincentives caused by IA is that emissions might be staying higher for longer, leading to missed opportunities to improve economic performance, efficiency and reduce fiscal costs over the longer term. Reducing the disincentives caused by IA is important for encouraging an efficient transition to net zero.

The government recently decided to remove allocative baseline reviews, the over-allocation test and eligibility reviews through the Climate Change Response Amendment Bill. This is expected to be considered by the House of Representatives in 2026.

The legislated phase out of IA creates difficulties for firms with hard to abate emissions

IA is being phased out¹² to reflect the general reduction in emissions from these activities as they become more efficient and decarbonise. The phase out began in 2021, and its aims are to:

- **Align with Emissions Budgets:** The free allocation of units was intended as a transitional measure, and its phase-down helps ensure the NZ ETS supports New Zealand's domestic emissions budgets.
- **Incentivise emissions reduction:** A gradual reduction in free units increases the incentive for EITE firms to invest in and adopt low-carbon technologies and practices, as they receive fewer financial benefits through the IA scheme.
- **Mitigate carbon leakage**¹³

Technological limits in reducing emissions from clinker production—around two-thirds of cement emissions—mean GB cannot materially cut this portion or its carbon costs during the phase-out. While coal alternatives such as waste fuels and electricity are feasible, they still emit carbon and incur costs.

Table 1 shows GB’s emission costs as the phase-out rate increases, assuming static production and emissions intensity. In FY2024, Fletcher Building’s Concrete division (GB, Firth, Winstone

¹² The phase down is occurring as follows: 1 percent reduction per year until 2030, 2 percent per year until 2040 and 3 percent until 2050 (moderately intensive goods) or 2060 (highly intensive goods).

¹³ <https://environment.govt.nz/assets/Publications/Files/Final-ETS-Consultation-document.pdf>



Aggregates, Humes) made \$125m profit.¹⁴ An annual emissions cost of \$6.3m represents 5% of this profit, noting this cost is absorbed by GB only, as opposed to the whole concrete division. This increases to 7.5% in 2035.

Table 1: Forecast of Golden Bay emissions, surrender obligations and emissions costs

Year	Total emissions tCO ₂ e ¹⁵	Surrender obligations (NZUs)	Indirect emissions tCO ₂ e ¹⁶	Rate of assistance (%)	Industrial allocation (NZUs)	Residual emissions costs (\$m) ¹⁷
2024	568,111	550,238	17,878	86	488,575	4.4
2030	568,111	550,238	17,878	80	454,488	6.3
2035	568,111	550,238	17,878	70	397,678	9.4

The fiscal cost of the cement industry's industrial allocation is significant

As NZ's sole domestic manufacturer of cement, GB is eligible for industrial allocation under the NZ ETS. In contrast, imported cement is not subject to emissions costs in New Zealand and does not receive any allocation.

To illustrate the significance of this support: assuming GB maintain its 2024 production levels, it is projected to receive a total of **9.7 million New Zealand Units (NZUs)** through to **2050**. Using the NZ ETS price assumptions set out in Appendix 8.1, this equates to approximately **\$648.4 million** over the period.

Due to the slower phase-out of allocation in the early years, GB is expected to have received around **\$383.3 million** worth of NZUs between 2024 - 2035.

Without efficiency gains and with the phase out of IA, domestic cement production will likely become more costly than imports in the future. GB has expressed concerns about the potential removal or reduction of IA. A significant reduction or removal of IA would mean **reviewing the continued viability of cement production** at its Portland plant.

Fletcher Building has publicly signalled they are maintaining optionality of shifting to an import only model or remaining as a domestic manufacturer and investing in decarbonising where possible, depending on whether a level playing field with importers is achieved.¹⁸ If a level playing field is not achieved, it is likely that Fletcher Building will opt for an import only model.

¹⁴ See [FBU FY25 Results Investor Presentation](#).

¹⁵ Total emissions = (industrial allocation/rate of assistance) *100

¹⁶ Indirect emissions = Total emissions – surrender obligations

¹⁷ Assumes a NZ ETS price of \$55 p/tCO₂e and is comprised on indirect emissions costs and residual surrender obligation costs

¹⁸ See [FBU Investor Day 2025 Construction Materials](#)

5. A border carbon adjustment may help reduce carbon leakage

Chapter summary

- A BCA applies a carbon price to imported goods equivalent to that faced by domestic producers to create a level playing field and, therefore, prevent carbon leakage.
- There is a growing body of evidence that a BCA could reduce carbon leakage. In addition, a BCA may incentivise decarbonisation in trade exposed sectors as a level playing field for carbon costs mean firms with lower emissions technology can gain a competitive edge.
- There is increasing global interest in BCAs. The EU and UK are implementing CBAMs in 2026 and 2027 respectively. Australia and Canada are also exploring the policy.

The NZ ETS is a domestic tool and does not cover emissions from imported products as these emissions are produced overseas. A BCA is a policy instrument designed to level the playing field between countries with different emissions pricing policies. The primary objective of a BCA is to reduce carbon leakage where domestic producers (supplying a domestic market) find it hard to abate sectors face higher emissions mitigation costs than international competitors. By imposing a carbon cost on importers equivalent to that faced by domestic producers, a BCA removes the need for industrial allocation.

The OECD defines a BCA as “a measure applied to traded goods that seeks to make their prices in destination markets reflect the costs they would have incurred had they been regulated under the destination’s market’s greenhouse gas emissions regime” (Cosbey et al, 2012, p. 7).

The liability applied by the BCA depends on the emissions intensity of the imported goods and the gap between the carbon price applied in the country of origin (if any) and the carbon price that would have been applied had the good been produced in NZ (including the cost impacts of the NZ ETS minus any IA support). A BCA liability would apply directly to the importer of goods within scope of the BCA.

9(2)(h)

The methodology for calculating a BCA is set out in Appendix 3.

5.1 Most studies agree that BCAs can reduce carbon leakage

Zhong and Pei (2023) found that, of the 24 studies reviewed, 21 showed BCAs reduce leakage. Bohringer et al (2022) reported that one study estimated a 20% emissions reduction in the industrialised world, while another estimated that BCAs could reduce leakage rates for EITE firms by one third.



On a global level, studies have shown that BCAs encourage trading partners to adopt more ambitious emissions price settings, including expanding the coverage and intensity of its domestic emissions pricing (Chang, 2025). Zhang and Pei (2022) and Zhang (2020) found a BCA does reduce leakage risk when compared to a stand-alone and unilateral emissions trading scheme, but models show global emissions reductions are modest. Bellora and Fontagne (2022) also found evidence of a reduction in carbon leakage - especially direct leakages resulting from import substitution and/or relocation.

The European Commission's 2021 Impact Assessment Report found a reduction in carbon leakage risk across all EU CBAM sectors of up to 29%. However, they found carbon leakage in the cement sector is expected to persist at 7% by 2030. The OECD (2025) has estimated the EU CBAM will prevent 0.1% carbon leakage resulting from the lower EU ETS cap and removal of free allowances.

In terms of emissions reductions, the European Commission estimated a 1% reduction in emissions for EU CBAM sectors by 2030 and a 0.4% reduction in non-EU CBAM sectors over the same period. The OECD (2025) found that, with a CBAM, each tonne of CO₂ avoided in the EU is mirrored by a decrease of 0.12 tonnes outside the EU. As a result, global emissions reduce by 0.54%, with about a third of the reduction explained by the introduction of the CBAM.

BCAs are likely to encourage decarbonisation....

BCAs are considered (at least theoretically) to discourage imports of high-carbon goods from other jurisdictions and to incentivise abatement by requiring organisations to fully internalise emissions costs (Ambec, 2022). As a BCA attempts to level the playing field between importers and domestic suppliers, a competitive advantage can be obtained if investments are made in lower emissions technologies.

The Australian Department of Climate Change, Energy, the Environment and Water (DCCEW, 2024) consider a BCA could provide the necessary confidence for investment in low or zero emissions production. They note a BCA could create incentives for producers in other countries to monitor production emissions and potentially to invest in low emissions facilities to enhance export competitiveness. It also enables firms to reflect the costs of complying with emissions constraints in their product prices and allows producers of clean goods to receive a market premium. The DCCEW notes that we could expect low emissions commodities to become cheaper relative to high emissions commodities, creating incentives for downstream firms and end users to substitute towards lower emissions options.

5.2 There are international developments in the use of BCAs

The EU is implementing a CBAM in 2026 and the UK in 2027.¹⁹ Australia is considering implementing a BCA, starting with the cement and clinker sector, followed by lime. Australia conducted a two-year review to explore policy options to address carbon leakage, focused on high-risk sectors, and in the context of its strengthened Safeguard Mechanism and commitment to net zero by 2050.

The Australian Carbon Leakage Review's final report and recommendations is scheduled be released later in 2025. Following this, further engagement on the recommendations will be undertaken, including whether to implement a BCA, as part of the 2026-2027 Safeguard Mechanism Review. No decision has been made by the Australian Government on implementing a BCA at this stage.

Details of the EU and UK CBAMs and what was proposed in the Australian Carbon Leakage Review can be found in Appendix 4.

Canada is actively exploring the implementation of a BCA as part of its climate strategy to prevent carbon leakage and protect the competitiveness of domestic firms. While consultations with provinces, industry, and international partners is ongoing, no formal BCA policy has been adopted yet. Research suggests that a well-designed BCA, particularly if coordinated with major trading partners like the United States, could reduce carbon leakage and enhance competitiveness, provided it is based on cooperative and fair principles.

In the United States, several legislative proposals are under consideration to impose tariffs on imported goods based on their carbon content, aiming to support both environmental objectives and US industrial competitiveness. Although the direction is clear, with both political parties showing interest, no concrete policy has been finalised, and the future approach under the Trump Administration remains uncertain. Notably, since June 2025, New Zealand steel and aluminium exports to the US have faced 50% tariffs, and further legislative measures, such as the Clean Competition Act, could increase export costs even more.

¹⁹ A BCA is a general policy tool designed to equalise carbon costs between domestic and imported goods. The CBAM is the term used for specific implementations of this concept, such as those being introduced by the European Union and the United Kingdom in 2026 and 2027 respectively.



6. What is the likely impact of a NZ cement sector BCA?

Chapter summary

Modelling indicates that:²⁰

- With a BCA, carbon leakage is estimated to reduce by 14.1 to 15.1 MtCO₂e over 2030 to 2050 depending on the scenario (which equates to 2.08% to 2.23% of NZ's projected gross emissions). Total global emissions reduce by up to 4.4 MtCO₂e over this period if a BCA is applied.
- A BCA results in small decreases in GDP (between 0.005% - 0.028% average annual reduction).
- A BCA increases cement prices (+1.8%-5.2% annual average), which reduces construction output (-0.11%-0.31% annual average) and cement use (-0.26%-0.75% annual average).
- A BCA changes demand for other construction inputs, with a decrease in demand for steel (-0.05%-0.19% annual average) and an increase in demand for wood products (+0.10%-0.24% annual average).
- The impacts of potentially introducing a BCA for cement on the wider ETS are expected to be relatively small (+0%-4.5%).
- A BCA is more likely to deliver net positive fiscal impacts if IA is phased out at a faster rate. Fiscal impacts range from a net benefit of \$33m (if IA is phased out in 2030) to a net cost of \$628m (if current IA phase out remains) over the period 2024 to 2050.
- As detailed summary of results across scenarios is available in Appendix 5.

Cement supply in New Zealand

As set out in the Terms of Reference for the study, this section discusses the impact of a cement sector BCA on:

1. **Carbon leakage:** extent to which the policy reduces carbon leakage risk and creates a more level playing field.
2. **Decarbonisation:** extent to which the policy promotes efficient investment decisions in decarbonisation and supports the 2050 NZ Net Zero Carbon Concrete Industry Roadmap.
3. **Industry and economy:** impacts on production, costs of concrete, broader supply chain and economy-wide impacts. This includes looking at the impact on concrete's competitiveness in the NZ building materials market.
4. **Fiscals:** impacts on Crown revenue.

²⁰ All impacts are based on the impacts over 2024 to 2050.

Section 7 provides a high-level assessment of implementation and administrative impacts.

6.1 How we assessed the industry and economy impacts

Two models were used to consider the impacts on the cement sector and broader economy:

- A Concrete New Zealand-led model of the impacts of a BCA on the cement sector
- Economy-wide modelling of the economic impacts of the BCA, carried out by Dr Niven Winchester of Alpine Economics Consulting.

Sense Partners independently reviewed the Concrete NZ model, with a focus on:

- assessing the model framework, logic and architecture
- evaluating the assumptions and parameters in the model
- reviewing the quality, relevance and reliability of input data, and
- checking for data gaps, biases or outdated sources.

Sense Partners assessed the Concrete New Zealand model as being sufficiently robust to inform policy advice at this early stage of the process. However, they noted that the results should be seen as indicative in the context of the various assumptions embodied in the model's parameters, data sets and scenarios, some of which will warrant further examination should the policy progress. See Appendix 6 for a further discussion of the limitations of the model.

Sense Partners also reviewed the economic-wide modelling results. They found the modelling generates intuitive and logical results to show the macroeconomic and construction sector impacts of a BCA on the cement industry.

The cement sector model

The Concrete NZ model assessed the central policy question: *how would introducing a BCA on cement imports affect domestic production, imports and the emissions associated with each?*

Scenarios

We assumed a BCA would commence in 2030 to allow for complex policy and legislative design, consultation, and potentially transitional measures. Analysis was conducted over the period 2024 to 2050 using the following scenarios:

1. Baseline: no BCA and a gradual phase down of industrial allocation (1% under 2030, 2% under 2040, 3% thereafter)
2. Scenario 1: With a BCA and current phase down rates for the IA Level of Assistance
3. Scenario 2: With BCA instead of industrial allocation (IA Level of Assistance drops to zero in 2031)



4. Scenario 3: With a BCA plus faster phase-out of IA Level of Assistance to reach zero by 2040 (8% from 2031 to 2040).

Input data sources

Public and government-supplied data was used, including NZ ETS price pathways, allocative baselines, and demand projections from the Concrete NZ Net Zero Roadmap. In addition, confidential industry data – specifically domestic pricing, production volumes, and process constraints covering the period 2017 to 2024 – were obtained from industry. Integrating real-world industry data significantly enhances the model’s accuracy, ensuring the analysis reflects actual market conditions rather than theoretical averages. The trade-off is that the commercially sensitive data has not been independently verified. This has implications for assessing the reliability of assumptions and scenario design choices, most notably in the baseline.

There are three potential import sources in the model:

- Source one: a relatively climate-ambitious source
- Source two: a moderately-ambitious source
- Source three: no carbon pricing expected in the foreseeable future.

Each source market has an assumed initial import share, based on insights from industry participants. Each source also has an assumed cost of carbon and process/fuel emissions intensity profile between 2024 and 2050.

Model architecture

The model works by modelling shifts in market share of General Purpose (GP) Cement between four distinct supply sources: one domestic and three international profiles, which are categorised by their carbon policies and product emissions. The logic of the model follows several steps:

1. Given an exogenous level of domestic cement demand, NZ ETS price path, and overseas producers’ carbon costs, determine **baseline** domestic production and imports from each of three source markets from 2025 to 2050 assuming no BCA is introduced and IA continues as previously announced (1% under 2030, 2% under 2040, 3% thereafter).

When domestic production falls below a defined “viability floor”, its remaining volume is reallocated to the import source with the lowest long-term carbon cost (averaged over 2035 to 2050). Without a BCA in place, the lowest long-term carbon costs remain associated with Source 3, resulting in the full displacement of domestic production to the highest-emitting source.

Consequently, the baseline represents the default outcome, and carbon leakage can only be evaluated in terms of ‘avoided carbon leakage’ achieved through the introduction of policy interventions.

2. **Estimate the carbon emissions** associated with domestic production and imports, excluding emissions from transport.

3. Repeat the analysis in steps 1 and 2 under **scenarios** in which a BCA is introduced in 2030 as an alternative to IA.
4. **Compare the baseline and scenario outputs** to assess the change in domestic production, imports and emissions generated in New Zealand and overseas.
5. **Determine the extent to which introducing a BCA leads to a reduction in carbon leakage.**

The cement sector analysis compares cumulative carbon emissions from imports of cement in the status quo from 2030 to 2050 with cumulative emissions from imports under the three BCA scenarios to determine whether there is likely to be a reduction in overseas carbon emissions.

In line with the NZ Climate Change Response Act, carbon leakage has been defined as emissions shifting offshore: the total embodied emissions in imports after the introduction of the policy change minus the total embodied emissions in imports before the policy change:

$$\text{Carbon Leakage (tCO}_{2e}\text{)} = \text{Emissions}_{\text{imports,after}} - \text{Emissions}_{\text{imports,before}}$$

Where:

$\text{Emissions}_{\text{imports,after}}$ = Emissions embodied in imports after domestic policy change

$\text{Emissions}_{\text{imports,before}}$ = Emissions embodied in imports before domestic policy change.

Behavioural aspects

At the core of the model is a single behavioural equation that determines how market participants (buyers choosing between domestic and imported cement) respond to changes in carbon costs. This equation drives changes in market shares from changes in carbon costs. The formula first apportions market shares between domestic and imported cement based on **relative cost-competitiveness**. It first calculates the cost difference between each source and a market-wide weighted average (driven by carbon costs and base price). It then apportions the imported share across the three import sources, based on their carbon costs relative to the average carbon cost of imports.

A single elasticity, a **trade elasticity**, determines the magnitude of the changes in domestic and import shares for a given change in relative carbon costs. This elasticity captures the responsiveness of domestic demand with respect to relative carbon costs. In the model, all prices are held fixed except carbon costs so we can elicit the impact on market shares (and as a result emissions) of changing carbon costs, and any changes in carbon costs are fully passed onto buyers.

This is considered a reasonable simplification because the primary drivers of cement cost – energy and raw materials – often contribute nearly 75% of total production cost and are largely correlated across all producers.²¹

²¹ Raw materials, like limestone, are almost exclusively sourced locally and have stable costs. Thermal energy (primarily coal) is a globally traded commodity, meaning significant price changes affect both domestic producers and importers simultaneously.



A trade elasticity of -2.46 was adopted from the Australian Government's Carbon Leakage Review. This proxy was necessary because, as detailed in Appendix 7.1, a statistically reliable figure could not be derived from the available New Zealand data. Analysis of how sensitive the model is to this assumption is provided in Section 6.4.

Assumptions and parameters

Several parameters and input assumptions underpin the study's analytical framework as set out in Table 2. Some of these variables are commercially sensitive so are not shown in the table.

Table 2: Key parameters and input assumptions

Parameter	Description	Value	Source
Projected domestic concrete demand	Estimate of the level of projected demand for concrete, largely driven by population growth. It does not vary across scenarios.		Concrete NZ's 'Roadmap to 2050' publication
Base cement price	Average domestic ex-depot selling price between 2022 and Q2 2025.	*	Concrete NZ member data
NZ ETS cost of carbon	Cost per NZU, both historical and projected through to 2050. Based on the NZ ETS price pathway underpinning the 2025 emissions projections.	Appendix 8.1	MfE
Allocative Baselines (AB) for cement and clinker	NZ Allocative Baseline projections, starting from 2024 allocative baselines of clinker (0.83t CO _{2e} /tonne of product) and cement (0.0235tCO _{2e} /tonne of product).	Appendix 8.2	MfE
Electricity Allocation Factor (EAF)	Estimate of how the ETS affects wholesale electricity prices, expressed as tonnes of CO _{2e} per megawatt-hour.	Appendix 8.2	MfE
Level of assistance	Decreasing multiplier for allocative baseline.	Appendix 8.3	MfE
Domestic clinker and cement production parameters	Includes process emissions, energy efficiency, and emissions intensities.	*	Concrete NZ member data
Concrete market factors	Such as total concrete volumes, the share of general Portland cement, the average clinker factor in Portland cement, and the average binder content in concrete.	Appendix 8.4	<i>A Net-Zero Carbon Concrete Industry for Aotearoa New Zealand: Roadmap to 2050²²</i>

²² Concrete NZ Roadmap

Parameter	Description	Value	Source
Cost of carbon imports	Overseas carbon cost scheme projections. Modelled across three policy pathways — ambitious, mid-scenario, and none.	Appendix 8.5	Based on public announcements
Overseas clinker and cement production parameters	Covering process emissions, energy efficiency, and emissions intensities, represented across three pathways (ambitious, mid-scenario, no improvement).	Appendix 8.5	Concrete NZ member data
Embodied emissions from non-kiln processes	Energy intensities and emissions data for non-kiln process steps like grinding and preheating.	*	Concrete NZ member data
Domestic production constraints	An upper capacity limit for clinker production reflecting physical plant limitations, and a lower “viability floor” representing the minimum operating threshold.	*	Concrete NZ member data

**Commercially sensitive and not disclosed here.*

To develop the models, assumptions were made about how a BCA would be designed...

To develop the models, several assumptions about specific elements of the BCA design were made as set out in Table 3: Assumptions related to BCA design for the modelling. This does not imply a preference for specific aspects of BCA design, as determining optimal design features requires further analysis and industry and international stakeholder engagement.

Table 3: Assumptions related to BCA design for the modelling

Design element	Assumptions or definitions applied
Calculation of BCA levy/charge	Assumes importers report - the quantities and characteristics (e.g. clinker factor) of imported goods - the embedded greenhouse gas emissions in those goods (direct and indirect), and - the carbon price effectively paid in the country of origin for those emissions on accrual basis, without any rebates or compensation (like free allowances). Emissions Liability Formula First, an importer determines how many emissions they are liable for using the following formula: $\text{Emissions liability} = \text{Total Embodied Emissions [t CO}_2\text{e]} - ((\text{Clinker Weight [t]} * \text{Clinker IA [NZU factor]}) + (\text{Cement Weight [t]} * \text{Cement IA [NZU factor]}))$ BCA Gross Levy Formula Second, the Emissions Liability is converted into a gross monetary value: $\text{BCA Gross Levy} = \text{Emissions Liability [t CO}_2\text{e]} * \text{NZ ETS Price [NZ$/NZU]}$



	BCA Net Levy Formula Third, the monetary value of carbon levies effectively paid to the authorities in the country of origin is deducted to determine the net NZ BCA levy: BCA Net Levy = BCA Gross Levy [NZ\$] – (Importer Carbon Price on Accrual Basis) [NZ\$] - The levy will be linked to the prevailing NZ ETS carbon price and apply on a per-tonne CO₂ basis. - Zero would be the minimum levy if the importer's carbon price is higher than the NZ ETS.
Charge point	The BCA charge point is the point at which the BCA liability would arise. The charge point is assumed to arise when the BCA good is imported into NZ and the good becomes subject to import duty. For goods not subject to import duty the charge point is assumed to arise when the goods enter NZ.
Liable person	The legal obligation for compliance rests with the importer of record.
Scope of a BCA	Includes: - Carbon price on the emissions embodied in imports of clinker and cements (originated outside of NZ) processed at the border (commodity codes – HS 2523 and 6810) - Scope 1 (direct) emissions and scope 2 (indirect emissions from the generation of purchased electricity consumed by a company) embedded in the imported product to ensure consistent coverage of emissions with the NZ ETS. - Stationary energy – direct combustion of fossil fuels (e.g. electricity generation, industrial heat) – estimated annually through the Electricity Allocation Factor. - Industrial processes (process emissions from chemical reactions). Excludes: - Fugitive or biogenic emissions unless relevant. - Transport emissions, office functions and packaging emissions.
Timing of policy implementation	- Assumed to start in 2030, with a transitional period from 2028-2030 - Assumed BCA levy is applied on an annual basis - Analysis considers a 20-year period from 2030 to 2050

The baseline and three scenarios were defined along the key parameters outlined above, with specific choices as follows. The most important of these – and the central premise on which the entire model is based – is that domestic cement production becomes unviable if production falls below a critical threshold (in 2030) due to reduced competitiveness as IA is phased down.

The additional baseline assumptions are set out in Table 4. These baseline parameters are not arbitrary. They are founded on the best available public information (such as MfE's own price pathways and the third-party reviewed Concrete NZ 2050 Roadmap) and supplemented with confidential, real-world industry data. They are intended to create the most realistic 'business as usual' reference case based on current (2025) knowledge, against which the policy scenarios can be assessed. As with any long-term projection, they are subject to future market and policy shifts.

