CEMENT CONCRETE & AGGREGATES AUSTRALIA

CCAA Submission to the Productivity Commission **Inquiry into Opportunities in the Circular Economy**

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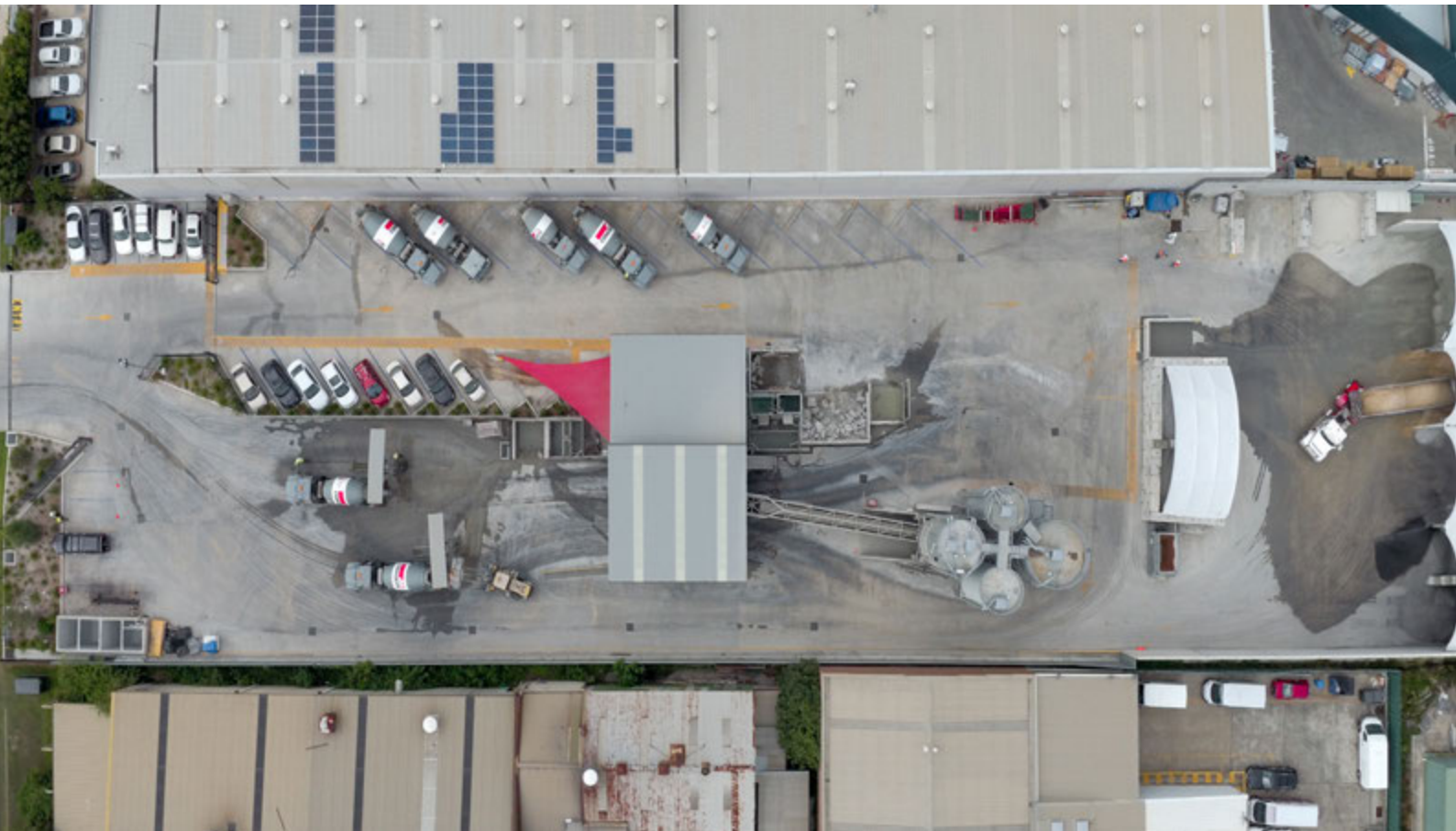

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Executive Summary

Cement Concrete and Aggregates Australia (**CCAA**) welcomes the opportunity to respond to the call for submissions relating to the Productivity Commission Inquiry into Opportunities in the Circular Economy.

CCAA is the voice of the heavy construction materials industry in Australia. Our members operate cement manufacturing and distribution facilities, concrete batching plants, hard rock quarries and sand and gravel extraction operations throughout the nation. The cement, concrete and aggregates industry has been a long-term leader using modern circular economy principles for decades, including utilising the by-products of other industries and various other secondary materials. But more can be done, especially in breaking down the barriers to expand the re-use and recycling of the next generation of materials.

CCAA makes the following recommendations:

1. **Develop Environmental Incentives**
   That the government develop appropriate environmental incentives, to encourage the adoption of circular economy principles across industries.
2. **Review Regulatory Barriers for Concrete Waste Re-Processing**
   That state governments review and remove regulatory barriers, such as additional consents, preventing the re-processing of concrete waste by quarries, streamlining approval processes. Including by ensuring that concrete waste, when returned for re-processing or use, is recognised as a product, and not subject to waste regulations.
3. **Update Building Standards and Approval Processes**
   That regulatory bodies review and update building standards to accommodate the use of recycled and alternative materials, speeding up approval processes for innovative construction methods and materials.
4. **Encourage Changes to Cement Standards**
   That state and territory governments support redesigning Australian Standards (e.g. AS3972-2010) to allow higher limestone additions, and greater use of supplementary cementitious materials, facilitating the adoption of new, lower-carbon cement types.
5. **Fit for Purpose State Transport Specifications**
   That state transport agencies adopt fit-for-purpose specifications to increase the use of recycled materials, reduce costs, and promote more efficient resource utilisation in infrastructure projects.
6. **Adopt a Whole-of-Government Approach**
   That governments take a coordinated, whole-of-government approach, aligning transport, environmental, and sustainability agencies to promote the use of recycled and alternate materials in infrastructure, ensuring they meet performance standards.
7. **Performance-Based Specifications for Construction**
   That state governments introduce performance-based specifications for road infrastructure to increase demand for recycled and alternative materials, reducing reliance on prescriptive standards.

