2 May 2025

Ms Joanne Chong and Ms Alison Roberts
Commissioners
Productivity Commission
4 National Circuit
Barton ACT 2600

By email: circular.economy@pc.gov.au

Dear Commissioners,

MCA feedback on Australia's circular economy: Unlocking the opportunities – interim report

The Minerals Council of Australia welcomes the opportunity to provide comment on the Productivity Commission's interim report on Australia's circular economy: Unlocking the opportunities.

The Australian minerals industry supports the adoption of Circular Economy (CE) principles to improve material efficiency and sustainability. The MCA has a longstanding commitment to facilitate and encourage responsible product design, use, re-use, recycling and (where necessary) disposal of our products.[1]

The Australian minerals industry is actively implementing CE through business efficiency, reducing material and energy inputs, and working to continually improve environmental and social performance. CE provides a significant opportunity for the mining sector to build on and accelerate these efforts.

Policies and initiatives promoting CE should be market-based and should consider the cost-benefit balance, including their flow on effects. The application of CE needs to be tailored to the context in which the industry operates.

The system wide findings are particularly important as this recognises the need to integrate CE into the broader economic ecosystem. There is a role for the governments in enabling CE by supporting harmonisation, knowledge sharing, regional coordination and establishing performance measures.

The proposed analysis of barriers inherent in mining regulation and policy is supported – the MCA recommends these could be examined through scenario testing with industry, government regulators and other relevant stakeholders.

MCA has prepared detailed feedback for the Productivity Commission's interim report in Appendix A. This feedback also addresses questions directly posed by the Commission to the MCA.

We welcome further engagement as the inquiry report is finalised. Should you have any questions, please do not hesitate to contact me

Yours sincerely

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APPENDIX A - MCA COMMENTS ON INTERIM REPORT

1. Australian minerals industry position on the application of Circular Economy principles

The Australian minerals industry supports the application of Circular Economy (CE) principles to minerals development and the broader economy with the objective of achieving greater materials efficiency.

The Australian minerals industry has a long-standing commitment to responsible production.[1] This includes a focus on materials stewardship, enhancing resource efficiency and the continual improvement in environmental and social performance.[2] CE builds on these existing approaches.

CE is ultimately about innovation in resource efficiency and sustainable materials management. The application of CE to mining needs to be tailored to the context in which the industry operates. This includes consideration of the broader regional and national economic implications.

The aim of CE should be to increase material efficiency by slowing, narrowing or closing material loops in activities ranging from raw material extraction to waste management.

Aligned with the United Nations Sustainable Development Goal 12 – Ensure sustainable consumption and production patterns, the outcomes sought from improved materials efficiency include:

- Retaining the value embedded in materials for as long as possible
- Reducing the impact of depletion on future generations
- Reducing waste generation and negative impacts on the environment.

CE policies designed to enhance the uptake of CE principles should be market-based and account for flow-on effects, such as the impacts of additional costs relative to the benefit of the actions.

2. Opportunities for the minerals industry

Opportunities exist to apply CE principles throughout all stages of minerals development, many of which the industry is already actively exploring and/or implementing. At a high level, these include:

- **Operations:** Strategies consistent with CE principles include reducing waste and pollution, extending the lifespan of products and materials, reducing energy inputs/emissions intensity and deploying renewable energy, generating value from waste and regenerating nature.
- **Land repurposing:** Including operational and non-operational land, there are significant opportunities to repurpose former mine sites and infrastructure for other uses, including social, cultural, environmental or economic purposes that provide longer-term benefit for former host communities and surrounding economies.
- **Infrastructure:** The use of infrastructure to support the reuse, remanufacture, and recycling of materials, as well as the adoption of new operating practices and business models, can help keep minerals and metals in circulation. This includes collecting used products and altering the extraction, reprocessing, and smelting of valuable materials for sale.
- **Products and materials:** Many mineral products have inherently circular characteristics such as durability, strength, and anti-corrosive properties that enhance recovery rates and improve the circular potential of the products in which they are used: enhancing longevity, lowering maintenance requirements, and providing higher functionality. Furthermore, metals have infinite recovery, reuse and recycling potential, where practical.

[1] Minerals Council of Australia, *Enduring Value: the Australian industry framework for Sustainable Development*, 2015.
[2] Minerals Council of Australia, *Towards Sustainable Mining*.

3. Interim report - System wide findings (Chapter 10)

The Productivity Commission (PC) identified a range of system-wide changes required to enable greater uptake of CE approaches. The MCA broadly supports these findings and comments on each are provided below:

a) Harmonised policies and regulations that affect the uptake of CE opportunities

It is proposed this be led by the Australian Government – either through improved interjurisdictional arrangements or a new body.