Table 4: Baseline assumptions in cement sector model

Parameter	Baseline assumptions
NZ ETS cost of carbon	Central assumption (Appendix 8.1 column 1)
NZ BCA effective from	No BCA
NZ IA Level of Assistance	Current phase down rates (Appendix 8.3 column 1)
Concrete production	Concrete NZ Net-Zero Carbon Concrete Industry Roadmap
Cement substitution elasticity of trade	-2.46 (see Appendix 7)
Domestic clinker production emissions	Using current technology to gradually reduce emissions intensity until 2031, but no further investment to become coal-free*
Domestic electricity emissions intensity	Using MfE steady decarbonisation pathway for Electricity Allocation Factor (Appendix 8.2 column 1)
Source 1 emissions profile	High carbon cost (Appendix 8.5 column 1) coupled with industry ambition: delayed implementation of alternative fuels on more modern kilns, ultimately resulting in lower specific modelled embodied emissions compared to the domestic producer
Source 2 emissions profile	Modest carbon cost (Appendix 8.5 column 2) coupled with medium industry ambition: strongly delayed implementation of alternative fuels on aged kilns
Source 3 emissions profile	No carbon cost (Appendix 8.5 column 3) coupled with lack of industry ambition: no implementation of kiln improvements
Initial import sources split	Starting in 2024, each profile is assigned a relative share. Since actual market shares between companies are confidential, we have used an approximation based on available shipping data: 45% imports, distributed as 60% Source 1, 20% Source 2, and 20% Source 3
Import electricity emissions intensity	Mirror of NZ EAF decarbonisation pathway (Appendix 8.2 column 1)

**In the baseline scenario, it is assumed that the domestic producer would not pursue a long-term coal-free strategy without the certainty of a Border Carbon Adjustment (BCA). However, this assumption proved inconsequential, as any potential benefits from such investment would materialise only after domestic production capacity has already been offshored.*

Changes in assumptions under the three BCA scenarios

All baseline parameters remain stable under each of the three BCA scenarios, except for the following as set out in Table 5.



Table 5: Diverging scenario assumptions in cement sector model (numbers in brackets refer to data columns in model)

Parameter	Assumption
NZ BCA effective from (all Scenarios)	2030
NZ IA Level of Assistance Scenario 1	Current phase down rates for Level of Assistance
NZ IA Level of Assistance Scenario 2	Level of Assistance drops to zero from 2031
NZ IA Level of Assistance Scenario 3	Level of Assistance drops by 1% under 2031, then by 8% annually to reach zero by 2040
Domestic clinker production emissions	Using current technology to gradually reduce emissions intensity till 2031; implementing coal-free technology from 2036 to achieve lowest fuel emissions by 2040*

*Note that the capital costs of implementing coal free technology and any expected operational costs or savings have not been factored into the model.

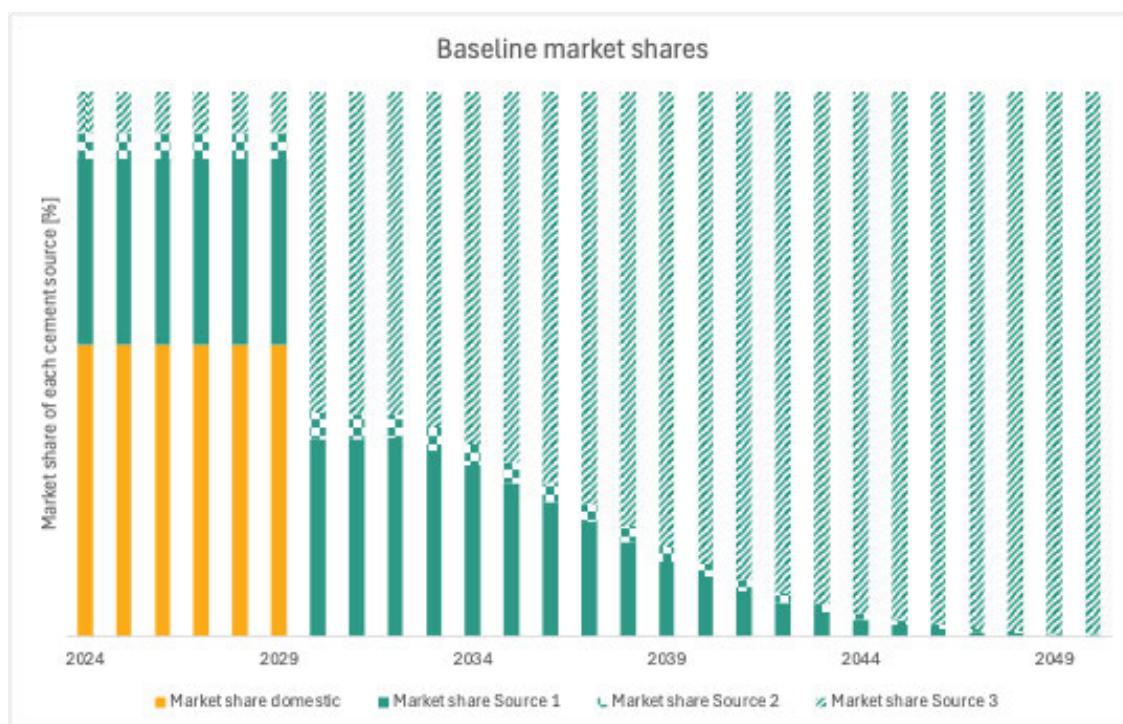
6.2 Impacts on carbon leakage and emissions

In the baseline, rising NZ ETS costs and the phase out of IA make domestic production unviable. The model pinpoints 2031 as the year when these pressures push the plant below its minimum viable production level. At that point, the domestic plant becomes around 4.1% more expensive than the market average. This cost disadvantage leads to a sharp drop in its market share — by 10% — which causes its clinker production to fall below the threshold needed to keep the plant running. This is illustrated in Figure 6: Modelled market shares of cement sources under baseline conditions.

Once this threshold is breached, the model assumes domestic production stops. The plant's 55% market share is then taken up by the cheapest long-term import option. In this case, that's "Source 3" — a supplier with high emissions and no carbon pricing. As a result, global emissions increase.

The minimum viable threshold is commercially sensitive and unverified. It is the key trigger for emissions leakage in the model, introducing significant uncertainty. External factors such as carbon price and market forces may also influence whether the threshold is reached. At the time of writing, the secondary market carbon price is \$40—well below the central price assumption. This limitation and proposed steps to address it are outlined in Section 6.5.

Section 4.3 briefly examined the financial impact of the IA phase-out rate on Fletcher Building's Concrete Division. Without public data on GB's annual profits, the scale of impact on GB is unclear. However, the effect will grow over time, and it is reasonable to assume a point will come when shifting to an import-only model becomes more efficient. The key uncertainty is when this occurs.

Figure 6: Modelled market shares of cement sources under baseline conditions

Source: Concrete NZ 2025 model

The model generates intuitive results that accord with expectations in terms of direction and broad magnitude, given the assumptions built into the scenarios and model. The central results of the model show that:

- If domestic cement producers face higher carbon costs relative to overseas competitors as IA is phased down, and a BCA is not in place, then for a fixed volume of demand more cement will be imported.
- As overseas producers have higher emissions intensity than New Zealand, as assumed by the model, global emissions increase. The increase in emissions associated with higher imports is greater than the reduction in domestic emissions from lower New Zealand production.
- Introducing a BCA moderates carbon leakage as it closes gaps when the domestic carbon cost is above overseas carbon costs. Domestic production increases and imports decline relative to the baseline.

Table 6 summarises the cumulative emissions and avoided leakage from 2024 to 2050 for each scenario. With a BCA, carbon leakage is reduced by 14.1 to 15.1 MtCO₂e depending on the scenario (which equates to 2.08% to 2.23% of NZ's projected gross emissions from 2024 to 2050).²³ This is the overseas emissions *avoided* by the BCA, which prevents the 2031 closure of domestic manufacturing. Total global emissions reduce by up to 4.4 MtCO₂e over this period if a BCA is applied.

²³ Estimated gross emissions from 2024 to 2050 are projected to be 678.21 million tonnes). See here: [New Zealand's projected greenhouse gas emissions to 2050 | Ministry for the Environment](#)



There is very little difference between the BCA scenarios when it comes to reducing carbon leakage. That is expected, because the BCA is specifically designed to equalise carbon costs (after accounting for industrial allocation), ensuring all producers face similar carbon pricing — effectively levelling the playing field.

Table 6: Modelled changes in cumulative carbon emissions and leakage from BCA scenarios

Scenario	Cumulative carbon emissions (MtCO ₂ e) 2024 to 2050		Total emissions (MtCO ₂ e) 2024 to 2050	Estimated reduction in carbon leakage (MtCO ₂ e) 2024 to 2050
	Domestic	Imports		
Baseline – no BCA	3.5	23.8	27.3	-
S1: BCA with current phase out rates	14.2	8.7	23.0	-15.1
S2: BCA with no IA from 2031	13.2	9.7	22.9	-14.1
S3: BCA with faster phase out rates to 2040	13.2	9.7	22.9	-14.1

Source: Concrete NZ 2025 model

Table 7 shows the distribution of total GP cement production from 2024 to 2050 under the “no BCA” baseline and the three scenarios. Total GP cement production is held constant across all cases, as there is insufficient data on the elasticity of substitution between GP cement and alternative binders, or between concrete and other building materials, to support a credible analysis. Continuing with current IA phase out rates results in the greatest domestic market share.

Table 7: Changes in production levels from a cement sector BCA

Scenario	Cumulative cement production 2024 to 2050 (million tonnes)		Market share (%)	
	Domestic	Imports	Domestic	Imports
Baseline - No BCA	4.7	30.2	13%	87%
S1: BCA with current phase out rates	22.6	12.3	65%	35%
S2: BCA with no IA from 2031	20.8	14.1	60%	40%

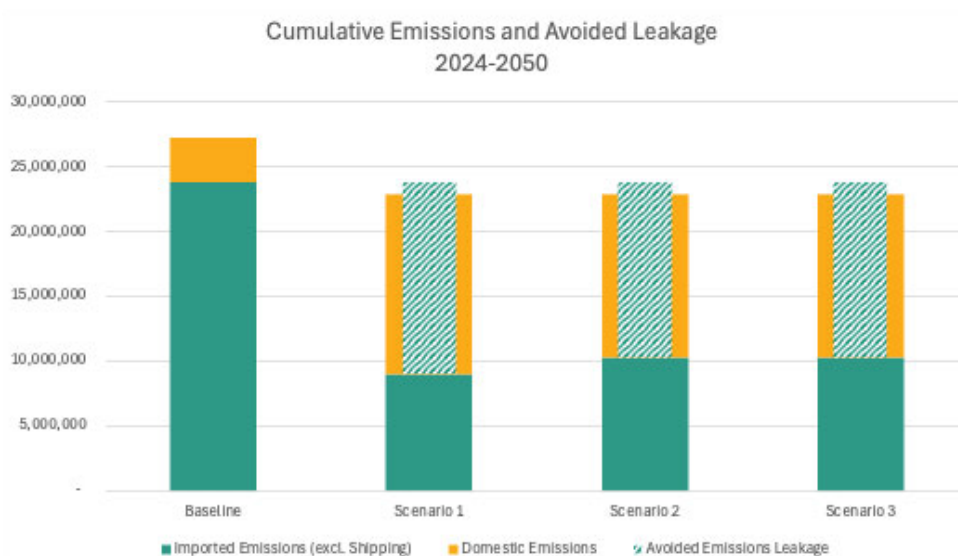
Scenario	Cumulative cement production 2024 to 2050 (million tonnes)		Market share (%)	
	Domestic	Imports	Domestic	Imports
S3: BCA with faster phase out rates to 2040	20.8	14.1	60%	40%

Source: Concrete NZ 2025 model

Impact of international transport emissions

This study focuses on comparing the carbon emissions from cement production across different sources, assuming equal carbon costs — but it doesn't include emissions from international shipping. While that's outside the scope of the modelling, it's important to remember that transport emissions can still have a significant impact on global outcomes. Transporting an accumulated 15 to 18 million tonnes of offshored cement to New Zealand is estimated to contribute an additional 1 to 2 MtCO₂e to global emissions (depending on vessel sizes, efficiency and distances).²⁴ Figure 7 illustrates cumulative cement emissions, excluding shipping emissions.

Figure 7: Cumulative (2024-2050) emissions from imported and domestically produced cement (excl. shipping)



Source: Concrete NZ 2025 model

6.3 Impacts on decarbonisation

The model indicates that when a single producer faces carbon pricing while others do not, its market share declines sharply due to trade elasticity effects (see Appendix 6 and 7.2 for limitations like the impact of non-price factors). Given the built-in threshold for minimum

²⁴ Based on modelled volumes and shipping emissions reported by one importing member of Concrete NZ, reflecting imports from Southeast Asia (confidential).

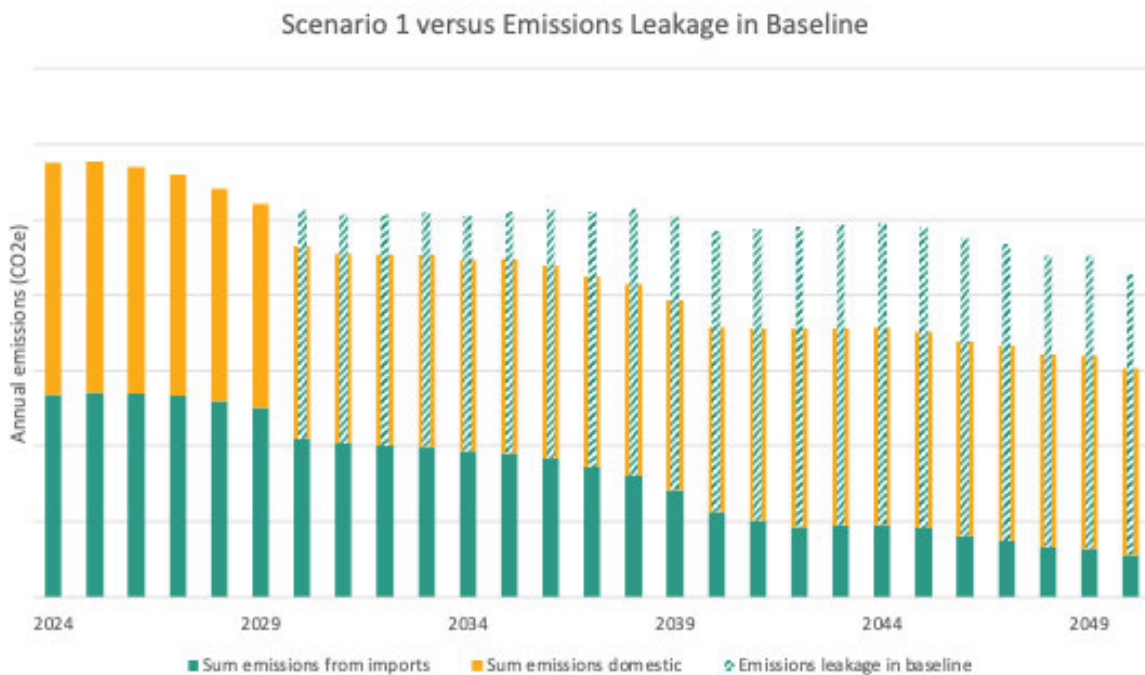


commercial viability, this triggers an immediate relocation of domestic production to offshore markets.

As noted earlier, in the absence of a BCA, this relocation is modelled to move all domestic volume to the source with the lowest anticipated long-term carbon cost — in this case, the high-emitting Source 3 — since no carbon pricing is applied either at source or in New Zealand. This assumes that businesses act according to the lowest cost option to optimise return. While carbon pricing is expected to become more prevalent worldwide, it is likely that pricing in developing countries will take time to implement and start low.

All scenarios introducing a BCA from 2030 demonstrate how a level playing field on carbon costs effectively prevents the offshoring of emissions. This is most prevalent in Scenario 1, see Figure 8. Shifts in market share now only occur due to differences in cement emissions intensities, which drive varying net carbon costs across domestic and importing sources.

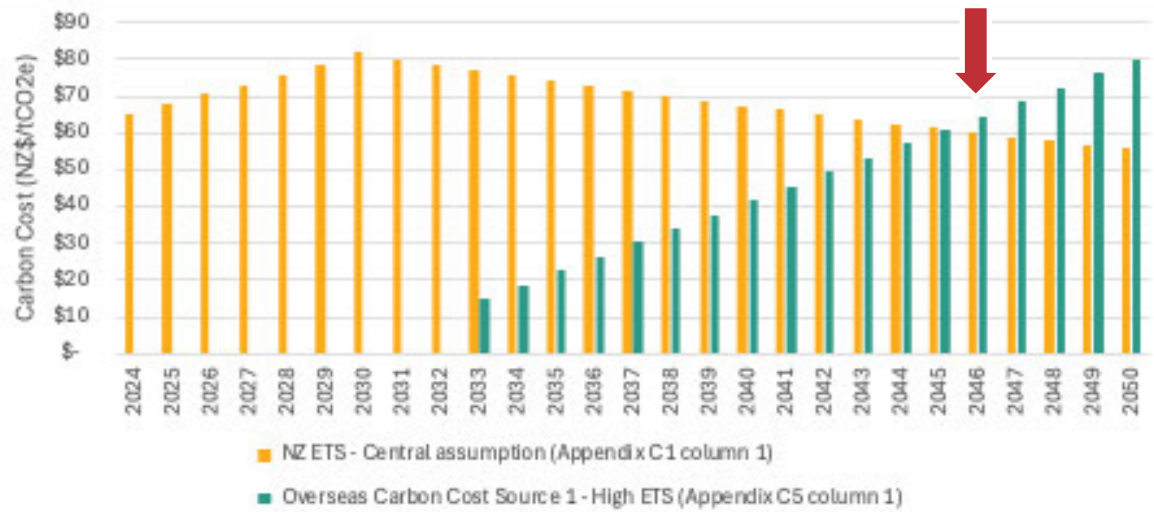
Figure 8: Modelled annual embodied emissions in domestically produced and imported cement under Scenario 1 assumptions (current IA phase down rates), contrasted with additional emissions from offshoring in the baseline



Source: Concrete NZ 2025 model

Different emissions intensity favours market share growth for the Source 1 profile, which represents higher industry emissions reduction ambition—provided its home-country carbon costs do not exceed NZ's levels. Figure 9 illustrates how Source 1's carbon costs surpass the NZ ETS central assumption (the baseline for BCA levies) from 2046, meaning a BCA would not apply from this time.

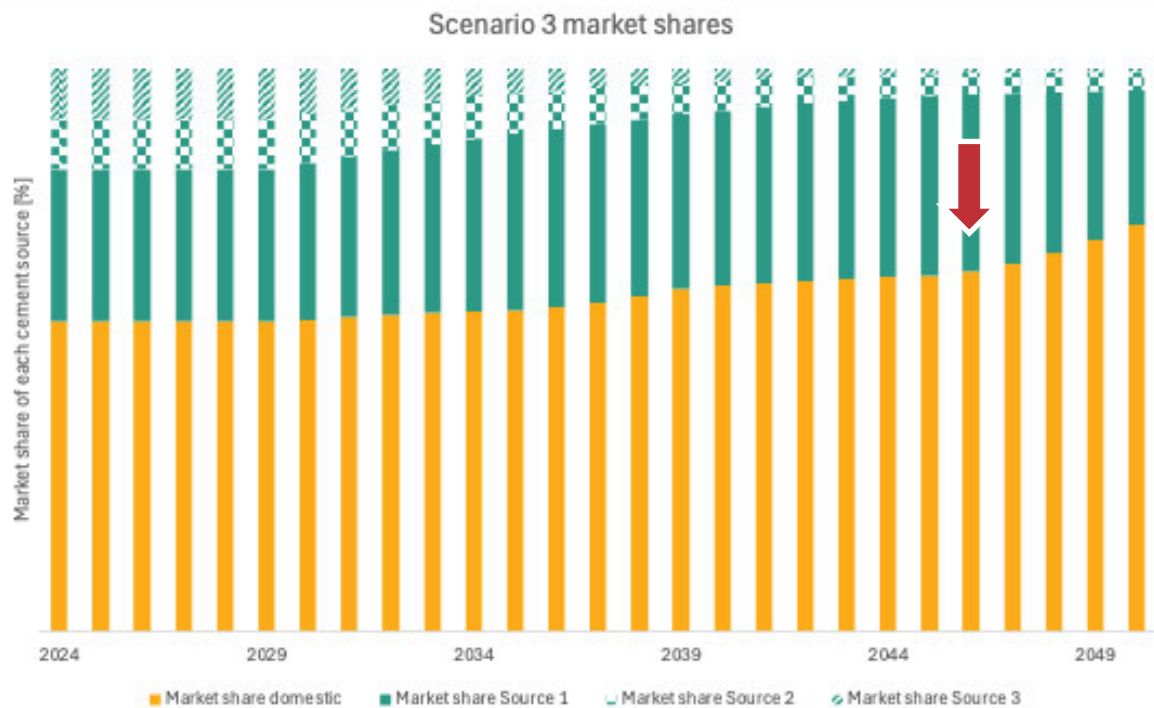
Figure 9: Illustration of two carbon pricing schemes used for domestic production and Source 1 imports



Source: Concrete NZ 2025 model

The modelled outcome, see Figure 10, shows that domestic cement gains market share once such a scenario occurs, discouraging sourcing from countries with relatively higher carbon reduction ambition than New Zealand.

Figure 10: Modelled market shares by source profile under Scenario 3 assumptions (BCA plus faster phase-out of IA)



Source: Concrete NZ 2025 model

Assessing the impact on the Concrete NZ Net-Zero Carbon Concrete Industry Roadmap

In 2023 Concrete NZ published its **Net-Zero Carbon Concrete Industry Roadmap**²⁵, outlining the pathway for the sector to meet Aotearoa New Zealand’s climate ambitions.

The roadmap divides the industry’s carbon footprint into seven levers, each contributing to varying degrees toward achieving net-zero carbon by 2050. Unsurprisingly, most emissions reductions must come from the binders, which account for most of concrete’s climate impact.

Three levers in Figure 11 relate specifically to binder properties: **Clinker**, **Cement & Binders**, and **Carbon Capture, Utilisation and Sequestration (CCUS)**. Together, these three account for 74% of the overall emissions reduction goal. Other levers also influence binder use; for example, the **Concrete Production** lever seeks to improve batching efficiency through streamlined operations and better raw materials, thereby reducing binder demand per cubic metre of concrete.

Figure 11: The seven levers for the NZ concrete industry to achieve net-zero carbon emissions by 2050



For the purposes of this study, the two most critical levers are **Clinker** and **CCUS**. The Clinker lever relies on continued uptake of alternative fuels in clinker production, while the CCUS lever focuses on capturing, then using or storing any remaining CO₂ after efficiency improvements and material science advancements have been implemented by the mid- or late-2040s. The impacts of both levers were originally modelled against domestic production facilities. Any decision to close those facilities would reduce the industry’s ability to actively pursue these levers and may remove incentives to source materials from the most efficient producers.

A BCA is expected to incentivise decarbonisation efforts across binder value chains, including General Purpose (GP) cement. For GP cement, maintaining domestic production means retaining control over this critical part of the decarbonisation pathway.

6.4 Sensitivity analyses for the cement sector model

Sensitivity analyses were conducted to alternative scenarios, including:

- Higher NZ ETS costs
- Divergence between import source ambition and source country ambition (e.g. high ambition import source operating in low ambition source country and vice versa)

²⁵ Concrete NZ Roadmap

- Introduction of CCUS under different carbon price settings (central NZ ETS, high NZ ETS, and IPCC AR6-compliant levels)
- Variation in trade elasticities (-1.5 and -3.5)
- Removal of all overseas carbon pricing
- Domestic manufacturer does not implement coal free investments.

The sensitivity analyses play a critical role in stress-testing the model and identifying its primary drivers. This method involves changing a single key parameter while holding all other assumptions constant. This isolation allows us to precisely quantify how sensitive the final outcomes (e.g. carbon leakage, market share) are to that specific variable, revealing the model's key vulnerabilities and most powerful levers.

Multiple sensitivity analyses were run and the resulting impacts on emissions, production and market shares are provided in Appendix 9. Only a few yielded significant differences. We found that under all scenarios, domestic production still shifts offshore. The scenario with a lower trade elasticity (-1.5) resulted in a one-year delay to the exit of domestic production.

Two scenarios resulted in notable changes to carbon leakage results. When the domestic producer does not implement its coal-free decarbonisation investments, it results in higher carbon leakage in scenario 2 and 3 compared with the base case (~5Mt by 2050 under both scenarios). This effect is due to some importers gaining market shares as they continue to reduce their emissions as assumed in the base case. The reduction in importer carbon costs relative to the domestic producer results in a higher market share for importers and, therefore, more carbon leakage. Continuing with current phase out rates softens this effect in scenario 1.

All importers having a carbon price of zero results in a ~5Mt increase in leakage by 2050 compared to the base case. The model assumes that domestic production shifts to the lowest emissions source in the baseline, resulting in lower total emissions (~4Mt compared to base case). Because total emissions are assumed to be lower, the avoided leakage under every scenario is similarly lower compared to the base case.

