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D3: POLICIES AND REGULATORY DRIVERS OF EMBEDDED EMISSIONS ACCOUNTING FOR ALUMINIUM AND CEMENT'S LOW-CARBON TRANSITION

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PROJECT

RP3.006 Certification and verification to enable a successful low-carbon transition for heavy industry

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INTRODUCTION

1.1 BACKGROUND

The aluminium and cement industries are significant contributors to global greenhouse gas emissions, responsible for approximately 2% and 8% of global CO₂ emissions respectively. This corresponds to an emissions intensity of 40-125 kg CO₂-eq per tonne of cement, depending on the clinker-to-cement ratio and 8-25 kg CO₂-eq per kg of aluminium (International Energy Agency, n.d.), depending on the energy source used in smelting for aluminium. Both sectors are critical to the global energy transition, integral to infrastructure and consumer goods, with production levels projected to remain steady due to ongoing demand, particularly from emerging markets.

Achieving large-scale production of near-zero emissions aluminium and cement is essential to align with global climate goals. If the sectors follow the ambition of the IEA's Net Zero Emissions (NZE) Scenario (International Energy Agency, 2021), near-zero emissions cement is projected to reach approximately 25% of total market share by 2035 and over 90% by 2050, up from a negligible share today. Similarly, for aluminium, near-zero emissions production is projected to achieve significant market penetration by 2050. While a growing share of aluminium will come from recycled sources, increased primary aluminium production will still be necessary, driving comparable growth in bauxite mining and alumina refining. This challenge is further intensified by the global nature of industrial markets and geopolitical tariff restrictions (Kissinger & Sullivan, 2022), which exposes producers to trade-related risks. At the same time, the ongoing issue of excess industrial capacity worldwide is driving down market prices, straining financial conditions for industrial producers, and making investments in near-zero emissions technologies even more risky.

This underscores the critical need for robust policy support to reduce investment risks linked to the early commercial deployment of near-zero emissions production. Achieving this transition will require a rapid scale-up of low-emission technologies across the aluminium and cement value chains. While broader government measures, such as carbon pricing, are being introduced in some regions to incentivise emissions reductions, current price levels remain with limited global coverage to yet provide the certainty needed to establish a strong business case for higher-cost early deployments. As international trade policies, procurement standards, and investor expectations tighten around emissions transparency, robust certification mechanisms are critical for ensuring the market access, competitiveness, and alignment with global sustainability goals in the aluminium and cement sectors.

In this context, the verification and certification of embedded emissions in aluminium and cement products are playing an increasingly critical role in shaping both incentives ("carrots") and regulatory compliance ("sticks") within evolving market and policy frameworks. Policymakers, consumers, and investors are prioritising **embedded emissions**¹ as a key criterion in such initiatives designed to establish a level playing field in the transition to low-carbon materials.

1.2 THE OPPORTUNITY FOR LOW-EMISSION/LOW-CARBON ALUMINIUM AND CEMENT FOR AUSTRALIA

Australia has a significant opportunity to enhance its position in global aluminium and cement markets by transitioning to low-emissions production as industries worldwide accelerate decarbonisation efforts. In the aluminium sector, it remains a key player in one of the few nations with an integrated aluminium value chain, from bauxite mining to finished products. It stands as the 7th largest global producers of primary aluminium (figure 1) and 2nd largest Alumina and bauxite producer and largest exporter. In 2024, Australian aluminium exports reached approximately USD 4.7 billion (Trading Economics, 2025), and aluminium ores and concentrates accounted for exports totalling about USD 1.12 billion, largely destined for China (World Bank COMTRADE, 2023). However, it faces increasing global uncertainty. The demand for low-emissions aluminium is growing in sectors like automotive and construction, where companies are setting net-zero supply-chain goals. In response, the industry has advocated for adding bauxite, alumina, and aluminium to Australia's Critical Minerals list aligning with partner nations and strengthening Australia's role in the energy transition².

¹ Please refer to industry brief #1 RP 3.006 for more details on embedded emissions, embedded emissions accounting and frameworks.

² <https://aluminiumtoday.com/news/australian-aluminium-council-renews-call-for-inclusion-of-bauxite-alumina-and-aluminium-on-critical-minerals-listing>

Similarly, in the cement industry, major economies are imposing stringent emissions-reduction policies, increasing demand for low-carbon alternatives. Emerging standards such as the Global Cement and Concrete Association's guidelines and national policies promoting sustainable construction materials are reshaping market expectations. Although dominated by domestic output, Australia still imports Portland cement valued at around US \$103 million in 2023, accounting for approximately 1.39 million tonnes, with major suppliers including Vietnam, Indonesia, and Japan (World Bank COMTRADE, 2023; Cement Industry Federation, n.d.). This illustrates significant import exposure and a parallel opportunity to expand low-carbon cement production including innovative binders like limestone calcined clay cement (LC3) and geopolymers options, supported by CCUS integration and to target export-oriented demand through low-carbon infrastructure development.

Given Australia's rich natural resources and access to renewable energy, the nation is well-positioned to become a leader in low-emissions aluminium and cement production. However, fully leveraging this advantage will require significant investment in renewable energy projects, grid infrastructure, and firming capacity to ensure reliable supply. Other regions with stable, affordable green energy such as those harnessing abundant hydro or geothermal power are already exploiting their energy advantage to attract and grow energy intensive heavy industries.

By accelerating investments in cleaner technologies and aligning with global decarbonisation trends, Australia can enhance its export competitiveness, attract investment, and support the transition to a net-zero industrial economy. Also, comprehensive policy support across the entire value chain is essential to sustain and enhance Australia's position in these sectors. With key trading partners implementing carbon border adjustment mechanisms (CBAM) and strengthening emissions regulations, Australian producers that adopt such low-carbon technologies can secure a competitive advantage.

