



# It's time to scale Australia's recycled materials market



## Contributors



Arcadis, Arup, Aurecon, Australian Flexible Pavements Association, Bluescope Steel, CPB Contractors, Downer Infrastructure, EcologiQ, Fusion Advisory, GHD, Infrastructure NSW, John Holland, Mott MacDonald, Transport for NSW, Ventia, VIDA, Ward Civil.

# Acknowledgement of Country

Roads Australia acknowledges Aboriginal and Torres Strait Islanders as the Traditional Owners and Custodians of this land and waterways.

We acknowledge and pay respect to their ancestors and Elders both past and present.

Roads Australia is committed to reconciliation amongst all Australians.

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# Introduction

Australia's recycled materials market presents an opportunity to accelerate decarbonisation, reduce waste and stimulate innovation-driven economic growth. As the nation strives to achieve net zero emissions by 2050, the use of recycled materials in transport infrastructure construction remains both a challenge and an opportunity to achieving this goal.

Transport infrastructure is responsible for significant portion of Australia's embodied carbon emissions<sup>1</sup> due to energy-intensive materials such as steel, concrete, and asphalt, as well as the logistics required for construction and maintenance – which includes transportation of goods via ship, plane and truck.

Globally, governments are integrating decarbonisation and circular economy objectives into infrastructure delivery, aligning investment strategies with sustainability goals.

In Europe, frameworks such as the EU Green Deal<sup>2</sup> have established strong regulatory and financial signals that encourage the use of low-carbon and recycled materials.

Similarly, the Netherlands has committed to achieving a 100 per cent circular economy for construction materials by 2050,<sup>3</sup> and Japan's long-standing legislation for recycled construction materials demonstrates how coordinated policy can drive innovation and economic growth.<sup>4</sup>

The use of recycled content in infrastructure projects is not new in Australia. Initiatives such as Victoria's EcologiQ program demonstrate the feasibility and benefits of funded industrial policy programs.

EcologiQ has integrated millions of tonnes of recycled material into transport projects, showing demand creation through government procurement and supply chain development can transform markets.

However, the uptake of recycled materials across Australian jurisdictions remains fragmented. Each state and territory apply different specifications and regulations for recycled products, creating inefficiencies and limiting economies of scale for industry suppliers.

To leverage the potential benefits of a developed recycled materials market, we must first address the barriers of divergent governance, uncertain technical performance and lack of demand and supply.

Roads Australia proposes these barriers can be overcome through a combination of:

- Funded industrial policy programs to support the economic transition required to meet decarbonisation goals.
- Harmonisation of recycled materials policy, standards and economic value to leverage and scale industrial policy programs.
- Strategic land-use planning to co-locate recycled materials supply with demand, to maximise economic and environmental sustainability.

With the global recycled materials market forecast to grow significantly in the coming years,<sup>5</sup> coordinated and strategic industry policy will position Australia as a leader in this space, diversify the economy, enhance supply chain resilience and reduce reliance on virgin material imports.

# Summary of recommendations

Fund industrial policy programs to support the economic transition required to meet decarbonisation goals

Harmonise standards and methodologies to leverage and scale industrial policy programs

Strategically co-locate recycled materials supply with demand to maximise economic and environmental sustainability





# Case study

## ALBION PARK RAIL BYPASS

**Location:** Albion Park, NSW

**Project name:** Albion Park Rail Bypass

**Project type:** Bypass

**Commenced:** 2019

**Governance:** Transport for New South Wales, Fulton Hogan, SMEC, Stantec, Seadar

### Project overview

- The Albion Park Rail Bypass extends the M1 Princes Motorway by 9.8 kilometres, bypassing the town of Albion Park between Yallah and Oak Flats.
- The project includes 13 bridges, various local road upgrades, and pedestrian and cyclist facilities to improve local connectivity and accessibility.
- Central to the project was a circular economy approach: reuse of materials, innovation in procurement, and collaboration throughout delivery.
- Transport for NSW used procurement, tender documentation, and contract management to influence material and process selections. Many initiatives were contractor-led, with Transport for NSW in a fully collaborative supporting role.

