

TSA Maximising the circular value of the  
resources in used tyres and conveyor belts



# Inquiry into the Australian Tyre Industry

Prepared for the House of  
Representatives Standing  
Committee on Industry,  
Innovation and Science

January 2026



# Contents

<b>Submitters Details</b>	<b>4</b>
<b>Executive Summary</b>	<b>5</b>
<b>Recommendations</b>	<b>6</b>
Recommendation 1: Mandatory Tyre Product Stewardship	7
Recommendation 2: Roads	9
Recommendation 3: Australian Design Rules (ADR)	10
Recommendation 4: Review OTR Tyre Burial Licensing Conditions	11
Recommendation 5: Boost Repair & Retread	12
Recommendation 6: Environment Ministers Meeting (EMM)	13
Recommendation 7: Amplify Enforcement of the Waste Export Ban	14
<b>Responses to Terms of Reference</b>	<b>15</b>
<b>TOR 1 Industry Review</b>	<b>16</b>
1.1 Tyre Manufacturing	16
<b>Case Study: Adoption of Electrical Vehicles (EV) and tyre manufacturing</b>	18
1.2 Distribution	18
1.3 Retail Trends	19
<b>TOR 2 Current Practices</b>	<b>21</b>
2.1 Current Practices In Tyre Reuse, Retreading, Recycling, and Resource Recovery	21
<b>Case Study: Retreading, the repeated benefits</b>	25
<b>Case Study: From Tyres to Triumph – Viva Energy Australia</b>	27
2.2 Reviewing Regulations Governing Tyre Production, Disposal, and Recycling	31
<b>Case Study: NSW Act Signals Mandatory Stewardship Future: A Turning Point for Tyres</b>	36
2.3 Advocacy for a Mandatory Stewardship Scheme	37
<b>TOR 3 Technical Advancements</b>	<b>38</b>
3.1 Exploring Technological Advancements in Tyre Design	38
3.2 Exploring Technological Advancements in Tyre Recycling Processes	38
3.3 Exploring Technological Advancements in Alternate Materials	41
<b>Case Study: Unlocking the potential of Tyre Derived Fuel (TDF)</b>	41
<b>TOR 4 Identify High Value Opportunities</b>	<b>43</b>
4.1 Context	43
<b>Case Study: Crumb Rubber Proven to Create More Resilient Roads</b>	43
4.2 High Value Opportunities for Tyre-Derived Material	45
<b>Case Study: Innovative Use - Rubber T-Lok Barrier</b>	48
4.3 Current limitations	48
<b>TOR 5 Effectiveness of Existing Models</b>	<b>50</b>
5.1 Effectiveness of the Existing Circular Economy Models	50
<b>Case Study: Why Australia’s Current Circular Economy Model Falls Short</b>	54
5.2 Identifying Opportunities for Research and Development	54
<b>TOR 6 Stewardship Scheme Role</b>	<b>56</b>
6.1 The Role of Product Stewardship Schemes	56
6.2 Whether Product Stewardship Schemes Should be Mandatory	57
6.3 Gaps in Collection, Processing and Recycling Facilities	60
<b>TOR 7 Safety Concerns</b>	<b>61</b>
7.1 Environmental and Community Risks from Poor Tyre Management	61
7.2 Tyre Waste and Recycling Operational Risks	63
7.3 Risk Assessment	65

<b>Appendices</b>	<b>66</b>
Appendix A: About Tyre Stewardship Australia	67
Appendix B: Definitions	68
Appendix C: Management Options for End-Of-Life-Tyres and Conveyor Belts	70
Appendix D: Advocacy for a Mandatory Product Stewardship Scheme for Tyres	71
Appendix E: Risk Assessment	73
Appendix F: Supply Chain Analysis	74
Appendix G: Australia's Tyre Supply Chain	75