Primary Aluminium Trade Flows

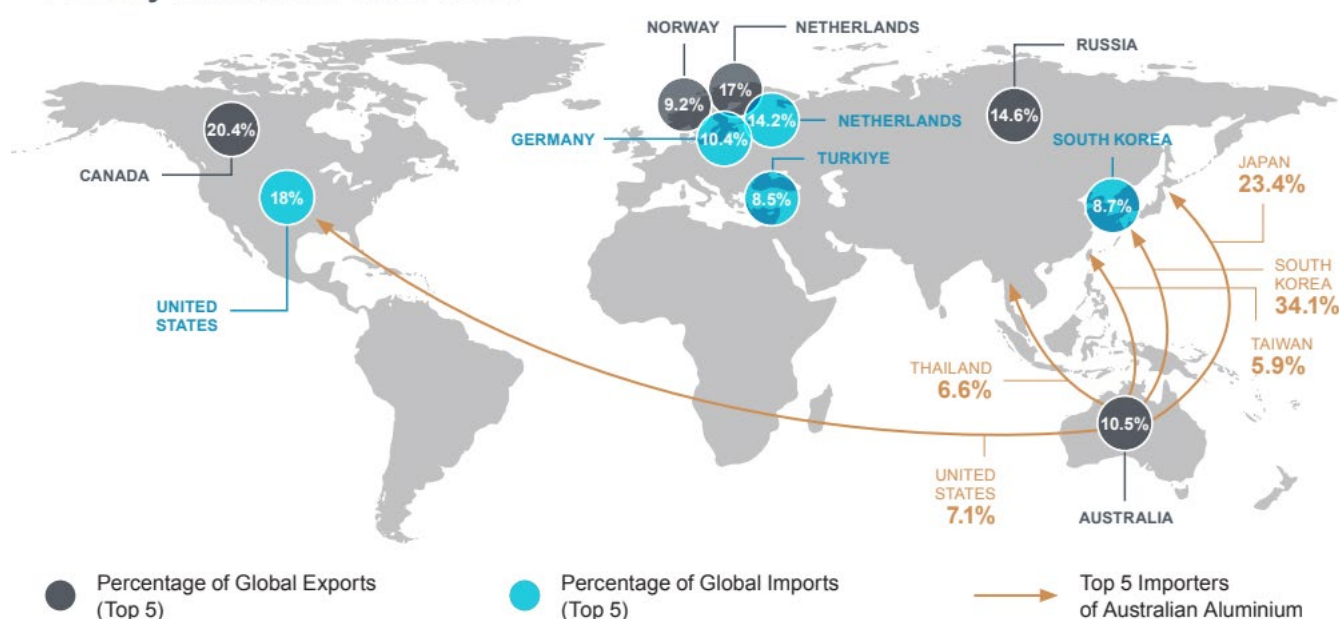


Figure 1 Global trade flows of primary aluminium, imports and exports (Source: Australian Aluminium Council³)

1.3 OBJECTIVE OF THE REPORT

Several previous reports examine Australia's domestic policies in relation to global regulatory developments, offering a holistic perspective on the policy and regulatory landscape driving the transition to low-emissions aluminium and cement production in Australia.

³ <https://Aluminium.org.au/wp-content/uploads/2024/04/2023-Trade-Competitiveness-Factsheet-.pdf>

However, this report draws upon data and information around the policy, regulatory and market initiatives for aluminium and cement which are specifically underpinned by embedded emissions accounting. Key sources of information include policy documents and regulatory filings from government agencies and international bodies; industry reports and academic literature focused on embedded emissions and carbon accounting methodologies.

The report attempts to provide aluminium and cement producers with a comprehensive understanding of the existing and emerging policies and regulatory and market mechanisms linked to embedded emissions accounting. It includes both Australia's domestic policies and initiatives, as well as international agreements and transnational efforts. While a few of regional initiatives were originally published in HILT reports published on iron and steel, they are reiterated in this report to highlight their relevance to aluminium and cement production as well (marked as highlighted in tables). By mapping these developments, it enables industry stakeholders to anticipate the impacts of developments in embedded emissions accounting frameworks for market access, regulatory compliance and alignment with international climate disclosure and sustainability standards. Approach for Mapping Regulatory and Market Initiatives.

The analysis is based on their direct/potential relevance to Embedded Emissions Accounting Frameworks (EEFs) (Australian Aluminium Council, 2024): Direct relevance means that a policy/regulation specifies the need or methodology of embedded emissions accounting or carbon intensity of the product; Potential relevance implies that the need of EEF is anticipated and reflected in guiding documents, may be reflected in different way, or likely to occur in future.

POLICIES AND REGULATIONS RELEVANT TO AUSTRALIAN INDUSTRY

1.4 AUSTRALIAN DOMESTIC POLICIES AND TOOLS

Table 2.1 Australia's domestic policies and regulations with relevance to EEFs⁴

Policies/regulations	Authority	Description	Coverage and timelines	Relevance to EEFs
Federal Government Policies & Initiatives				
Australia's Product Guarantee of Origin Scheme (PGO)	Department of Climate Change, Energy, the Environment and Water (DCCEEW)	PGO is an internationally aligned program that tracks and verifies the emissions of products made in Australia, encouraging sellers to reduce carbon intensity; Increasing transparency for consumers; Establishing stronger markets for green manufacturing.	Under the Australian Government's "Future made in Australia National Interest Framework", a recent "Future made in Australia bill 2024" has been proposed to establish the legislative framework for GO scheme which will provide for the certification of low-emission products. May 2024 budget announcement provides an intention of this bill to expand to green metals such as green iron, steel, alumina and aluminium required to support the energy transition, globally and domestically.	<u>Directly Relevant</u> The Australian Product GO is an example of a public EEF. It aims to certify the information about a product's embedded (supply chain) emissions. This information can then be used to satisfy requirements of some of the other Australian policies listed here. If Aus Gov can negotiate recognition, it may also be able to be used to meet requirements of trade partners' policies. GO certificates may also be directly useful to attract customers and investors.
Carbon Leakage Review	Australian Government (DCCEEW, Productivity Commission)	This review examines strategies to address the risk of carbon leakage within the Australian economy and investigates policies that support the competitiveness of domestic energy intensive industries through incentives, subsidies, or innovation grants for low-	Currently undergoing Consultations and Stakeholder Engagement since 2023.	<u>Directly relevant</u> If implemented, a CBAM may start to be phased in around 2025-2026, with the goal of aligning with broader international practices, such as those being developed by the European

⁴ Yellow highlights indicate policies and regulations applicable to both the aluminium and cement sectors. Grey highlights apply exclusively to aluminium, while light brown highlights apply exclusively to cement.