8. **Financial Incentives and Public Procurement Policies**
   That governments introduce financial incentives and supportive public procurement policies to drive the market demand for circular economy solutions, encouraging industry investments in circular practices.

9. **Promote Industry Partnerships for Innovation**
   That the government encourage partnerships between industry, research institutions, and government agencies to drive innovation and accelerate the commercialisation of circular economy technologies.

10. **Improve Access to Information on Circular Materials**
    That governments support the development of centralised platforms providing reliable information on the availability and performance of circular materials to help industry transition more effectively.

11. **Fund Supply Chain Training**
    That state and federal governments fund training initiatives across supply chains, helping project managers and contractors understand and implement fit-for-purpose circular economy principles, including the use of recycled materials in construction projects.

12. **Enable national adoption of beneficial Circular Economy initiatives**
    That the Productivity Commission encourage governments to enable a simplified pathway for the sharing and adoption of effective and beneficial circular economy initiatives between jurisdictions.

More broadly, CCAA also recommends that governments go beyond removing barriers to circular economy adoption, and actively share information on proven practices and science-backed circular economy concepts. To educate the public and government, helping to dispel common misconceptions and align efforts with regulatory and state goals. Not all material diversion is inherently positive; CCAA emphasises the importance of prioritising genuinely beneficial practices that provide clear value to the community, and drive effective, sustainable outcomes for communities.

CCAA looks forward to engaging further on these and other opportunities in the Circular Economy.

CCAA Members

FOUNDATION MEMBERS

Companies that originally formed CCAA.

ADBRI

BORAL

CEMENT AUSTRALIA

Hanson HEIDELBERGCEMENT Group

HOLCIM

MEMBERS

Companies engaged in the manufacture or supply of cement, concrete or extractive products. Currently CCAA has over 70 Ordinary Members.

ADBRI Quarries

Catalano

Barossa Quarries

Barro Group

Baxters Concrete & Quarries

Benedict

Bracalba Quarry

Broadway & Frame

Coastal Sands

CCS Group

CQ

Clay & Mineral

CB Cleary Bros

CAMM Group

Concrete Goulburn

Concrite

Daracon Group

Daracrete

Duggans Precast-Quarry-Earthworks Premixed Concrete

Elvin Group

Entire Concrete

Eziway Concrete

flyash Australia

Fulton Hogan

Gadtech

GreenTech Cement

Gunlake Concrete

Hallett Group

hazellbros

Hillview Quarries

Hymix

Hytec

Independent Cement

ASSOCIATE MEMBERS

Entities that are directly related to the manufacture and supply of cement, concrete and extractive products - e.g. suppliers of plant and equipment, concrete admixtures & supplementary materials.

Introduction

CCAA is the voice of the heavy construction materials industry in Australia. Our members operate cement manufacturing and distribution facilities, concrete batching plants, hard rock quarries and sand and gravel extraction operations throughout the nation.

CCAA members produce the majority of Australia's cement, concrete, and aggregates, which are crucial to Australia's building and construction sectors. These materials support the development of our nation's transport, energy, water, housing, defence, and social infrastructure. The industry generates approximately $15 Billion in annual revenues and employs approximately 30,000 Australians directly and a further 80,000 indirectly.

The Australian Productivity Commission's Inquiry into the Circular Economy seeks submissions on how Australia can improve materials productivity and efficiency. It focuses on sectors such as mining, construction, manufacturing, agriculture, and waste management.

The Inquiry invites feedback on successful circular economy activities, barriers to adoption, and priority opportunities to reduce material use, boost productivity, and enhance environmental outcomes. The Inquiry also explores the role of government in enabling these changes through regulation, incentives, and collaboration, and seeks examples of circular economy innovations that could be applied across industries and supply chains.

Background

- Concrete is the most used construction material in the world today, and cement and aggregates are key ingredients in concrete.
- Concrete underpins Australia's $150 billion building and construction industry and contributes to Australia's economic and social well-being through employment, taxation, and investment activities.
- Over 30 million cubic metre of concrete is produced in Australia per annum supplied by around 1,300 concrete batching plants. A cubic meter of concrete contains approximately 250kg of cement/cementitious material, 700kg of sand, 1,200kg of aggregates.
- Some 200 million tonnes of aggregates are used in the construction of homes, workplaces, public buildings, and infrastructure every year.
- In Australia, a large proportion of concrete is produced in premixed concrete batching plants and delivered in a plastic state to construction sites. A 'just-in time' product, premixed concrete is mixed and delivered locally to order, using locally sourced materials, labour, and other resources.
- The resulting social and economic benefits are felt in large cities and industrial hubs, as well as in small rural communities.
- Concrete can be moulded into any shape and, due to its strength and durability, will continue to be the base for housing and infrastructure and subsequently for economic growth, societal wellbeing, and prosperity. It will also be the foundation of future low carbon infrastructure.
- Premixed concrete is manufactured at batching plants that are typically located strategically within a radius of 45-minute travelling time from major development areas.