## Submitters Details

**Submitter:**

Tyre Stewardship Australia

**Address:**

Office West, Suite 101,  
271 Bridge Road,  
Richmond, VIC 3121

**Postal Address:**

PO BOX 250  
Richmond VIC 3121

**Contact Person:**

Lina Goodman, Chief Executive Office, Tyre Stewardship Australia

e:

m:

## Executive Summary

The voluntary stewardship arrangement has taken Australia's tyre recovery as far as it can and has plateaued. Far from moving towards greater circularity, Australia is now at risk of going backwards: consumption of tyres overall is increasing, single-use tyres are becoming more common on trucks and buses, off-the-road (OTR) tyres are still mostly being buried or stockpiled on-site, while end-of-life passenger tyres are mostly recovered but are predominantly exported to be burnt as fuel.

Meanwhile, other countries are harmonising their approach through tighter regulations, more robust standards and expanded recovery capabilities. If Australia fails to act soon to increase the circularity of Australia's tyre industry and resource recovery, it risks becoming a target for poor-quality tyres not accepted elsewhere, and the problems we have today will only compound.

Meeting government ambitions for circularity and advanced manufacturing urgently requires stronger, mandatory action. Tyres are a priority product and must be a focus for a stronger national stewardship approach. Along with the cohort of other priority products such as small electrical products and solar PV panels, tyres need to transition from the Environment Minister's Product Stewardship Priority List to direct regulation due to insufficient industry progress to participate in the voluntary arrangement.

The advantage is that Australia can build upon the voluntary arrangement and transition to a mandatory product stewardship scheme for tyres, capable of meeting policy expectations and targets, with minimal disruption.

A well-designed mandatory scheme can directly address free riders, eliminate rogue operators, and create stable, long-term markets for tyre-derived materials by providing investment certainty and consistent national standards.

It can also significantly improve recovery rates, particularly in the OTR segment, and support equitable access for regional and remote communities.

By embedding fair levies, clear producer obligations, strengthened traceability, procurement levers, and incentives for higher order- manufacturing, a better scheme can lift environmental performance while expanding domestic processing capacity.

Ultimately, a mandatory stewardship framework signals globally and locally that Australia is committed to high value recovery, infrastructure investment, advanced manufacturing jobs, and innovation in tyre-derived materials.

Industry by-and-large supports this call for better regulation. What is needed now is government attention to resolving the issues and unlocking the opportunities, conducted in close cooperation with parties at all points of the supply chain.

See [Appendix F: Supply Chain Analysis](#) on page 74 below which identifies the issues impacting increased circularity across the tyre supply chain, and interventions to fix these issues.

## Recommendations

TSA submits its response to the Tyre Inquiry, emphasising that tyres are a priority product requiring urgent regulatory action.

With strong industry support for mandatory participation, TSA advocates reform to create a fair, effective stewardship framework and stands ready to work with the Committee and government to advance circular economy outcomes.