Policies/regulations	Authority	Description	Coverage and timelines	Relevance to EEFs
		carbon technologies. This approach aims to enhance Australia's position in global low-carbon markets and reduce reliance on carbon-intensive processes.		Union. A CBAM will need to be calculated based on the embedded emissions in imported products – that is – it will rely on information from specified EEFs.
Safeguard Mechanism (SGM) mechanism	Clean Energy Regulator (CER)	It provides a framework for Australia's largest emitters to measure, report and manage their emissions. It does this by requiring large facilities, whose net emissions exceed the Safeguard threshold, to keep their emissions at or below emissions baselines set by the Clean Energy Regulator	SGM was commenced in 2016, reformed in 2023, applies to industrial facilities emitting more than 100,000 tonnes of carbon dioxide equivalent (CO ₂ -e) per year.	<u>Potentially relevant</u> The SGM involves an “intensity baseline”. If SMG reporting requirements and GO reporting requirements are designed with each other in mind, it is possible that duplication of reporting - and thereby regulatory burden - could be reduced.
Climate Active (CA)	Joint initiative between Australian Government and industry	CA is a voluntary Australian government program that offers a clear framework for companies seeking to quantify and reduce the emissions associated with their products and services.	Was launched in 2007 by the Australian Government, undergone significant reforms in 2023.	<u>Directly Relevant</u> CA includes a specific “Carbon Neutral Standard for Products and Services,” which provides guidelines on how to calculate, reduce, and offset the emissions across a product's entire life cycle—from production to disposal. In other words, it contains its own EEF.
\$2 Billion Green Aluminium Production Credit	Australian Government (announced in 2024-25 Budget)	Australia has committed \$2 billion in support of its aluminium smelters to transition to renewable electricity.	Announced as part of the Australian Government's broader energy transition plan, starting in 2023 and continuing through future budgets	<u>Directly Relevant.</u> Aluminium, cement. To qualify for the subsidy, producers will need to prove their product embedded emissions using the expanded Australian Government PGO.
1.5 million Commitment for Definition of Green Materials - Industrial Products	Australian Government (Department of Industry, Science and Resources)	This initiative outlines a commitment to define green materials to help shape and influence standards for green aluminium with our international partners and give technical expertise about definitions for other green metals.	This commitment is expected to be rolled out over 3 years as part of the national green product standards initiative.	<u>Directly Relevant.</u> This commitment ties into the wider regulatory push to establish EEFs for industrial products, ensuring transparency and consistency in assessing embedded emissions for products like aluminium and cement.



Policies/regulations	Authority	Description	Coverage and timelines	Relevance to EEFs
		This work will inform final design and eligibility for the credit.		
\$750M for Green Metals (including aluminium and alumina) technologies	Australian Government (via National Reconstruction Fund)	Part of the broader \$1.7 billion Future Made in Australia Innovation Fund.	It was announced on March 14, 2025. Specific timelines for implementation are not provided.	<u>Directly Relevant</u> . In order to qualify for the subsidy, producers will need to prove their product embedded emissions using the expanded Australian Government PGO.
Built Environment and Embodied Carbon Tools				
National Australian Built Environment Rating system (NABERS) Embodied Carbon rating tool	NSW Government, administered by NABERS and CSIRO	<p>It provides a standardised method to assess the embodied carbon emissions associated with building materials and construction processes, ensuring consistency across the industry.</p> <p>The tool covers major emission sources like the superstructure, substructure, and building envelope, while promoting material reuse and using certified emission data from Environmental Product Declarations (EPDs).</p>	<p>Launched in November 2024, tool will officially launch after pilot testing and is set to become widely available by the end of 2024.</p> <p>the rating system is expected to be integrated into existing frameworks like Green Star and the Climate Active Carbon Neutral Buildings Standard.</p> <p>In New South Wales, the tool is set to gain legislative backing under the State Environmental Planning Policy (Sustainable Buildings) 2022.</p> <p>The Australian Building Ministers have agreed to include a voluntary pathway in the 2025 National Construction Code for commercial buildings to measure and report on embodied carbon using the NABERS tool. This move signifies a step towards integrating embodied carbon considerations into national building standards.</p>	<p><u>Directly relevant</u></p> <p>Rating system relies on data from EPDs which are an established form of EEF.</p>
Good Environmental Choice (AELA) for Aluminium and Cement	Good Environmental Choice Australia (NGO)	Good Environmental Choice declaration for sustainable products, led by	Australia's leading independent ecolabelling organisation, Founded in	<u>Potentially relevant</u>