Concrete is durable: buildings can be reused and repurposed long after original design life has expired, maximising use of resources and slowing the circular economy loop. Concrete's durability also makes it ideal for design for disassembly. Elements can be designed for recovery and reused in new projects. At end of life, if reuse, repurpose or disassembly are not feasible, concrete demolition waste can be recycled as an aggregate, reducing both the extraction of new raw materials and the amount of waste sent to landfill.

The cement, concrete and aggregates industry has been a long-term leader using modern circular economy principles for decades, utilising the by-products of other industries and various other secondary materials.

Contribution areas are well summarised in this short CCAA explainer video. But more can be done, especially in breaking down the barriers to expand the re-use and recycling of the next generation of materials.

The environmental impacts of construction and demolition (**C&D**) waste in Australia are significant, with 33% of waste generation attributed to building and demolition.[1] However, despite 78%[2] of all C&D waste being recycled, a large amount of it still goes to landfill, resulting in negative local environmental outcomes.

The heavy construction materials industry is already making a strong effort to reduce waste and lower the carbon intensity of manufacturing by:

- Increasing use of by-products from other industries (such as blast furnace slag from steel production and fly ash from electricity generation) in the concrete manufacturing process.
- Transforming waste into alternative fuel for cement kilns.
- Recovering and reusing surplus materials in the production of recycled construction materials. Noting that recycled aggregate materials are a welcome addition to the market, not a replacement for virgin quarried materials. In Victoria for example, about 86 per cent[3] of construction and demolition (C&D) waste is recycled, providing about 6.3 million tonnes of material[4]. This is about 10 per cent of the virgin quarry market.
- CCAA supports procurement of recycled materials for construction projects, on a Fit for Purpose Use and Highest and Best Use of Materials basis. The ecologiQ program in Victoria is a good example of this process – see Case Study example in this submission.

Other Opportunities

- CCAA supports strengthening end markets for recycled materials by updating standards and specifications. Whole-of-government approach to developing performance-based specifications requires all stakeholders to work together.
- An increased emphasis on performance-based specifications rather than the current prescriptive infrastructure specifications would help to increase market demand. As well, a whole-of-government and consistent approach will give confidence in the quality and safety of these products and provide the long-term policy setting that is required to support industry investment.

With the right harmonised policy settings across Australia, more can be done to achieve a wide based circular economy.

Note: This submission should be read in conjunction with the submission from the Cement Industry Federation, which also discusses circularity issues in relation to the Australian Integrated cement manufacturing industry.

[1] DCCEEW *National Waste Report 2022 fig*ure 31: 112 https://www.dcceew.gov.au/sites/default/files/documents/national-waste-report-2022.pdf

[2] Ibid: figure 29

[3] Waste and Recycling in Victoria Recycling Industry waste report 2019–20 - page 31 https://assets.sustainability.vic.gov.au/susvic/Report-Waste-Recycling-Industry-Report-2019-20.pdf

[4] Earth Resources Regulation 2019-20 Annual Statistical Report - page 5 https://resources.vic.gov.au/__data/assets/pdf_file/0008/626696/Earth-Resources-Regulation-Statistical-Report-2019-2020.pdf

Decarbonisation Pathways for the Industry

In 2021, an independent Decarbonisation Pathways for the Australian Cement and Concrete Sector Report developed by VDZ[5] was released, following the Australian cement and concrete industry declaring its ambition to deliver net zero carbon cement & concrete by 2050.

The report enables a better understanding of the technologies and practices necessary to decarbonise Australian cement and concrete, and identifies eight decarbonisation pathways and key future research requirements.

Within the pathways, the report identifies several circular economy opportunities for the Australian cement and concrete sector. Key opportunities include increasing the use of alternative fuels derived from waste, enhancing the recycling and re-use of concrete, and pro

oting the use of supplementary cementitious materials (SCMs) like fly ash and slag.

Additionally, it highlights the potential for carbon capture, utilisation and storage (CCUS) particularly in transforming CO_2 emissions into usable products. These strategies aim to reduce waste, lower CO_2 emissions, and increase resource efficiency across the supply chain, contributing to sustainable practices in the construction industry.

Circular economy examples

General examples of how the industry has adopted to the requirements of the circular economy include:

Use of supplementary cementitious materials (SCMs)

Cement and concrete can contain constituents or additions, such as fly ash (a by-product from the coal fired power sector), granulated blast furnace slag (a by-product from the steel manufacturing process, amorphous silica) or unburnt ground limestone. These so-called supplementary cementitious materials (SCMs) have been used in the sector for a long time. They contribute to the cement and concrete performance and are also used to produce cements and concretes that can exhibit properties for dedicated applications. At the same time, SCMs can substitute for clinker in cement and in concrete and thus lower the CO_2 footprint of both.

Typically, 30-50%[6]of cement content can be replaced by SCMs that would otherwise end up in landfill.

Alternative fuels

Similarly, alternative fuels derived from industrial by-products and waste materials, including municipal refuse, spent oils, rubber, plastics, wood waste can be used as a partial substitute for traditional fossil fuels, such as coal and pet coke, in the cement kiln.

Currently alternative fuels meet around 15 per cent[7] of the total energy requirements of the Australian cement industry. This is approaching the global average of around 16 per cent as Australian producers continue to seek out opportunities to increase alternative fuel usage in their operations. These fuel substitutes reduce the industry's carbon footprint.[8]

[5] VDZ is a world-renowned research centre, providing practical and quality-oriented joint research and services in the field of cement and concrete.

[6] CCCA Guide to Concrete Construction (2020): section 2 https://www.ccaa.com.au/CCAA/CCAA/Docs/Technical/A_Guide_to_Concrete_Construction_2020.aspx

[7] https://cement.org.au/alternative-fuels-raw-materials/

[8] VDZ Decarbonisation Pathways for the Australian Cement and Concrete Sector (2021) – section 5.1 https://cement.org.au/wp-content/uploads/2021/10/Decarbonisation_Pathways_Australian_Cement_and_Concrete_Sector.pdf

Recycled aggregates

Increasingly, the industry is turning to recycled aggregates - a by-product of concrete demolition waste - as a viable and sustainable substitute to virgin raw materials.