Recommendation 1: Mandatory Tyre Product Stewardship		
Implement a mandatory product stewardship scheme covering the entire supply chain to drive improved circularity outcomes, productivity and public benefit		
Current Situation	Recommended Government Intervention	Likely Outcome of Government Intervention
<p>The current Tyre Product Stewardship Scheme (Scheme), administered by Tyre Stewardship Australia (TSA) is voluntary.</p> <p>Under a voluntary arrangement:</p> <ul style="list-style-type: none"> <li>▪ Only 53% of tyre importers (by volume) are contributing towards the Scheme. Current scheme levy is the equivalent of \$0.25 per passenger tyre (for comparison, NZ mandatory scheme equivalent fee is NZD\$6.65<sup>1</sup>).</li> <li>▪ Only 1% auto-brands (by volume) are contributing to the Scheme for tyres on new vehicle imports. On-vehicle tyre imports make up one-quarter of the import volume of tyres.</li> <li>▪ 1,655 tyre retailers are participating in the Scheme. It is anticipated that there are approximately 15,000+ organisations in Australia who are in the business of tyre replacement.</li> <li>▪ TSA Accredited collectors and recyclers accounted for 89% of Australia’s tyre collection and recycling market.</li> </ul>	<p>Implement a mandatory scheme for all tyres that provides the framework needed to achieve optimal circular outcomes and mitigates against dumping, stockpiling and burial of used tyres.</p> <p>Advocate for a regulatory impact statement for mandatory tyre stewardship that aligns with the Western Australian Government led <a href="#">National End of Life Tyres Options Project</a><sup>2</sup> (National Options Project), and focuses on:</p> <ul style="list-style-type: none"> <li>▪ Addressing free riders – ensuring that levies from tyre imports are used to advanced Scheme objectives.</li> <li>▪ Ensuring the entire supply chain associated with tyres actively participates in the Scheme, this includes importers (on-vehicle and replacement) wholesalers, retailers, purchasers of new tyres, tyre collectors, recyclers and organisations using tyre-derived materials as feedstock to finished products.</li> </ul>	<p>A well-designed scheme fit for Australia can deliver the following outcomes:</p> <ul style="list-style-type: none"> <li>▪ 100% of all tyre imports (including those affixed to imported vehicles) will be contributing to the Scheme, increasing the funds available to expedite markets for Australia’s used tyres.</li> <li>▪ 100% of all Australian retailers who are replacing tyres will be accredited participants creating a level playing field.</li> <li>▪ Removal of rogue operators, who will no longer have access to tyres to collect and earn revenue only to dump them.</li> <li>▪ Ensuring only legitimate recyclers and collectors benefit from tyre processing in Australia, supporting their infrastructure investments and job security.</li> <li>▪ Market development opportunities focused on circular outcomes, and Australian Made and Re-Made are all supported and amplified under a regulated scheme. Australia moves closer to becoming custodians of its own tyre waste.</li> </ul>

<sup>1</sup> See [Waste Minimisation \(Tyres\) Regulations 2023](https://www.legislation.govt.nz/regulation/public/2023/0263/latest/whole.html) at <https://www.legislation.govt.nz/regulation/public/2023/0263/latest/whole.html>

<sup>2</sup> <https://www.wa.gov.au/service/building-utilities-and-essential-services/waste-management/national-project-options-end-of-life-tyres>

<b>Recommendation 1: Mandatory Tyre Product Stewardship</b>		
Implement a mandatory product stewardship scheme covering the entire supply chain to drive improved circularity outcomes, productivity and public benefit		
<b>Current Situation</b>	<b>Recommended Government Intervention</b>	<b>Likely Outcome of Government Intervention</b>
	<ul style="list-style-type: none"> <li>▪ Supporting government policy to develop incentives for retread and repair (see also Recommendation 5: Boost Repair &amp; Retread).</li> <li>▪ Incentivising advanced manufacturing utilising Australia’s tyre derived materials.</li> <li>▪ Mitigating against stockpiling and dumping by removing commercial incentives received by rogue operators who collect and dump tyres.</li> <li>▪ Increasing support to regional and remote communities to meet circular outcomes for their end-of-life tyres.</li> <li>▪ Reviewing licence conditions and waste codes associated with OTR tyres to support collection, recycling and sustainable circular outcomes.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Risks of reliance on exports as a means of managing waste streams are mitigated.</li> <li>▪ Government policy, regulatory frameworks and industry implementation are consistent with each other creating a stable environment, the confidence for industry to invest, and improved productivity.</li> <li>▪ Increased recovery rates and circular outcomes for end-of-life OTR tyres.</li> <li>▪ Increased consumer confidence resulting from disposal cost transparency and clarity of end fates for used tyres.</li> <li>▪ Increased consumer confidence in the eventual fate of end-of-life tyres and their disposal costs.</li> <li>▪ Increased protection of the environment and human health from the improved circular outcomes for all tyres.</li> </ul>