Policies/regulations	Authority	Description	Coverage and timelines	Relevance to EEFs
		Australian Environmental Labelling Association Inc. (AELA).	December 2000, offering certification for environmentally preferable products across various sectors, including aluminium and cement. In the cement sector, GECA has established the Cement, Concrete and Concrete Products Standard (CCCPv1.0i-2017).	AELA certification is third-party verified, meaning an independent organisation assesses a product; align with internationally recognised environmental standards, such as ISO 14001 (environmental management systems) and ISO 14024 (environmental labelling)
State and Infrastructure Policies				
NSW Decarbonising Infrastructure Delivery Policy and Embodied Emissions Measurement Guidance	NSW Government (Infrastructure NSW)	Policy sets out guidance for government delivery agencies to manage upfront carbon when delivering public infrastructure projects- consistent with the broader targets set out in the Climate Change (Net Zero Future) Act 2023 (NSW).	Developed in 2024. Policy sits alongside other key policies aimed at reducing emissions: • State Environmental Planning Policy (Sustainable Buildings SEPP) 2022 • Net Zero Plan Stage 1: 2020-2030 • NSW Waste and Sustainable Materials Strategy 2041 • Transport for NSW Net Zero and Climate Change Policy • Transport for NSW Net Zero Cities Action Plan • Circular Design Guidelines for the Built Environment • Government Resource Efficiency Policy • Transport for NSW Sustainable Infrastructure Program.	<u>Directly relevant</u> Policy provides clear agency guidance on how to measure and reduce embodied carbon throughout all stages of infrastructure projects.
Embodied Carbon Measurement for Infrastructure: Technical Guidance	Infrastructure Sustainability Council (ISC), in partnership with state agencies	The Guide sets out the scope and methodology to support consistent measurement and reporting of embodied carbon emissions across public infrastructure projects.	developed and released by the Australian Government in 2021 .	<u>Directly relevant</u> Provides technical guidance on for measuring the embodied carbon in infrastructure projects across all Australian jurisdictions.
National Framework for Embodied Carbon in Infrastructure (2020)	Infrastructure Sustainability Council (ISC) and partners	It was developed to guide the measurement and reduction of embodied carbon in infrastructure projects across Australia.		<u>Directly relevant</u> Supports the adoption of embedded emissions accounting for

Policies/regulations	Authority	Description	Coverage and timelines	Relevance to EEFs
				infrastructure by establishing consistent measurement methodologies.
Queensland Green Building Council (QGBC) and Infrastructure Sustainability Council (ISC)	QLD Government (Department of Energy and Public Works) in collaboration with ISC	QGBC provides tools to assess embodied carbon and offers sustainable building standards that integrate carbon emissions measurement in construction materials.	QGBC was founded in 2002; and ISC was established in 2010	<u>Potentially relevant</u> A voluntary certification scheme available to all regions. Supports and mandates the integration of embodied emissions in Queensland's construction and infrastructure projects.
ACT Low carbon concrete policy (LCC) 2025	ACT Government	Policy is designed to enable a consistent approach to reducing embodied emissions from concrete in ACT Government projects and help to normalise and accelerate the uptake of LCC in the ACT more broadly.	Phase 1 of the LCC Policy commences on 1 January 2025 and will apply to projects in the design stage or projects that are able to accommodate the use of LCC without impacting project timelines or budgets.	<u>Directly Relevant</u> policy mandates the use of low embodied carbon concrete in government projects. This directly encourages suppliers to quantify, disclose, and reduce emissions embedded in their concrete products.
GECA Ecolabel	Good Environmental Choice Australia (GECA) – Independent not-for-profit NGO	Certification for Cement, Concrete & Concrete Products (CCCPv1.0i-2017); led by Good Environmental Choice Australia (GECA) Voluntary certification for eco-label products	Australian certification program designed to recognise products and services including cement.	<u>Directly relevant</u> relies on a blend of international standards (ISO, LCA methodologies) and Australian regulations; like ISO 14025, ISO 14024, LCA, to guide the preparation of EPDs, and often align with the Green Star rating system used by the Green Building Council of Australia (GBCA).

1.5 INTERNATIONAL BILATERAL AGREEMENTS AND POLICIES

Australia's bilateral agreements and policies are increasingly shaped by the imperative for robust Embedded Emissions Accounting Frameworks (EEFs), underscoring the government's commitment to ensuring the competitiveness of Australian industry on the global stage. This proactive approach is evident in Australia's efforts to develop tailored embedded emissions accounting systems, which are integral to its international cooperation agreements, outlined in table 2.2).

Table 2.2 Australia's international bilateral policies with relevance to EEFs

Policies/regulations	Description	Coverage and timelines	Relevance to EEFs
Australia-China Memorandum of Understanding on Climate Change Cooperation	Bilateral agreement, emphasising cooperation in energy efficiency, technology transfer, emissions data reporting, and the development of low-carbon technologies.	First signed in 2014	<u>Potentially relevant</u> The MOU includes goals to improve emissions tracking and reporting, which may intersect with efforts to measure and report carbon intensities of products.
Indo-Pacific Economic Framework for Prosperity (IPEF)	a first-of-its kind regional agreement which sets the framework for regional clean economy cooperation into the future to boost the net zero transition. It has 3 pillars: - IPEF supply chain agreement - IPEF Clean economy agreement - IPEF fair economy agreement	Announced in November 2023 with several initiatives and work programs being launched.	<u>Directly relevant</u> IPEF clean economy agreement has key initiative with Australia- an "emissions intensity accounting work program", announced in June 2024, to explore and share information on interoperable regional methodologies that can better classify, assess, identify and trade emerging low emissions products.
Singapore-Australia Memorandum of Understanding for Cooperation on Low-Emissions Technologies and Solutions (2020)	Fosters bilateral collaboration on advancing low-emissions solutions, including the development of emerging technologies.	Signed in 2020- designed to foster collaboration key areas such as low-carbon hydrogen, carbon capture, utilisation and storage (CCUS), renewable energy trade, and emissions monitoring and reporting.	<u>Potentially relevant</u> includes working on measurement, reporting, and verification (MRV) of emissions, which aligns with efforts to enhance transparency and accountability in emissions reductions.
Singapore-Australia Green Economy Agreement	Builds on bilateral cooperation on existing areas such as MoU on low-emission technologies and solution,	Signed on 18 October 2022, spanning over key areas such as decarbonisation, trade and investment, standards and conformance, engagement and partnerships.	<u>Potentially relevant</u> It recognises that standards, technical regulations, and conformity assessment procedures enhance system compatibility, interoperability, and trade, supporting a green economy.