The use of recycled aggregates is reducing demand for natural resources.

Sand and aggregate are important ingredients of concrete, and as supplies from existing quarries are exhausted, new reserves need to be found from further afield.

Recycled concrete aggregates are used in fit-for-purpose end uses such as road base and fill, low strength concretes, and to a limited extent, some structural-grade concrete. This reduces the amount of material going to land fill.

In general, returned ready mixed concrete to concrete batch plants is minimised by careful planning of production to match sales. Any wet waste concrete is recycled back into the concrete batching process, subject to quality requirements and solid concrete is crushed to aggregate at an appropriate recycling facility and reused in the concrete batching process or alternative uses such as road base. Material is transported to a licensed landfill as a last resort only.

Under the right conditions and controls, recycled aggregates may also be made from other materials discarded as waste by other industries, for example glass.

Manufactured sand

Manufactured sand is a purpose-made crushed fine aggregate, which was previously considered a quarry waste. Once processed, the material can reduce the amount of natural sand required, while still meeting the highest quality concrete specifications.

Cross Industry Waste Recycling

The recovery and use of wastes from our industry can also prove beneficial for use in other industries beyond construction.

Recycled water

The Australian concrete industry uses recycled water in concrete production where possible, to enhance sustainability and reduce the environmental impact of water usage. This approach reduces freshwater consumption and supports the minimalisation of waste water disposal and its potential environmental impacts.

However, the use of recycled water must meet strict quality control measures to ensure it does not adversely affect the performance or durability of the concrete. Australian standards, such as AS 1379 (the standard for supply of concrete), provide guidelines on water quality, including the use of recycled water, to ensure the final concrete product meets performance requirements.

Case Studies

CCAA Members are already making significant contributions to the circular economy through their operations, including through re-use of other industries by-products, recycling C&D waste, and recycling water. The industry also has a focus on the development of Lower Carbon Products and solutions. CCAA has five Foundation Members, over 70 ordinary Members and over 15 Associate Members.

Some initiatives from the five CCAA Foundation Members worth noting for example include:

Boral has highlighted several circular economy initiatives in the Boral 2023 Annual Report that focus on recycling and sustainability within the construction materials industry, including recycling construction and demolition materials**.** Boral recycles over 2 million tonnes of construction, demolition, and excavation materials each year. These materials, which would otherwise end up in landfills, are repurposed into new construction materials, such as road base and aggregates. Boral is increasing its use of waste-derived alternative fuels in its cement kilns, helping to reduce reliance on fossil fuels and supporting waste diversion from landfills**.** Project specific case studies on contributions to the circular economy can be found in their publication Circular Materials Solution and recycling

Cement Australia has engaged in several circular economy initiatives that focus on recycling and reducing the environmental impact of construction materials.

Cement Australia is a user of the services of Geocycle, who deliver competitive, innovative, safe and ecologically sustainable waste management solutions. This provides one of the few environmentally safe and sustainable alternatives for industrial waste disposal. Geocycle has become a leader in the field of Waste to Energy (WtE) and hazardous waste treatment.

For Cement Australia, Geocycle blends and processes industrial and hazardous waste, that is then transformed into alternative fuels and raw materials (AFR) for Cement Australia's high-temperature kiln operations.

Read more about Cement Australia's contributions to the circular economy.

Holcim Australia focuses on several circular economy initiatives to promote sustainability and reduce waste in construction. Key initiatives include recycling of construction and demolition materials, through Holcim's proprietary ECOCycle® technology as a cornerstone of its circular economy efforts. In Australia, Holcim also recycles construction and demolition materials (CDM), turning them into new building products like cement, concrete, and aggregates. Holcim aims to increase the use of recycled content in its products, contributing to reducing the need for virgin raw materials. Read more about Holcim Australia Sustainability Pillars, including Circularity.

Hanson Australia is focusing on several circular economy initiatives, with one major project being the Wollert Resource Park in Melbourne. This facility aims to become a circular economy hub by recycling materials such as organics, metals, and soils from construction and demolition waste. The site will integrate waste-to-energy processes, which will convert waste into renewable energy, and produce recycled construction materials from the residual waste. Located on 20 hectares, the park focuses on diverting recyclable materials like organics, metals, and soils from landfills and converting them into new resources. It integrates waste-to-energy technology, generating renewable energy and using residual materials for construction. The site also features environmental restoration and community engagement initiatives, such as revegetation and educational programs. Read more about Wollert Resource Park.

Adbri Ltd is also actively involved in several circular economy initiatives aimed at reducing environmental impact and promoting sustainable practices across its operations. Including the use of Refuse Derived Fuel (RDF) for around 20 years, particularly at its Birkenhead facility in South Australia. RDF is created from non-recyclable waste materials, which would otherwise be sent to landfill.

By using RDF, Adbri diverts approximately 200,000 tonnes of waste annually from landfills, reducing reliance on fossil fuels in cement production. Adbri also focuses on reducing waste throughout its processes, including recycling excess concrete and packaging materials. Additionally, it is exploring new ways to incorporate recycled materials into its cement and concrete products, helping to close the loop in the construction industry. See Adbri Ltd's 2023 Annual Report for more detail.