The Commonwealth can play an important convening and coordination role with the states and territories to identify opportunities to harmonise or enhance alignment and interoperability of CE policy. In addition, the Commonwealth can also identify and realise opportunities to integrate CE into Australia's trading relationships.

To achieve this, the MCA recommends adopting a minimalist approach, avoiding the creation of unnecessary bureaucracy. An interjurisdictional arrangement, supported by existing resources within the Commonwealth should be sufficient and support a more rapid roll-out of coordination on CE.

Commonwealth interventions, such as the establishment of specific initiatives or regulated approaches that aim to promote CE outcomes should be evidence-based, pass rigorous economic net benefit criteria, focus on clear gaps and support market establishment.

b) Facilitation and coordination services can assist businesses to find circular opportunities, develop partnerships, and navigate complex regulatory arrangements

The Productivity Commission is considering how governments could work with industry associations, research bodies and/or community organisations on coordination initiatives. This could include offering information on existing services, trialling new platforms, or facilitating connections between businesses for circular opportunities

The application of CE opportunities requires an understanding of the ecosystem of businesses and initiatives at a regional level to create synergies on materials efficiencies, including energy, inputs and waste streams. Individual businesses or industries will not always have the information on third party activities and planning, and there is a role for government to help businesses connect and identify CE opportunities.

There may also be opportunities for governments to support innovative or start-up businesses to facilitate the micro or smaller changes that will contribute to greater circularity.

The government could leverage industry association networks – including that of the MCA – to connect companies and promote greater uptake of CE. These networks could focus on sharing innovative initiatives or establishing government-facilitated forums to connect local/regional actors.

c) Place/regional based circular initiatives involve businesses co-locating to innovate and share knowledge, reduce costs (e.g. on inputs and transport), and share infrastructure.

The Productivity Commission is seeking further input on how governments can use place-based circular policies to support economic, social and/or environmental objectives – such as by reducing regulatory burdens, linking circular objectives to precincts or regions with related objectives (such as net zero) or service delivery (such as waste management and recovery).

The MCA supports place-based approaches and the co-location of industries in hubs or precincts where practicable. These should aim to drive greater efficiencies through the collaboration or the establishment of co-beneficial infrastructure and maximise opportunities for business synergies around materials, energy and waste where such interventions make commercial sense.

While this will assist in reducing regulatory barriers, for location-constrained industries such as mining, unlocking this opportunity will require government leadership, collaboration with industry and innovative approaches to encourage the necessary investment in co-beneficial infrastructure, including services, energy and access to workforces.

d) Governments can foster innovation in circular practices and technologies and help connect researchers and industry to commercialise research

The Productivity Commission is considering challenge-based funding models to encourage collaboration across supply chains.

Many businesses, while supportive of CE approaches, may not be aware of the innovative technologies, practices and opportunities that already exist. The MCA recommends that, rather than establish new approaches to achieve this, the Commonwealth Government should instead consider bolstering existing tools such as the Circular Economy Hub to achieve this.[3]

e) Monitoring the circular economy will be necessary to measure Australia's progress and inform government and business decisions, but the current set of circular economy indicators included in the *Measuring What Matters* framework is limited

The Productivity Commission is proposing that an expanded set of indicators could include environmental and economic outcomes from circular activities, so that the data can be used to identify opportunities and measure improvements made. But feasibility could be limited by high data collection costs for some indicators.

The inability to measure progress and benefits of CE is a key issue for CE uptake. There is a need to develop simplified metrics to support government policy makers, businesses and others to assess the feasibility of CE, implement CE and measure its success in a consistent manner.

Building a business case for increasing circularity is challenging because it must consider direct financial factors as well as hard-to-measure aspects like environmental, social, and regulatory impacts, plus future opportunities and liabilities. Complexity and data access are significant barriers to CE adoption.

Simplified tools are needed to support companies to consider and invest in CE opportunities, emphasising the importance of a clear value proposition, metrics and taking small steps in realising CE outcomes. While less mature, examples of indicators, research and case studies can be found on the Circular Economy Knowledge Hub. Furthermore, the World Business Council for Sustainable Development's Circular Transition Indicators are beginning to enable entities to measure and track circularity performance[4]

There is also an opportunity to consider how Artificial Intelligence models could be used as tools for companies seeking to understand CE opportunities and benefits.