Recommendation 2: Roads		
Mandate the use of crumb rubber in road construction consistent with current specifications to achieve improved road performance and circular outcomes		
Current Situation	Recommended Government Intervention	Likely Outcome of Government Intervention
<p>Crumb rubber usage in roads is anticipated to reach 31,275T by the end of 2026 (or the equivalent of five million passenger tyres). This represents only 6% of the total used tyre volume generated each year in Australia.</p> <p>See further discussion on <a href="#">Crumb Rubber in Roads</a><sup>3</sup> on the TSA website.</p>	<p>Mandate the procurement of crumb rubber in roads as detailed in the relevant state roads guidelines, codes, and specifications.</p> <p>Each jurisdiction has an established and approved set of specifications for the utilisation of crumb rubber in their roads. These specifications are listed in TSA’s <a href="#">Crumb Rubber Roads Fact Sheet</a><sup>4</sup></p> <p>Mandating the adherence to these specifications ensures a significant end market for the nation’s used tyres; making Australia the global leader on circular construction of roads and pavements using crumb rubber.</p> <p>The usage of crumb rubber in roads can be further supported under Recommendation 1: Mandatory Tyre Product Stewardship.</p>	<p>Approximately 40% of the 537,000 tonnes of end-of-life tyres generated in Australia each year would be consumed locally. Under mandatory procurement where 15% crumb rubber is used in all bitumen consumed in both sprayed sealing and asphalt applications, consumption of crumb rubber would increase to 158,866 t, or the equivalent of 26.4 million passenger tyres.</p> <p>Improved performance outcomes for roads and pavement applications utilising crumb rubber, including:</p> <ul style="list-style-type: none"> <li>▪ Increased service life, reduction in the frequency and cost of maintenance.</li> <li>▪ Reduced road noise and increased passenger comfort.</li> <li>▪ High resistance to moisture and water infiltration.</li> <li>▪ Reduced surface deformation from heavy traffic.</li> <li>▪ Reduce construction costs.</li> <li>▪ Improved circular outcomes for tyres.</li> </ul>

<sup>3</sup> <https://www.tyrestewardship.org.au/tools-and-resources/crumb-rubber-in-roads>

<sup>4</sup> [https://storage.googleapis.com/tsa\\_craftcms\\_media/assets/pdf-resources/TSA-Crumb-Rubber-Roads-Fact-Sheet.pdf](https://storage.googleapis.com/tsa_craftcms_media/assets/pdf-resources/TSA-Crumb-Rubber-Roads-Fact-Sheet.pdf)

Recommendation 3: Australian Design Rules (ADR)			
Expand and enforce ADRs harmonised with international standards to drive improved tyre quality, health and environmental harms and increased retreading			
Current Situation		Recommended Government Intervention	Likely Outcome of Government Intervention
The Australian Design Rules (ADR) are essential regulations that apply to all imported vehicles. They ensure that vehicles meet specific safety, performance, and environmental standards before they can be sold in the Australian market.			
<b>Part A:</b>	The ADR is enforceable on vehicle imports only, not on replacement tyres.	Enforce the ADR to include replacement tyres of all types. If the ADR is required for all vehicle imports, then it needs to be extended to tyre replacements.	<p>Ensures consumers and commercial organisations are consistently replacing tyres with those that meet the ADR and are built for Australian conditions.</p> <p>Eliminates the harms associated with incorrectly or unsuitably affixed tyres, those which are expired or contain chemicals that amplify harm to the environment.</p>
<b>Part B:</b>	The ADR do not include comprehensive design rules and standards or effective enforcement measures that prioritise improved performance, reduced fuel emissions, improvement to composition to mitigate tyre road wear particles (TRWP).	Harmonise the ADR with UNR No.108,109,117 and Euro 7 to ensure Australia is aligned with international circular and industry best-practices.	<ul style="list-style-type: none"> <li>▪ Harmonising with UN Regulations No.108 and 109 will deliver improved quality of tyres being imported for eventual retread and align retread practices internationally.</li> <li>▪ Harmonising with UN regulation No 117 will deliver improved fuel efficiency, health, and safety, reusability, and overall quality of tyres.</li> <li>▪ Applying UNR 117 abrasion limits and incorporating Euro 7 standards as they are introduced into the ADR will deliver reduced TRWP emission. Harmonisation can be achieved within the current ADR system.</li> </ul>