Other specific illustrations of how the industry contributes to the circular economy:

Case study 1

Cross River Rail, Queensland

The Cross River Rail project is a major infrastructure initiative in Queensland, designed to transform the state's public transport system. It involves the construction of a 10.2 km rail line, including 5.9 km of twin tunnels running under the Brisbane River and the central business district (CBD). The project includes four new underground stations (Boggo Road, Woolloongabba, Albert Street, and Roma Street) and one new above-ground station at the Exhibition Showgrounds.

The project is notable for its focus on sustainability, incorporating innovative practices such as using lower-carbon concrete, recycled glass sand, and alternative waste materials like fly ash and slag in construction. Cement Australia is supplying Hanson concrete, with Wagners engaged in precast products. The project uses Fly Ash and Slag as cementitious materials replacing up to 60% of traditional cement with waste materials.

Learn more about the Cross River Rail sustainability initiatives.

Case study 2

Mordialloc Freeway, Victoria

The multi award winning Mordialloc Freeway has been called 'Australia's Greenest Freeway' for its unique design features and high percentage of recycled material.

The Mordialloc Freeway construction was completed in November 2021 and was firmly focused on sustainability, using large volumes of recycled materials and emission reduction initiatives largely driven by the Victorian Government's Recycled First Policy and the willingness of Major Road Projects Victoria (MRPV) to innovate.

The project delivered nine kilometres of dual carriageway between Mornington Peninsula Freeway and the Dingley Bypass, eight kilometres of shared walking and cycling paths and six new bridges, including four with new freeway entry and exit ramps.

Initiatives and optimisations included:

- In a world first, plastic noise walls were made up of 75% recycled plastic waste
- 5kms of 100% recycled plastic drainage pipe
- 13.4 tonnes of 100% recycled plastic fibre Emesh replacing steel reinforcing in the concrete shared path
- The delivery of 6,800 tonnes of unused concrete, asphalt and brick to a recycling facility which reused the material for road base
- The use of 192,511 tonnes of road base containing 97% recycled materials including crushed concrete and crushed glass.
- The use of 2,000 tonnes of recycled crushed glass as a replacement drainage bedding sand
- The project collectively saved over 14,300 tonnes of greenhouse gas emissions and reduced material impact by 19%.
- Overall, 97% of construction waste was diverted from landfill and 44% of energy used was from green energy providers.

More detail on the Mordialloc Freeway is available at:

- https://www.sustainability.vic.gov.au/news/news-articles/from-your-bin-to-the-big-build
- https://bigbuild.vic.gov.au/projects/roads/mordialloc-freeway

Case Study 3

ecologiQ – Implementing the Recycled First Policy in Victoria

ecologiQ is integrating recycled content across Victoria's transport infrastructure projects and making the use of greener materials business-as-usual.

This initiative is using Victoria's record infrastructure investment to be recognised as the world leader in the sustainable use of recycled and reused materials by 2025.

These efforts started with the Victorian Government's Big Build, which is transforming how waste is used in construction and contributing to a circular economy.

ecologiQ supports the Recycled First Policy, which for the first time in Australian history, requires bidders on transport projects to optimise their use of reused and recycled materials. Over 3.4 million tonnes of recycled materials have been delivered under the Recycled First Policy.

Key to the success of this program are the Recycled Materials Reference Guides. Each guide is intended for use by designers, contractors, asset owners and others working on major road infrastructure projects during the planning, pre-tender, and construction stages.

The Guides provide a short summary of current Department of Transport and Planning (DTP), and Australian standards, specifications and clauses that allow the use of recycled materials in pavement design and other road infrastructure applications. These are available here.

This framework provides the template on how to implement the circular economy in infrastructure projects for other jurisdictions to follow.

More detailed information is available from https://bigbuild.vic.gov.au/about/ecologiq

Case Study 4

Geocycle – Alternative fuels from industrial waste for cement kilns

Companies such as Geocycle operate a waste management service in Dandenong for the generators and consolidators of waste and transform that material into alternative fuels and raw materials that are used as fuel in cement kilns. Typical wastes and by-products converted into fuel include:

- Petroleum products, including oils, greases, and distillation residues.
- Resins, paints, inks, and solvent based materials
- Chemicals, including pesticides and herbicides
- Filter cakes
- Pigments and powders
- Industrial waste/wash waters
- Spent catalyst
- Spent Cell Liner (SCL)
- AFFF/PFAS Concentrates and Wash Waters

In 2023, Geocycle used 25,036 kL of industrial waste that would have gone to landfill to help create 36,399 kL of alternative fuel replacement which replaced 39,419 tonnes of coal as cement kiln fuel and saved 21,627 tonnes of CO^2 from going into the atmosphere. In addition, a further 33,920 tonnes of solid, liquid, and gaseous industrial waste was diverted to cement kilns which saved a further 27,030 tonnes of CO^2.

Such initiatives have helped the Australian cement industry reduce their CO^2 emissions by 25% since 2000.

More detail is available from https://www.cementaustralia.com.au/geocycle

Case Study 5

Water recycling

Treating water as a precious, critical resource, and reusing and recycling water is standard practice at member operations, including quarries and concrete batch plants[9] throughout Australia, with mains water use minimised through effective water recycling.