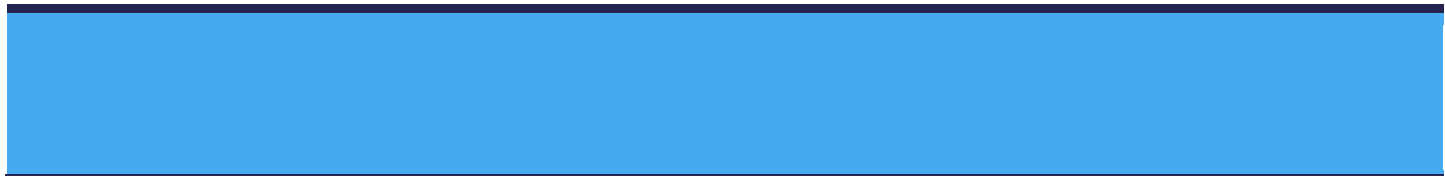
REGIONAL AND DOMESTIC POLICIES AND REGULATIONS IN KEY ECONOMIES

1.6 REGIONAL AND DOMESTIC INITIATIVES IN KEY ECONOMIES

Regional and domestic policies in key economies play a pivotal role in setting the direction for Embedded Emissions Accounting Frameworks (EEFs). For Australia, these policies are significant as they shape the regulatory and market conditions of its major export destinations, particularly for carbon-intensive products like iron and steel. Aligning with these policies ensures that Australian industries remain competitive in evolving low-carbon markets, while also minimising risks related to trade barriers such as carbon border adjustment mechanisms (CBAMs). This section includes initiatives of different regions and countries such as Roadmaps, plans and targets, <https://iea.blob.core.windows.net/assets/cfd54d6e-fdf2-4582-83de-31d651c4cb14/PolicyToolboxforIndustrialDecarbonisation.pdf>

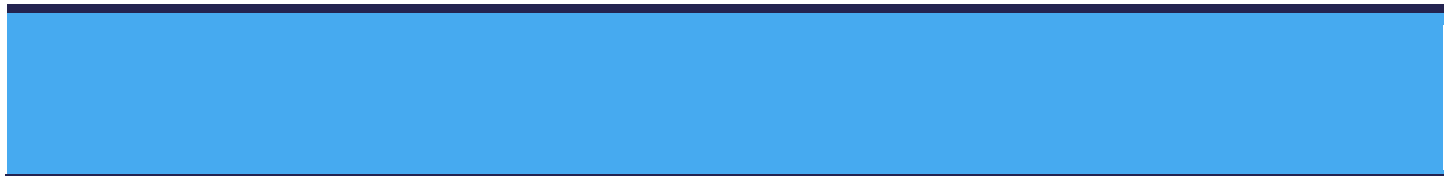
Table 3.1 Regional and domestic policies and regulations with relevance to EEFs

REGION/COUNTRY	POLICY/REGULATION	RELEVANCE TO EMBEDDED EMISSIONS, EMISSION INTENSITY TARGETS	SCOPE AND COVERAGE	IMPLEMENTATION TIMELINES AND	COMPLIANCE (VOLUNTARY OR MANDATORY)
EU	EU CBAM	No explicit reduction target but aims to equalise carbon pricing between EU and non-EU regions. The target is to prevent carbon leakage by including the carbon intensity of imported products.	CBAM adjusts the price of carbon for imported aluminium products, not alumina, to align with the EU's carbon pricing. Targets depend on the carbon pricing adjustments for imports.	2023-2026 (gradual implementation, full implementation by 2026).	Mandatory (for imports to the EU)
	EU-U.S. Joint Statement on Steel and Aluminium (2021)	Negotiating on The Global Arrangement on Sustainable Steel and Aluminium (GASA) on carbon intensity-based tariffs and establishing policies to ensure transparent emissions accounting, as these sectors are among the largest emitters globally.	Statement was passed in 2021 and currently negotiating GASA. It is designed to be inclusive, allowing countries with similar environmental goals to join in, and had set two-year timeframe for establishing a technical working group and developing a methodology for assessing embedded emissions of traded steel and aluminium, and for negotiating a global arrangement on sustainable steel and aluminium By the end of this phase, the participating		



REGION/COUNTRY	POLICY/REGULATION	RELEVANCE TO EMBEDDED EMISSIONS, EMISSION INTENSITY TARGETS	SCOPE AND COVERAGE	IMPLEMENTATION TIMELINES AND	COMPLIANCE (VOLUNTARY OR MANDATORY)
			countries intend to set common standards and practices to address carbon intensity and foster fairer competition through sustainable trade ⁵		
United States (US)	Inflation Reduction Act (IRA)	IRA specifies embedded emissions accounting rules for hydrogen which is critical input for producing green steel through the H2-DRI process.	Includes EPA labelled program and funds to identify and label products and materials with low embedded carbon, This specifically includes steel, and program to support reporting and measurement of embedded carbon (through grants, technical assistance. www.epa.gov/greenerproducts/label-program-low-embodied-carbon-construction-materials .	2030 targets for the US overall.	Voluntary (incentives for industry)
	Buy Clean California Act (BCCA)	First US state to pass green procurement initiatives on product-level accounting	Specifies the product category rule (PCR), and EPD, publish GWP and independent verification system for embedded emissions accounting for steel products.	Signed into law in 2017, and became effective in 2018, with major developments in GWP limits in 2021-2022.	Mandatory for public projects, requires state agencies to consider the embodied carbon emissions of specific construction materials when awarding contracts.
	Federal buy clean initiative in US	Reduction of embodied carbon in federal procurement (exact target varies by material, including steel).	Aims to reduce the carbon intensity of construction materials purchased by the federal government, including steel.	2023 and ongoing for federal procurement	Mandatory (for federal procurement)

⁵ https://ec.europa.eu/commission/presscorner/api/files/document/print/en/ip_21_5724/IP_21_5724_EN.pdf