<b>Recommendation 4: Review OTR Tyre Burial Licensing Conditions</b>		
Review government licences which permit in-pit burial and stockpiling of tyres to improve recovery rates for OTR tyres and capitalise on industry investment		
<b>Current Situation</b>	<b>Recommended Government Intervention</b>	<b>Likely Outcome of Government Intervention</b>
<p>Less than 15% of OTR tyres are recovered. The mining segment alone represents less than 5% recovery of OTR tyres.</p> <p>Each year at mines, over 100,000T of OTR volume is left unrecovered either left on land, buried in pit or stockpiled.</p> <p>TSA Accredited recyclers and collectors have collectively invested over \$100 M in infrastructure to support the processing of OTR tyres in Australia, primarily in Western Australia.</p> <p>Infrastructure investment in OTR recycling in Australia risks being mothballed unless the necessary policies to ensure appropriate management of OTR tyres are made.</p>	<p>Require State EPA(s) or other relevant authorities to review current licence conditions which allow in-pit burial and on land stockpiling of tyres.</p> <p>Such a review should consider infrastructure investment made in OTR tyre recycling technology; licence conditions need to reflect and support such infrastructure technology and capacity investments.</p> <p>Implement a mandatory scheme (see <a href="#">Recommendation 1: Mandatory Tyre Product Stewardship</a> on page 7.</p>	<ul style="list-style-type: none"> <li>▪ Recovery rate for OTR tyres will increase from the current 15% to over 80%.</li> <li>▪ Infrastructure investment in OTR tyre recycling and advanced manufacturing will achieve sustainable productivity and profitability levels.</li> <li>▪ Existing infrastructure investments part funded by taxpayers to manage OTR tyres will not be at risk of closure.</li> <li>▪ Australia will be a world leader in OTR tyre recovery options.</li> </ul>

Recommendation 5: Boost Repair & Retread		
Incentivise purchase of retread or repaired tyres to support the retread sector, protect jobs and align government circularity policy with practical industry support		
Current Situation	Recommended Government Intervention	Likely Outcome of Government Intervention
No incentive exists for government agencies, industrial and commercial fleet organisations, or other relevant organisations to prioritise repair and retread of commercial tyres. See <a href="#">Tyre Retreading in Australia</a> <sup>5</sup> (Retread Market Analysis)	Follow the lead of the US Tire Manufacturing Association (USTMA) and legislate to boost support for retreading and repair via an incentive to revitalise the retreading industry by making fleet purchases of retread or repaired commercial tyres more financially feasible. See <a href="#">USTMA Reinforce Support for Legislation Boosting Tire Retreading</a> <sup>6</sup> and the <a href="#">Retreaded Tire Job, Supply Chain Security and Sustainability Act</a> . <sup>7</sup>	<ul style="list-style-type: none"> <li>▪ Avoid the continuing decline and eventual cessation of the retread market in Australia and amplify repair of commercial tyres.</li> <li>▪ Align the Government’s circularity policies with practical industry support.</li> <li>▪ Increase and maintain jobs and manufacturing retread tyres in Australia.</li> </ul>

<sup>5</sup> <https://www.tyrestewardship.org.au/tools-and-resources/tyre-retreading-in-australia-market-analysis>

<sup>6</sup> <https://www.ustires.org/newsroom/ustma-reinforce-support-legislation-boosting-tire-retreading>