Cockburn Cement, an Adbri company, in one example, was recognised with the Industrial Platinum Business of the Year award in Watercorp's Waterwise Program in May 2023. The award recognises 'a strong culture of water efficiency' at Cockburn Cement's Munster operation, with annual water use reduced by 27.5 million litres since 2012. An artificial wetland recycles most processed water and captures stormwater, and regular monitoring and sub meters help make the most of our resources.[10]

Case Study 6

Circular soils and concrete

At Meriton's Pagewood site in Sydney, Boral excavated over 200,000 tonnes of sand from the project, transporting it to recycling sites, washing the material and re-using as input to concrete production across various concrete plants. This delivered financial and sustainability benefits to both the customer and materials supplier.[11]

[9] Environmental Management Guideline for Concrete Batch Plants, CCAA, October 2019

[10] Adbri Building a Better Future, 2023 Sustainability Report

[11] Reshaping our Future. Boral Sustainability Report 2022

Government policies and legislation

Governments across Australia have been working to introduce more circular economy objectives into policy as set out in this table:

Table 1: Australian government circular economy policies

Federal Australia's National Waste Policy
NSW NSW Circular Economy Policy
Victoria Recycling Victoria A new economy
Queensland Waste Management and Resource Recovery Strategy
South Australia Supporting the Circular Economy South Australia's Waste Strategy 2020-2025
Western Australia WA Waste Avoidance and Resource Recovery Strategy 2030
Tasmania Tasmanian Waste and Resource Recovery Strategy 2023-2026

Policies of this nature typically impose waste levies to:

- develop an incentive to recycle rather than dump waste; and
- set reach targets to reduce the amount of waste dumped, such as C&D waste.

The waste levy is an important tool to promote resource recovery over landfilling waste.

As indicated in the July 2024 *Review of the NSW Waste Levy Issues Paper*:

While development activity in NSW has increased over recent years, resulting in increased generation of C&D waste, independent analysis by Marsden Jacob Associates shows that landfill diversion rates for C&D waste is responsive to the waste levy. Historically, for every 1% increase in disposal costs in the Metropolitan Levy Area and Regional Levy Area, disposal of C&D waste to landfill declined by 0.5% and 1.2%, respectively. This is because C&D waste is generally made up of heavy materials such as concrete and ceramics. As the levy is applied per tonne of waste, it costs more to dispose of these materials at landfill than lighter materials like plastic or paper and cardboard. This creates a stronger incentive for waste generators to find alternatives to landfill and may explain in part why C&D waste has a much higher resource recovery rate in NSW – 80% in 2021-22 – than C&I waste and MSW.[12]

Legislation has been established to support these policies, as set out in Table 2:

[12] https://hdp-au-prod-app-nswepa-yoursay-files.s3.ap-southeast-2.amazonaws.com/4417/1744/9825/24p-4519-nsw-waste-levy-review-issues-paper.pdf: 7

Table 2: Australian jurisdictional legislation regulating waste

NSW Protection of the Environment Operations Act 1996 Protection of the Environment Operations (Waste) Regulation 2014
Victoria Circular Economy (Waste Reduction and Recycling) Act 2021 Environment Protection Act 2017
Queensland Environmental Protection Act 1994 Environmental Protection Regulation 2019 Waste Reduction and Recycling Act 2011 Waste Reduction and Recycling Act 2023
South Australia Environment Protection Act 1993 Environment Protection Regulations 2023 and policies made thereunder
Western Australia Waste Avoidance and Resource Recovery Act 2007 Waste Avoidance and Resource Recovery Regulations 2008 Waste Avoidance and Resource Recovery Act 2007 Waste Avoidance and Resource Recovery Levy Regulations 2008
Tasmania Waste and Resource Recovery Act 2022 Waste and Resource Recovery Regulations 2022 Environmental Management and Pollution Control (Waste Management) Act 1994 Environmental Management and Pollution Control (Waste Management) Regulations 2020

Legislation of this nature usually has provisions which:

- identifies prescribed types of controlled waste;
- sets out how waste can be received, stored, reused, recycled, reprocessed, salvaged, incinerated, treated, disposed of, or used for energy recovery;
- creates offences relating to the production, storage, treatment, disposal, and dilution of controlled waste.
- establishes registration and authorisation requirements for the transport of controlled waste by approved controlled waste transporters;
- prohibit the disposal of general waste to land without approval, and a description of those wastes that can be disposed of on land;
- establishes management methods for specified controlled or general waste; and
- allows the granting of specific approvals for the management of controlled or general waste.

Some jurisdictions also encourage the use of recycled materials such as crushed recycled concrete as a roadbuilding product.[13]

[13] See for instance Queensland Department of Main Roads Technical Note TN 193 *Use of recycled materials in road construction* (September 2020), Victorian Department of Transport and Planning Technical Note 107 *Use of Recycled Materials in Road Pavements* (July 2023), WA Department of Main Roads *Main Roads Recycled Materials Reference Guide* (November 2022)

Encouraging beneficial reuse of materials

State Governments have been working in recent times to encourage the broader beneficial reuse of materials so that they are not treated as waste and contribute to the circular economy. However more can be done.

Examples of regulatory regimes that allow material to transform from waste to beneficial reuse include:

- Queensland End of Waste Codes[14]
- New South Wales Resource Recovery Framework[15]
- Western Australia Recovered Material Framework – in the process of being developed[16]
- Victoria Declaration of Use[17]
- SA's waste derived product framework supported by regulatory concepts including when materials can be declared to not be waste under clause 4 of the Environment Protection (Waste to Resources) Policy 2010

In general, these legislative and regulatory frameworks provide the legal mechanism to reclassify material that would have been waste, into material that has a beneficial reuse, hence enabling the circular economy. The frameworks generally cover issues such as material characteristics, contaminants, proposed end uses, operational control procedures, and testing regime so that if the material meets the criteria in the framework, then it can be reused/recycled.

CCAA supports this concept in principle, but the frameworks introduced should be streamlined, not introduce unnecessary red tape and administrative burden on operators, and actively support the market for the material, as well as delivering the required environmental benefits.

Recommendations

In these contexts, the following recommendations are made:

Appropriate environmental incentives, and the review and removal of barriers (including Australian Standards)

1. **Develop Environmental Incentives**
   That the government develop appropriate environmental incentives, to encourage the adoption of circular economy principles across industries.
2. **Review Regulatory Barriers for Concrete Waste Re-Processing**
   That state governments review and remove regulatory barriers, such as additional consents, preventing the re-processing of concrete waste by quarries, streamlining approval processes. Including by ensuring that concrete waste, when returned for re-processing or use, is recognised as a product, and not subject to waste regulations.