REGION/COUNTRY	POLICY/REGULATION	RELEVANCE TO EMBEDDED EMISSIONS, EMISSION INTENSITY TARGETS	SCOPE AND COVERAGE	IMPLEMENTATION TIMELINES AND	COMPLIANCE (VOLUNTARY OR MANDATORY)
	United States-Mexico-Canada Agreement (USMCA)	Provides framework for cross-border emission reduction strategies, including steel.	Provides guidelines for measuring and reporting emissions in cross-border trade, particularly steel.	Ongoing, with ongoing implementation under the trade agreement framework.	Mandatory (under trade agreements)
Japan	Carbon Border Adjustment Mechanism (CBAM) (Proposed)	A proposed mechanism that could impose carbon pricing adjustments on steel imports to Japan, encouraging low-carbon production. Aims to mitigate carbon leakage.	As with all CBAMs, will rely on embedded emissions information generated by some sort of EEFs.	Proposed, likely in the coming years	Mandatory (for imports)
China	China National Standards	GB/T 30052-2013- Life cycle assessment specification on steel products Product category rules	cradle to gate boundary (products) with recycling	Developed by the Standardization Administration of the People's Republic of China in 2013	Voluntary standard
	China's ETS Inclusion for aluminium	Expand emissions trading system (ETS) to cover aluminium, aiming for significant reductions.			
France	France's Industrial Decarbonisation Roadmap	EUR 5.6 billion investment for domestic industry decarbonisation, including aluminium.			
Singapore	Carbon Tax (2019)	\$10-\$20 per ton of CO2 by 2024	The tax applies to industrial emitters, including steel, based on their carbon intensity.	2030 for interim reduction goals, 2050 for net-zero.	Voluntary (industry-driven)
United Arab Emirates	UAE industrial strategy "operation 300bn"	17 initiatives of strategy including establishing standards negotiating reciprocal trade agreements and work to control the classification	In alignment with UAE's circular economy policy 2021-2031, to boost industrial sector's competitiveness.		



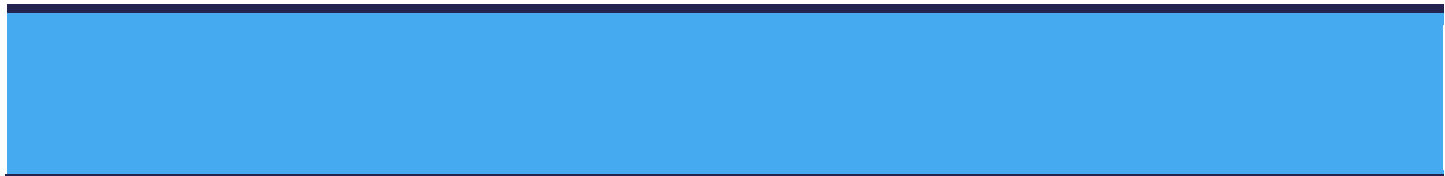
REGION/COUNTRY	POLICY/REGULATION	RELEVANCE TO EMBEDDED EMISSIONS, EMISSION INTENSITY TARGETS	SCOPE AND COVERAGE	IMPLEMENTATION TIMELINES AND	COMPLIANCE (VOLUNTARY OR MANDATORY)
		system of traded products for export and import.			
	Carbon Border Adjustment Mechanism (CBAM) (Proposed)	This will initially apply to imports of certain goods and selected precursors whose production is carbon intensive and at most significant risk of carbon leakage: cement, iron and steel, aluminium, fertilisers, electricity and hydrogen			
United Kingdom	Carbon Border Adjustment Mechanism (CBAM)	No specific reduction target, but aimed at addressing carbon leakage.	Under consideration, this mechanism may affect imports from non-EU countries, including steel, by adjusting prices based on carbon intensity.	Under consideration, potential future policy	Mandatory (for imports)

1.7 TRANSNATIONAL INITIATIVES

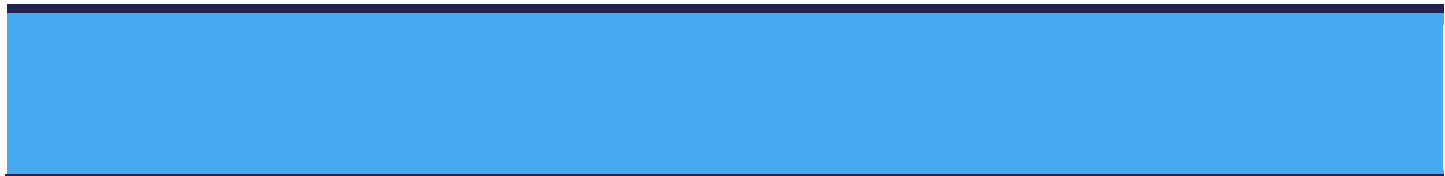
Table 3.2 Transnational initiatives with relevance to EEFs

Several transnational initiatives are actively shaping the development and implementation of Embedded Emissions Accounting Frameworks (EEFs) for aluminium and cement products. As a major exporter and producer of emissions-intensive materials, Australia's active participation in these initiatives is critical to aligning domestic practices with evolving international standards. Such engagement ensures that Australian aluminium and cement industries remain competitive in emerging low-carbon markets while supporting global decarbonisation efforts in hard-to-abate sectors.