6.5 Improving the empirical basis of the Concrete NZ model

In their peer review, Sense Partners note several aspects of the model that could be re-visited to improve its empirical basis:

- Exploring the baseline in more detail, particularly the assumed closure of domestic production in the absence of a BCA. This is critical to the results because it provides the counterfactual against which leakage is measured. At present, the baseline is shaped around commercially sensitive assumptions.
- Basing shifts in import patterns on total production costs in the three overseas jurisdictions vis-à-vis domestic production costs, not just relative carbon costs. This would also involve moving away from having a single base price that is common across all domestic and overseas producers.
- Building price responses into the demand function, rather than assuming domestic demand is exogenous, regardless of cement prices. This would be consistent with the underlying model logic and would allow for effects on cement buyers to be analysed.



- Further econometric investigation of the key behavioural parameter (trade elasticity) driving domestic production vs imports, and consideration of a second set of elasticities that determine how imports are apportioned across sources with different costs.

Despite these limitations, the peer review concluded that the model is sufficiently robust to inform policy advice and generates intuitive results consistent with economic theory.

6.6 Impacts on waste

The Ministry for the Environment's Waste team considered the impact on waste of the closure of Golden Bay's Whangārei cement plant. Golden Bay diverts approximately 100,000 tonnes of waste from landfill annually. This represents around 1.92 percent (5.22 million tonnes in 2024/25) of NZ's landfill waste by using wood waste, waste tyres and other waste materials including industrial sludge waste and hard-to-recycle plastics as fuel. We do not have data on how much waste GB cement generate annually.

GB is the sole domestic processor of tyre derived fuel registered with the government accredited tyre stewardship scheme, Tyrewise. This scheme has only been operational since September 2024, and NZ relies on this facility to process at least 60% of its waste tyres. If GB were to close its Portland Cement operations:

- 70,000–80,000 tonnes of waste currently processed would likely go to landfill, increasing national totals by <2%.
- 20,000–30,000 tonnes of tyres would be exported to verified offshore markets, incurring higher costs and compliance requirements. However, securing domestic processes for the estimated 20,000–30,000 tonnes of waste tyres is likely to present greater challenges.

Alternative domestic facilities may absorb 14,500 tonnes of wood waste, supported by EECA's forecast of increased biomass energy use (from 7 to 12 and 14 percent by 2035).

It is important to distinguish the co-processing method used in cement manufacturing from conventional 'waste-to-energy' (incineration). Unlike simple energy recovery, which typically leaves a residual ash that must be landfilled, co-processing also achieves a form of **material recycling**. The mineral components of the waste (such as ash) are chemically incorporated into the cement clinker, replacing the need for primary raw materials like limestone and iron sands. This dual function—recovering energy while recycling materials without residue—places co-processing higher on the waste management hierarchy than standard energy recovery.

6.7 Impacts on the broader economy

A computable general equilibrium model was used to assess economy-wide impacts of a BCA on cement. The Climate Policy Analysis (C-PLAN) model has been developed specifically to support climate policy analysis in New Zealand. Further information on the C-PLAN model, including its limitations, can be found in Appendix 10.

The CPLAN model was calibrated to capture the key features of the Concrete NZ model, including applying ETS prices used in the sectoral analysis, domestic production ceasing in 2030 and switching to an import-only model, and cement demand remaining constant.

The modelling is intended to provide key insights into the nature and scale of potential impacts from a BCA. It is not intended to accurately predict the outcomes of a BCA.

CGE models like C-PLAN are powerful tools for assessing complex economy-wide interactions and revealing system-wide effects that simpler methods miss but have key limitations. They simplify firm behaviour and assume full employment, are sensitive to uncertain parameters, and capture only specified technological change.

In addition to the C-PLAN analysis, the Ministry of Business, Innovation and Employment (MBIE) examined potential supply-chain impacts.

A BCA will have a small impact on GDP

Averaged across all years, a BCA will decrease annual GDP by between 0.005% (BCA with current IA reductions) and 0.028% (BCA with no IA from 2031). GDP changes are driven by two factors: reducing the IA (an implicit output subsidy) increases GDP and imposing a BCA decreases GDP.

A BCA distorts both producer and consumer prices, with impacts from a BCA generally larger than those from reducing IA. In the scenario of a BCA with no IA from 2031, GDP increases due to the elimination of IA; however, this relative gain decreases over time as IA is phased out in the base policy scenario. As a BCA cost is higher when IA allocations are lower, a BCA has a larger (negative) impact when IA is lower. See Figure 12 and Figure 13.

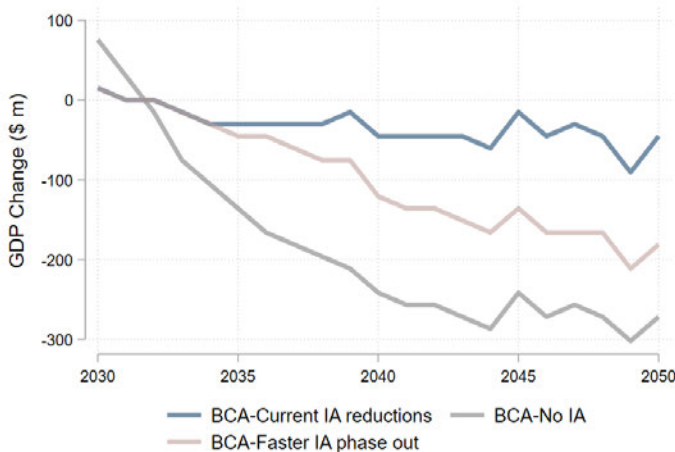
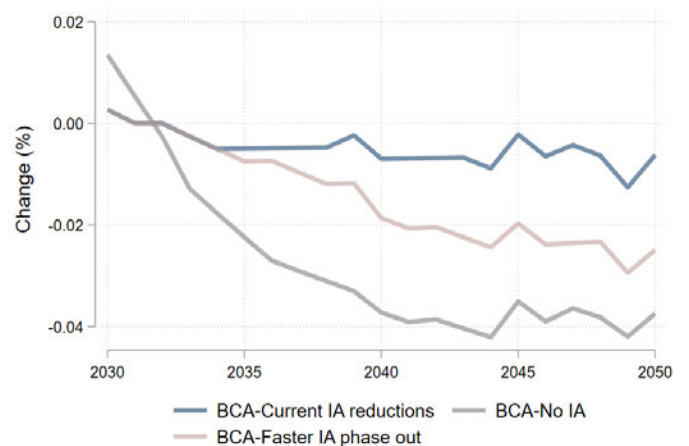


Figure 12: GDP changes relative to base policies (\$m)

Figure 13: GDP changes relative to base policies (%)



Source: Niven Winchester, Alpine Economics Consulting 2025

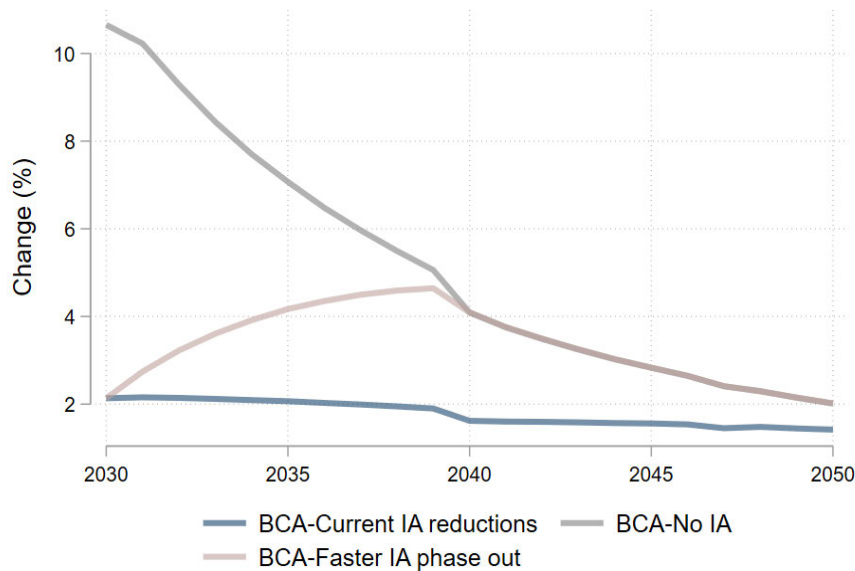


A BCA will increase the price of cement, with minimal impacts on construction costs

Averaged across all years, a BCA will increase the cement price by between 1.8% (BCA with current IA phase out rates) and 5.2% (BCA with no IA from 2031), see Figure 14. The price of cement is influenced by two factors: IA reductions (in some scenarios), which increases the cement price; and a BCA, which increases the price of cement.

Cement prices are higher in scenarios with a higher BCA cost. In the BCA with no IA from 2031 scenario, a BCA cost is higher in 2030 and decreases over time (due to decreasing CO₂ intensity of imported cement and ETS prices).

Figure 14: Changes in cement price relative to base policies (%)



Source: Niven Winchester, Alpine Economics Consulting 2025

We expect a minimal impact on heavy construction costs. For example, concrete is a small proportion (approximately 2.5%) of the total cost of a selected vertical infrastructure project, which is a much smaller share than inputs such as steel or equipment costs (approximately 28% and 22% of average construction costs respectively).²⁶

Total 2025 infrastructure spend in New Zealand is forecast at \$17.5 billion.²⁷ A 3.5% increase in concrete price is estimated to result in a 0.08% increase in total infrastructure spend.

²⁶ See Table 6 in this paper: [Microsoft Word - RI5 Infrastructure cost benchmarking v8](#)

²⁷ [Pipeline snapshot | Te Waihanga](#)

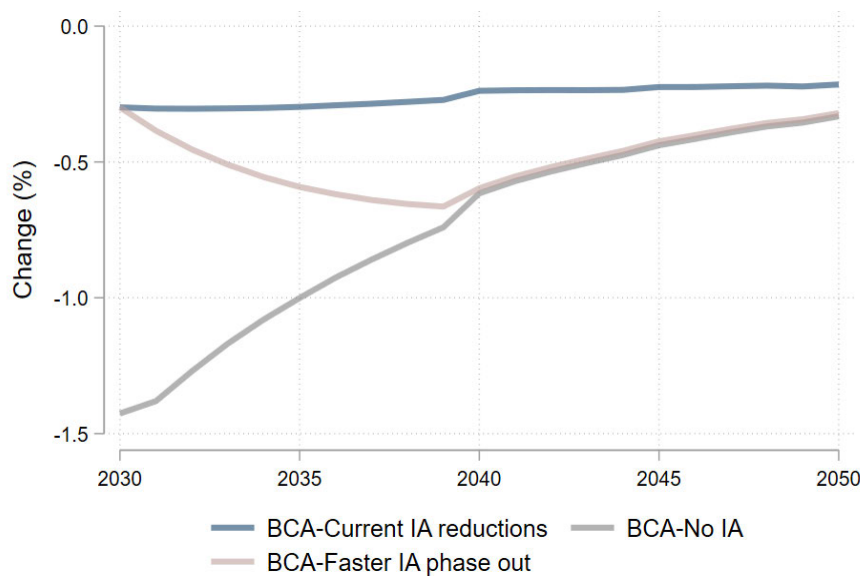
Our analysis shows that a 5.2% rise in cement prices (under the BCA with no IA scenario) would lead to an average estimated increase of 0.016% in the cost of a new house, with a range of 0.014% to 0.019% depending on the scenario.²⁸

A BCA results in a small decrease in demand for cement

As Figure 15 illustrates, changes in cement demand move in the opposite direction to changes in cement prices. As a BCA increases the price of cement, cement use decreases in all scenarios. The decrease in cement use is largest in 2030 in the BCA with no IA from 2031 scenario (when the increase in the cement price is largest).

As the rise in cement prices decreases over time, decreases in cement use also decline over time. Averaged across all years, a BCA decreases cement demand by between 0.26% (BCA with current IA phase out rates) and 0.75% (BCA with no IA from 2031 scenario).

Figure 15: Changes in cement use relative to base policies (%)



Source: Niven Winchester, Alpine Economics Consulting 2025

A BCA will have a small impact on construction output

The increase in cement prices (and decrease in GDP in most years) decreases construction output in all scenarios. Decreases in construction output are largest in cases where cement prices increase the most.

²⁸ Our assumptions include:

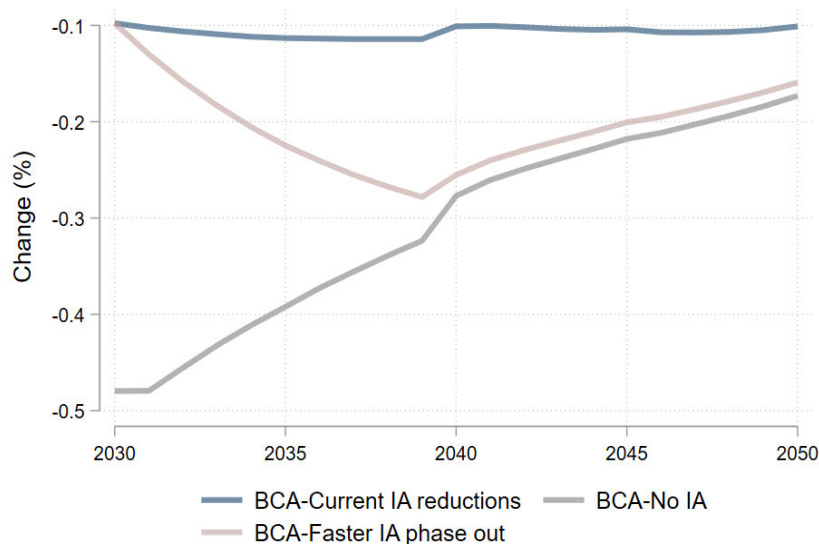
- Cement constitutes 17.5% of concrete. Confidence: High.
- Cement accounts for 19.3% of the concrete cost. Confidence: Medium to low, as we lack specific wholesale figures. Some anecdotal estimates suggest that this figure might be around 30%. If that is the case, the impact would increase to 0.026%, with a range from 0.022% to 0.029%.
- The current average material cost for bulk concrete (20 MPa, 19mm aggregate) is \$315.50 per cubic meter. Confidence: High



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Averaged across all years, BCAs decrease construction output by between 0.11% (BCA with current IA phase out rates) and 0.31% (BCA with no IA from 2031). See Figure 16.

Figure 16: Changes in construction output relative to base policies (%)



Source: Niven Winchester, Alpine Economics Consulting 2025

A cement BCA decreases demand for steel products and increases demand for wood products

The decrease in construction output reduces demand for steel. At the same time, the increase in the price of cement-based products incentivises substitution towards steel.

The substitution effect only partially offsets the output effect, so demand for steel falls in all scenarios (but by less than the decrease in construction output). Averaged across all years, BCAs decrease steel use by between 0.05% (BCA with current IA phase out rates) and 0.19% (BCA with no IA from 2031). See Figure 17.

Wood products are better able to substitute for cement-based products than steel in the model. Consequently, the substitution effect leads to increased demand for wood and the use of wood products increases. Averaged across all years, BCAs increase the use of wood products by between 0.10% (BCA with current IA phase out rates) and 0.24% (BCA with no IA from 2031). See Figure 18.

Figure 17: Changes in steel use relative to base policies (%)

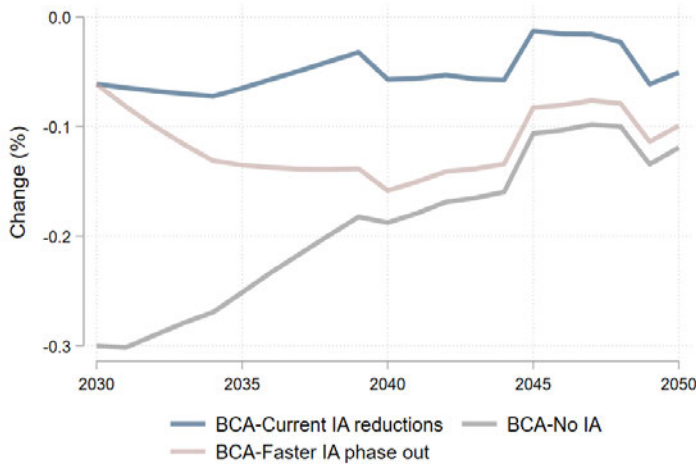
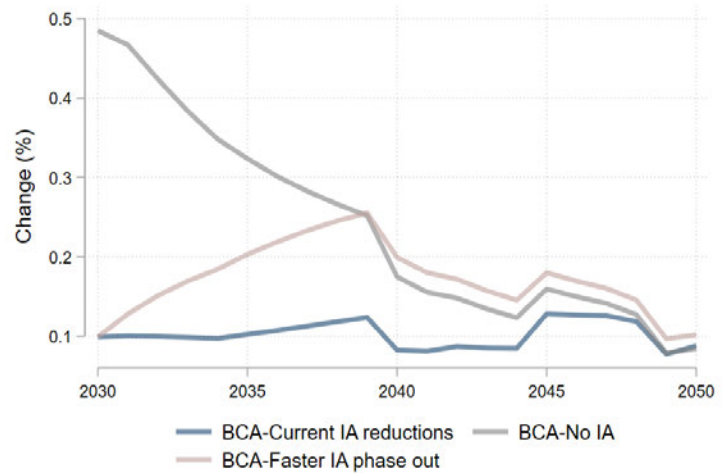


Figure 18: Changes in wood product use relative to base policies (%)



Source: Niven Winchester, Alpine Economics Consulting 2025

A BCA reduces exposure to international markets

New Zealand currently has two cement importers (bulk and bagged) and one clinker importer with domestic processing. Imports come from several Asian countries, though cement is widely traded globally. A key barrier to cement (and clinker) imports is the infrastructure required for shipping, unloading, processing, and distribution.

Full reliance on cement imports would increase New Zealand's exposure to global shipping routes and price volatility. Major disruptions (e.g. conflicts, natural disasters) could significantly impact supply and costs across the construction sector. Minor disruptions, such as shipping or port delays, typically add cost and time but are expected to be managed by the market under an import only model.

We understand that some supply is typically held domestically, although there are barriers to stockpiling. In the longer term, it may be possible for some construction to substitute concrete with other materials, and cement may be partially replaced by supplementary cementitious materials.

Overall, we assess the risk of severe disruption to cement supply to be low, and that there would be limited macroeconomic impacts if cement supply was disrupted in the short term. Over the long term, lessons from past shortages can be taken to build resilience - including promoting competition and diversity of supply, improving access to overseas products and encouraging use of substitutes.



6.8 NZ ETS and fiscal impacts

Impacts on the NZ ETS are expected to be small

The impacts of potentially introducing a BCA for cement on the wider NZ ETS are expected to be relatively small. Current industrial allocation for the cement industry makes up about 2% (0.6 million units) of total annual compliance demand (around 34 million units) in the NZ ETS. Based on the industrial allocation forecasts and total NZ ETS demand projections used in the 2025 NZ ETS unit and price control settings analysis, that share is projected to progressively decrease to around 1% by 2050.

To test the potential impacts of a cement BCA on the ETS, the Ministry for the Environment modelled the scenarios outlined in section 6.1 in the NZ ETS Market Model. Except for adjustments in IA to align with cement BCA scenarios, the model's assumptions and main parameters remain as they were when calibrated to support the 2025 NZ ETS unit and price control settings decision.²⁹ For the purposes of this analysis, domestic production is assumed to remain at current levels in scenarios 1-3 (this differs slightly to the cement sector model presented in section 1). For the baseline scenario, cement production emissions were subtracted from baseline compliance demand from 2031 onwards to reflect domestic production ceasing. To illustrate the uncertainties, a range of different NZ ETS price pathway profiles were tested.

All else equal, increasing compliance demand and reducing the amount of industrial allocation while maintaining the same level of supply of ETS units is expected to put upwards pressure on ETS prices. This is shown in the first ETS profile below, where the removal of IA increases ETS prices by around \$3 (4-5%) per NZU in scenarios 2 and 3 compared to the baseline. As would be expected, increasing compliance demand, but with much of the change offset by higher IA, dampens the price impact (less than 1% increase).

Other parts of the market are likely to adjust to the removal of cement IA as a source of supply. This is illustrated in the second NZ ETS profile, which allows for a more liquid stockpile of NZUs that can fill some supply shortfalls, and the third NZ ETS profile where forestry is allowed to respond to the price. In the second profile, the average price impact is less than 2% owing to greater use of NZUs from the stockpile. In the third profile, total afforestation is slightly less than in the other scenarios but is more frontloaded in response to the price profile. This means that there are more units projected to be available from forestry at the time cement IA is either removed or phased down, which are sufficient to offset the removal of the IA units.

The cyclical profile is based on an overarching assumption that prices need to remain above the auction floor price in the near term to release auction volumes but will then converge over the medium to long term with the price level needed to incentivise afforestation. A less likely but still plausible outcome is that the restrictions on converting farmland to exotic forestry might support a steadily rising price ("constant pathway") by constraining the afforestation

²⁹ See Appendix three of the [2025 ETS Unit and Price Control Settings Regulatory Impact Statement](#) and the [Technical annex to the 2025 ETS Unit and Price Control Settings consultation](#).

response to higher prices. In this situation, other factors in the NZ ETS are the dominant driver of the rate of price increase and no impacts were observed from the different BCA scenarios.

Table 8: Projected ETS Price Impacts

ETS Price Profiles		Projected average ETS Price 2031-50 (2023-dollar terms)				Difference to Baseline (%)	
	Baseline	S1	S2	S3	S1	S2	S3
Cyclical pathway with central stockpile liquidity and exogenous forestry	63.79*	64.32	67.25	66.53	0.8%	5.4%	4.3%
Cyclical pathway with higher stockpile liquidity and exogenous forestry	63.36	63.79	64.32	64.32	0.7%	1.5%	1.5%
Cyclical pathway with central stockpile liquidity and endogenous forestry	63.79	63.79	63.79	63.79	0.0%	0.0%	0.0%
Constant pathway with central stockpile liquidity and exogenous forestry	102.45	102.45	102.45	102.45	0.0%	0.0%	0.0%

Source: Ministry for the Environment

* The cyclical pathway with central stockpile liquidity and exogenous forestry for the baseline scenario is the same price assumption as used for the cement sector model.

Fiscal impacts could be significant across every scenario

The fiscal impacts on the Crown have been derived from the results in the Concrete NZ model set out in Section 6.1. The results vary significantly depending on whether domestic manufacturing shuts down in 2030. The results are expressed in real terms (i.e. 2023 dollars).³⁰

A BCA has two fiscal impacts:

- Industrial allocation expenses change if the phase out rate differs from current settings³¹
- A BCA generates revenue.

³⁰ Testing the results in Net Present Value (NPV) had little impact on the overall insights, so for simplicity we present the results in real terms.

³¹ The Government treats industrial allocation as a fiscal liability until units are surrendered, at which point, industrial allocation becomes an expense.



Fiscal expenses vary depending on how fast industrial allocation is phased out

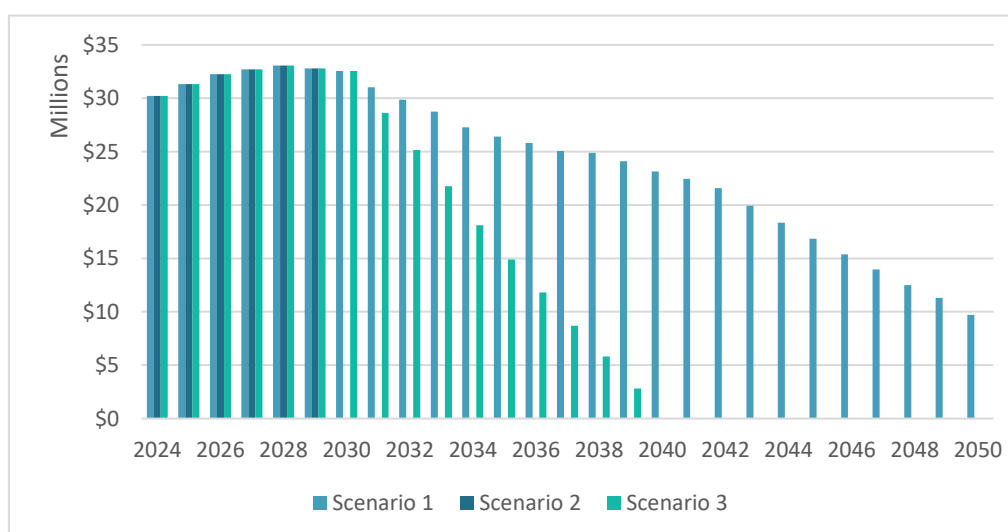
Fiscal expenses are the lowest under the baseline and scenario 2 (BCA with no IA from 2031), owing to domestic cement production and industrial allocation ceasing respectively (Table 9). A BCA increases IA expenses compared to the baseline under scenarios 1 and 3.