### The results

- Over 1 million tonnes of recycled material were utilised.
- Breakdowns of reused materials:
  - ~500,000 tonnes of coal wash (low-grade mining waste)
  - ~300,000 tonnes of tunnel spoil
  - ~130,000 tonnes of recycled Select Material Zone (SMZ) material
  - ~180,000 tonnes of Heavily Bound Base (HBB)
  - ~6,000 tonnes of Recycled Crushed Glass (RCG) used in asphalt
- The asphalt base layer used on the bypass is composed of 25 per cent recycled material, specifically:
  - 10 per cent recycled crushed glass (replacing sand in asphalt)
  - 15 per cent reclaimed asphalt pavement
- The project benefited from a grant from the NSW Environment Protection Authority (EPA), via the Civil Construction Market Program, aimed at promoting uptake of Recycled Crushed Glass.



Image source: Transport for NSW

### Lessons learnt

- Integrating circular economy demands early into procurement, tendering, and contracts ensures that recycled material use is considered from the start, enabling innovation rather than penalty.
- Contractor-led ideas can be highly effective when supported by government agencies; giving contractors room to propose materials and methods encourages better outcomes.
- Reusing large-volumes of diverse materials (coal wash, spoil, SMZ, HBB, RCG) is feasible in a major infrastructure project, without compromising function and safety.
- Recycled crushed glass as a substitute for sand in asphalt shows that waste products (glass bottles) can be repurposed on a huge scale, delivering both environmental and material savings.
- Grant funding and government program support (like from the EPA) help overcome economic or technical barriers to adopting novel recycled materials.

### For more information

- Transport for NSW. 2025. [Sustainable Infrastructure Program](#)
- Transport for NSW. 2023. [Albion Park Rail Bypass](#)





# Case study

## REGENCY TO PYM STREET PROJECT

**Location:** South Australia

**Project name:** Regency to Pym Street Project

**Project type:** Motorway

**Commenced:** 2018

**Governance:** R2P Alliance (South Australian Department of Transport and Infrastructure, McConnell Dowell, Mott MacDonald, Arup)

### Project overview

- The Regency Road to Pym Street (R2P) project connects the South Road Superway and Torrens Road to the River Torrens Motorway, creating a continuous 47 km motorway.
- Recognising that civil construction has major environmental impacts (especially via material use and resulting greenhouse gas emissions), the project set explicit sustainability objectives: minimise whole-of-life emissions and maximise circular economy outcomes.
- These objectives were embedded into procurement and contract requirements. The R2P Alliance (the consortium responsible for design and construction) was required to achieve an Infrastructure Sustainability Rating (v2.0) for both design and construction phases.

### The results

- 32,600 tonnes of recycled PM2/20 (particles sized 2-20 mm, made from crushed concrete by local recyclers) were used in the lower layers of the road base, replacing virgin quarried material.
- Trialled use of 5 per cent recycled glass in the lower layers of the PM2/20 road base (the first-time natural sand was substituted with recycled glass for such use in SA). The Master Specification was updated to permit use of recycled glass aggregate in road base and asphalt.
- Introduced Reconophalt™, an asphalt product using soft plastics as partial binder replacement. This diverted large amounts of waste from landfill: 409 tonnes of recycled asphalt planings; 794 kg of recycled canola oil; 19,230 waste toner cartridges; 798,105 plastic bags.
- Approximately 80 metres of noise wall panels that would otherwise have been demolished were instead reused in an adjacent location.



Image source: South Australian Department of Transport and Infrastructure



### Lessons learnt

- By specifying sustainability and circular economy objectives from the design phase (via the Resource Efficiency Strategy), many reuse and recycling opportunities could be identified and assessed early, increasing feasibility.
- The embedding of mandatory requirements (through contract/performance expectations, specifications) pushed the Alliance and contractors to investigate and implement circular solutions (e.g. recycled materials, reuse).
- Trials (like the 5 per cent recycled glass in road base, or use of soft plastics in Reconophalt™) showed that non-traditional recycled inputs can meet technical performance, enabling updates to specifications and paving the way for wider adoption.
- Specifications need updating. As a result of what was learned, DIT's Master Specification was amended to allow the use of recycled glass aggregate in road base and asphalt. This demonstrates the importance of institutional flexibility to incorporate new materials.

### For more information

- Green Industries South Australia. 2021. [Regency to Pym Street Project](#)



# Benefits

Scaling the integration of recycled materials in transport infrastructure construction will create economic and environmental benefits beyond waste reduction.