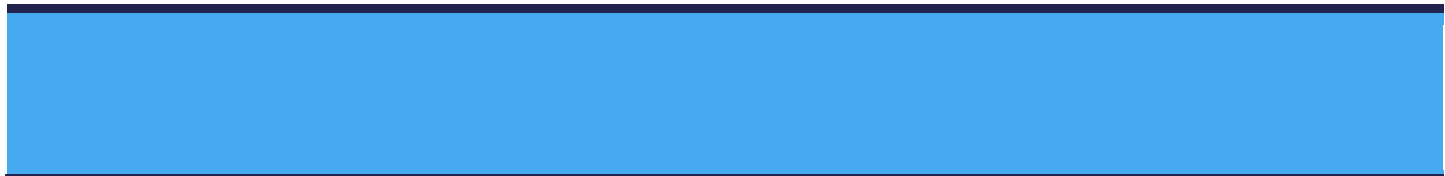
INITIATIVES	DESCRIPTION	AUSTRALIA'S PARTICIPATION	RELEVANCE TO EEFs
Aluminium Industry Greenhouse Gas Initiative	A program launched by the International Aluminium Institute (IAI) during the United Nations Climate Change Conference (COP28) in Dubai. This initiative aims to enhance transparency and accountability in the aluminium sector's efforts to reduce greenhouse gas emissions.	Notably, companies such as Rio Tinto Aluminium and South32 are among the signatories of this initiative.	Directly Relevant The initiative promotes ambition and reporting commitments to track aluminium decarbonisation progress. Buyers committed to purchasing specific low-carbon aluminium volumes by 2030 also support the consistent use of emissions measurement methodologies and reporting.
The Mission Possible Partnership (MPP)	An alliance of leading climate organisations released 2030 Milestones for seven hard-to-abate industrial and transport sectors, following publication of transition strategies endorsed by more than 200 industrial companies.	Australia is not formally a national member, Australian stakeholders, and industries like steel, aviation, aluminium are engaged in MPP initiatives. www.missionpossiblepartnership.org/action-sectors/steel/	<u>Directly Relevant</u> For HILT partners, this partnership represents an important example of how industry can work together to define actionable, transparent frameworks for emissions reduction.
Mission Possible Partnership (MPP) – Aluminium Transition Strategy	The MPP, a coalition of businesses, governments, and civil society, works to accelerate the decarbonisation of the aluminium sector by demonstrating pathways to a net-zero emissions future.	Primarily facilitated through the participation of its key industry players. Notably, Rio Tinto, a major Australian mining and metals company, has endorsed MPP's Aluminium Transition Strategy, which outlines a pathway for the global aluminium sector to achieve net-zero emissions by 2050.	Directly Relevant MPP's Aluminium Transition Strategy emphasises the need for consistent and transparent emissions reporting across the aluminium sector.



INITIATIVES	DESCRIPTION	AUSTRALIA'S PARTICIPATION	RELEVANCE TO EEFS
Aluminium Stewardship Initiative (ASI)	Global certification program for the aluminium value chain that aims to ensure that aluminium is produced with responsible environmental practices, including reduced carbon emissions.	Several leading Australian aluminium producers, such as Rio Tinto, Alcoa, and Australian Aluminium Council members, are involved in the ASI. These companies actively participate in the ASI's Performance Standard and Chain of Custody Standard,	Directly Relevant It provides a standardised approach to calculating and certifying the embedded emissions associated with aluminium products. Also, ASI's Chain of Custody Standard, to track emissions along the supply chain.
Science Based Targets Initiative (Aluminium)	SBTi for Aluminium provides a framework for companies to set targets that are scientifically aligned with global climate goals, encompassing scope 1,2 and 3 emissions.	Through industry players. For example: Rio Tinto (an Australian-British multinational mining and metals company) has committed to setting science-based targets through the SBTi for its aluminium production,	Directly Relevant The framework relies on sector specific methodologies using standards such as Greenhouse Gas (GHG) Protocol, ISO 14067 (for carbon footprint), or sector-specific initiatives like the Aluminium Stewardship Initiative (ASI) for aluminium.
G7 Climate Club	An initiative proposed by the G7 nations to create a cooperative framework for accelerating global climate action, particularly among industrialised economies.	While Australia is not a member of the G7 itself, it is actively involved in climate discussions and is a participant in other multilateral frameworks related to climate action, such as the UNFCCC (United Nations Framework Convention on Climate Change), COP (Conference of the Parties) negotiations, and Asia-Pacific Economic Cooperation (APEC) climate initiatives.	Directly Relevant One of the key objectives of the club is about aligning standards, regulatory frameworks, and certifications to promote carbon transparency across borders. This would include aligning standards for low-carbon materials, such as low-emissions aluminium and cement .
Global Aluminium Association's Low-Carbon Roadmap	An initiative aimed at guiding the aluminium industry; led by the Global Aluminium Association (GAA) , which represents the interests of the aluminium industry globally.	Australian aluminium producers, such as Rio Tinto and Alcoa , are members of the GAA and actively contribute to its initiatives.	<u>Directly Relevant</u> One of the key aspects of GAA's Low-Carbon Roadmap is quantifying carbon footprint across the supply chain to ensure accurate measurement and verification of emissions.



INITIATIVES	DESCRIPTION	AUSTRALIA'S PARTICIPATION	RELEVANCE TO EEFS
The Global Breakthrough Agenda	<p>countries representing more than 50% of global GDP set out sector-specific 'Priority Actions' to decarbonise power, transport and steel:</p> <p>Develop common definitions for low-emission and near-zero emission steel.</p>	<p>Represents more than 45 countries including Australia.</p> <p>www.iea.org/reports/breakthrough-agenda-report-2024</p>	<p><u>Potentially relevant</u></p> <p>By addressing the challenges of affordability, accessibility, and coordination across sectors, the agenda underscores the importance of integrated standards and market mechanisms, which could involve embedded emissions accounting frameworks in future regulatory initiatives.</p>
Mission Innovation	<p>A global initiative to accelerate clean energy innovation, including decarbonisation in the steel sector.</p>	<p>Include 23 countries including Australia</p>	<p><u>Potentially relevant</u></p> <p>Australia's role in Mission Innovation aligns with its National Hydrogen Strategy and other decarbonisation initiatives in the steel sector, promoting the development of green steel and low-carbon technologies.</p> <p>https://mission-innovation.net/</p>
Industrial Decarbonization and Development Initiative (IDDI)	<p>A global initiative focused on advancing the decarbonisation of heavy industries like steel through collaboration, policy advocacy, and funding for low-carbon technologies.</p>	<p>www.unido.org/IDDI</p> <p>Works with Australia as a part of clean energy ministerial (CEM).</p>	<p><u>Directly relevant</u></p> <p>One of its goals is to develop clear definitions, methodologies, and guidelines that can be universally applied to sectors that are difficult to decarbonise, like steel.</p>
First Movers Coalition (FMC) by the World Economic Forum (WEF)	<p>A global initiative aimed at accelerating the adoption of low-carbon technologies, including in steel, by creating a demand-side pull for net-zero emissions solutions.</p>	<p>Australia joined in 2023, amongst the 13 governments.</p> <p>https://initiatives.weforum.org/first-movers-coalition/home</p>	<p><u>Potentially relevant</u></p> <p>This market driven approach could shape EEFS when the global demand signals from FMC begin to shape regulatory frameworks.</p>