4. Circular Economy opportunities for the mining industry (Chapter 7)

The Commission's key findings are broadly supported by the MCA, including the focus on enhanced resource extraction and post-mining land uses.

While other CE opportunities exist, there is already a significant business imperative for companies to improve materials efficiency through much of the mine-life cycle. Furthermore, operational barriers to integrating CE approaches are largely addressed through the system-wide issues identified in Chapter 10.

The MCA supports the proposed reform direction to undertake a national assessment of mining regulations to identify and reduce barriers to opportunities for mining waste and the repurposing of closed mines. The MCA recommends this analysis be informed by testing different scenarios in a workshop with industry and relevant government regulators in key mining jurisdictions.

MCA comments on key mining-specific CE opportunities identified in the interim report and other information requested by the Commission are provided below.

[3] For example: Circular Economy Hub, viewed 10 April 2025.
[4] Circular transition indicators - World Business Council for Sustainable Development (WBCSD) Circular Economy Knowledge Hub - Indicators, viewed 10 April 2025.

a) Deriving value from mining waste through the recovery of secondary minerals and metals

Mining waste should be considered in context. The placement of overburden rock, tailings and other residues at the mine site is not equivalent to the disposal of urban consumer products going to landfill. Instead, mining spoils and residues are stored remotely with mineralisation representative of the surrounding geology, and therefore may not represent an ongoing safety, environmental or social risk where managed according to risks presented. Therefore, if the economic benefits of re-mining are low, then there is little imperative for re-mining.

The optimal outcome for mining is coproduction extraction that maximises the value of the ore body, enabling operations to move to 'full value mining'. While re-mining of mine waste on operational and legacy sites also has significant potential, this can present unique challenges.

The technical and regulatory obstacles to achieving this vary depending on the location of the activity and the stage of the mine's operational life. For example, new mines can be planned to maximise full value mining opportunities to reduce the creation of waste streams and avoid regulatory barriers associated with retrofitting CE. It should be noted however, the take-up of full value mining opportunities will still be influenced by market demand and commodity prices.

In its analysis, the PC correctly notes that regulatory and broader policy barriers affect the ability of the industry to derive greater value from waste streams. This is particularly true for brown fields or existing operations where the technical, regulatory and cost barriers will be more significant.

The factors that influence a company's ability to mine additional minerals or process existing or new waste streams to recover new minerals and metals sit primarily at the state and territory level and include:

- **Mining lease requirements**: These authorise the recovery of specified minerals, meaning changes to lease conditions will be required.
- **State and territory level environmental regulation/approvals**: This will require changes to conditions, particularly if there is a material change to operational processes and/or environmental footprint. Depending on the nature of these changes, this will likely require a change of conditions for any Commonwealth approvals.
- **Native Title implications**:These changes may affect existing agreements with Traditional Owner groups, requiring modification and/or re-negotiation of agreements
- **Climate requirements**: Where more energy and hence greater emissions intensity from processing new minerals and metals may affect a facility's obligations under climate policy, including the Safeguard Mechanism.
- **Associated authorisations**: For example, transportation/dangerous goods authorisations may also be required.

Mining leases, environmental approval conditions and other licensing requirements can be inflexible, making these difficult, costly or time-consuming to change.

In addition to regulatory barriers, there may be a range of technical and practical barriers to retrofitting for full value mining and processing of mine waste at existing mining operations.

There may be opportunities for specialist third-party companies to engage in the processing of mine waste streams, however legal, practical and regulatory barriers remain while the primary mine is in operation. The MCA recommends these scenarios be considered in any detailed assessment of regulatory barriers, in line with the proposed reform direction.

Legacy mines

In addition to waste storages and streams at active mines, stored waste can be found across Australia at historical legacy sites. These sites have significant potential for reprocessing, given many of them were mined at a time when processing technologies were less efficient. Furthermore, state governments will often carry significant liabilities for historical legacy mines and so re-mining provides an opportunity to reduce or mitigate these risks.

In terms of data on waste storages, Geoscience Australia's Atlas of Mine Waste provides an online mapping tool of tailings, waste rock, and residues.[5]

The re-mining of historical waste storages can present challenges for operators. In addition to technical challenges (e.g. the selection of processing technologies and the often-heterogeneous nature of historical overburden and tailings storages), regulatory barriers such as the attribution of rehabilitation liabilities can affect the viability of a proposed re-mining operation. Furthermore, reprocessing operations may be opportunistic and short-lived, upon which lengthy approval processes can have a significant impact on their economics.