<sup>7</sup> <https://www.congress.gov/bill/119th-congress/house-bill/3401/text>

Recommendation 6: Environment Ministers Meeting (EMM)		
Undertake an impact analysis for a mandatory tyre stewardship scheme, align regulation and industry and achieve improved circular outcomes		
Current Situation	Recommended Government Intervention	Likely Outcome of Government Intervention
<p>In October 2022, the Australian Government added tyres to the Environment Minister’s Product Stewardship Priority List, and the 2023-24 list included a call to action for the tyre industry to join the voluntary Scheme or face regulation.</p> <p>In June 2023, the EMM announced Western Australia would lead the development of a <a href="#">National Options Project</a><sup>8</sup> paper relating to product stewardship for tyres.</p> <p>Following preliminary findings and extensive stakeholder consultations, the <b>National Options Project</b> delivered its final Project Report, including a review of regulatory settings, industry practices, markets for tyre-derived products, and the voluntary Scheme. The Project Report found that while the voluntary scheme has delivered benefits, significant gaps remain and that a regulated stewardship scheme is the best solution.</p>	<p>At the next EMM, agree to complete an impact analysis – and any other work – to prepare for a mandatory tyre stewardship scheme and streamlined regulations to achieve increased recovery rates and circularity.</p>	<p>Refer to <a href="#">Recommendation 1: Mandatory Tyre Product Stewardship</a> on page 7 above which details the outcomes that will be achieved.</p>

<sup>8</sup> <https://www.wa.gov.au/service/building-utilities-and-essential-services/waste-management/national-project-options-end-of-life-tyres>

**Recommendation 7: Amplify Enforcement of the Waste Export Ban**

Extend the current Foreign End Market Verification program to cover all tyre-derived materials and tyre-derived fuel exports to mitigate environmental and social harms in foreign markets

Current Situation	Recommended Government Intervention	Potential Outcome of Intervention
<p>The current waste export ban has largely reduced the volume of whole and baled tyres being exported. However, it is reported that leakage of baled tyres remains and/or that processed tyres not meeting waste export specifications are still being exported, undermining legitimate tyre recyclers.</p> <p>The existing waste export ban calls on tyres sent for retread or reuse to go through a <a href="#">Foreign End Market Verification (FEMV)</a><sup>9</sup> process.</p>	<p>Government should:</p> <ul style="list-style-type: none"> <li>▪ Boost the enforcement of waste audit exports for tyres.</li> <li>▪ Align waste export licence regulations with Scheme accreditation processes.</li> <li>▪ Mandate the current Foreign End Market Verification program and extend it to cover all exports.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Further improve pathways to circularity and support of legitimate recyclers by eliminating low to zero processed tyre exports.</li> <li>▪ Mitigate current environmental and social harms in export markets.</li> <li>▪ Protect and enhance Australia’s reputation as a responsible exporter and custodian of its own waste.</li> </ul>

<sup>9</sup> <https://www.tyrestewardship.org.au/find-services/foreign-end-market-verification>

## **Responses to Terms of Reference**

# TOR 1 Industry Review

## Reviewing tyre manufacturing, distribution, importation, and retail trends

### Relevant Recommendations

[Recommendation 1: Mandatory Tyre Product Stewardship](#) on page 7 above

[Recommendation 3: Australian Design Rules \(ADR\)](#) on page 10 above

[Recommendation 5: Boost Repair & Retread](#) on page 12 above

[Recommendation 6: Environment Ministers Meeting \(EMM\)](#) on page 13 above

## 1.1 Tyre Manufacturing

China is the largest manufacturer of tyres in the world by unit volume and represents more than double the output of United States. South Korea, Japan, Germany, Thailand, India, Mexico, Italy, and Spain makeup the top ten tyre producing countries in the world.

No tyres have been manufactured in Australia since 2010. Retreading, particularly of bus and truck tyres, continues in Australia although retread market share has declined significantly over the last eight years.

Global tyre manufacturing is transforming as manufacturers respond to systemic challenges - from regulatory changes such as Euro 7 and the restrictions on hazardous chemicals, to the need to optimise performance for electric vehicles (EV) and intensifying competition from EV and tyre manufacturing in China.

These pressures have been compounded over the past five years by digitisation across the value chain, shifting tariffs, and the arrival of new market entrants.