INITIATIVES	DESCRIPTION	AUSTRALIA'S PARTICIPATION	RELEVANCE TO EEFS
Climate Bonds Initiative	The initiative lays out a Steel Criteria and requirements: climate bond standard for Steel production, contain Mitigation Requirements, Adaptation & Resilience Requirements and Transition Requirements.	www.climatebonds.net/	<u>Directly relevant</u> www.climatebonds.net/files/files/CBI_Method_Criteria_03F%281%29.pdf
Cement Sustainability Initiative (CSI) (now GECA)	Voluntary industry reporting by World Business Council for Sustainable Development (WBCSD), GECA	Australian companies such as Holcim Australia (formerly known as Cement Australia) and Boral are engaged.	<u>Potentially relevant</u> The GECA's efforts to promote sustainability and reduce emissions in the cement sector have significant relevance for the development of policy frameworks around carbon pricing, green subsidies , and carbon border adjustments . As these regulatory measures become more widespread, they will likely incorporate EEF principles ⁶ for tracking embedded emissions, which can impact the market access and competitiveness of cement and concrete products.
Cement Innovation for Climate (CIC)	Frameworks for alternative clinker use: lead by CIC, European Cement Research Academy (ECRA), HeidelbergCement	Represented by major producers like Boral , Holcim Australia , and Adelaide Brighton Cement	<u>Potentially relevant</u> Specifies alignment with global standards and frameworks, life cycle analysis methods to ensure consistent and transparent emissions measurement and carbon accounting .
GECA Ecolabel	Certification for Cement, Concrete & Concrete Products (CCCPv1.0i-2017); lead by Good Environmental Choice Australia (GECA) Voluntary certification for eco-label products	Australian certification program designed to recognise products and services including cement.	<u>Directly relevant</u> relies on a blend of international standards (ISO, LCA methodologies) and Australian regulations; like ISO 14025, ISO 14024, LCA, to guide the preparation of EPDs, and often align with the

⁶ White, L. V., Aisbett, E., Pearce, O., & Cheng, W. (2025). Principles for embedded emissions accounting to support trade-related climate policy. *Climate Policy*, 25(1), 109-125.



INITIATIVES	DESCRIPTION	AUSTRALIA'S PARTICIPATION	RELEVANCE TO EEFS
			Green Star rating system used by the Green Building Council of Australia (GBCA).
Good Environmental Choice (AELA) for Aluminium and Cement	Good Environmental Choice declaration for sustainable products, lead by Australian Environmental Labelling Association Inc. (AELA)		<u>Potentially relevant</u> AELA certification is third-party verified , meaning an independent organisation assesses a product; align with internationally recognised environmental standards, such as ISO 14001 (environmental management systems) and ISO 14024 (environmental labelling)

KEY FINDINGS

The transition to near-zero emissions aluminium and cement is increasingly influenced by both industry-driven initiatives and evolving regulatory frameworks. Policies and regulations like Carbon Border Adjustment Mechanisms (CBAMs) which are directly relevant and underpinned by robust embedded emissions accounting, are reshaping market access, trade policies, and industry strategies. These rules are becoming central to regulatory and financial mechanisms that govern green subsidies, sustainable investment taxonomies, and compliance with international trade policies. Governments, including Australia, the EU, and the U.S., are increasingly integrating EEFs into their industrial policies, influencing investment flows and trade competitiveness. However, inconsistencies between different EEFs across jurisdictions pose a major challenge, creating compliance burdens and potential trade barriers.

Despite significant challenges, producers in both sectors are proactively positioning themselves in emerging markets, securing financing, and initiating the first near-zero emissions production facilities from 2025. Early offtake agreements, including those involving Brimstone (develops a **carbon-negative cement** process that meets **industry-standard ASTM C150 requirements for ordinary Portland cement**), Fortera⁷ (**ReCarb®, a low-carbon cement technology**), Hydro, and Rio Tinto⁸ (carbon capture technology for aluminium smelting), signal the formation of a market for low-carbon materials. Meanwhile, industry associations such as the Aluminium Stewardship Initiative (ASI) and the Global Cement and Concrete Association (GCCA) are developing certification, labelling, and emissions accounting frameworks to facilitate this transition. However, these voluntary initiatives, while important, lack the regulatory authority to drive large-scale investment and global market alignment.

For aluminium and cement producers, these frameworks will dictate competitive positioning in global markets. For aluminium, the Aluminium Stewardship Initiative (ASI) has taken a leadership role in establishing emissions reporting standards. However, its voluntary nature limits its impact on shaping governmental policies and CBAM regulations. A similar challenge exists in the cement sector, where GCCA's proposed low-carbon cement definitions are an important step but remain insufficient to drive global regulatory alignment. Governments must play a more active role in ensuring harmonisation of EEFs across major economies to provide clear market signals and reduce compliance complexity for producers.

Australia's Guarantee of Origin (GO) framework serves as a potential model for integrating EEFs into national policies. If Australia proceeds with a CBAM, aligning its accounting rules with GO and ensuring interoperability with international frameworks will be crucial to maintaining trade competitiveness and avoiding regulatory friction. In this context, the role of HILT partners, ASI, GCCA, and national governments is vital in advocating for mutual recognition and standardisation of emissions accounting frameworks.

Ultimately, achieving large-scale deployment of near-zero emissions aluminium and cement requires a coordinated approach between industry players, governments, and standard-setting organisations. While industry-led certification and voluntary standards are advancing transparency, they must be complemented by government policies that drive regulatory alignment, investment incentives, and international cooperation. Only through such an integrated approach can aluminium and cement industries scale near-zero emissions production, navigate evolving trade regulations, and contribute meaningfully to global climate goals.

⁷ <https://carbonherald.com/fortera-raises-85m-to-scale-low-carbon-cement-tech>

⁸ www.riotinto.com/en/news/releases/2025/rio-tinto-and-hydro-partner-on-carbon-capture-technologies-for-aluminium-smelters

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