The difference in expense is primarily driven by changes in the phase out rate under each scenario. Scenario 1 (BCA with current phase out rates) results in the highest expense given the phase out rate is slowest and because this scenario results in a higher domestic market share. This scenario is largely the same as current fiscal forecasts, which assume domestic production continues post-2030. Fiscal expenses are lower under BCA scenarios 2 and 3 compared to current fiscal forecasts of IA.

Table 9: Fiscal expense of Industrial Allocation between 2024-50

	Current fiscal forecasts – domestic manufacturing continues post-2030 ³²	Baseline (domestic manufacturing shifts offshore 2030)	S1: BCA with current phase down rates	S2: BCA with no IA from 2031)	S3: (BCA & faster phase down of IA)
Industrial allocation (NZ ETS units)	9.69m	2.75m	9.64m	2.75m	5.02m
Fiscal expense estimate	\$648.4m	\$192.4m	\$653.3m	\$192.4m	\$362.7m

Figure 19: Fiscal expense of industrial allocation (2025 to 2050) shows how the fiscal expense is distributed over 2024 to 2050. Where the costs fall depends on the phase out rate of IA.



³² Figures based on the 2025 October Baseline Update for the Half-Year Economic and Fiscal Update. They assume the current phase out rate and constant production.

Figure 19: Fiscal expense of industrial allocation (2025 to 2050)

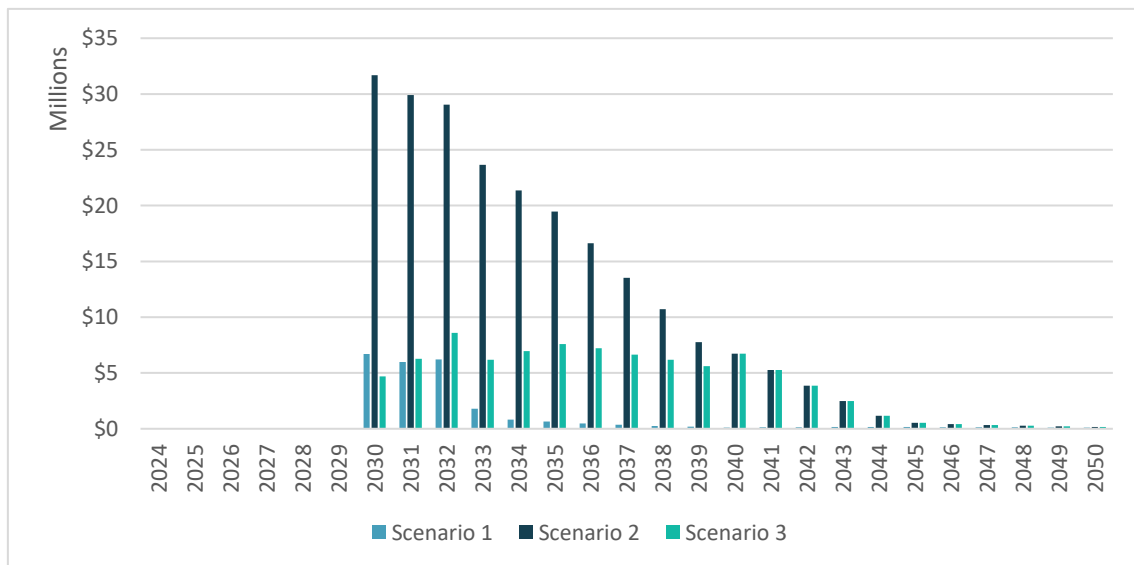
BCA revenue will be driven by the phase out rate and overseas carbon costs

Crown revenue from a BCA depends on how quickly IA is phased out and the carbon price in countries we import cement from (see Table 10). The Concrete NZ model assumes importers face 100% of overseas carbon costs, with no allocation or benchmarking—likely a conservative estimate, as these features are common globally. To illustrate, we ran two additional scenarios where importers avoid either 100% or an average of 55% of their carbon costs.³³

Table 10: BCA revenue between 2024-50

BCA revenue with different importer cost assumptions	S1: BCA with current phase down rates	S2: BCA with no IA from 2031)	S3: (BCA & faster phase down of IA)
Concrete NZ model assumptions	\$24.9m	\$225.2m	\$87.4m
Importers face no overseas carbon cost	\$123.9m	\$432.3m	\$297.5m
Importers face 55% of their overseas carbon costs	\$38.7m	\$322.6m	\$184.8m

As international carbon pricing increases over time, revenue gradually drops, so that by the early 2040s, only a minor share of revenue is generated (see Figure 20). In scenario 2, which features a rapid phase-out of IA, BCA revenue is high between 2030-39 because overseas carbon prices stay comparatively low until the early 2040s.

Figure 20: BCA revenue (2024-50) - Concrete NZ modelled assumptions

A BCA will likely yield positive fiscal results if IA phase-out rates are increased quickly

Table 11 shows that a BCA's net fiscal impact varies depending on the scenario. Both the baseline and scenario 2 have positive fiscal impacts compared to current fiscal forecasts. Relative to

³³ An average of 55% was chosen based on a rate of assistance of 90% in 2030, gradually declining to zero in 2050 (assuming net zero goals). The rate of assistance averages to 55% over the specified period.



current fiscal forecasts, all scenarios including the baseline see an improvement in the fiscal position.

Table 11: Estimated net fiscal impacts of a BCA (2024-50)

Importer carbon cost assumptions	Current fiscal forecast	Baseline – No BCA	S1: BCA with current phase down rates	S2: BCA with no IA from 2031)	S3: (BCA & faster phase down of IA)
Importers face 100% of overseas carbon costs	-\$648.4m	-\$192.4m	-\$628.4	+32.8m	-\$275.3m
Importers face 55% of overseas carbon costs	-\$648.4m	-\$192.4m	-\$614.6m	+\$130.2m	-\$177.9m

7. Implementation and administrative impacts

Chapter summary

- Registration and data verification are expected to have the greatest implementation and administrative impacts on firms and the Government.
- Implementation costs remain uncertain. How a BCA is designed will determine the scale of costs and administrative burden.
- Costs could be reduced if a BCA is designed in a particular way, for example, by using default emissions values only. However, in reducing costs there are often trade-offs with effectiveness or fairness.

Accurately estimating implementation costs requires detailed design, with key considerations outlined in Appendix 11. For a high-level estimate, we used the primary design parameters from the Concrete NZ model (see Section 6). We also analysed the impact of alternative approaches, such as applying the BCA to multiple sectors or using default emissions values only. Table 12 summarises the main parameters for the primary and alternative design assessments.

Table 12: Key parameters of primary design approach and its variations

Parameter	Primary design approach – levy based	Alternative design approach – certificate based
Point of obligation and form of payment	BCA participants are required to periodically pay a levy based on import volumes.	BCA participants are obliged to periodically surrender BCA certificates based on import volumes.
Frequency of price setting	BCA unit price set annually.	BCA unit price set weekly.
Firm reporting requirements	N/A	Annual BCA returns.

Figure 21 outlines the primary BCA design approach, showing how government and firms navigate a levy-based system where obligations arise after goods are imported.³⁴ Agencies then report and notify importers of their responsibilities.

Figure 22: Alternative BCA design approach steps presents an alternative approach. The key difference is that importers can buy BCA certificates anytime, with prices updated weekly. Both approaches share processes for setting default emissions values, verifying data, and annual reporting and surrender.

³⁴ An annual obligation and reporting period is assumed for both implementation pathways. A quarterly cycle was considered but deemed impractical, as it would require frequent emissions reporting and an annual rebate process. This would add complexity and cost due to the need for separate appropriations, difficulty estimating rebate amounts, and an additional assessment. Most ETs, including New Zealand's, follow an annual reconciliation cycle.



While the chosen design affects participant interaction, it has little impact on overall implementation cost or complexity. However, the alternative approach adds higher costs for firms and government due to extra reporting and weekly pricing.

Figure 21: Primary BCA design approach steps

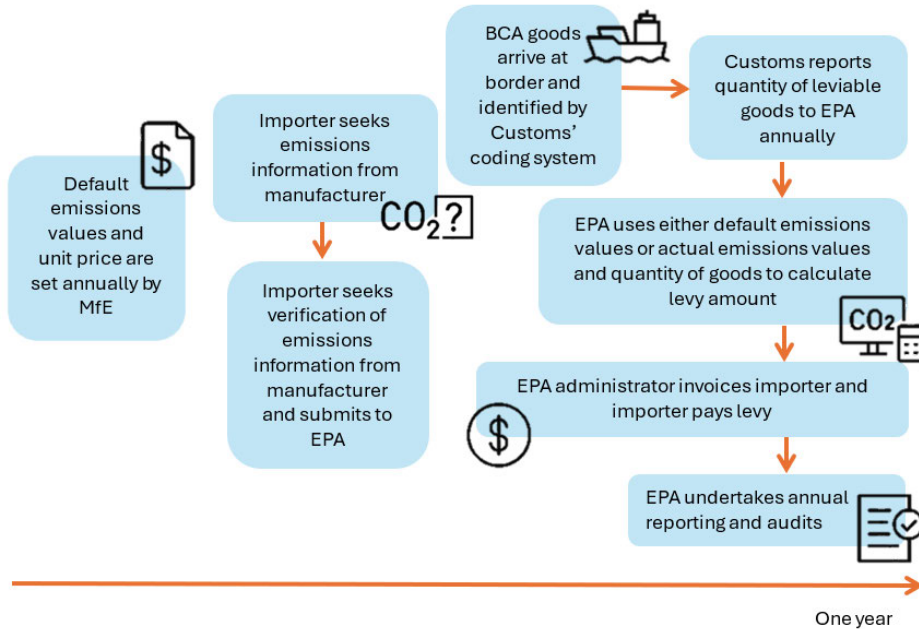
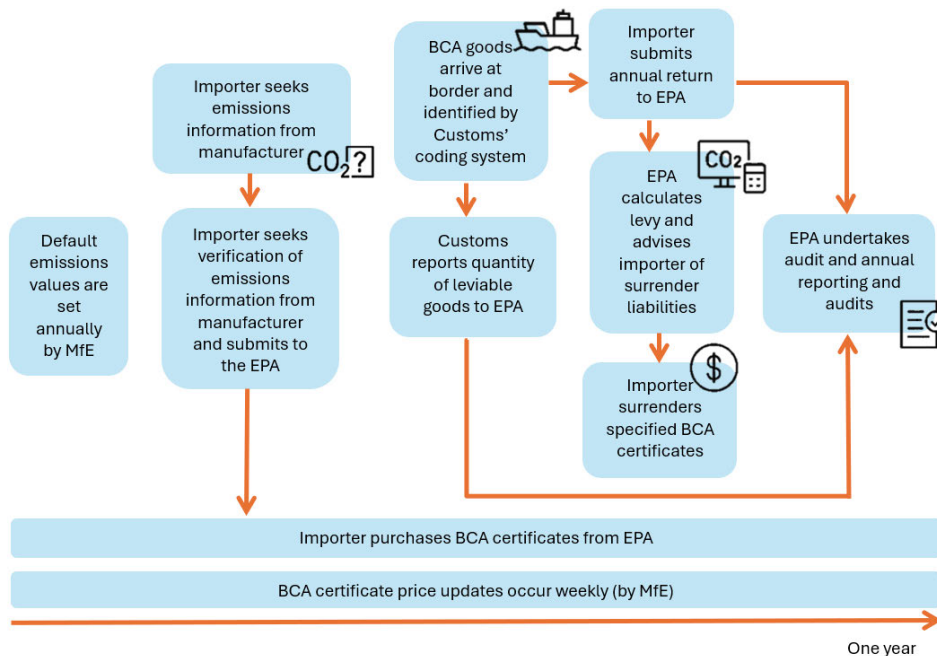


Figure 22: Alternative BCA design approach steps



A high-level assessment of the operational functions required to implement a BCA are provided in Appendix 12.

Without detailed design, the implementation costs remain uncertain...

Appendix 13 assesses the implementation impacts of BCA functions, drawing on international experience and comparable New Zealand government costs. Most steps incur low to moderate costs and administrative burden, but registration and verification are more resource intensive.

For the government, this is primarily due to the upfront and ongoing IT and resourcing costs of a BCA register and costs of accrediting data verifiers. Estimates from the EU and UK CBAM assessments suggest an upfront cost of \$118.8m and \$53m respectively (HM Treasury, HM Revenue and Customs, 2024, European Commission, 2021c). While the scale of an NZ BCA would be significantly smaller, the cost is expected to be significant in a New Zealand context if standalone IT infrastructure is required. Costs may be significantly mitigated if IT functions can be combined with another platform, 9(2)(f)(iv)

Further savings could come from not accrediting verifiers, instead enforcing standards—like climate-related disclosure schemes. However, this trade-off may affect compliance and data accuracy.

Appendix 14 outlines firms' information requirements. Collecting and verifying emissions data can be costly if requirements diverge from current practices. Importers recommend aligning BCA data with International Environmental Product Declarations and calibrating reporting cycles to reduce complexity and administrative burden.

Box 3: Implementation challenge – varying capacity of firms to absorb costs. Are exemptions or tailored support mechanisms necessary?

Compliance costs, though similar in amount, impact smaller firms more due to their limited resources. The government has previously increased the threshold for the mandatory climate-related disclosures, reducing the burden on smaller entities. Requiring data verification for small test batches, such as low emissions cement, could be unnecessarily onerous. Therefore, exemptions or special provisions for small and medium firms may be needed. Both the EU and UK CBAMs have introduced thresholds to exempt small import volumes or values.

Combining a BCA register with the ETS register would be efficient, but existing ETS register issues must be resolved in any new system

The NZ ETS register (the Register) delivers similar functions to those required for a BCA and manages comparable information. It would therefore be efficient to have a single register capable of supporting both schemes.

However, the Register is reaching the end of its life with out-of-date components. To mitigate the risks in the short term, there is a freeze on any major development within the Register to ensure it remains stable, minimises the risk of ageing technology, and avoids any unforeseen consequences of coding changes.

Consequently, the Register cannot be modified to accommodate BCA functions, and new infrastructure would be required. 9(2)(f)(iv)



9(2)(f)(iv)

Extending the BCA down the value chain or to additional sectors introduces complexity

As BCA coverage expands, the growing diversity of goods complicates tariff classification and carbon emission estimates. Tracking embedded emissions becomes harder, increasing misclassification and non-compliance risks (Ambec, 2022). Downstream expansion—especially in sectors like steel—adds complexity and likely requires greater international coordination due to global trade implications.

These challenges must be weighed against leakage or circumvention risks if only primary materials are covered. Sectoral differences matter. Cement has a simpler value chain and fewer tariff codes, while steel and aluminium involve many specialised goods. Under the EU CBAM, cementitious goods span six tariff codes: steel covers 15, with 13 exceptions (European Parliament, 2023). However, BCA implementation costs are relatively fixed due to required systems and processes, and adding sectors with simple value chains is unlikely to significantly change costs.

Box 4: Implementation challenge - should only default emissions values be used to minimise costs on firms and the government?

Appendix 15 outlines a process using default emissions values, which would eliminate the need for firms to collect and verify data, somewhat reducing administrative costs. However, automated levy collection at the border could not allow for exemptions below minimum volume thresholds or differentiated rates depending on the origin of the goods and the amount of embedded carbon. Complexities also remain for downstream products that are hard to identify.

Firms may resist default values if they overestimate emissions and increase costs. 9(2)(h) Customs systems also cannot account for carbon prices paid overseas, requiring a rebate process that adds cost and complexity.

How well BCAs work together impacts business costs...

Interoperability between BCAs —such as if Australia were to implement a similar mechanism—could significantly reduce compliance costs for firms. Aligning reporting and emission measurement standards, product classifications and potentially digital platforms enables importers to leverage existing data and processes. This could also enable firms to use emissions data already verified under another BCA, helping to reduce one of the most resource-intensive aspects of BCA compliance.

There are already multilateral and plurilateral efforts underway to harmonise emissions accounting methodologies across jurisdictions, including efforts within the Climate Club and between the EU and UK ETs. The Ministry for Primary Industries is also working to have on-

farm emissions methodologies recognised by other countries. Multilateral and plurilateral efforts are discussed further in Section 8. We have heard from industry that alignment across emissions reporting methods and obligations will be crucial to a BCA being workable.

Transitional arrangements are important for managing the impact of a BCA...

The EU is in its final stages of a transitional period for their CBAM, which includes introducing reporting obligations without financial liabilities. The UK does not have a transitional period.

It is likely that both firms and government would benefit from a transitional period. The EU's transitional period has enabled administrative capacity building across member states and importers. While the administrative burden is not necessarily reduced for firms, a transitional period enables them to adapt to the scheme without the consequences of error (given financial liabilities are not applied). A transitional scheme also allows for systems to be tested by the government prior to enforcing financial liabilities.

In summary, the costs of implementing a BCA are uncertain...

This section has analysed the cost implications and administrative requirements associated with implementing a BCA in New Zealand. The overall expenses of a BCA will vary depending on its design, IT infrastructure needs, and the degree to which government and industry procedures can be standardised or replicated.

Typically, high-cost schemes are not adopted for a small group of firms or within a single sector. Nonetheless, there may be advantages to introducing a cement sector BCA rather than a multisector approach, as the cement industry is relatively homogenous and comprises a limited number of importers. Significant savings could also be realised if the IT system is integrated with an existing platform, such as the Register.

Conversely, broader application across EITE sectors may prove more practical, particularly if it results in decreased carbon leakage, enhanced incentives for decarbonisation, lower industrial allocation costs, and increased Crown revenue from BCA participants. The implementation costs of a BCA are generally consistent across both single-sector and multi-sector models, aside from the staffing required for new operational processes and systems.

Industry stakeholders emphasise that leveraging existing reporting mechanisms and cycles, such as Environmental Product Disclosures, would substantially reduce expenses compared to imposing novel requirements. Design decisions—including the use of default emissions values and limitations in scope—can further reduce costs but may compromise other objectives. It is essential to optimise BCA design to mitigate carbon leakage, comply with WTO obligations, and minimise administrative and compliance burdens. Effective implementation requires carefully balancing these considerations.



8. Alternative options to address carbon leakage

Chapter summary

- There is value in continuing to pursue solutions to carbon leakage through plurilateral and multilateral approaches, such as the Climate Club.
- However, multilateral and plurilateral initiatives are not expected to provide short to medium term solutions to carbon leakage.
- While some alternative options could contribute to addressing carbon leakage, alongside a BCA, none are suitable on their own as a solution.

We undertook a high-level desktop analysis of alternative options to industrial allocation to address carbon leakage, covering the policies set out in Table 13: Alternative policy options to address carbon leakage. Our findings are based on insights from the literature review. The findings provide initial insights into the benefits, challenges, and limitations of other carbon leakage policy options, noting that detailed quantitative analysis of these options is beyond the scope of this study.

Table 13: Alternative policy options to address carbon leakage

Policy	Description
Excise taxes on consumption	Excise taxes apply charges to the domestic consumption of carbon-intensive goods at the point of sale or production. Both domestic producers and importers are subject to the tax, which can be flat (per tonne) or variable (based on carbon intensity). By applying the tax equally, the approach is trade-neutral and can help mitigate leakage by maintaining a level playing field.
Climate Clubs and multilateral agreements	Climate clubs involve coalitions of countries with aligned carbon pricing and leakage mitigation policies. They harmonise carbon prices, reduce trade tensions, and provide platforms for mutual recognition of carbon pricing instruments. Application of common rules and pricing means there are no impacts on competition.
Trade agreements with environmental provisions	Embedding climate commitments into trade agreements can include mutual recognition of carbon pricing, commitments to phase out free allocation, or cooperation on emissions data standards.
Decarbonisation support	Targeted public investment supports high-emitting firms to reduce emissions by easing the financial burden on domestic producers. This can enhance competitiveness and lower the risk of firms relocating to countries with weaker climate policies, thereby reducing carbon leakage.
Mandatory Product Standards	Mandatory product standards set minimum environmental performance requirements for goods sold domestically, including imports. These may limit embodied emissions or impose strict production criteria. Non-compliant goods cannot enter the market. By restricting market access, such standards encourage emissions reductions in domestic production and reduce the competitiveness of carbon-intensive imports, helping to mitigate leakage risks.

Other countries have found limitations in the effectiveness of these policies in addressing carbon leakage risk...

Australia, the EU and UK considered other options to address carbon leakage when assessing a BCA policy. All favour multilateral and plurilateral initiatives in the first instance, such as the Climate Club, and note the potential for these to address competitiveness and carbon leakage risk (as demonstrated through the common goal of an open trading system).

In practice, limitations exist. The Australian Carbon Leakage Review notes these initiatives are, “complex and may take time to develop and realise outcomes” (DCCEEW, 2023, pg. 31). Their later paper also concludes – “possible long term international solutions will not replace the near- and medium-term need for domestic policy action” (DCCEEW, 2024, pg. 82). Similarly, the UK’s Net Zero Review highlights the scale of the problem facing these initiatives – pointing out that more than three quarters of the world’s emissions remain outside any formal carbon pricing system (HM Treasury, 2021). Box 5 discusses the progress of plurilateral and multilateral initiatives.

Box 5: Mixed progress has been made across multiple plurilateral and multilateral initiatives

G7 Climate Club

New Zealand joined the Germany-led Climate Club at COP28 in 2023. Established in 2022, the Club now includes 46 countries committed to accelerating climate action and raising ambition (Climate Club, 2025a). Its three pillars focus on advancing transparent mitigation policies, transforming industry, and strengthening international cooperation (Climate Club, 2025a). Carbon leakage is a growing focus, with recent progress including a set of voluntary principles to address leakage and spillovers—though formal adoption by member states remains uncertain (Climate Club, 2025b).

Green Economy Partnership Agreement (GEPA)

New Zealand, Chile, and Singapore are exploring the GEPA as a plurilateral initiative to address carbon leakage. The agreement aims to foster cooperation in carbon markets, develop credible standards and methodologies, and share best practices. If successful, GEPA could offer an alternative to unilateral BCAs, though the timeline for tangible progress remains unclear.

IMF International Carbon Price Floor (ICPF)

In June 2021, the IMF proposed an international carbon price floor, differentiated by income levels and focused on major emitters and sectors (Parry et al, 2021). Despite its potential, momentum has stalled, with limited progress toward implementation or deeper international engagement since its launch.

Other countries have recognised mandatory product standards as a potential tool to align emissions requirements for domestic and imported goods. However, like BCAs, they face challenges such as high data demands and possible conflicts with international law. Australia’s second Carbon Leakage Review also noted limited support for mandatory product standards, citing the policy’s bluntness and risk of unintended consequences (DCCEEW, 2024).



Targeted public investment in decarbonisation is generally supported across countries considering BCAs, however, it is often noted that public investment is not sufficient on its own to address carbon leakage. Public investment on its own would need to have broad coverage and ongoing monitoring, which would likely be complex and expensive (DCCEEW, 2024).

An excise duty was considered in an early EU assessment of BCAs but found to offer only marginal improvement in carbon leakage reduction—3% for the cement sector compared to 4% under the status quo (European Union, 2021a).

We used a set of criteria to assess the options...

Table 14: Assessment criteria for alternative options to carbon leakage

Criteria	Description
Ability to mitigate leakage	Prevents emissions-intensive and trade exposed production from shifting offshore due to domestic climate policy, resulting in increased global emissions.
Support for domestic and international decarbonisation	Incentivises reduced emissions intensity within New Zealand's industrial sectors, and internationally, driven largely by investment in low-carbon technologies and processes.
Impact on domestic cement industry and wider economy	Impacts on predictability and certainty for investment and other direct economic and sectoral impacts on New Zealand's cement industry and broader economy.
Fiscal impacts	Impacts on Crown costs and savings, including implementation costs.
Administrative feasibility	The practicality of implementing and enforcing the option, including government capacity, compliance burden and scalability over time.

The broader political and strategic impacts (including legal and trade) have not been examined at this time and would require additional analysis from the Ministry of Foreign Affairs and Trade.

All of options have challenges and none are wholly appropriate on their own

A summary of our assessment is provided in Table 15 with more detail provided in Appendix 16. It demonstrates that all policies considered have drawbacks, with mixed results in how effectively they address carbon leakage risk. See Appendix 16 for a full assessment of the options against the criteria.

Most initiatives, except for climate clubs, do not directly target the problem of carbon leakage risk. While excise duties, decarbonisation support, mandatory product standards and international agreements are not directly designed to address leakage, these policies can have positive effects. However, there are practical limitations:

- Decarbonisation support: can help domestic producers lower their ETS costs, but the key difficulty is determining the extent to which Government intervention is needed to assist with decarbonisation goals. The policy is likely to be costly and the application uneven.