There are some successful examples of re-mining, including the Heritage Minerals copper-gold re-mining project at Mount Morgan, Queensland.[6] However, it should be noted other companies have previously attempted to re-mine at this site but were faced with significant technical and regulatory barriers and delays and therefore did not proceed.[7]

b) Alternative, higher value post-mining land uses

The MCA supports a focus on delivering greater value from post-mining land. There are significant opportunities to repurpose former mine sites and infrastructure for other uses, including social, cultural, environmental or economic purposes that provide longer-term benefits for host communities.

There is a range of technical, regulatory and policy barriers to achieving these outcomes. Similar to deriving value from waste, agreeing on a higher value end land use can be undertaken at a planning stage, but is more challenging for mines in a mature stage of operation with set rehabilitation goals.

Regulation has traditionally focused on rehabilitation of formerly mined land to previous land use or environmental purposes, underpinned by the requirement that landforms be safe, stable and non-polluting. Mines can often be long-lived, with changing regulator expectations affecting the company's ability to relinquish sites. In addition, a focus on progressive rehabilitation where practical, while good practice, can reduce the opportunity for repurposing.

Regulations that affect repurposing of existing mines include mining lease conditions, state and potentially Commonwealth environmental approvals, along with related land use agreements with Traditional Owners. In addition, companies have financially provisioned for a particular end land use, making changes financially challenging.

Liabilities for repurposed mine sites

The Commission has sought MCA views on whether ongoing liabilities at repurposed mine sites should be held by the former mine operators. Relinquishment remains an ongoing challenge for the sector, driven by an increasingly risk-averse regulatory culture. The MCA does not support in-perpetuity liability for companies, as this could impose a significant burden on companies, lock up capital and is impractical in the long term.

Where mines meet their rehabilitation obligations, this should be sufficient to address residual liability. In other cases where uncertainty remains a barrier to relinquishment, policy mechanisms are

[5] Geoscience Australia, Atlas of Mine Waste, viewed 10 April.
[6] Heritage Minerals – Mount Morgan Project, viewed 10 April.
[7] For example: Stockhead, "Carbine frustrated by environmental permit delays; shares fall 15pc" viewed 10 April.

emerging to help support relinquishment. An example of these mechanisms is residual risk payments to address potential future liabilities, such as the Queensland Government's Residual Risk policy.

c) Management of Off-the-road (OTR) tyres

On site disposal of off-the-road tyres

Off-the-road (OTR) tyres, when co-disposed and encapsulated in inert waste rock, generally do not react chemically with the surrounding environment, and so are considered to pose little to no environmental risk. This method of disposal takes advantage of the relatively stable nature of OTR tyres, mitigating concerns about potential contaminants leaching into the soil or water.[8] Additionally, by combining tyre disposal with existing waste rock management processes, mining operations can efficiently manage waste while minimising their environmental footprint.

Nonetheless, the mining industry understands the need to continuously explore opportunities to improve practices, including finding alternatives to on-site placement. Opportunities exist to improve the materials efficiency of operations by recovering materials from end-of-life tyres.

Industry Initiatives

The remote nature of most Australian mining operations limits the viability of recovery options. Stakeholders must weigh the benefits of material recovery against the financial and non-financial costs, including emissions and safety risk. There is currently no evidence to indicate that greater recovery rates for OTR tyres would deliver better outcomes for the environment.

However, recognising the potential environmental benefits of improved material recovery, several Australian mining companies have begun to undertake specific initiatives and programs aimed at recycling or repurposing their end-of-life OTR tyres.

A notable example is the partnership between Alcoa Australia and Tyrecycle.[9] This initiative involves transporting OTR tyres that have reached the end of their operational life from Alcoa's bauxite mines in the Peel and south-west regions of Western Australia to Tyrecycle's newly established East Rockingham facility. At this facility, the tyres are processed to create crumbed rubber. The resulting product has various applications, including as a component in crumbed rubber modified bitumen and in soft-surface applications for athletics tracks and playgrounds. This collaboration allows Alcoa to manage its end-of-life OTR tyres in an environmentally responsible manner, supporting the company's objectives for waste management and the reduction of landfilled waste. Alcoa is also exploring potential recycling solutions for other rubber products, such as end-of-life conveyor belts, and the possibility of using the crumb rubber generated by Tyrecycle in roadworks around their own operations.