By leveraging innovative technologies, the sector can significantly lower carbon emissions, reduce impacts on nature and foster a circular economy that reduces reliance on virgin materials.

This transition not only mitigates the impacts of resource extraction and landfill use but also drives industrial transformation and economic diversification.

## Drive an innovation economy

The shift toward recycled materials is more than an environmental initiative, it is a catalyst for industrial transformation and economic diversification.

Developing advanced material processing technologies and integrating them into infrastructure supply chains can stimulate new business models and attract investment in local recycling and manufacturing.

Further, industrial transformation will increase the demand for skills in material science, circular economy logistics, and low-carbon design, which will foster a more future-ready Australian construction sector.

Government-backed programs like the Future Made in Australia Fund will play a pivotal role in scaling these capabilities by increasing business confidence to invest in innovative products.

## Reduce carbon emissions

While the carbon content of recycled materials varies by product type, significant savings can be achieved in many cases. For instance, using recycled crushed concrete as aggregate can reduce emissions associated with quarrying and transporting virgin stone.

Similarly, supplementing fly ash or slag in cement reduces the clinker content of concrete – a major source of embodied carbon. However, the logistics of sourcing and transporting recycled materials can sometimes offset these benefits, underscoring the need for strategic planning and carbon accounting frameworks.

Where recycled materials have higher whole-of-life carbon emissions than their virgin counterparts, other benefits such as waste mitigation or environmental protection may make them the preferred product.





## Limit waste and environmental impacts

Construction and demolition accounted for 39 per cent of Australia's total waste in 2022-23, double the amount of waste produced by households. <sup>6</sup>

Despite high recovery rates for some materials, significant volumes still end up in landfill or are downcycled into low-value applications. Other waste, including soft plastics, tyres and glass also have the potential to be upcycled or recovered.

With landfill capacity across Australia reaching crisis point <sup>7</sup> – with Sydney set to run-out by 2030 <sup>8</sup> – it is critical to quickly and significantly reduce construction and demolition waste.

By integrating recycled content into major infrastructure projects, governments can help mitigate the looming landfill crisis.

Furthermore, reducing extraction of virgin materials mitigates biodiversity loss, soil degradation, and water impacts associated with quarrying and mining.

The dual benefit of waste diversion and natural resource conservation makes recycled materials a cornerstone of environmentally responsible infrastructure delivery.





# Barriers

The potential to scale the use of recycled materials in Australia is limited by three key factors. Regulatory fragmentation across states and territories complicates procurement and restricts economies of scale, testing and proving the technical performance of new materials is a lengthy process, and limited demand restricts commercial viability.

## Divergent governance

While most Australian jurisdictions have adopted policies to promote or require recycled material content in infrastructure, the governance structure differs in each.

This divergence creates uncertainty and complexity for suppliers and contractors, as well as limiting economies of scale.

Each Australian state and territory can have their own:

- Standards for recycled materials
- Procurement policies for the use of recycled materials in infrastructure projects
- Environmental regulations around the recycling of materials
- Calculation of the carbon footprint of recycled materials
- Economic values for recycled materials for use in investment decision-making

Aligning these regulations nationally would unlock economies of scale by improving supply chain efficiency across states and territories and boosting industry confidence to invest in facilities and product innovations.

## Uncertain technical performance

As with any new construction material, their technical performance needs to be tested and proven – which can take years – for their use to be approved and scaled.

Uncertainty about the durability, structural integrity, environmental performance and long-term performance of recycled materials will prohibit their use in projects. This means well-resourced research and development, innovation incentives and risk-sharing on recycled materials is essential to leverage Australia's recycled materials market.

## Lack of demand and supply

For new recycled materials to be commercially viable, there needs to be sufficient demand.

As with many new innovative products and materials, commercialisation is one of the most difficult stages, where many fail to make it from research trials to market deployment – a phenomenon commonly known as the 'commercialisation valley of death'. Clarity of government procurement can derisk demand, and industrial policy can provide confidence and capability to suppliers.

As transporting recycled products over long distances can negate both carbon and cost benefits, it is ideal that supply of recycled materials is geographically proximate to construction sites. This highlights the importance of strategic land-use planning to co-locate recycling facilities near major infrastructure corridors and ports.