Regulatory barriers that prevent concrete waste to be re-processed by quarries without additional consents should be removed.

Accordingly, so as to reduce the administrative costs to industry inherent in seeking an approval, CCAA strongly suggests the adoption of frameworks across all jurisdictions similar to the end of waste codes established under the Queensland *Waste Reduction and Recycling Act 2011*[18].

An example of such a code for this industry is the Code made for returned concrete.[19]

[14] https://www.business.qld.gov.au/running-business/environment/waste-management/regulated-waste/eow-codes

[15] https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/resource-recovery-framework

[16] https://www.wa.gov.au/system/files/2024-05/warr-strategy-2030-consultation-draft.pdf

[17] https://www.epa.vic.gov.au/for-business/waste/declaration-of-use

[18] https://www.business.qld.gov.au/running-business/environment/waste-management/regulated-waste/eow-codes

[19] https://www.des.qld.gov.au/policies?a=272936:policy_registry/wr-eowc-approved-concrete-washout-returned.pdf

Regulatory Barriers and Building Standards (including Australian Standards)

3. **Update Building Standards and Approval Processes**
   That regulatory bodies review and update building standards to accommodate the use of recycled and alternative materials, speeding up approval processes for innovative construction methods and materials.

4. **Encourage Changes to Cement Standards**
   That state and territory governments support redesigning Australian Standards (e.g. AS3972-2010) to allow higher limestone additions, and greater use of supplementary cementitious materials, facilitating the adoption of new, lower-carbon cement types.

One of the most significant barriers is the regulatory framework that governs the construction industry. Building codes and standards often prescribe the use of virgin materials, leaving little room for innovation in recycled content or alternative materials.

These standards need to evolve to reflect the advancements in materials technology, ensuring that recycled and alternative materials can be used safely and effectively in construction.

Moreover, the approval processes for new materials or construction methods are often slow and cumbersome, creating a disincentive for companies to invest in circular practices.

Building standards and approval processes should be reviewed and updated to accommodate the use of recycled and alternative materials.

In particular, state and territory jurisdictions should be encouraged to support the redesign of standards that facilitated decarbonisation, such as changes to AS3972-2010 (General Purpose and Blended Cements), so as to enable the greater use of limestone additions in General Purpose Cement, and supplementary cementitious materials in concrete. The Standard change is also needed to enable the greater use of innovative new cement types for example emerging Pozzolans such as Delithiated Beta Spodumene derived as a by-product from lithium ore processing.

Several hundred thousand tonnes of this material is about to be produced in Western Australia with the potential to be a significant SCM in the future, but current standards and specifications do not allow its use in concrete.

Without substantive changes to these Australian Standards and adoption through State transport agency specifications, a broader circular economy and decarbonising of transport infrastructure will be limited more than the technology allows.

Fit for Purpose State Transport Agency Specifications

5. **That Fit for Purpose State Transport Specifications**
   That state transport agencies adopt fit-for-purpose specifications to increase the use of recycled materials, reduce costs, and promote more efficient resource utilisation in infrastructure projects.

CCAA supports the use of fit-for-purpose heavy construction materials in construction to improve resource utilisation, increase use of recycled materials and reduce costs of construction.

Fit-for-purpose materials is about using the right materials in the right location, where it makes economic sense, and includes quality raw quarry materials, recycled construction materials and marginal quarry materials.

As an example, the Victorian Department of Transport & Planning has recently amended a range of road construction specifications to allow for the inclusion of recycled products such as crushed concrete and brick, glass fines and reclaimed asphalt but only in specific, certain circumstances. There is still significant opportunity in this area.

Recycled content requirements for infrastructure and construction projects should be carefully considered due to the limited capability of the recycled materials supply chain to economically respond to a potentially massive increase in demand in some markets.

The cost of transport and distance from source of materials to market is also a key cost consideration in deciding between using recycled versus virgin quarry materials.[20]

It is recognised that over specification or 'gold plating' of non-state transport agency assets with inappropriate, over restrictive specifications does occur. CCAA estimates that between 70-95 per cent of the infrastructure market uses state road agency specifications for non-state road agency projects such as local suburban streets.

High quality material as required for freeways is not required for many local suburban roads due to the lower road traffic and lack of heavy freight transport. Yet many local council engineers are risk adverse and lack a wide skill set, and due to a lack of readily available alternatives, often copy state transport agency specifications for use in local suburban roads. Such 'gold plating' may provide for long life assets, but at additional, unnecessary upfront construction costs.

Improving quarry resource utilisation, using high quality resource for high quality product only, is of increasing concern for the extractive industry as viable locations for future quarries are becoming increasingly constrained as urban development and rising environmental constraints sterilise some known resources close to market. Specifying very-high grade materials for an element that has low performance requirements, such as footpaths, will lead to unnecessary depletion of valuable high-quality resources when a lower grade virgin or recycled 'fit for purpose' alternative would be adequate. A focus on cross department cooperation is also beneficial, to ensure resource and land use, as well as development planning, do not increase constraints on the vital extractive industry.

Whole of Government Approach to Performance Based Specifications:

6. **Adopt a Whole-of-Government Approach**
   That governments take a coordinated, whole-of-government approach, aligning transport, environmental, and sustainability agencies to promote the use of recycled and alternate materials in infrastructure, ensuring they meet performance standards.

7. **Performance-Based Specifications for Construction**
   That state governments introduce performance-based specifications for road infrastructure to increase demand for recycled and alternative materials, reducing reliance on prescriptive standards.