BHP, in collaboration with the Queensland Department of Transport and Main Roads (TMR) and the Australian Flexible Pavement Association (AfPA), conducted a significant trial in Queensland to investigate the potential of using crumb rubber derived from mining tyres to resurface major highways.[10] BHP estimates that this approach could potentially utilise more than 6,000 tonnes of tyres annually for sealing roads if proven to be viable at scale. The trial highway surfacing has demonstrated strong performance under heavy mining traffic and summer heat in Central Queensland and continues to be monitored.

Rio Tinto undertook a significant recovery project at its closed Argyle Diamond Mine in Western Australia, recovering 800 tonnes of used OTR tyres and conveyor belts.[11] This project involved a partnership with Carroll Engineering Services. The recovered materials were transported over 3,200

[8] The Basel Convention technical guidelines on the environmentally sound management (ESM) of used and waste pneumatic tyres states that tyre components have no hazardous properties and are therefore not intrinsically hazardous.
[9] Tyrecycle, *Long awaited solution for end-of-life mining tyres*, January 2025.
[10] BHP, *Where giant mining tyre rubber meets the road*, September 2023.
[11] TSA, *Tipping the balance for mine restoration and waste recycling*, July 2024.

kilometers to Queensland, where they were processed into crumb rubber. This crumb rubber is now being used in road construction on the Sunshine Coast.

MMG's Dugald River underground zinc mine in Queensland is also exploring alternative tyre disposal methods and supporting a joint venture program called REVYRE with Energy Estate and InfraCo.[12] This proposed recycling process aims to break down and repurpose end-of-life tyres into a high-value polymer product suitable for tyre manufacturing and clean high tensile scrap steel.

Tyrecycle has recently opened dedicated OTR mining tyre recycling facilities in Port Hedland and East Rockingham in Western Australia.[13] These facilities, particularly the one in Port Hedland located close to major mining operations in the Pilbara region, aim to provide an efficient mine-to-processing service. Tyrecycle is actively collaborating with mining companies, including their partnership with Alcoa Australia, to deliver more sustainable outcomes for end-of-life OTR tyres.

5. Other factors to support CE uptake

In addition to the systems level and mining opportunities discussed above, the following factors should also be considered when determining CE opportunities and barriers to uptake.

Market development

The MCA considers downstream market development to support CE uptake remains a key issue, which, if resolved, would encourage organic growth of CE businesses across the supply chain. A lack of market demand for CE-derived products will affect the CE uptake. This could result from a lack of market need (e.g. higher value tyre derived products) or competition with lower-cost alternatives. No 'green premium' currently exists that prices in these externalities, limiting the growth of CE initiatives.

Common user infrastructure.

Regional-based approaches can be complemented by common user infrastructure investment.

There is an opportunity to consider how government initiatives, such as infrastructure funding to open up areas of critical minerals prospectivity, can also support complementary CE activity and establishment of regional hubs.

Furthermore, co-beneficial infrastructure either funded by government or public private partnerships is more efficient than parallel individual investments (i.e. water supply, communication or transport infrastructure).

Financial and other incentives for CE

Consideration should be given to incentive-based approaches to CE. Government has a role in supporting market development and access (i.e. infrastructure, regional approaches) for CE products. This could be financial or reputational (product differentiation) incentives. Certain activities, such as re-mining and reprocessing, that bring a range of environmental, social or economic benefits governments should consider incentivising these activities by project facilitation and financial incentives such as royalty reductions.

Costs to end-users

While CE integration is supported, care needs to be taken to ensure regulation, policies or targets are evidence-based and do not inadvertently impose significant additional costs on business end-users.

Encouraging small steps towards greater circularity

A barrier to the uptake of CE is understanding the business case for adoption – as this can sit outside of business as usual – and where CE is perceived as a high complexity approach out of reach to many companies. This is a particular challenge for smaller businesses. In addition to connecting

[12] WeiBold, *OTR tire devulcanization project receives support in Australia*, July 2021.
[13] Tyrecycle, *Huge Tyres, Enormous ESG Opportunities*, September 2024.

businesses to CE innovation, there is an opportunity to develop guidance for companies to make the business case and encourage taking the smaller steps that contribute to greater circularity.

Scenario testing to support assessment of policy/regulatory barriers to CE uptake

There is a myriad of differing policies and regulatory settings influencing the take-up of CE approaches, particularly at the state and territory levels. As such, the MCA supports the Commission's proposed reform direction to undertake a deeper analysis of these factors. Given the complex nature of drivers and barriers to CE there may be few specific examples the Commission can draw upon.

Given this, the MCA recommends the Commission consider running hypothetical case studies with industry and government regulators to test regulatory/policy settings on a jurisdictional basis. The MCA would welcome the opportunity to support these engagements.