- Mandatory product standards: unless a mandatory product standard is continually tightened, it may become ineffective in mitigating the risk of carbon leakage overtime if, for example, domestic firms exposed to the ETS price continue to reduce the emissions intensity of their product below the standard.
- Excise duty: there is risk of double taxation due to firms facing costs via fuel and electricity (as opposed to directly through the NZ ETS). A rebate would likely be required to address this, 9(2)(h)
- Climate clubs and international agreements: may not be feasible in the short and medium term due to the time it takes to gain consensus across countries.

Some alternatives could be combined with a BCA...

While some policies, such as excise taxes, are not compatible with a BCA due to the issue of double taxation, others could be combined to increase net benefits. Multilateral and plurilateral approaches could be used to align BCA policies to minimise complexity for firms and limit fragmentation of policies globally.

A BCA may also be compatible with decarbonisation support. However, careful consideration is needed of whether financial support for BCA firms could result in unfair treatment between domestic producers and exporters. It is likely that decarbonisation support would be beneficial for sectors that are not suitable for a BCA.

In summary, no single policy is likely to be fully effective at addressing carbon leakage on its own. Some measures – such as multilateral and plurilateral approaches – have merit but can take a long time to reach agreement. Tackling this challenge—particularly across EITE sectors—will likely require a coordinated and targeted mix of tools. A layered approach that combines domestic measures with international engagement may offer the best chance of managing carbon leakage risk.

Table 15: Assessment of Carbon Leakage policies for the cement sector

	Ability to mitigate leakage	Support decarbonisation (domestically and globally)	Impact on domestic cement industry and wider economy	Fiscal impacts	Administrative feasibility
Industrial Allocation					
Excise Taxes on Consumption					
Climate Clubs and Multilateral Agreements					
Trade Agreements with Environmental Provisions					
Decarbonisation Support					
Mandatory Product Standards					



Low

High

9. Discussion of findings

Carbon pricing only accounts for around a quarter of global emissions. While it is gaining traction, divergent climate policies are creating significant risks of carbon leakage.

The cement sector is at risk of carbon leakage, being trade exposed and with production processes that are hard to abate. Modelling undertaken by Concrete NZ indicates that in the absence of a BCA, as IA is phased out, domestic cement production will shift offshore if it drops below a minimum threshold.

The study considered whether a cement BCA would be more effective than IA in reducing carbon leakage risk. It has focused on the environmental and economic impacts. 9(2)(g)(i) the impacts on trade have not been included in this report.

The findings indicate that a BCA would reduce carbon leakage risk, with reduced carbon leakage of around 15 MtCO₂e out to 2050 and reduced global emissions. Modelling also shows a BCA retains waste benefits from domestic cement operations and delivers additional revenue. However, a BCA results in significant IA costs if IA is not phased out in 2030, with a small negative impact on GDP, concrete prices and construction output.

The key driver of the results in the study is domestic cement manufacturing ceasing in 2030 and shifting offshore in the absence of a BCA. The competitiveness of the domestic cement industry hinges on its ability to invest in decarbonisation. With the phase out of IA, increasing carbon costs make domestic production commercially unviable, even with decarbonisation investment.

These results are based on data provided by the cement industry – in particular, maximum and minimum thresholds of domestic production. This data has been provided in good faith and has not been independently verified.

A peer review of the cement sector model found the model is suitable for answering the key policy question - whether a BCA would be a more effective policy instrument than current IA settings in reducing leakage risk. However, several limitations were identified. These warrant attention to improve the robustness of the modelling if further work on a BCA is undertaken.

The implementation of the UK and EU CBAMs will provide important learning opportunities, as will continued engagement in Australia on a potential BCA. The status of BCAs in trade law remains uncertain, with complaints before the World Trade Organisation yet to be resolved.

Implementation costs remain uncertain and will largely depend on how a BCA is designed. This includes opportunities to use existing data, processes and systems. As BCAs are implemented internationally this will likely encourage international coordination to establish a baseline of reliable data to account for embedded emissions in trade goods subject to a BCA, clarity on what counts as a carbon price, options for managing scope 2 and scope 3 emissions, and further analysis of how far down the value chain a BCA should apply.

Carbon pricing schemes are also gaining traction globally. New Zealand's largest exporter of cement, Japan, is implementing an emissions trading scheme from 2027. Other countries in the Asia-Pacific, including Vietnam and Thailand are also exploring carbon pricing. Whether these



carbon pricing schemes will mitigate carbon leakage risk is unclear. This will depend on the details of the schemes, such as the carbon price and use of industrial allocation or industry benchmarks. Extensive international engagement would be required to better understand the details of these schemes and how they would interact with a NZ BCA.

Multilateral initiatives offer the most durable solution to carbon leakage over the longer term by creating consistent rules and reducing competitiveness concerns across jurisdictions. They can also lower administrative complexity compared to unilateral measures. However, these approaches require extensive negotiation and alignment among countries, meaning progress will be gradual and benefits will materialise over the longer term.

If the government were to undertake further work on a BCA, there are also some critical questions that would need to be answered:

- How can a BCA be designed in a least trade restrictive way and continue to reinforce the rules-based trading system?
- How would a BCA be implemented and what are the costs of doing so?
- Is a BCA feasible for other EITE sectors (see Appendix 17 for an initial high-level assessment)?
- What are the details of proposed carbon pricing schemes in key trading jurisdictions and how would they interact with a BCA? For example, will Japan's proposed ETS remove the need for a BCA in the future?

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Appendix 1: Border Carbon Adjustment Feasibility Study

Terms of Reference

Purpose

To provide an initial assessment of whether a Border Carbon Adjustment (BCA) could be a more effective policy instrument than industrial allocation (or other alternatives) for the cement sector.

The study will focus on the cement sector but will draw out learnings and insights relevant for other sectors. It will also enable the Government to keep pace with international developments on carbon border adjustment mechanisms.

Focus

The study will have a focus on the impact of a BCA for the cement sector on:

1. Leakage: extent to which the policy reduces leakage risks and creates a more level playing field.
2. Decarbonisation: extent to which the policy promotes efficient investment decisions in decarbonisation and supports the 2050 NZ Net Zero Carbon Concrete Industry Roadmap.
3. Industry and economy: economic costs, including supply-chain and industry cost and competitiveness impacts. This includes looking at the impact on concrete's competitiveness in the NZ building materials market.
4. Fiscal impacts: impacts on Crown revenue.
5. Trade: 9(2)(g)(i) [REDACTED]
6. Administration: minimise administrative burden and compliance costs for both industry and government.

Context

BCAs are gaining traction globally as a tool to address carbon leakage. The EU and UK are implementing a Carbon Border Adjustment Mechanism (CBAM) (in 2026 and 2027 respectively), and Australia and Canada are exploring one.

The Concrete NZ Cement Sector Group (on behalf of all suppliers in New Zealand i.e. Golden Bay, Holcim, HR Cement and NZIC) has written to the Minister of Climate Change in March 2025 expressing in-principle support for policy work on a cement industry BCA or similar measure as a replacement for industrial allocation. The Group has offered to work with officials to progress a feasibility study.

The Climate Change Commission has also indicated support for exploring alternatives to industrial allocation, including a BCA. This is in response to known long-term challenges with industrial allocation, including it exceeding the ETS cap and remaining above zero post-2050.

Ministers have agreed to undertake an initial exploratory study of the feasibility of a BCA for the cement sector. This study will not get into details of policy design or recommendations, and no decisions will be taken in terms of implementing a BCA.

Scope

This is an initial exploratory study to consider whether a BCA for imports of cement is likely to be economically, legally, and administratively feasible (exports are excluded).

The study will consider the viability of alternative or complementary policy instruments to address carbon leakage risk for the cement sector. This could include, but not be limited to, strengthening the existing industrial allocation framework within the ETS or providing other forms of targeted support for an industry at high risk of carbon leakage.

Within scope is the following:

- Critical design choices for assessing the impact of a BCA on cement e.g. scope of coverage, carbon pricing benchmark, emissions measurement, comparison with other options including the status quo of no change.
- Wider economic, trade, political and strategic considerations of a BCA on cement.
- Whether it would be feasible to implement a single-industry BCA or whether that creates specific trade implications.
- Overview of how a BCA could be practically applied, including possible changes to industrial allocation, timing and transitional options.
- Likely required legislative provisions for a BCA.

Approach

International scan and literature review

A literature review will be undertaken to gain initial insights into the key matters that should be considered in the feasibility study and how other countries have considered these matters.

Analysis

We will analyse the impacts of a cement industry BCA compared with other alternatives (particularly changes to industrial allocation) and consider the following impacts:



Sector-specific impacts

Government officials will work collaboratively with the cement industry to estimate the impacts on production costs, availability of cement (including low-emissions cement) and other goods and supply-chain impacts (including the impact on concrete prices and its competitiveness against other materials). The study will also assess the carbon leakage risk for transportable finished goods like precast concrete goods. This will include possible market and policy reactions, and a high-level assessment of regulatory readiness. This will be considered in the context of the Net Zero Carbon Concrete Industry Roadmap to 2050.

Economic analysis

Government officials, in collaboration with the cement industry, will lead the analysis of economic impacts including changes in consumer prices, employment effects, market competition dynamics and the fiscal impacts on the Crown.

Alignment with climate change goals and targets

This will be led by the Ministry for the Environment, with the cement industry playing an advisory role. This will include considering alignment with New Zealand's emissions profile and consistency with domestic and international climate targets, and opportunities for low-emissions transitions across the wider economy, including innovation and investment pathways.

Trade implications

The Ministry of Foreign Affairs and Trade (MFAT) will lead the assessment of trade-related impacts, in close coordination with relevant agencies and with the cement industry playing an advisory role. 9(2)(g)(i)

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Implementation options and implications

We will consider how a BCA could be practically applied. This will consider, at a high level, design options, transitional support, and other administrative considerations. This will include analysis of the potential scale of administrative burden, compliance costs and operational adjustments for both government and private firms.

The study will also explore, at a high level, opportunities to align a BCA with international best practice, particularly the mechanisms being implemented or considered in Australia, the UK and the EU to minimise trade friction and compliance complexity.

Other sectors

A high-level desktop analysis, along with targeted engagement, will be undertaken to consider the impact on sectors, other than the cement industry (e.g. steel and lime).

Peer review

The analysis (particularly the industry-level analysis) will be independently peer reviewed.

Governance

The study will be overseen by the Cross Sector Officials Group (CSOG), chaired by the Climate Change Chief Executives Board Unit. The Inland Revenue Department and Customs will be invited to attend this group when the BCA feasibility study is on the agenda.

An agency working group will meet from time to time to agree key inputs into the study and discuss results, working closely with the cement industry. The working group will be broken into smaller groups as required for the analysis.

The cement industry, fully represented by the Concrete NZ Cement Sector Group, will convene a designated Cement Working Group to work collaboratively with government officials and oversee the industry specific analysis.

A protocol will be developed for how government agencies and the cement industry will work together, including respective roles and responsibilities. The industry will not be privy to the final advice provided to Government Ministers or Cabinet but will provide review the feasibility study report. Any material differing views may be noted in the feasibility study or Ministerial advice.

Engagement

The Minister of Climate Change has directed that no formal announcement will be made about the feasibility study. However, the cement industry can engage on a confidential basis with its members and downstream suppliers about the study, emphasising its exploratory nature and that no policy recommendations will be made at this time. The Ministry for the Environment will also undertake targeted engagement to inform the likely impacts on other sectors.

The Ministry of Foreign Affairs and Trade will lead all engagement with international counterparts on 9(2)(g)(i)

Ministers will likely engage at the 2+2 Climate and Finance Dialogue and the Climate Club.

Communications material, including Q&A, will be prepared in response to any media enquiries and this may include providing an update on the Ministry for the Environment's website.



Deliverables

A briefing to Ministers (most notably, the Minister of Climate Change and Minister for Trade and Investment) with the findings of the feasibility study. The feasibility study will be included as an appendix. A Cabinet paper may follow, subject to Ministerial decisions.

Timeline

June 2025: formalising governance structures, developing the analytical framework, data collection and completing the literature review.

July/August 2025: qualitative and quantitative analysis.

September 2025: drafting of feasibility study.

October 2025: finalise study with agencies and the cement sector.

November 2025: Ministerial consideration of feasibility study

Appendix 2: Carbon Pricing Trends across jurisdictions

Table 16: Carbon pricing trends across jurisdictions

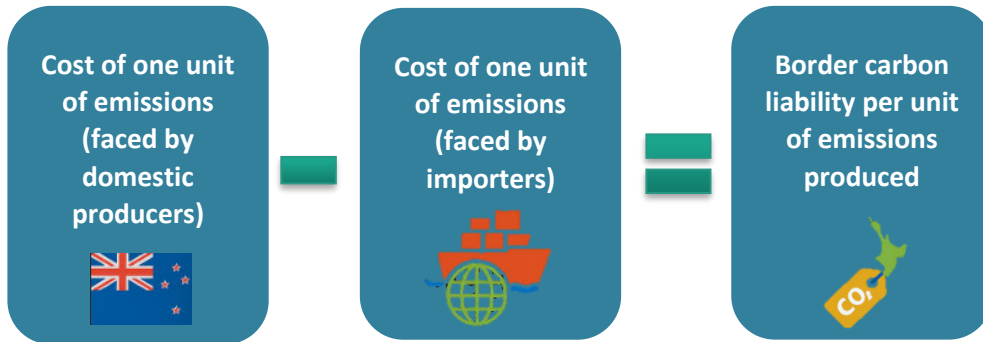
Country (And top imports from each country)	Current ETS system in place	Current ETS price (if applicable)	Planned carbon pricing developments	Anticipated future price movements
Japan (cement, urea, iron and steel)	GX-ETS launched in 2023 (voluntary); mandatory from 2026. Covers major sectors including cement and steel – around 60% of all emissions.	¥5,400 (NZD \$62)	Mandatory participation for around 400 large emitters with emissions greater than 100,000 tonnes of CO ₂ with free allocations based on benchmarking approach. ³⁵ Adjusted annually with a reduction factor to encourage decarbonisation. From 2033, high emitting entities in electricity generation will need to purchase allowances via government-run auctions. Power producers will likely pass on the cost of carbon allowances to industrial consumers.	Could be up to ¥10,000 (NZD \$115.33) by 2026 and ¥30,000 (NZD \$354) by 2040. These prices are assessed as required to align with national targets; however, it is unclear that such high prices would eventuate, particularly in the early years.
China (urea, iron and steel, cement)	National ETS since 2021; expanded in 2024 to cement, steel, aluminium.	CNY 100 (NZD \$23.68)	Retrospective compliance from Jan 2024 for new sectors; system remains baseline-and-credit without a hard cap	Prices remain low; limited incentives
Malaysia (cement, urea, burnt lime)	Voluntary carbon exchange since 2022; no formal ETS or tax yet.	No fixed price	Draft ETS legislation expected in 2025; carbon tax under consideration; current focus on offsets	Prices likely to remain low
Thailand (cement, iron and steel, urea)	No ETS yet; draft Climate Change Act includes ETS and carbon tax.	Not applicable	Legislative process expected to begin in 2025; allocation updates planned; fossil fuel subsidies may hinder effectiveness	Modest increases post-2030

³⁵For sectors where benchmarking is feasible (e.g., power), **performance-based benchmarks** will be used. For sectors like **cement**, where benchmarking is more complex, Japan will use a **grandfathering method: Allocation = Average emissions over the past 3 years × reduction factor**. The **reduction factor** will be sector-specific and aims to align with Japan's NDC targets.

Country (And top imports from each country)	Current ETS system in place	Current ETS price (if applicable)	Planned carbon pricing developments	Anticipated future price movements
Vietnam	Pilot ETS launched in 2025 for cement, steel, electricity.	No firm price yet	Full ETS operational by 2029; auctioning and expanded sectoral coverage planned	Gradual increases expected
Indonesia (urea, iron and steel, cement)	ETS launched in 2023 for power sector; expanding in 2025.	IDR 12,000 (NZD \$1.25)	The transitioning to hybrid cap-tax-trade model; international trading via IDXCcarbon began in 2025	Prices are currently extremely low would require significant change to see competitive pricing
Australia (urea, cement, iron and steel)	Safeguard Mechanism functions as baseline-and-credit ETS.	A\$70 (≈NZD \$75)	Considering BCA; mandatory baselines for large emitters in industry and transport	Comparable to NZ/EU

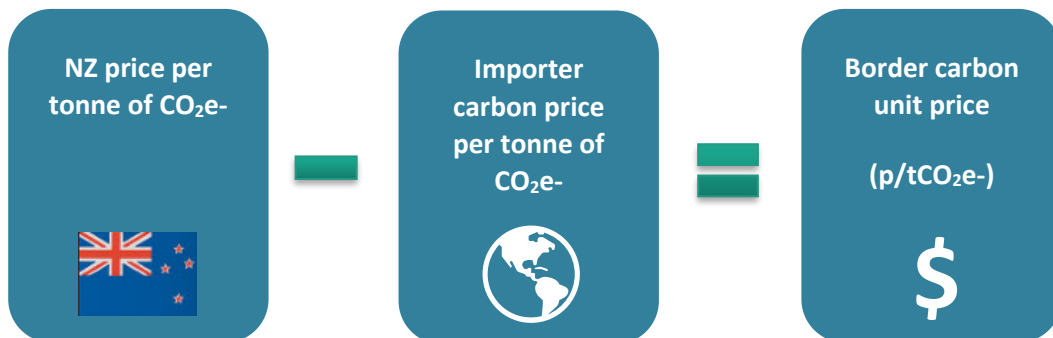
Appendix 3: BCA calculation methodology

A BCA aims to calculate the difference between the cost of a unit of emissions from a domestically produced product and an imported product. If that cost is lower for an importer compared with a domestic producer, the importer is obliged to pay the difference.

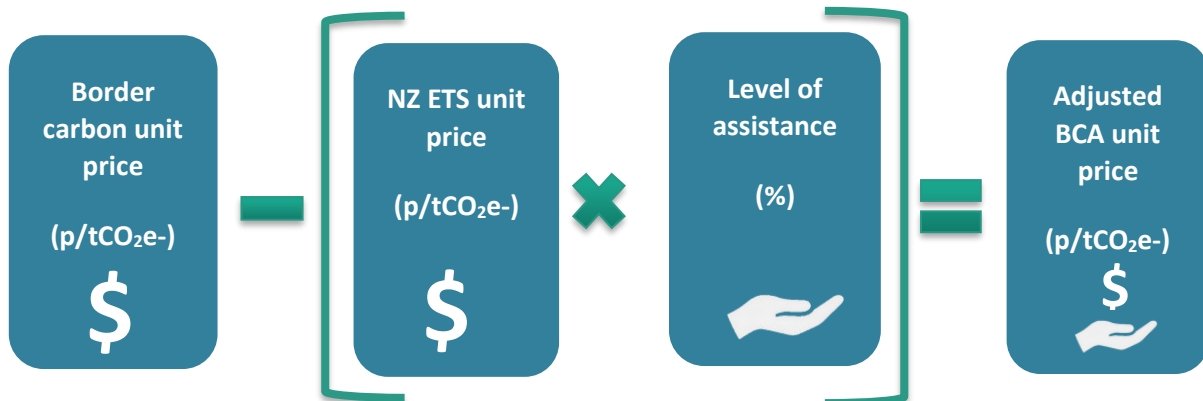


A BCA must account for variables that impact emissions costs for a domestically produced or imported product. This includes the NZ ETS price and any equivalent price overseas, the emissions intensity of a product, production volumes and any adjustments for industrial allocation, or equivalent policies overseas. The following calculations are required:

Step one: calculate the difference between NZ ETS price and importer price (if any)

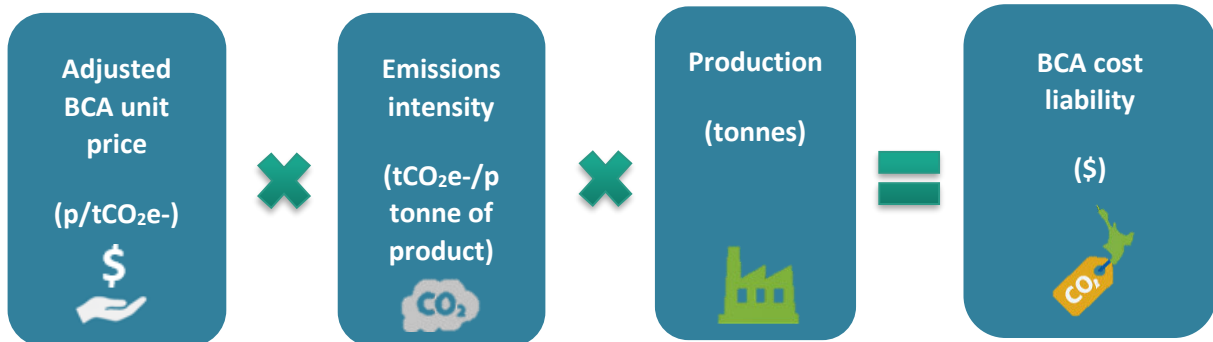


Step two: adjust for New Zealand industrial allocation according to the legislated level of assistance (given this reduces the costs of the ETS for domestic producers)





Step three: calculate the BCA importer liability



Appendix 4: International approaches to border carbon adjustments

Table 17: International approaches to BCAs

Country	Sectors covered	Type of emissions (scope 1, 2, 3)	Mechanism type	Exporters excluded (Y/N)	Industrial allocation or equivalent policy	Year of implementation	Method of calculating liability	BCA unit price	Exemptions
Australia ³⁶	TBD. Carbon Leakage Review notes cement, clinker and lime sectors as suitable for early consideration	TBD (Initial recommendations to focus on only scope 1 to mirror their existing emissions policy ‘Safeguard Mechanism’ ³⁷)	TBD (levy or certificate unclear)	Yes - Carbon Leakage Review notes including exports is ‘unlikely appropriate for Australia’	Unclear – 2023 reforms introduced an annual reduction of the Safeguard Mechanism baselines	TBD	TBD – likely to mirror domestic policy settings. Would focus on liability above the Safeguard Mechanism and deduct for carbon costs already incurred in producing jurisdiction	Based on Australia ETS price (after accounting for free allocations)	TBD
United Kingdom	Iron and Steel, Cement, Aluminium Fertilisers Hydrogen. Glass and ceramics may be included in the future.	Scope 1 and 2; limited Scope 3 coverage (select precursors) ³⁸	Levy (tax-based)	Yes	Consultation on free allocation changes underway	January 2027 (no transitional phase)	Actual emissions values based on emissions embodied within imported CBAM goods; verified by accredited third party organisation OR Default emissions values based on global average emissions weighted by production volumes Only direct carbon foreign pricing policies (e.g. taxes or ETSs) will be recognised for deductions	Based on the average UK ETS auction price over the previous quarter Adjustment to account for free allowances	Import volumes under \$50,000 annually Countries that have linked ETSs with the UK
European Union	Iron and steel, Cement, Aluminium, Fertilisers, Electricity Hydrogen (covers more than 500 emissions-intensive goods)	Scope 1, scope 2 for cement and fertiliser; limited Scope 3 coverage (select precursors)	CBAM certificates (market-based)	Yes	Free allowances under the EU ETS will be phased out for most firms between 2025 and 2034, and the ETS cap will be lowered	October 2023 (transitional phase without financial liabilities) January 2026 (including financial liabilities)	Actual emissions values based on emissions embodied within imported CBAM goods; verified by accredited third party organisation OR Default emissions set at the average emission intensity for the country or region Only direct carbon foreign pricing policies (e.g. taxes or ETSs) will be recognised for deductions	Average auction price of the EU ETS allowances in EUR/tonne of CO2 for the previous week Adjustment to account for free allocation until 2034	Import volumes under 50 tonnes annually Countries that have linked ETSs with the EU

³⁶ 6(b)(i) The information included in this table represents the design features modelled as opposed to decisions about preferred design.

³⁷ Australia’s Safeguard Mechanism sets industry level emissions baselines which provide a limit firms can emit to before they are required to purchase ETS credits.

³⁸ Scope 1 emissions: Direct greenhouse gas emissions from sources owned or controlled by an entity (e.g. fuel combustion on-site); Scope 2 emissions: Indirect emissions from the generation of purchased electricity, steam, heating, or cooling consumed by the reporting entity, and; Scope 3 emissions: All other indirect emissions that occur in a company’s value chain, including upstream and downstream activities (e.g. transportation, product use, waste). Precursor goods: upstream materials used in the production of CBAM materials (e.g. coke in steelmaking).