Countries that do not raise the bar on tyre manufacturing sustainability - from product design, material sourcing, to market segments - risk becoming dumping grounds for inferior products rejected by countries with more stringent regulations.

There are four factors impacting tyre manufacturing globally, identified in a recent TSA and CSIRO study, [Exploring Global Influences on the Tyre Industry](#)<sup>10</sup>. The four factors influencing tyre design globally are:

### 1. Government Policies and Regulations

Globally, there has been increased government focus on tyre design and circularity. This is reflected in targeted tyre policies and regulation on tyre design, such as Euro 7, circularity targets, and stewardship schemes. The pace and level of adoption of tyre design policies and regulations vary across regions, including government priorities and market drivers.

Arguably, circularity practices are not new in Australia, having been practiced for tens of thousands of years by Aboriginal and Torres Strait Islander Peoples. Australia's circularity, material productivity and waste recovery rates have all increased slightly, and slowly, over the decade.<sup>11</sup> More information on Australia's circularity can be found in sections [2.2.9 Global Best Practice: Lessons for Australia's Tyre Stewardship](#) and [5.1 Effectiveness of the Existing Circular Economy Models](#) on pages 36 and 50 respectively below.

<sup>10</sup> [https://storage.googleapis.com/tsa\\_craftcms\\_media/assets/pdf-resources/CSIRO-TSA-Global-Review-Report-2024.pdf](https://storage.googleapis.com/tsa_craftcms_media/assets/pdf-resources/CSIRO-TSA-Global-Review-Report-2024.pdf)

<sup>11</sup> [https://assets.pc.gov.au/387678/sub148-circular-economy.pdf?VersionId=lvxUFqnEq\\_M0y\\_ITsd6BHf5o0VMq22jv](https://assets.pc.gov.au/387678/sub148-circular-economy.pdf?VersionId=lvxUFqnEq_M0y_ITsd6BHf5o0VMq22jv) at pg 75 and pg 4

Policies and regulations typically focus on two broad outcomes: improving safety and reducing environmental impact. In terms of reducing environmental impact, current regulations and policies promote the following changes in tyre manufacturing:

- Alternative and **more sustainable rubber sources**.
- Increased **incorporation of recycled materials** and **product circularity**.
- Tyres with improved abrasion resistance to **limit particle emissions** and **microplastic generation**.
- Restrictions, exploration of alternatives, and **substitution of chemicals of concern** in tyres with no loss of performance or safety.

## 2. Tyre Manufacturer's Product Development and Innovation

Tyre manufacturer's globally have published their own ESG targets, which broadly align to global policies and regulations outcomes – increased safety and reduced environmental harm. Their objectives include reducing carbon emissions and deforestation, and improving safety and performance especially regarding EV needs, for example wet grip performance and fuel efficiency/rolling resistance. The replacement of chemicals of concern and reduction in tyre wear appear to be a lower product development priority possibly because global regulations are still evolving.

**Tyre composition innovation has been significant in recent years. In particular, the increased use of recycled raw materials, new rubber sources (guayule, dandelion rubber), bio-derived material (soybean and sunflower oils), and nano- and other technical materials.**

See [Case Study: Adoption of Electrical Vehicles \(EV\)](#) on page 18

## 3. Adapting Recycling Processes

The impact of tyre design and innovation development on existing end-of-life tyre solutions remains unclear. Current recycling processes, such as pyrolysis or devulcanisation, may not be directly applicable to new tyre materials and products. For example, can tyres created with dandelion rubber be processed by pyrolysis or devulcanization? Can carbon black recovered multiple times from pyrolysis maintain its quality and meet the strict technical specifications demanded by end markets?

To achieve sustainable tyre manufacturing by 2050, whole-of-life considerations are necessary for new tyre design, to understand their fit in current end markets and potential impacts on human health and the environment.

## 4. Research Drivers

In addition to the work being done by tyre manufacturers, global research to address chemicals of concern is generally approached in large-scale collaborations among industry associations and government bodies.