CCAA believes that the journey to a circular economy must include the whole of government, including working with the state transport agency, environmental and sustainability arms of government and cross jurisdictional recognition of sound circular economy frameworks and initiatives (including learnings from compatible scenarios overseas). These bodies together can consider the increased use of alternate and recycled materials in specifications and road infrastructure under a 'fit for purpose' paradigm.

An increased emphasis on performance-based specifications rather than the current prescriptive road pavement material specifications would help to increase market demand. As well, a whole-of-government and consistent approach will give confidence in the quality and safety of these products and provide the long-term policy setting that is required to support industry investment.

For example, state/territory governments that introduce performance-based specifications that do not specifying minimum amounts of Portland cement will promote the greater uptake of Supplementary Cementitious Materials (SCM) such as Fly Ash and Blast Furnace Slag. Using these by-products form other industries will make significant steps to decarbonise concrete as well as enable the circular economy.

[20] https://www.sustainability.vic.gov.au/research-data-and-insights/research/research-reports/recycled-products-in-pavement-construction

Market and Financial Barriers

8. **Financial Incentives and Public Procurement Policies**
   That governments introduce financial incentives and supportive public procurement policies to drive the market demand for circular economy solutions, encouraging industry investments in circular practices.

9. **Promote Industry Partnerships for Innovation**
   That the government encourage partnerships between industry, research institutions, and government agencies to drive innovation and accelerate the commercialisation of circular economy technologies.

Innovation in materials and processes is critical to advancing the circular economy, but the cement, concrete, and aggregates sectors face significant technical challenges.

For example, while SCMs are an effective way to reduce the carbon intensity of cement, further research is needed to optimise their use and ensure that they meet performance standards.

Similarly, new technologies like carbon capture and utilisation require substantial investment and development before they can be deployed at scale.

Without financial incentives or supportive public procurement policies, companies face difficulty justifying the higher costs to clients and stakeholders. There needs to be strong market pull to provide the right economic incentives for industry to invest in the circular economy.

Possible solutions include:

- the introduction of financial incentives, such as tax credits, grants, or subsidies, for projects that use recycled or low-carbon materials. The Victorian Sustainability Fund is one such initiative that other jurisdictions may follow[21];
- the establishment of public procurement policies that support the fit for purpose, economic use of circular materials in government-funded infrastructure projects;
- the creation of market-based mechanisms, such as carbon credits or material recovery credits, that reward companies for adopting circular practices;
- increasing public and private investment in R&D for circular materials, including alternative SCMs such as de-lithiated beta spodumene, low-carbon cements, new alternative materials such incinerator bottom ash aggregate, and carbon capture technologies; and
- encouraging partnerships between industry, research institutions, and government to drive innovation and accelerate commercialisation of circular solutions.

Information Gaps and Lack of Industry Collaboration

10. **Improve Access to Information on Circular Materials**
    That governments support the development of centralised platforms providing reliable information on the availability and performance of circular materials to help industry transition more effectively.

11. **Fund Supply Chain Training**
    That state and federal governments fund training initiatives across supply chains, helping project managers and contractors understand and implement fit-for-purpose circular economy principles, including the use of recycled materials in construction projects.

12. **Enable national adoption of beneficial Circular Economy initiatives**
    That the Productivity Commission encourage governments to enable a simplified pathway for the sharing and adoption of effective and beneficial circular economy initiatives between jurisdictions.

Access to reliable information on the performance and availability of circular materials is another major barrier.

Construction companies may be unaware of the benefits or availability of alternative materials, leading to a continued reliance on traditional resources.

[21] https://www.environment.vic.gov.au/sustainability/sustainability-fund

Furthermore, the fragmentation of the industry limits opportunities for knowledge sharing and collaboration on circular economy initiatives.

To effectively advance Australia's circular economy, the Productivity Commission should advocate for a simplified, coordinated framework that allows governments to share and adopt impactful circular economy initiatives seamlessly across jurisdictions.

Such initiatives could include:

- the creation of centralised databases and knowledge-sharing platforms that provide comprehensive data on circular materials, including performance, environmental impact, and cost-effectiveness should continue to be developed. Examples that jurisdictions could aspire to include the development of something like the Recycling Victoria Data Hub[22] and the development of documents providing information presented in a manner similar to Sustainability Victoria's *Circular Economy Market Report*, first published in 2024.[23]; and
- fostering industry collaboration through partnerships, forums, and working groups that facilitate the exchange of knowledge and best practices.
- providing supply chain training on using fit for purpose recycled materials to mitigate resistance from project managers and contractors.
- a national framework, to offer a clear pathway for identifying, evaluating, and implementing best practices and proven initiatives. This would support the creation of a more cohesive and efficient approach to circular economy adoption nationwide.

Conclusion

The cement, concrete, and aggregates sector is critical to Australia's infrastructure and economic development, and they are also resource-intensive industries that can make a major contribution to the circular economy.

By embracing circularity, these industries significantly reduce their environmental impact, improve materials productivity, and contribute to a more sustainable and resilient economy.

The Heavy Construction Materials Industry has been a longstanding leader in embracing aspects of the circular economy, but the successful transition to a full circular economy will require coordinated efforts from government, industry, and consumers.

Regulatory reform, financial incentives, investment in R&D, and the creation of platforms for knowledge sharing and collaboration are critical to overcoming the barriers that currently impede circular economy adoption.

CCAA is committed to working with government and industry partners to advance the circular economy agenda and ensure that Australia's built environment is both sustainable and prosperous.

[22] https://www.vic.gov.au/about-the-data-hub

[23] https://www.vic.gov.au/sites/default/files/2024-03/circular-economy-market-report-2024_0.pdf