KEY	
Large negative impact	Large positive impact
Medium negative impact	Medium positive impact
Small negative impact	Small positive impact
Little to no impact	

Appendix 5: Summary of results

Table 18: Summary of results

	Measure	Scenario 1 – BCA, current IA phase out rates	Scenario 2 – BCA, IA stops in 2030	Scenario 3 – BCA, IA phases out by 2040
Environmental impacts	Carbon leakage	-15.1Mt CO ₂ e- (by 2050)	-14.1Mt CO ₂ e- (by 2050)	-14.1Mt CO ₂ e- (by 2050)
	Decarbonisation incentives	May enable domestic cement production to become coal free by ~2035		
	Domestic emissions	+10.7Mt CO ₂ e- (by 2050)	+9.7Mt CO ₂ e- (by 2050)	+9.7Mt CO ₂ e- (by 2050)
	Global emissions	-4.3Mt CO ₂ e- (by 2050)	-4.4Mt CO ₂ e- (by 2050)	-4.4Mt CO ₂ e- (by 2050)
Economic impacts	GDP	-0.005% p/a	-0.028% p/a	-0.014%
	Cost of cement (tonne)	+1.8% p/a	+5.2% p/a	+3.3% p/a
	Cost of concrete (M ³) ³⁹	Peak of +3% p/a	Peak of +8.6% p/a	Peak of 5.9% p/a
	Construction costs – residential build ⁴⁰	+0.006%	+0.016%	+0.010%
	Construction costs – infrastructure	Up to +0.05% of total infrastructure spend	Up to +0.13% of total infrastructure spend	Up to +0.08% of total infrastructure spend
	Construction output	-0.11% p/a	-0.31% p/a	-0.20% p/a
	Cement demand	-0.26% p/a	-0.75% p/a	-0.49% p/a
	Steel demand ⁴¹	-0.05% p/a	-0.19% p/a	-0.12% p/a
	Wood product demand	+0.10% p/a	+0.24% p/a	+0.17% p/a
Fiscal impacts	Fiscal impacts (2024-50) ⁴²	+\$24.9m in BCA revenue -\$653.3m in IA expenses	+\$225.2m in BCA revenue -192.4m in IA expenses	+\$87.4m in BCA revenue -\$362.7m in IA expenses

⁴⁰ Based on an average 141 sqm house

⁴¹ Due to decreased construction output, offset by product substitution of cement to steel

⁴² Compared to baseline where domestic cement manufacturing shifts offshore in 2030.

Appendix 6: Cement sector analysis key assumptions and limitations

1. **Product Scope (Cement):** The analysis focuses on General Purpose (GP) cement (CN code 25232900). Historically, New Zealand used only small volumes of alternative binders (non-GP cement) — just 1.5% of all binders until 2020 — but replacement levels are steadily increasing to reduce concrete's climate impact and diversify binder sources (~6.6% in 2025). GP cement cannot be fully replaced with alternative binders in most applications, but levels of ~30% replacement on average are common in developed countries. Future binder composition is modelled using assumptions from the *Concrete NZ Net-Zero Carbon Concrete Industry Roadmap to 2050* (2023). This results in a projected shrinking demand for GP cement, even as total concrete demand is projected to grow. All total quantities of concrete and cement are considered exogenous.
2. **Product Scope (Clinker):** Cement clinker (CN code 25231000) — although analysed in the Australian Carbon Leakage Review — is **excluded** as a separate traded commodity in this Feasibility Study. Although a small percentage of NZ cement is produced from imported clinker (<10%), all reported clinker volumes have been converted to a GP cement equivalent using supplier-specific clinker factors for this analysis. This approach was taken because all imported clinker originates from a single source, and isolating competition between domestically produced clinker (sold as cement) and that single import source was deemed unlikely to produce meaningful results.
3. **Future BCA Scope:** A future, effective BCA must include all cementitious products within the HS 2523 scope to prevent circumvention, even if current import volumes are negligible. Also, the design BCA should consider the potential for carbon leakage via imported downstream products (e.g., precast concrete, masonry) which use cement as an input (HS 6810). In other jurisdictions, this is considered a material risk of policy circumvention.
4. **Emissions Scope:** The scope mirrors the NZ ETS, covering **direct emissions** (fuels, process) and **indirect emissions** from electricity. Carbon costs for electricity and liquid fuels are currently embedded in their procurement price. Indirect emissions are calculated using the national Electricity Allocation Factor (EAF), not the specific emissions intensity of the local grid (see Appendix 8.2: Allocative Baselines).
5. **Transport Emissions:** Emissions from **transport and shipping** (Scope 3) of cement and clinker are **excluded** from this analysis.
6. **Data Verification:** The model assumes the availability of reliable, third party-verified emissions data from overseas producers. In practice, a lack of standardised, audited data from non-NZ jurisdictions presents a significant implementation challenge and a high risk of 'carbon fraud' or inaccurate assessments.



7. **Alternative Fuels:** It is assumed that overseas jurisdictions apply similar carbon accounting rules for waste-derived fuels (WDF) as New Zealand, specifically regarding the zero-rating of biogenic CO₂.
8. **Ambition Correlation:** The model assumes a correlation between a jurisdiction's carbon price and its industry's emissions intensity. Scenarios primarily couple high carbon prices with low-emission manufacturing and low carbon prices with high-emission manufacturing, except for specific sensitivity analyses.
9. **Monetary Basis:** All monetary values are converted to 2025 New Zealand dollars (NZ\$) using official RBNZ inflation and exchange rate data.
10. **Stable Pre-2030 Market:** We assume market shares remain stable until 2030 to account for implementation lags and existing commercial arrangements. Elasticity-driven changes are only applied from 2030 onwards.
11. **Exclusion of Exports:** While exports currently represent a small but non-negligible share for some cement companies, this model assumes that all domestic production is consumed locally. It does not assess potential competitive disadvantages for exported cement arising from increasing carbon prices.
12. **Carbon capture:** The implementation of carbon capture is based on several publications. Energy requirements are assumed to decline gradually from 3.5 GJ/tCO₂ in 2024 to 2.0 GJ/tCO₂ in 2050, in addition to electricity requirements decreasing from 120 kWh/tCO₂ in 2024 to 80 kWh/tCO₂ in 2050. Levelised costs per tonne of CO₂ avoided are drawn from a European study considering a heat pump for energy generation. Capturing efficiency is set to 85% with 50% of the required energy recovered from kiln waste energy. This study only considers sequestration based on European examples as a likely use for CO₂; however, CO₂ utilisation may play a significant role in New Zealand. Additionally, all assumptions are based on an isolated view of the cement facility, without accounting for potential partnerships or shared infrastructure. It is strongly recommended that separate studies be undertaken to assess the eventual feasibility of carbon capture in the New Zealand cement sector.

Appendix 7: Trade elasticity

Appendix 7.1: Assessing domestic cement trade elasticity

This appendix details the iterative statistical analysis undertaken to determine the trade elasticity of cement imports relative to domestic cement prices. The methodology evolved significantly to address data limitations and potential statistical biases, specifically endogeneity.

The analysis of domestic trade elasticity focused on the post-2016 market structure, following the closure of Holcim's West Coast plant. This simplifies the modelling. A more complex study could incorporate the pre-2016 period, as the closure decision itself was a response to the changing relative price of imports versus domestic reinvestment, providing important data on import demand elasticity. However, analysing this longer, transitional timeframe would require significantly different methods.

The analysis progressed through four main phases:

1. Initial time series modelling.
2. More advanced Two-Stage Least Squares (2SLS) panel data modelling to correct for endogeneity.
3. A pivot to a literature review to identify a robust, external proxy value.
4. Triangulation and justification for the final adopted elasticity.

1. Initial Time Series Analysis (ARDL)

The first approach used an Autoregressive Distributed Lag (ARDL) model to analyse the relationship between absolute national data on a quarterly basis from 2017 to 2024. The ARDL model was initially selected in line with the methodology described in Annex of the Australian Carbon Leakage Review Consultation Paper 2.

This model found a statistically significant correlation between the domestic price (LN_GBC_Price) and import volumes (Coefficient -2.7068, $p=0.0009$), and a strong, expected correlation with construction activity (LN_Construction_GVA). A second ARDL model attempting to include an Effective_Carbon_Cost variable proved complex and statistically inconclusive.

However, an external review of this approach identified a critical potential flaw: **endogeneity**. The model assumed that domestic prices independently influence import volumes. It is equally, if not more, plausible that domestic producers set their prices *in response* to import prices. This "simultaneity" makes the resulting -2.7 coefficient unreliable for policy modelling.



2. Two-Stage Least Squares (2SLS) Analysis

To correct for this endogeneity, the analysis shifted to a Two-Stage Least Squares (2SLS) panel data model, as recommended by external peer review. This model used the quarterly LN_Import_Price as an "instrumental variable" to predict the LN_GBC_Price.

2SLS Attempt 1: plm Package

The first 2SLS model (plm package) produced a statistically significant coefficient for LN_GBC_Price of **-7.91** ($p=0.04$). However, the model **failed its overall validity test** (Chi-squared p -value = 0.21). This indicated the instrument was weak in this specification, and the resulting -7.91 coefficient was statistically unstable and unusable.

2SLS Attempt 2: fixest Package

A second, more robust 2SLS model (fixest package) was run using a more precise demand variable (LN_RMC_Actual) and firm-level fixed effects. This model was statistically valid and yielded three definitive findings:

1. **Instrument Strength:** The first-stage F-statistic was **106.12** ($p<0.001$). This confirms that LN_Import_Price is a **very strong and valid instrument** for the domestic price.
2. **Endogeneity Test:** The Wu-Hausman test returned a p -value of **0.283**. This high p -value means we **cannot reject the null hypothesis** that the domestic price is exogenous. This finding suggests the endogeneity we were attempting to correct was not statistically significant in this dataset.
3. **Final Coefficient:** In this correctly specified 2SLS model, the coefficient for the (instrumented) domestic price was **-0.1918** and was **not statistically significant** ($p=0.725$).

Conclusion: The rigorous statistical analysis demonstrated that no reliable, statistically significant trade elasticity could be derived from the available 2017–2024 New Zealand dataset.

3. Pivot to Literature Review

The failure to derive a statistically significant domestic elasticity necessitated a pivot to a literature review to identify a robust, defensible proxy.

1. **Qualitative Context:** UK-based reports confirmed that cement markets are oligopolies highly exposed to import competition, implying a significant elasticity must exist, even if not quantified.
2. **Market Demand vs. Substitution:** Some studies provided *price elasticity of market demand* (how the total market size changes with price), with estimates ranging from -0.27 to -1.38. This is a different metric from the required *elasticity of substitution* (how market share shifts between suppliers).

3. **Armington (Substitution) Elasticity:** This is the correct metric for the study.

- **Ahmad & Riker (2019, 2020)** provided a direct estimate of **2.38** for the US market.
- **GTAP11ce data base** (Global Trade Analysis Project) used for the EU Joint Research Centre GEM-E3 CBAM analysis reported values of **2.9** (cement substitution elasticity between domestic and imports) and **5.8** (cement substitution elasticity between countries). Of note is the significant difference to the commonly used classification as “non-metallic minerals”, reporting values of 0.9 and 1.8 respectively, but grouping cement with less elastic materials like lime.
- **Fontagné et al. (2019, 2022)**, endorsed by the OECD, provided a theoretical, long-run global average elasticity of **-16.2** for Portland cement.

4. **Triangulation and Final Adopted Value**

Following external advice, the Fontagné value (-16.2) was "triangulated" by scaling it by import market share.

1. **New Zealand:** $-16.2 * \sim 0.40$ (import share) = **-6.48**. This was dismissed as unrealistically high and likely a statistical artifact of New Zealand's unique market structure (i.e., the 2016 Holcim plant closure and the production ceiling of the remaining domestic plant).
2. **Australia:** $-16.2 * \sim 0.10-0.15$ (import share) = **-1.6 to -2.0**. This value was considered plausible and in the "ballpark" of the empirically derived value in the Australian Carbon Leakage Review.

Final Adopted Value: The study adopted the estimate from the **Australian Carbon Leakage Review (2024)** of **-2.46**.

Justification: This value was deemed the most defensible proxy. It is a direct, long-term measurement from a market with similar logistical and economic characteristics to New Zealand. It aligns well with the USITC estimate (2.38) and is supported by the triangulation of the Fontagné (OECD) data. External review found this approach "reasonable" and the Australian result "empirically relevant" and "usable".

Appendix 7.2: Trade elasticity key assumptions and limitations

The cement and concrete supply chain is complex. The following key assumptions and limitations apply to the chosen trade elasticity metric.

1. **Elasticity Data Source:** The trade elasticity value used in the sector analysis is informed by analysis of the Australian cement market using an ARDL model. We acknowledge this source modelling is generic and does not follow standard trade protocols, as it largely omits factors like foreign production costs, trade barriers, and other non-price



attributes. Despite these limitations, the empirical correlations identified in that analysis are considered relevant and usable for this study's purposes.

2. **Exclusivity of Use:** The elasticity metric adopted is exclusively for the purpose of this Border Carbon Adjustment Feasibility Study. Future investigations must re-evaluate available data to determine if more accurate alternatives have emerged, or if the potential for more precise outcomes warrants additional investment in detailed econometric modelling.
3. **Elasticity Aggregation:** The model uses a single, aggregated trade elasticity value for 'imports'. This simplifies the real-world market, where elasticity would differ significantly between various import sources (e.g., Southeast Asia vs. Japan) based on their domestic market conditions, shipping costs, and existing trade relationships.
4. **Domestic Production:**
 - The model recognises that the current domestic/import market split is influenced by the production constraints (ceiling and floor) of New Zealand's sole domestic clinker plant. The model caps the market share of domestic production at a fixed annual clinker output ceiling. If market conditions cause domestic production to fall below a minimum viable floor, its remaining market share is instantly reallocated to the single import source with the lowest projected long-term carbon cost (2035 to 2050). This logic simulates a market participant's decision to secure the most cost-effective long-term supply.
 - The analysis assumes **no new cement manufacturing facilities** will be commissioned in New Zealand.
 - This study considers clinker and cement production only at the single integrated manufacturing site in New Zealand. It is acknowledged that the same facility could also be used intermittently to produce a share of other pozzolanic or cementitious materials, such as calcined clay.
5. **Market Structure:** Vertical integration is prevalent in the NZ market, which can distort price-based market-share decisions. Therefore, the model **analyses 'sources' (i.e., domestic vs. import profile 1 vs. import profile 2 vs. import profile 3) rather than individual firms**. An 80% market share for a 'source' does not imply an 80% share for a single company.
6. **Geographic Limitation:** Standard trade elasticities are difficult to apply to New Zealand's unique geography. The long, narrow layout creates regional sub-markets, meaning local demand shifts can disproportionately affect specific suppliers. This national-level model cannot fully capture these regional dynamics.
7. **Non-Price Factors:** The model is based primarily on price and carbon cost. It does not quantify non-price factors that influence procurement, such as supplier reliability, customer service, or specific product performance and consistency.

Appendix 8: Sector analysis data tables

Appendix 8.1: NZ ETS cost of carbon

Table 19: Domestic Carbon Price NZ\$/t CO₂e (2023-dollar terms)

Year	Central assumption (1)	Low Scenario (2)	High Scenario (3)
2024	\$65.46	\$ 65.46	\$ 65.46
2025	\$ 67.95	\$ 63.34	\$ 67.75
2026	\$ 70.52	\$ 63.34	\$ 69.78
2027	\$ 73.20	\$ 63.34	\$ 71.87
2028	\$ 75.98	\$ 63.34	\$ 74.03
2029	\$ 78.87	\$ 63.34	\$ 76.24
2030	\$ 81.87	\$ 63.34	\$ 78.54
2031	\$ 80.32	\$ 63.34	\$ 80.89
2032	\$ 78.79	\$ 63.34	\$ 83.32
2033	\$ 77.29	\$ 63.34	\$ 85.82
2034	\$ 75.82	\$ 63.34	\$ 88.40
2035	\$ 74.39	\$ 63.34	\$ 91.05
2036	\$ 72.97	\$ 63.34	\$ 93.78
2037	\$ 71.58	\$ 63.34	\$ 96.59
2038	\$ 70.23	\$ 63.34	\$ 99.49
2039	\$ 68.89	\$ 63.34	\$ 102.47
2040	\$ 67.58	\$ 63.34	\$ 105.54
2041	\$ 66.30	\$ 63.34	\$ 108.71
2042	\$ 65.03	\$ 63.34	\$ 111.97
2043	\$ 63.80	\$ 63.34	\$ 115.34
2044	\$ 62.58	\$ 63.34	\$ 118.79
2045	\$ 61.40	\$ 63.34	\$ 122.36
2046	\$ 60.23	\$ 63.34	\$ 126.03
2047	\$ 59.09	\$ 63.34	\$ 129.81
2048	\$ 57.97	\$ 63.34	\$ 133.71
2049	\$ 56.86	\$ 63.34	\$ 137.71



Year	Central assumption (1)	Low Scenario (2)	High Scenario (3)
2050	\$ 55.78	\$ 63.34	\$ 141.85

Appendix 8.2: Allocative Baselines

Starting from the Allocative Baselines (AB) in 2024, future AB have been adjusted to reflect the expected reduction in the emissions intensity of electricity using the Electricity Allocation Factor (EAF) as a proxy. The Ministry for the Environment has proposed a linear EAF reduction factor between 2026 and 2050, decreasing from 500 kg CO_{2e} per MWh in 2026 to 40 kg CO_{2e} per MWh in 2050.

Table 20: Cement and clinker allocative baseline, adjusted for the Electricity Allocation Factor

Year	Electricity Allocation Factor (EAF) — MfE Pathway [kgCO _{2e} /MWh]	Clinker [kgCO _{2e} /t _{clinker}]	Cement [kgCO _{2e} /t _{cement}]
2024	554	830	23.5
2025	516	827	21.9
2026	500	826	21.3
2027	480	824	20.4
2028	460	823	19.6
2029	440	821	18.8
2030	420	819	17.9
2031	400	818	17.1
2032	380	816	16.3
2033	360	815	15.5
2034	340	813	14.6
2035	330	812	14.2
2036	310	811	13.4
2037	290	809	12.6
2038	270	808	11.7
2039	250	806	10.9
2040	230	804	10.1
2041	210	803	9.2
2042	190	801	8.4

Year	Electricity Allocation Factor (EAF) — MfE Pathway [kgCO ₂ e/MWh]	Clinker [kgCO ₂ e/t _{clinker}]	Cement [kgCO ₂ e/t _{cement}]
2043	170	800	7.6
2044	150	798	6.8
2045	140	797	6.3
2046	120	796	5.5
2047	100	794	4.7
2048	80	792	3.9
2049	60	791	3.0
2050	40	789	2.2

Appendix 8.3: Level of Assistance

The 'Level of Assistance' (LoA) is the **percentage** of an eligible activity's emissions that is covered by free NZU allocations to protect emissions-intensive, trade-exposed businesses from carbon leakage. The three main scenarios are characterised by different phase down rates in LoA.

Table 21: Changes in industrial allocation for each scenario

Year	Current phase down rates (1)	Industrial Allocations stop in 2030 (2)	Faster phase-out of IA to reach zero by 2040 (3)
2024	86%	86%	86%
2025	85%	85%	85%
2026	84%	84%	84%
2027	83%	83%	83%
2028	82%	82%	82%
2029	81%	81%	81%
2030	80%	80%	80%
2031	78%	0%	72%
2032	76%	0%	64%
2033	74%	0%	56%
2034	72%	0%	48%
2035	70%	0%	40%
2036	68%	0%	32%
2037	66%	0%	24%
2038	64%	0%	16%



Year	Current phase down rates (1)	Industrial Allocations stop in 2030 (2)	Faster phase-out of IA to reach zero by 2040 (3)
2039	62%	0%	8%
2040	60%	0%	0%
2041	57%	0%	0%
2042	54%	0%	0%
2043	51%	0%	0%
2044	48%	0%	0%
2045	45%	0%	0%
2046	42%	0%	0%
2047	39%	0%	0%
2048	36%	0%	0%
2049	33%	0%	0%
2050	30%	0%	0%

Appendix 8.4: Concrete market factors

The following table is taken from Concrete NZ's *Net-Zero Carbon Concrete Industry by 2050 Roadmap*, published in 2023. The assumptions were developed during various industry workshops moderated by Thinkstep-ANZ in 2022 and 2023.

Table 22: Concrete market factors

Year	Projected concrete volume [m ³]	Share of Ordinary Portland Cement in binders [%]	Average clinker factor in cement	Binder requirement in concrete [%]
2024	3,818,287	93%	0.88	100%
2025	3,992,496	91%	0.88	100%
2026	4,166,704	88%	0.87	99%
2027	4,340,913	84%	0.87	99%
2028	4,515,122	80%	0.86	99%
2029	4,689,330	75%	0.86	99%
2030	4,863,539	70%	0.85	98%
2031	4,897,712	69%	0.85	98%
2032	4,931,884	69%	0.85	98%

Year	Projected concrete volume [m ³]	Share of Ordinary Portland Cement in binders [%]	Average clinker factor in cement	Binder requirement in concrete [%]
2033	4,966,057	69%	0.85	98%
2034	5,000,230	68%	0.85	97%
2035	5,034,402	68%	0.85	97%
2036	5,068,575	68%	0.85	97%
2037	5,102,747	67%	0.85	97%
2038	5,136,920	67%	0.85	96%
2039	5,171,093	65%	0.85	96%
2040	5,205,265	63%	0.85	96%
2041	5,232,895	63%	0.85	95%
2042	5,260,524	63%	0.85	95%
2043	5,288,154	63%	0.85	95%
2044	5,315,783	63%	0.85	95%
2045	5,343,413	62%	0.85	94%
2046	5,371,042	60%	0.85	94%
2047	5,398,672	59%	0.85	94%
2048	5,426,301	57%	0.85	94%
2049	5,453,930	57%	0.85	93%
2050	5,481,560	54%	0.85	93%

Appendix 8.5: Cost of Carbon Imports

We assume the overseas carbon cost represents the **'effective price paid'** on an accrual's basis (i.e., recorded when the emission occurs) and covers both direct and indirect electricity emissions. This effective price is calculated as the total carbon cost (e.g., taxes or units purchased) **minus the value of any free allocations, rebates, or other compensation** received by the producer. All values are in 2025 NZ\$ dollar terms.

We created three distinct profiles representing nation states with roughly similar levels of ambition. Profile 1 is loosely based on announcements from the Japanese government, Profile 2 draws on various statements from individual Southeast Asian nations, and Profile 3 represents countries with no carbon pricing schemes at all. Initial shares at the outset of the analysis are rough approximations of current import levels: 60% of imports from Source 1 and 20% each from Sources 2 and 3. Overall, imports are assumed to account for 45% of the domestic cement market.



Table 23: Cost of carbon imports under different level of decarbonisation ambition

Year	High carbon cost (1)	Modest carbon cost (2)	No carbon cost (3)
2024	\$ 0.00	\$ 0.00	\$ 0.00
2025	\$ 0.00	\$ 0.00	\$ 0.00
2026	\$ 0.00	\$ 0.00	\$ 0.00
2027	\$ 0.00	\$ 0.00	\$ 0.00
2028	\$ 0.00	\$ 0.00	\$ 0.00
2029	\$ 0.00	\$ 0.00	\$ 0.00
2030	\$ 0.00	\$ 5.00	\$ 0.00
2031	\$ 0.00	\$ 6.75	\$ 0.00
2032	\$ 0.00	\$ 8.50	\$ 0.00
2033	\$ 15.00	\$ 10.25	\$ 0.00
2034	\$ 18.82	\$ 12.00	\$ 0.00
2035	\$ 22.65	\$ 13.75	\$ 0.00
2036	\$ 26.47	\$ 15.50	\$ 0.00
2037	\$ 30.29	\$ 17.25	\$ 0.00
2038	\$ 34.12	\$ 19.00	\$ 0.00
2039	\$ 37.94	\$ 20.75	\$ 0.00
2040	\$ 41.76	\$ 22.50	\$ 0.00
2041	\$ 45.59	\$ 24.25	\$ 0.00
2042	\$ 49.41	\$ 26.00	\$ 0.00
2043	\$ 53.24	\$ 27.75	\$ 0.00
2044	\$ 57.06	\$ 29.50	\$ 0.00
2045	\$ 60.88	\$ 31.25	\$ 0.00
2046	\$ 64.71	\$ 33.00	\$ 0.00
2047	\$ 68.53	\$ 34.75	\$ 0.00
2048	\$ 72.35	\$ 36.50	\$ 0.00
2049	\$ 76.18	\$ 38.25	\$ 0.00
2050	\$ 80.00	\$ 40.00	\$ 0.00

Appendix 8.6: Clinker & Cement Production Parameters

The relevant parameters for the model are the embodied emissions per tonne of clinker and per tonne of cement, expressed in tonnes of carbon dioxide equivalents. The relevant emissions contributing to each parameter are:

- **Clinker**
 - **Clinker process emissions factor:** Calculated as fraction of oxides (e.g. CaO, MgO) in lime multiplied by the mass ratio of CO₂ released per unit of oxide (e.g. $EF_{CaO \text{ in clinker}} = \text{fraction CaO} \times \left(44.01 \frac{g}{\text{mole CO}_2} \div 56.08 \frac{g}{\text{mole CaO}} \right)$).
 - **Clinker kiln energy intensity** in Gigajoule (GJ) per tonne of clinker.
 - **Clinker energy emissions intensity** in kilograms of CO₂ per GJ (resulting from the clinker kiln fuel mix).
 - **Clinker electricity consumption** in kWh per tonne of clinker (e.g., clinker grinding).
 - **Clinker support energy** in GJ per tonne of clinker (e.g., raw material preheating).
- **Cement**
 - **Clinker factor** (share of clinker in cement, see Appendix 7.4).
 - **Cement electricity consumption** in kWh per tonne of cement (e.g., cement grinding).