# Recommendations

## **Fund industrial policy programs to support the economic transition required to meet decarbonisation goals**

Funded industrial policy programs are critical to develop and establish Australia's recycled materials market – by bridging the commercialisation valley of death. Such programs will drive industrial transformation and economic diversification, as well as reduce waste.

Programs should have a dedicated team that provide wrap-around services to grow and support the recycled materials market. This should include engagement with suppliers and contractors, reviewing and updating standards, development of best value procurement policy (with weightings for carbon, circularity and lifecycle cost), development of baselines for recycled content to measure success, guidance on allowable recycled materials within standards and specifications, new-material trials and knowledge sharing.

Victoria's EcologiQ program (see case study on page 16) is a leading example of a funded industrial policy program that has yielded strong results. EcologiQ has been particularly successful due to early engagement with suppliers and project teams, demand creation through pilots and major transport infrastructure projects, active review of applicable standards and industry guidance.

Industrial policy programs for recycled materials across Australia will have the added benefit of reducing carbon emissions, waste and environmental impacts of construction.

## **Harmonise standards and methodologies to leverage and scale industrial policy programs**

To realise the maximum economic and environmental benefits of Australia's recycled materials market we need to enable economies of scale. This is currently prohibited by divergent governance across Australian jurisdictions.

There are five primary areas where a nationally harmonised approach is required:

- Standards for recycled materials
- Policies for the use of recycled materials in infrastructure projects
- Environmental regulations around the recycling of materials
- Calculation of the carbon footprint of recycled materials (currently being progressed through the Infrastructure and Transport Ministers Meeting)
- Economic values for the utilisation of recycled content within investment decision making.

Harmonising these policies and regulations across Australian jurisdictions will unlock economies of scale.

There are multiple ways harmonisation could be achieved, such as through coordination between state and territory infrastructure bodies, or through agreement at the Infrastructure and Transport Senior Officials' Committee and the Infrastructure and Transport Ministers Meeting, or through Federal regulation.



**Strategically co-locate recycled materials supply with demand to maximise economic and environmental sustainability**

To overcome logistical challenges and to mitigate the potential cost and emissions associated with transporting materials, governments should integrate funded industrial policy programs – and associated infrastructure – with strategic land-use planning. Co-locating processing facilities near industrial hubs, or major transport infrastructure sites reduces haulage distances and costs, enhancing the economic viability of recycled materials. This could also be achieved with mobile hubs for initial processing.





# Case study

## ECOLOGIQ

**Location:** Victoria, Australia

**Program name:** ecologiQ

**Program type:** Circular economy and infrastructure sustainability initiative

**Commenced:** 2019

**Governance:** Victorian Department of Transport and Planning

### Program overview

- ecologiQ is a Victorian Government initiative embedded within the \$80–100 billion Big Build transport infrastructure program.
- ecologiQ aims to integrate recycled and reused materials into the design, construction, and maintenance of major transport projects across the state.
- The program's cornerstone is the Recycled First Policy, introduced in 2020, which mandates that all bidders on major transport projects outline how they will use recycled and reused materials in construction.
- The initiative was developed in response to growing pressure to address waste stockpiles, landfill use, and the underutilisation of local recycled materials.
- ecologiQ provides industry guidance, facilitates trials of new recycled products (e.g. plastic noise walls, crumb rubber asphalt), and supports supply chain development.
- It also collaborates with asset owners and designers to influence infrastructure standards and hosts the annual ecologiQ Greener Infrastructure Conference to encourage knowledge sharing.



Image source: Victoria's Big Build



## The results

- As of late 2023, more than 4.5 million tonnes of recycled materials have been committed across 26 road and 6 rail projects in Victoria.
- The program has contributed to an industry-wide shift in the use of materials like recycled crushed glass, reclaimed asphalt pavement, crumb rubber, and recycled plastic.
- Individual project outcomes include the Mordialloc Freeway, which diverted 97 per cent of construction waste from landfill and used 570 tonnes of recycled plastic in Australia's first recycled-plastic noise walls. The initiative has contributed to significant carbon savings across projects - up to 66 per cent reductions in some cases.
- Uptake of recycled content has nearly doubled across the Big Build program since the introduction of the Recycled First Policy.
- Metropolitan projects report over 90 per cent use of recycled crushed rock and asphalt base, while regional adoption is steadily growing.
- ecologiQ won the Premier's Sustainability Award in 2023 for Circular Economy Innovation.