The clinker process emissions factor is fairly uniform, depending on the exact chemistry of the lime used, but generally fluctuates between ~510 and 550 kg CO_{2e} per tonne. Golden Bay's reported emissions factor has been used across all sources.

The main differentiator between different plants remains the primary energy intensity and energy emissions intensity in the clinker kiln. Public data suggests that energy intensity generally ranges between 6 GJ/t (wet process; like the discontinued Holcim Westport operations) and 3.6 GJ/t (dry process with multi-stage preheater), with conventional dry process plants consuming around 4.5 GJ/t.

As per the Climate Change (Stationary Energy and Industrial Processes) Regulations 2009 (version as of 1 January 2025), Schedule 2, the applicable emissions factor for imported sub-bituminous coal for industrial use is 90.43 kg CO_{2e}/GJ.⁴³ This was taken as the worst-in-class emissions intensity for cement kilns.

Golden Bay shared its operating consumption data and emissions intensities in confidence. It is operating a conventional dry process plant but have already implemented significant shares of alternative fuels, replacing more than 50% of energy from coal by using mainly waste timber and tyres, as well as various other forms of waste products. Unlike conventional Waste-to-Energy applications, mineral components of the waste are embedded in the resulting cement product, reducing the need for primary raw materials like iron sands and providing an enhanced circular aspect to using alternative fuels in cement kilns.

For the importer profiles, it was important to determine realistic pathways to contrast with domestic production:

⁴³ [Link](#)



- **Profile 1** operates a dry process with multi-stage preheater, representing a more modern and efficient plant setup. The profile begins with mainly coal but replaces it with increasing shares of alternative fuels, eventually achieving coal-free operation by 2040.
- **Profile 2** operates a conventional dry process but on a more modern plant, resulting in slightly lower kiln energy consumption compared to the domestic production case. This profile starts with coal and gradually reduces fuel emissions intensity, but never achieves the 100% coal-free target, reaching about a 50% fuel emissions intensity reduction by 2040.
- **Profile 3** operates on a conventional dry process like the domestic producer but is slightly less efficient (~1.5% higher energy intensity). This profile is assumed to continue operating on coal for the entire duration of the study.

Each of the profiles was then coupled with a specific importer carbon cost pathway, as per Appendix 7.5:

- Profile 1 with High carbon cost (1)
- Profile 2 with Modest carbon cost (2)
- Profile 3 with No carbon cost (3)

Several sensitivity analyses investigated the impact of different combinations.

Initial market shares were based on current import data but adjusted to give each profile a minimum starting share. This adjustment ensures that any profile, if favoured by policy changes, can grow to a meaningful market share within the model's timeframe. A starting share set too low would prevent a profile from showing a significant impact, even if it became the most competitive option. The chosen starting shares are:

- 55% domestic production
- 27% Source 1 (60% of imports)
- 9% Source 2 (20% of imports)
- 9% Source 3 (20% of imports)

Appendix 9: Sector model sensitivity analysis results

Table 24: Sensitivity analysis

Scenario	Cumulative carbon emissions (MtCO ₂ e) 2024 to 2050		Total emissions (MtCO ₂ e) 2024 to 2050	Estimated reduction in carbon leakage (MtCO ₂ e) 2024 to 2050	Cumulative cement production 2024 to 2050 (million tonnes)		Market share (%)	
	Domestic	Imports			Domestic	Import	Domestic	Import
Base case								
Baseline	3.52	23.79	27.32		4.69	30.23	13	87
Scenario 1	14.23	8.74	22.97	-15.05	22.75	12.28	65	35
Scenario 2	13.20	9.70	22.89	-14.10	20.80	14.12	60	40
Scenario 3	13.20	9.70	22.89	-14.10	20.80	14.12	60	40
High NZ ETS cost of carbon								
Baseline	3.52	23.79	27.31	-	4.80	30.23	14	86
Scenario 1	13.84	9.01	22.85	-14.78	22.05	12.98	63	37
Scenario 2	13.26	9.59	22.85	-14.20	21.01	14.02	60	40
Scenario 3	13.26	2.59	22.85	-14.20	21.06	14.02	60	40
Divergence between import source ambition and source country ambition (e.g. high ambition import source operating in low ambition source country and vice versa)								
Baseline	3.53	19.74	23.26	-	4.80	30.23	14	86
Scenario 1	14.59	8.66	23.25	-11.08	23.28	11.75	66	34
Scenario 2	14.59	8.71	23.31	-11.02	23.29	11.74	66	34
Scenario 3	14.59	8.71	23.31	-11.02	23.29	11.74	66	34
Assigning different emissions intensity of electricity to each source – Source 1 low emissions, Source 2 unchanged, Source 3 constant high emitting electricity								
Baseline	3.52	24.38	27.91		4.80	30.23	14	86
Scenario 1	14.07	8.66	22.73	-15.73	22.50	12.53	64	36
Scenario 2	10.68	11.96	22.64	-12.42	16.35	18.68	47	53

Scenario	Cumulative carbon emissions (MtCO ₂ e) 2024 to 2050		Total emissions (MtCO ₂ e) 2024 to 2050	Estimated reduction in carbon leakage (MtCO ₂ e) 2024 to 2050	Cumulative cement production 2024 to 2050 (million tonnes)		Market share (%)	
	Domestic	Imports			Domestic	Import	Domestic	Import
Scenario 3	10.68	11.96	22.64	-12.42	16.35	18.68	47	53
Introducing carbon capture and storage in NZ in 2048, capturing 85% of emissions – central assumption of ETS cost								
Baseline	3.52	23.79	27.32		4.80	30.23	14	86
Scenario 1	12.81	10.01	22.82	-13.79	20.73	14.30	59	41
Scenario 2	11.92	10.99	22.91	-12.81	18.56	16.48	53	47
Scenario 3	11.92	10.99	22.91	-12.81	18.56	16.48	53	47
Trade Elasticity of cement set to -1.5								
Baseline	4.02	22.96	26.97		5.51	29.52	16	84
Scenario 1	13.88	9.15	23.02	-13.81	22.14	12.89	63	37
Scenario 2	12.96	10.04	23.00	-12.02	20.48	14.55	58	42
Scenario 3	12.96	10.04	23.00	-12.92	20.48	14.55	58	42
Trade Elasticity of cement set to -3.5								
Baseline	3.52	23.91	27.43		4.80	30.23	14	86
Scenario 1	14.39	8.57	22.95	-15.34	23.01	12.02	66	34
Scenario 2	13.37	9.45	22.83	-14.46	21.21	13.81	61	39
Scenario 3	13.37	9.45	22.83	-14.46	21.21	13.81	61	39
All importer sources' carbon price is zero								
Baseline	3.52	19.82	23.34		4.80	30.23	14	86
Scenario 1	12.71	10.19	22.89	-9.63	20.00	15.03	57	43
Scenario 2	12.71	10.19	22.89	-9.63	20.00	15.03	57	43
Scenario 3	12.71	10.19	22.89	-9.63	20.00	15.03	57	43
Source 3 with carbon cost equal to Source 2								
Baseline	3.52	21.12	24.64		4.69	30.23	13	87

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Scenario	Cumulative carbon emissions (MtCO ₂ e) 2024 to 2050		Total emissions (MtCO ₂ e) 2024 to 2050	Estimated reduction in carbon leakage (MtCO ₂ e) 2024 to 2050	Cumulative cement production 2024 to 2050 (million tonnes)		Market share (%)	
	Domestic	Imports			Domestic	Import	Domestic	Import
Scenario 1	14.22	8.74	22.96	-12.38	22.64	12.28	65	35
Scenario 2	13.19	9.70	22.89	-11.43	20.80	14.12	60	40
Scenario 3	13.19	9.70	22.89	-11.43	20.80	14.12	60	40
No coal free								
Baseline	3.52	23.79	27.32		4.80	30.23	14	86
Scenario 1	15.03	9.10	24.13	-14.70	22.13	12.90	63	37
Scenario 2	8.56	14.52	23.08	-9.27	12.24	22.79	35	65
Scenario 3	8.56	14.52	23.08	-9.27	12.24	22.79	35	65

Appendix 10: CPLAN overview

The Climate Policy Analysis (C-PLAN) Model is a New Zealand-focused global computable general equilibrium (CGE) model of economic activity and GHG emissions. The model is based on economic theory, national statistics, and behavioural response estimates.

C-PLAN was built for the Climate Change Commission to provide policy advice for the New Zealand government on the economy-wide impacts of different policies. It has been peer reviewed and is open source. Following the Climate Change Commission, targets for long-lived greenhouse gases and biogenic methane are imposed using separate emission trading schemes.

C-PLAN represents 38 production sectors and projects GHG emissions for each gas linked to activities (e.g., biogenic CH₄ from dairy cows, CO₂ from coal in steelmaking).

Emissions abatement options include: (1) fossil fuel substitution (e.g., coal to gas), (2) energy efficiency improvements (e.g., efficient boilers), and (3) switching to new low-carbon technologies. Advanced technologies include electric vehicles, methane-reducing dairy and livestock systems, geothermal electricity with carbon capture, electric heat, and bioheat from forestry waste.

The model assumes advanced technologies appear in specified future years. They are initially inactive and typically costlier than conventional options, operating only when carbon prices make them competitive.

This study updates and applies the CCC's version of C-PLAN used for its first three emissions budgets. Updates include GDP projections, forestry CO₂ removals, and EV uptake, reflecting CCC's advice for the fourth emissions budget. The model is also updated to account for the Marsden Point closure, continuation of the Tiwai Point smelter, and biomass replacing fossil fuels in cement production.

Emissions targets used for this study align with the government's latest commitments (as of November 2025).

The model incorporates the following climate policies:

- Climate Change Response (Zero Carbon) Amendment Act 2019
 - Net zero emissions for long lived greenhouse gases by 2050
 - Biogenic methane emissions 10% below 2017 levels by 2030 and 14-24% below 2017 levels by 2050.
- Linear reductions are assumed towards long-term targets
- Forestry removals are fixed each year and equal those used by the Climate Change Commission in its advice on the fourth emissions budget.

Figure 23: Biogenic methane targets

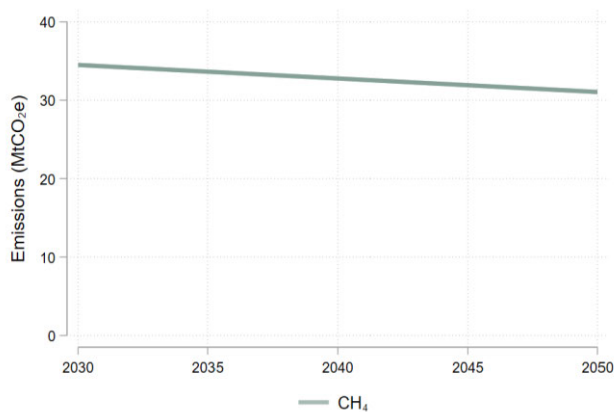
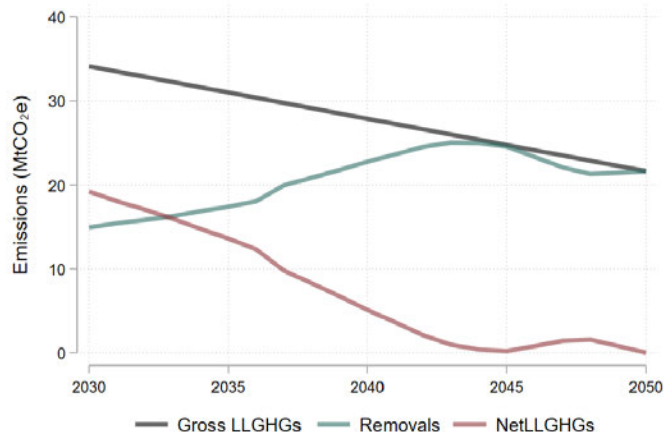


Figure 24: Gross and net long lived greenhouse gases and forestry removals included in the C-PLAN model



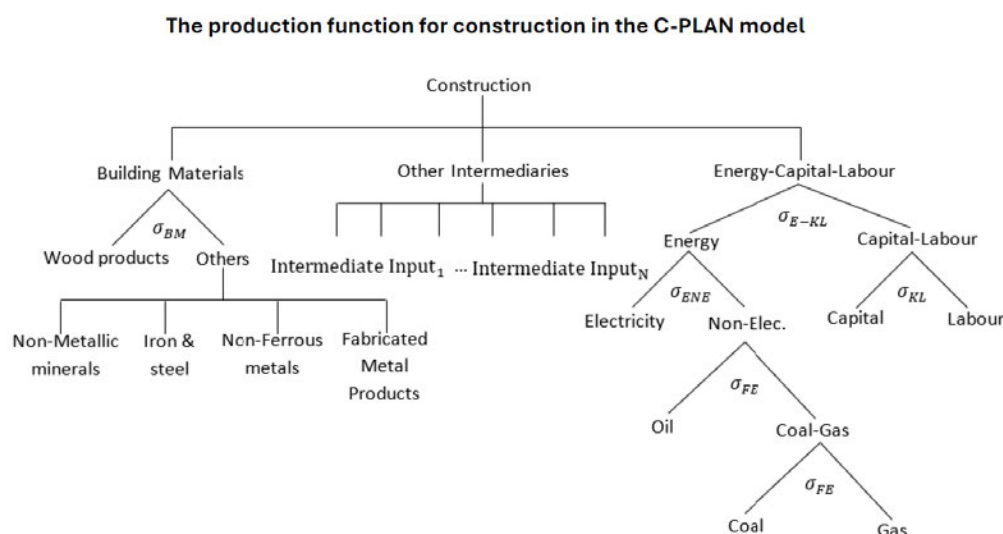
The following sectors are included in the model.

CPLAN sectors

Agriculture	Transport
Dairy farming	Road Transport (commercial)
Beef and sheep farming	Air transport
Other animal products	Water transport
Horticulture	Private transport
Forestry	
Fishing	Energy-intensive manufacturing
	Chemical, rubber & plastic products
	Cement manufacturing
	Non-ferrous metals (e.g., aluminium)
	Iron and steel
Energy extraction & distribution	Other sectors
Crude oil extraction	Mining of metal ores
Refined oil products	Dairy products
Coal extraction	Meat products
Natural gas extraction and distribution	Other food processing
Coal electricity	Wood and paper products
Gas electricity	Textiles, clothing and footwear
Hydroelectricity	Trade
Wind & solar electricity	Construction
Geothermal electricity	Services
Electricity transmission and distribution	

Various production functions are built into the model. The production function for construction is set out below.

Figure 25: The production function for construction in the C-PLAN model



Limitations specific to this study include:

- The representation of the cement industry in C-PLAN is not as detailed as in the sectoral analysis (e.g., minimum economic production levels are not represented).
- As C-PLAN represents the Rest of the World as an aggregate region, it is unable to calculate leakage of emissions to different production sources.
- Changes in the use of other construction inputs (e.g., steel and wood products) are driven by assigned elasticities of substitution between these inputs and cement products.
- The model does not consider administration costs – the costs of jointly administering IA and BCAs could be substantial.
- Cement manufacturing is included as a stand-alone industry in C-PLAN. However, it incorporates more than solely cement as it is based on the ‘non-metallic minerals’ composite sector in the GTAP database, which includes glass and ceramics. However, modelling shocks were applied only to the share of the C-PLAN sector that is accounted for by cement.
- Forestry sequestration is determined outside the model based on MPI projections and is imposed exogenously. It does not respond to changes in the emissions price, which is a simplification of real-world forestry decision-making. This is expected to overestimate the cost of adjustment to policy shocks that materially increase the emissions price.
- GTAP11 database portrays the New Zealand economy as it was in 2017, based on scaling production and expenditure to match national accounts and trade data for 2017 with underlying input-output (IO) data from 2013.⁴⁴ That is, the composition of

⁴⁴ Table 8.1 of Aguiar, A. 2023. ‘Chapter 8 Regional Input-Output Data’. In GTAP 11 Data Base documentation.

<https://www.gtap.agecon.purdue.edu/uploads/resources/download/12852.pdf>

the New Zealand economy and its industry structures – including cement manufacturing – is based on core data that is over a decade old



Appendix 11: Key design principles, elements and considerations

Table 25: Principles for the design and implementation of a border carbon adjustment

Environmentally effective	Provide scientifically robust evidence that global emission will be lower with the BCA in place than they would have been without a BCA, taking indirect effects on production and trade into account in both New Zealand and overseas.
WTO compatible	Complies with the rules and principles of the World Trade Organization (WTO), particularly those under the General Agreement on Tariffs and Trade (GATT).
Least trade restrictive	Does not favour domestic goods over imported goods or create undue restrictions on trade.
Predictable	Policies, implementation measures and calculations for emission costs are implemented following a clear timeline, are communicated clearly, and trade partners are given sufficient forewarning.
Scientifically robust	Scientific research supports the environmental effectiveness of the measure. In the absence of conclusive scientific evidence, science is used to identify the risk of serious or irreversible environmental harm and policies are designed with flexibility to manage risk.
Non-discriminatory	Trading partners or goods are not unfairly disadvantaged or discriminated against.
Transparent	Policies, implementation measures and calculations for a BCA are explained clearly and publicly.
Actively consulted with trading partners	Significant domestic and international consultation with trading partners during the design and implementation of the measure.

Table 26: BCA design elements and key considerations

Design element	Description	Key considerations
Sectoral coverage	Type of sectors included.	Whether there are environmental benefits, the sector is trade exposed, and compliance is manageable and predictable.
Scope of emissions coverage	Scope of emissions covered – • Scope 1 – emissions produced directly • Scope 2 – emissions produced indirectly (e.g. electricity) • Scope 3 – other emissions a firm is responsible for across the value chain (e.g. transport emissions).	Generally, it is advised that a BCA should conform to the coverage of domestic pricing tools (e.g. ETSs). Achieving broad emissions coverage needs to be weighed up with administrative feasibility as there is complexity in measuring indirect emissions.
Scope of product coverage	Extent of coverage across a value chain (e.g. finished goods or input materials to finished goods).	Assessment of goods further down the value chain would likely be needed to avoid downstream leakage or circumvention. However, this adds complexity.
Measuring and verifying emissions	Emissions can either be estimated using default emissions values (e.g. basing emissions intensity on industry average) or using actual reported emissions from a firm. Using actual emissions values needs independent verification.	The availability of default emissions values is important where actual emissions values are not accessible. However, they are complex to set. If they are set too high, this disadvantages importers; too low, the incentive for importers to reduce emissions is weakened. It may also be important to support BCA participants to ensure there is no additional burden on them compared with domestic manufacturers.
Accounting for overseas carbon costs	Overseas carbon costs must be defined and recognised to ensure importers are not double charged.	Which tools should be recognised as a carbon cost is not clear cut. Some argue that indirect pricing (e.g. product standards) and the use of voluntary carbon credits should be considered as imposing legitimate carbon costs. Doing so adds complexity given a lack of clear cost per unit of emissions, or in the case of voluntary credits, inconsistent methodologies and reliability.
Implementation timeline and transition	When a BCA comes into force and any corresponding changes to other leakage policies, such as industrial allocation.	How quickly industrial allocation is phased out will lead to different outcomes, including the strength of decarbonisation incentives, crown revenue, the level of cost increases on firms and the flow on impacts of those costs.
Use of revenue	How BCA revenue will be used.	Revenue use options include, but are not limited to, supporting BCA participants with administrative costs, assisting developing countries and funding international or domestic decarbonisation initiatives. Supporting developing countries may support international political acceptability.



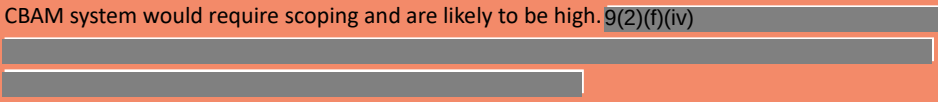
Appendix 12: High-level assessment of required operational functions

Table 27: Operational functions required to implement a BCA

Function	Description
Pricing setting	A mechanism to set the BCA unit price and default emissions values. Similar existing functions: The Ministry for the Environment (MfE) monitors the NZ ETS price and sets an average annual emissions price in regulation for other emission sources (for example, synthetic greenhouse gases).
Registration	IT infrastructure to manage customer interface, record emissions factors, obligations and transactions. Accreditation body and process to assess and approve overseas emissions data verifiers. Similar existing functions: The Environmental Protection Authority (EPA) administers the NZ Emissions Trading Register, manages participant accounts, and assesses applications for unique emissions factors for certain activities.
Border co-ordination	Report on import volumes, based on tariff codes, to the EPA. Similar existing functions: Customs manages the tariff system and monitoring goods at the border.
Levy/certificate calculation and payment	Government capability to receive BCA revenue (or certificates), calculate the levy and, under the varied parameter scenario, process BCA returns. Similar existing functions: EPA receives emissions returns, calculates surrender obligations and receives NZUs to crown accounts. Levy rates for Synthetic Greenhouse Gases (SGGs) are calculated by MfE and collected by Customs and New Zealand Transport Agency.
Reporting/compliance	Government framework for reporting and monitoring. Processes to identify non-compliance and data inaccuracy. Appeals and disputes mechanism. Similar existing functions: EPA undertakes monitoring, compliance and enforcement functions and reporting under the NZ ETS, including in relation to the Synthetic Greenhouse Gas Levy.
International co-operation	Co-operation with international countries, including the development of online messaging, engagement with the WTO and holding online workshops

Appendix 13: BCA implementation impact assessment

Table 28: BCA implementation impact assessment

Operational function		Government impact (primary scenario)	Firm impact (primary scenario)	Impact of policy variables
Pricing	Mechanism for setting the price	Low-no cost: MfE already has required data and undertakes a similar process annually for other emission sources	No cost: firms not involved	Government - Low cost: BCA unit price set weekly: causes a marginal increase in resource
	Setting of default emissions values	Low cost: similar process undertaken by MfE for other emission sources, such as synthetic greenhouse gases. Setting the initial methodology would involve extensive engagement with firms to ensure the values are fair.	Low cost: importing firms will need to engage in the process of setting the methodology for default values.	Low cost: Same as primary scenario
Registration	Registration	Medium-high cost: IT infrastructure required to manage customer interface, payment handling, reporting and invoicing and the calculation of the BCA obligation. Costs to build a standalone CBAM system would require scoping and are likely to be high. 9(2)(f)(iv)  Cost examples: • EU CBAM IT infrastructure estimate: NZD \$118.8 million (significantly larger scale – 27 member states and nearly 20,000 firms covered; includes 6 sectors, some complex, such as steel) • UK CBAM IT infrastructure estimate: NZD \$53 million (Includes five sectors, some complex, such as steel) • Cost to implement and administer ETS between 2008-15: \$38.9m (includes more sectors and participants, more complex trading functions)	Low -medium cost: registration includes gathering and verifying information, such as, emissions intensity data (see appendix 11 for the full list), that is not easily accessible. The European Commission estimates that verifying emissions data under the EU CBAM could cost NZD \$49,000–\$72,000 per assessment, with monitoring alone costing around NZD \$42,000 (European Commission, 2021b). Under the NZ ETS, firms using unique emissions factors must engage EPA-approved third-party verifiers, with costs often reaching tens of thousands of dollars depending on complexity. Industry stakeholders note that cost will be low if requirements are aligned with existing reporting structures, such as EPDs. Costs would be more burdensome if new requirements are placed on industry.	Medium-high cost: Same as primary scenario
	Verification process	Medium cost: To ensure emissions data accuracy and reliability, the Government needs to accredit the overseas verifiers of emissions data. This involves setting criteria, principles and standards for accreditors to comply with and potentially, an independent body, such as the National Accreditation Bodies being stood up by the EU for their CBAM, to undertake the accreditation.		Medium-high cost: same as primary scenario
	Support for importers	Low to medium cost: Support for importing firms to navigate the new system, including understanding the policy and their obligations, will be required in the initial stages of the BCA.	No cost: firms not involved	Low to medium: Same as primary scenario
Customs and border co-ordination	Co-ordination between Customs and EPA, including reporting	Low cost: Cement and clinker goods already identified by tariff codes. Data is easily extracted by Customs to send to the EPA.	No cost: firms already must use tariff codes to identify their goods at the border.	Low cost: Same as primary scenario