## Lessons learnt

- Procurement policies like Recycled First can be powerful levers for systemic change when embedded in infrastructure programs and backed by funding, technical support and stakeholder engagement.
- Regional adoption lags due to transport costs and availability of recycled materials, highlighting the need for distributed processing infrastructure.
- Success required funding, close industry engagement, demonstration trials, and updates to engineering specifications to build trust in new materials.
- Ongoing collaboration with suppliers and asset owners is key to testing and scaling new recycled products and circular design approaches.

## For more information

- Victorian Government. 2025. [ecologiQ](#)
- Australian Circular Economy Hub. 2024. [‘Recycled First’ construction policy highlighted as hero campaign for circular economy development in Victoria](#)
- Sustainable Built Environment National Research Centre Australia. 2024. [Case study: ecologiQ the Victorian state change platform](#)
- Victorian Government. 2020. [Purposely greener infrastructure: ecologiQ](#)



Image source: Victoria's Big Build

# Case study

## CIRCLEZERO

**Location:** Western Australia

**Program name:** CircleZero

**Program type:** Digital knowledge hub for sustainable materials

**Commenced:** 2025

**Governance:** Western Australian Department of Transport and Major Infrastructure

### Program overview

- CircleZero, is a WA-first digital Hub to share knowledge, research and experience across our government and industry partners in working towards a circular economy and net zero transport and infrastructure.
- The Hub is a public resource specifically targeted at government staff working across Transport and Major Infrastructure and our industry partners including contractors, consultants and suppliers. It's also a useful resource for local government and other State government agencies who design, build and operate critical infrastructure and share learnings towards a circular economy and decarbonisation of infrastructure.

### Intended and current results

- CircleZero provides resources to support major goals of the WA State Government: reduce emissions by 80 per cent below 2020 levels by 2030, and achieve net zero by 2050 across WA's infrastructure and transport networks.
- Launched by the Transport and Major Infrastructure Director General in April 2025 at the WA Connect Infrastructure Sustainability Council event, the focus is building communications and engagement across government and industry over the next 12 months. As of September 2025, the Hub has:
  - 1800 new users to the website with 19,000 active events most direct to website home page
  - 85 subscribers to CircleZero website
  - 11 case studies added
  - 28 suppliers added
  - 3 webinars and recordings with over 130 registered and 60+ attendees
  - 4 presentations of the Hub at industry events and 5 internal staff briefings
  - 1 monthly newsletter to subscribers

### Lessons learnt

- Partnership with existing trade associations, research groups and sponsorship opportunities is a key enabler to drive the program.

### For more information

- Western Australian Department of Transport and Major Infrastructure. 2025. [CircleZero](#)



# Conclusion

Recycled materials can deliver multiple benefits including lower emissions, reduced waste, enhanced resource security, and new economic opportunities. However, these benefits will not materialise at scale without deliberate and coordinated action.

While Victoria's EcologiQ program demonstrates what is possible, the absence of nationally consistent policy and regulation for recycled materials means that such funded programs are limited in their scalability.

Developing a robust recycled materials market can drive industrial transformation and economic diversification. This transition represents a strategic industrial policy opportunity that aligns with the

Australian Government's vision for sovereign capability and resilience in manufacturing and construction.

By positioning recycled materials as a core element of transport infrastructure planning, Australia can strengthen domestic supply chains and reduce reliance on imported virgin materials.



# Footnotes

1 DITRDCA. 2024. [Working with states and territories to decarbonise infrastructure and transport](#)

2 Council of the European Union. 2019. [EU Green Deal](#)

3 Government of the Netherlands. 2016. [Circular Dutch Economy by 2050](#)

4 World Economic Forum. 2024. [Why this Japanese circular built environment makes economic and environmental sense](#)

5 Insight Ace Analytics. 2024. [Sustainable Construction Materials Market Size](#)

6 DCCEW. 2024. [Waste at a glance](#)

7 DCCEW. 2009. [Australian landfill capacities into the future](#)

8 NSW EPA. 2025. [Sydney landfill shortage](#)



**Roads Australia 2025**

P +61 3 9821 5255

E [office@roads.org.au](mailto:office@roads.org.au)

 [roads-australia](#)

 [@RoadsAustralia](#)

[roads.org.au](http://roads.org.au)