Operational function		Government impact (primary scenario)	Firm impact (primary scenario)	Impact of policy variables
Levy calculation/payment	Receipt of BCA cost	Low-medium cost: the EPA does not currently have the capabilities to collect money. New functions would be required for the EPA.	Low-no cost: Firms will need to organise the payment of the levy. However, given systems already exist for such activity, the impact is expected to be low.	Use of BCA certificates Government - Low-no cost: the EPA's systems are already set up to receive units, for example, NZ ETS units. However, this sits within broader cost of IT infrastructure.
	Calculation of levy	Low cost: the EPA and MfE undertake similar calculation processes for allocative baselines, industrial allocation, NZ ETS obligations Software and coding will be required to calculate the levy based on input data.	No cost: firms not involved.	Low cost: same as primary scenario
	Importer reporting	Low cost: the EPA would need to assess importer information about the effective carbon price paid overseas. This involves confirming the cost originated from a recognised pricing mechanism, whether an industrial allocation equivalent policy is in place, the price per emission unit and the coverage of the pricing mechanism of emission types.	Medium cost: if an effective carbon price has been paid through an ETS or similar scheme, it is likely that this cost is known by the overseas manufacturer. However, it may be difficult to acquire in a timely way and would likely need verifying.	Importer returns Government - Low-medium cost: additional reporting burdens for firms and requirement for EPA to assess returns. Importer returns Firms – medium cost: same as primary scenario as additional information required is accessible.
Reporting/compliance	Framework for monitoring and reporting	Low cost: requires policy process, working alongside the Ministry of Justice, to develop a framework. May be based on the NZ ETS framework.	Low cost: firms may be consulted on the proposed framework.	Low cost: same as primary scenario
	Procedures for non-compliance detection	Medium cost: The EPA currently undertakes similar monitoring and reporting for the NZ ETS and so would need to extend these functions to assess BCA payments, requiring additional resource. Customs undertakes auditing of a portion of imports to ensure correct application of tariff codes as part of its business-as-usual operations.	No-low-medium cost: while firms are not involved in setting the procedures for compliance, they may have to comply with information requests from the regulator as part of an investigation. There may also be legal cost if enforcement action is taken by the regulator.	Medium cost: same as primary scenario
	Appeals and dispute mechanisms	Medium cost: EPA role to open investigations, with legal support and, in some cases, supporting the case through a court process. Like current EPA role for the NZ ETS, but additional resource may be required to extend functions.		
International co-operation	Support or third-country authorities	Medium cost: likely to be resource intensive prior to the operationalisation of the scheme and in the initial stages. MfE, supported by MFAT, would be required to create an extensive engagement plan, online messaging, undertake engagement with the WTO and hold online workshops.	Low cost: importing firms will need to participate in some engagement. Effective engagement could reduce administrative burden for firms as there would be less expectation that they explain policy and guide overseas firms on how to account for their emissions.	Medium cost: Same as primary scenario



Appendix 14: Information required from firms for BCA implementation

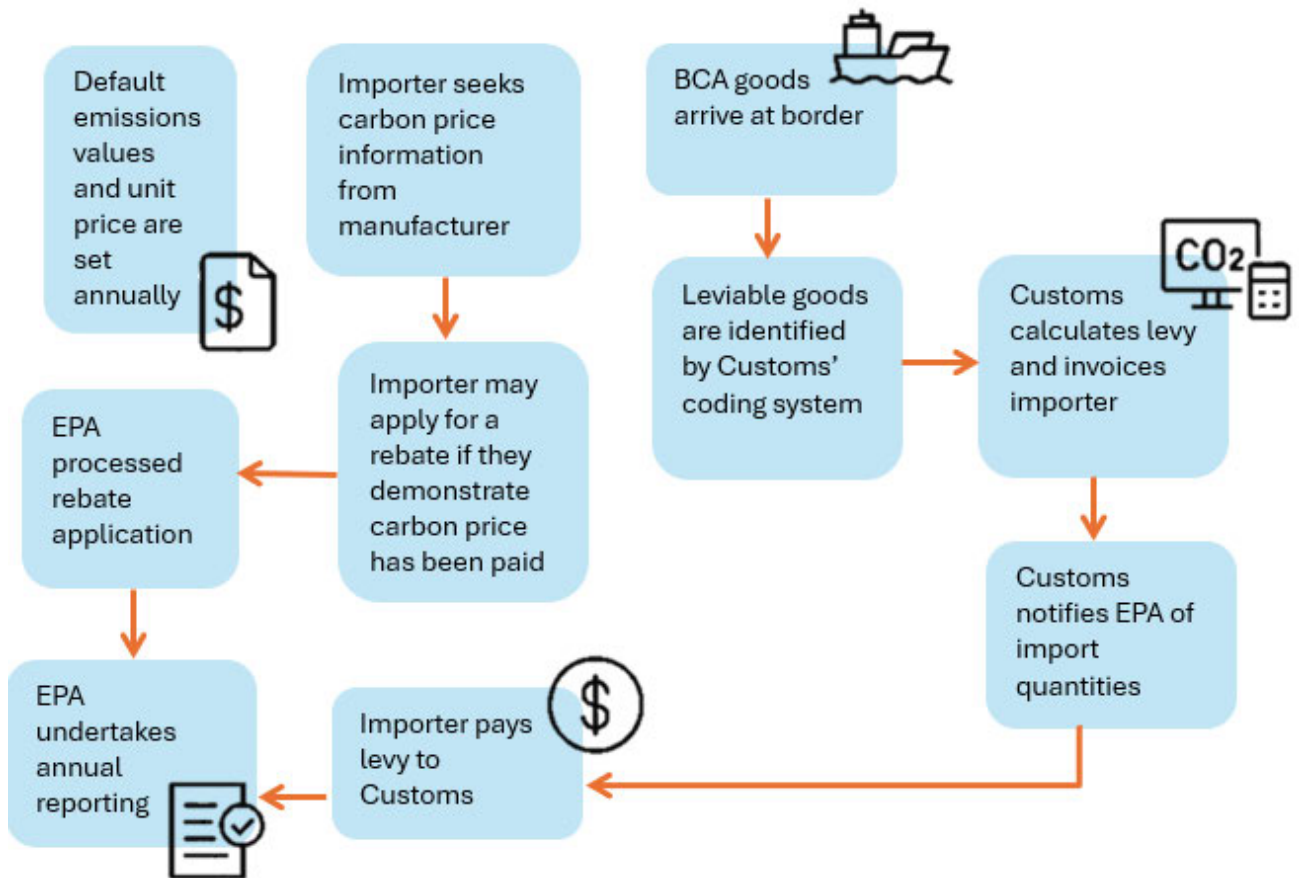
Table 29: Information required from firms to support BCA implementation

Compliance activity	Type	Accessibility
Registration (one-off, unless significant changes occur)	Type of goods by their tariff code, country of origin	Already held by firms
	Name of overseas manufacturer	Already held by firms
	Geographical coordinates of the main emissions source	Can be easily accessed if not already held
	Embedded emissions of the goods based on: • Technology type used in production • Fuel type used in production • Fuel efficiency • Electricity efficiency • A measure of emission intensity for electricity	Accessible via Environmental Product Declarations. However, may not be easily accessible if methodologies differ.
Firm reporting post-import (annual)	Carbon price already paid (if relevant), based on: • Name of ETS scheme (or equivalent) • The legal act imposing the carbon price • Quantity and type of emissions covered by carbon price • Amount paid in origin country, adjusted for any industrial allocation policy	Partially publicly available. Information on amount paid may not be available in a timely way.
	Additional information for annual return (in the varied parameter scenario): • Type of goods by their tariff code and country of origin • Overseas manufacturer name • Quantity of goods imported	Already held by firms



Appendix 15: Implementation pathway for BCA design using default emissions values only

Figure 26: Design configuration for BCA design using default emissions values only



Appendix 16: Summary of assessment of policy alternatives to industrial allocation

Table 30: Assessment of policy alternatives to industrial allocation

Policy Alternatives

	Ability to mitigate leakage	Support for domestic and international decarbonisation	Impact on domestic cement industry and wider economy	Fiscal impacts	Administrative feasibility
Industrial Allocation (status quo/counterfactual)	TBC (need sectoral analysis of leakage under status quo)	1 General disincentive effect of IA may cause domestic emissions to stay higher for longer. Does not support international decarbonisation.	1 Continued phase out of IA results in increased risk of GB shifting to import only model, potentially resulting in economic losses. Due to the decarbonisation incentive, there may be missed opportunities to improve economic performance, efficiency and reduce fiscal costs over the longer term.	1 Assuming GB continue 2024 production activity, they will be allocated a total of 10.5m NZUs under industrial allocation by 2060 (when IA reaches zero) ⁴⁵ . The units are worth \$575m at a price of \$55. Were GB to shift to an import only model in the mid-2030s, they would be allocated \$297m in NZUs by 2035.	3 Feasible – status quo settings
Excise Taxes on Consumption	1.5 Excise taxes can reduce carbon leakage within the domestic market by applying equal costs to local and imported goods. However, they’re less effective when production and business can shift offshore, as higher domestic costs may drive relocation, causing leakage.	1.5 Excise taxes support domestic decarbonisation by discouraging carbon-intensive consumption and promoting cleaner alternatives. Their impact on international decarbonisation is limited, as they don’t directly affect foreign producers unless access to domestic market is at stake.	1 Excise taxes on cement could raise production costs significantly, threatening the sector’s viability in New Zealand. They may also increase costs, affecting households and businesses – although some research suggests carbon excise taxes can reduce emissions over time with less impact on economic stability than other alternatives.	2.5 Excise taxes can be cost-effective to administer, especially when applied upstream to a few high-emitting producers. They can generate significant short-term revenue, but the tax base may shrink over time due to decarbonisation and potential offshoring.	1 Excise taxes can be efficiently administered when applied upstream to high-emissions goods like cement. Can involve very substantial compliance and security costs for the importer and domestic manufacturer and very significant audit and enforcement costs for the administrator.
Climate Clubs and Multilateral Agreements	1.5 Carbon clubs have the potential to reduce leakage by aligning carbon pricing within the membership, decreasing carbon price differentials However, effectiveness depends on the levels of participation and enforcement, and it may take a long time to reach agreement There is a risk that the problem between price differentials from developed to developing nations persists.	2 Homogenised carbon pricing within a carbon club encourages decarbonisation through encouraging carbon pricing. Principle C of the voluntary carbon club principles also specifically supports increased investment in low carbon production.	1.5 Dependant on the participation levels of our cement trading partners. The domestic cement industry is hard to abate, so it is not a decarbonisation priority for the current G7 climate club, they are currently focused on steel. Impact on the economy is dependent on climate clubs’ ability to stabilise competitiveness	2.5 Lower direct fiscal impacts than alternative options but it may require investment in diplomatic relationships Could increase government revenue through higher carbon prices in the domestic ETS, having a reduced need for domestic subsidies and implementing club aligned taxes or BCAs	2 Moderate administrative challenge due to the need to align with other countries to benchmark emissions pricing and comply with climate club agreements Principle F of the climate club agreements suggests shared monitoring and verification systems, so possibility of less of a burden on New Zealand
Trade Agreements with Environmental Provisions	1 A free trade agreement is not a very powerful tool to reduce carbon leakage, as competitiveness would still exist with other nations Free trade agreements with nations with environmental provisions does not prevent carbon leakage, as competitiveness and lower price points persist.	1 Does not directly encourage decarbonisation as there is less financial incentive to do so compared with emissions pricing	1.5 Trade agreements would not solve the problem of competitiveness or carbon leakage; therefore, the cement industry would still be facing these key issues Potential positive impacts in the wider economy for New Zealand as a favoured trade partner, given it has stronger emissions policies in place	2 Trade agreements can be costly upfront but overall are low cost for a government to maintain Small costs associated with administration and monitoring of trade partners meeting their commitments	2.5 These are administratively easy to establish with existing systems in place within Governments to negotiate trade agreements There may be complexities associated with negotiating the environmental provisions in the trade agreement, and maintenance costs associated with adhering to these

⁴⁵ Assumes current phase out rate settings, 2024 production levels remaining constant, a stable allocative baseline.

	Ability to mitigate leakage	Support for domestic and international decarbonisation	Impact on domestic cement industry and wider economy	Fiscal impacts	Administrative feasibility
Decarbonisation Support	2 Can help reduce leakage in sectors with high barriers to decarbonisation and offshore relocation risks. However, it doesn't address differences in climate policy across countries- a key driver of leakage.	2.5 Aligns well with domestic goals and helps hard-to-abate sectors like cement invest in cleaner production. Its impact on international decarbonisation is limited unless global demand for low-carbon goods grows, incentivising international firms to adapt.	2.5 Could support the cement sector by reducing investment risk and improving global competitiveness. Public investment can attract private capital and accelerate decarbonisation – however, poor design risks uneven support and transformation across sectors.	1.5 Can be costly for government, especially with ongoing monitoring requirements. Without well allocated funding and supporting policies, long-term viability of support may not be feasible.	2 Governments with experience can set up support mechanisms easily, but long-term monitoring may increase administrative burden. Support likely straightforward for firms exposed to carbon pricing or trade, but broader schemes may struggle to reach intermediaries or subsidiaries.
Mandatory Product Standards	1.5 May reduce incentives to offshore emissions-intensive production, if access to the domestic market is still preferred. However, they have limited impact on export oriented-firms, which may move offshore or bypass standards by exporting high-emissions goods.	2 Can drive emissions reductions by setting thresholds for domestic goods and influencing the supply chain. Without international alignment, unilateral standards risk carbon leakage, limiting their impact.	1.5 Could help future-proof domestic cement production, but they may also raise compliance costs and reduce competitiveness. Applied across supply chains, they can drive broader decarbonisation – but poor design risks disruption and offshoring.	2 Can reduce long-term reliance on government support by encouraging private investment. Initial setup, monitoring, and enforcement can be costly, depending on scope. Government procurement may need to meet or exceed standards, adding secondary costs.	1 New standards can build on existing frameworks, especially in high-emissions sectors, and be phased in to ease compliance. Products may be difficult to identify using tariff descriptions and there is a significant reliance on compliance monitoring which may be difficult to prioritise given other border priorities (e.g. illicit products)

Appendix 17: High-level analysis of potential sectors for inclusion in a BCA (based on top industrial allocation emitters)

Table 31: Analysis of potential sectors for inclusion in a BCA

Sector	Environmental Effectiveness	Import on a scale, plus domestic production	Administrative Burden	Suitability for a BCA
Cementitious Products	High – High emissions per unit and hard to abate sector. High risk of carbon leakage	High - 9(2)(f)(iv) also imports from Vietnam, Indonesia, Thailand. Imports comprise 40% of the market. GB is NZ's only integrated domestic manufacturer.	Medium – Homogenous product makes tracking imports more straightforward but additional compliance burden including on a number of smaller importers.	Likely to be suitable
Iron and Steel	High – High emissions intensity and strong trade exposure – high risk of carbon leakage. Although, steel has a lower leakage risk than cement, due to higher technological flexibility. Glenbrook Steel Mill is investing in an electric arc furnace to significantly cut emissions. Industry has not signaled interest a BCA.	High - NZ relies heavily on imports of steel and iron products (around half of all steel and iron in the NZ market). 9(2)(f)(iv) Glenbrook Steel Mill is the sole integrated steel producer in NZ. 6(a)	High – Complex supply chains and numerous producers and product types make emissions tracking and verification challenging. The high number of product variances also makes costs of implementation higher at the border.	Likely to be suitable - subject to consultation with industry, international stakeholders and the Ministry for Foreign Affairs.
Carbamide (Urea)	Medium – Highly emissions intensive due to its reliance on natural gas. Exports of carbamide are lower so the trade exposure is low. But New Zealand imports urea from nations with low emissions pricing, risking some carbon leakage to lower cost countries.	Medium - NZ imports most urea (mainly from Saudi Arabia, Malaysia and China); The Kapuni urea plant in Taranaki is NZ's main producer supplying about a third of the country's consumption.	Medium – Emissions factors are known; moderate complexity in tracking imports.	May be suitable - further analysis required, including assessment of trade risks. There is a significant risk of a BCA on urea increasing the cost of fertilizer for the New Zealand farming industry.
Burnt Lime	High – High emissions intensity due to calcination process and the energy from kiln heating.	Medium - NZ imported 9(2)(f)(iv) of burnt lime from a range of countries in 2024 the largest quantity being the UK. NZ produced 9(2)(f)(iv) of burnt lime in 2020/2021, making us a significant exporter of processed lime products. An import tax may put a strain on the industry processing of these products.	Medium – The sector has minimal product codes, and is constrained to a few main import partners	Not suitable - high domestic production and low import quantities
Packaging and Industrial Paper	High – A highly emissions intensive process. But it does have more future decarbonisation options due to easy access to lower emissions residues in the future.	NZ is a net importer of packaging paper (mainly from Australia, China); exports are modest. The industry has seen a decline in the number of NZ businesses in recent years.	Medium – Emissions data available; moderate complexity in product differentiation.	Not suitable - lower emissions intensity, declining domestic operations.
Carton Board	High– A highly emissions intensive process. But it does have more future decarbonisation options due	Low - NZ imports carton board primarily from Australia and Asia;	Medium – Similar to packaging paper; manageable compliance.	Not suitable - limited domestic production.

⁴⁶ Ranked in order of potential suitability for a BCA.

	to easy access to lower emissions residues in the future.			
Aluminum Smelting	High – Very high emissions per unit and strong trade exposure.	Low - NZ exports aluminium (mainly from Tiwai Point); imports are minimal.	High – Electricity-based emissions require detailed tracking; few producers but complex inputs.	Not suitable – aluminum production is primarily exported.
Market Pulp	Medium – Moderate emissions intensity.	Low - NZ exports pulp (mainly to China, Japan); Imports of pulp are limited. New Zealand pulp production volumes fluctuated between9(2)(f)(iv) [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]	Medium – Emissions data generally available; moderate complexity in supply chains.	Not suitable - imports are limited.
Methanol	Medium – Emissions vary by feedstock.	Low - NZ exports methanol (mainly to Asia); imports are negligible.	Medium – Emissions data available; moderate complexity in production and trade.	Not suitable - imports are limited.



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Note: Appendix 18 contains additional commentary from Concrete New Zealand members, provided following the Minister of Climate Change's receipt of the study.

Border Carbon Adjustment for the Cement Industry

A Feasibility Study



Te Kāwanatanga o Aotearoa
New Zealand Government

COMMERCIAL

Appendix 18: Industry stakeholder statement on final report content

Provided by: Concrete NZ (on behalf of the Cement Working Group)

Date: 9 February 2026

1.1 Introduction

This appendix records the material differing views of Concrete NZ regarding the final version of the Border Carbon Adjustment (BCA) for the Cement Sector: Feasibility Study. As per the project **Terms of Reference**, this statement identifies areas where industry expertise and data diverge from the assessments presented in the Executive Summary and key analytical sections.

1.2 Overview of consolidated findings & comprehensive impact matrix

The feasibility study identifies significant environmental and fiscal benefits associated with a BCA for the cement sector. While the mechanism introduces specific administrative and price considerations, the body of the report contains evidence of substantial mitigation of global emissions and a positive impact on the Crown's net fiscal position.

The table below collates findings from Sections 6, 7, and 8 of the report to provide a complete picture of the BCA's feasibility.

Category	Identified Benefits	Identified Risks & Costs	Concrete NZ Remark
Climate & environment	Emissions mitigation: Prevents 14.1 – 15.1 MtCO ₂ e of global emissions leakage between 2026–2050 (Section 6.2).	Domestic profile: Retains domestic emissions within the NZ inventory. ¹	¹ Concrete NZ strongly rejects this framing, recalling the purpose of this study as well as the fact that NZ domestic emissions remain under the ETS cap (see Headline 1.3 below).
	Waste diversion: Protects the diversion of 100k tonnes of waste from NZ landfills annually (Section 6.6).		
	Decarbonisation response: Both domestic manufacturers and importers suggest decarbonisation as a likely response to a BCA, including increased use of supplementary cementitious materials.		

Category	Identified Benefits	Identified Risks & Costs	Concrete NZ Remark
Fiscal (Crown)	Revenue generation: Generates \$24.9m – \$225.2m (PV) in auction revenue depending on allocation settings (Section 6.8).	Implementation: Estimated one-off setup of \$53m – \$118m (Section 7). ²	² Concrete NZ notes that there is significant potential for reduction via existing systems (see Headline 1.4 below).
	Subsidy avoidance: Saves the Crown up to \$653m (PV) in avoided Industrial Allocation (IA) (Section 6.8).		
	Net position: Achieves a positive net fiscal position (+\$32.8m) under Scenario 2 (Section 6.8).		
Supply chain & resilience	Sovereign capability: Maintains a ~60% domestic production buffer, reducing 100% reliance on international shipping and “Just-in-Time” logistics (Section 6.7).	Market adjustment: Potential for administrative burden on importers, mitigated by the use of Default Values. ³	³ Concrete NZ notes that, if well designed, this may create compliance symmetry, given that domestic manufacturing has been subject to significant ETS reporting requirements for decades.
	Price stability: Insulates NZ infrastructure from global shipping price volatility and geopolitical supply shocks (Section 6.7).		
Economic & regional	Regional stability: Retains high-value manufacturing and employment in Northland.	Price impacts: Modelled 1.8–5.2% increase in cement price, resulting in a 0.05–0.13% increase in total infrastructure costs (C-PLAN Modelling). ⁴	⁴ Concrete NZ submits that C-PLAN did not assess the impact of shipping costs and their significant volatility on a much larger shipment volume.
	Investment certainty: Provides the regulatory signal required for private investment in low-carbon alternative binders.		

1.3 Review: Alignment with Terms of Reference (ToR)

A critical finding of this synthesis is the requirement to re-evaluate the framing of “domestic emissions” as a negative impact.

- **Primary objective:** The study’s ToR and Introduction define the core purpose as assessing whether a BCA is a more effective tool than industrial allocation for mitigating emissions leakage.
- **Leakage prevention:** The study finds that a BCA prevents 14.1 – 15.1 MtCO₂e of global leakage. If domestic production is ceased in favour of imports, these emissions are

simply offshored to jurisdictions with higher emissions intensities or less stringent regulation, increasing global net emissions.

- **The capped ETS context:** Because New Zealand operates under a capped ETS, retaining domestic production does not increase the national emissions limit. It ensures that the carbon cost is paid domestically while preventing the global “leakage” that the ToR specifically identifies as the study’s primary concern.

Consequently, “retaining domestic emissions” is a neutral factor for the New Zealand inventory, but a significant positive factor for global climate goals and the specific objectives of this study.

1.4 Implementation efficiency

The report currently cites high implementation costs (\$53m – \$118m) based on standalone UK and EU models. However, an investigation of current New Zealand policy reveals an existing framework that could materially lower these costs:

- **Existing infrastructure:** The NZ ETS already possesses the infrastructure to process surrender obligations triggered by a Customs entry, as demonstrated by the current policy regarding imported CO₂.
- **Operational synergies:** From a Customs–ETS interface perspective, there is no material difference between processing x tonnes of imported CO₂ and x tonnes of embodied CO₂ in cement.
- **Software scalability:** If the current software is capable of converting a Customs entry into an ETS liability, a BCA does not require a bespoke IT build. It requires the coding of a different “product” (cement) into a pre-existing operational process. This opportunity for systems integration suggests the implementation costs in the report are likely overestimated.

1.5 Supply chain resilience and market disruption

Section 6.7 and the Executive Summary conclude that the “risk of severe disruption is low” regarding supply chain impacts. Concrete NZ notes the following:

- **Evidence gap:** The report provides no empirical evidence for this “low risk” assessment. Historically, the sector has seen immediate project stoppages following international supply shocks (e.g., the 2007 Indonesia sand export ban to Singapore and the UK Brexit).
- **Infrastructure sensitivity:** The majority of New Zealand’s concrete is used in ground contact (foundations and infrastructure), where no viable substitutes exist. The report’s reference to “substitutes” likely refers to mass timber, which is limited to a minor segment of mid-rise construction. Even in hybrid timber buildings, concrete remains the dominant material by both mass (>80%) and volume (>70%).
- **Import access:** The reference to “improved access to overseas products” is misplaced. There are currently no regulatory barriers preventing imports; a BCA levels the carbon-cost playing field rather than creating or limiting market access.