- The Tire Industry Project, an industry think tank comprising ten of the world's largest tyre companies, is committed to various research efforts, considering tyre emissions (particularly with proposed Euro 7 standards), mitigation and end-of-life impacts.<sup>12</sup>
- The U.S. Tyre Manufacturers Association is exploring alternatives to replace 6PPD, (precursor to the ecotoxic chemical 6PPD-Q), driven by the reality of future restrictions or ban on this chemical from both individual states like California, and at a Federal level under the *Toxic Substances Control Act*.<sup>13</sup>

---

<sup>12</sup> <https://tireindustryproject.org/news/tire-industry-project-commitment-to-addressing-tire-and-road-wear-particles/>

<sup>13</sup> <https://www.ustires.org/resources/6ppd-stage-1-alternatives-analysis-report>

- The National Environmental Science Program (NESP) is an Australian Government funded initiative providing research towards environmental and climate related topics. Within the NESP is a program dedicated to create more sustainable communities and to reduce the impact of waste, [Research | Sustainable Communities and Waste Hub](#)<sup>14</sup>, which includes target programs on microplastics and chemicals of concern from tyres.

### Design and Manufacturing Changes in Practice

#### Case Study: Adoption of Electrical Vehicles (EV) and tyre manufacturing

The additional weight and torque of EVs require specific manufacturing changes to the tyres to provide the necessary performance.

TSA commissioned research to review the increasing EV trend and the impact on tyre manufacturing and recycling, which can be found here: [Implications of the Transition to EV for End of Life Tyre Recovery](#)<sup>15</sup>.

The research found that advanced design features in tyres to improve performance are on the rise, including noise reduction foams, stronger sidewalls, and self-sealing layers, but that little consideration was found as to how these features impact end-of-life processing. Tyre recyclers that are using granulation and crumbing equipment are experiencing challenges in processing tyres with these new features, and in some cases need to remove tyres from the processing line to avoid contamination.

Australia currently has no regulations or standards addressing circular design or tyre wear and abrasion resistance, either for standard tyres or EV tyres.

The report highlights that by 2034, up to 3.2 m EV tyres could enter Australia's waste stream annually. This rapid transition to EVs is accelerating the challenges for both processing and tyre wear, but these challenges are not exclusive to just EV tyres; the overall trend towards larger and heavier vehicles such as SUVs can also contribute to these end-of-life processing and microplastic impacts.

## 1.2 Distribution

Australia imports 100% of its tyres, either affixed to new vehicles or shipped separately as replacement tyres.

**In 2023-24 approximately 84% of tyres were imported as replacement tyres**<sup>16</sup>, to be distributed through wholesalers, retailers, and specialist networks.

In 2024-25, companies that contribute to the voluntary Tyre Product Stewardship Scheme imported 53% of the tyres arriving in Australia as replacement tyres, down from 57% in the previous year. If current trends continue, within the next 12 months, at least half of all tyres imports by market share will fall outside the current product stewardship framework as an increasing number of tyres are imported each year.

The situation is more alarming for tyres imported affixed to new vehicles, which account for 16% of all tyre imports. Scheme participation by vehicle importers has remained at an extremely low rate of 3% by market share for several years. Recent departures from the Scheme by Volkswagen and

<sup>14</sup> <https://www.nespsustainable.edu.au/research>

<sup>15</sup> <https://www.tyrestewardship.org.au/tools-and-resources/implications-of-the-transition-to-evs-for-end-of-life-tyre-recovery>

<sup>16</sup> [https://storage.googleapis.com/tsa\\_craftcms\\_media/assets/pdf-resources/TSA0047-L8-Material-Flow-Analysis-Report-WEB.pdf](https://storage.googleapis.com/tsa_craftcms_media/assets/pdf-resources/TSA0047-L8-Material-Flow-Analysis-Report-WEB.pdf)

Mercedes-Benz leaves only Porsche contributing - representing around 1% market share contributing to the Scheme at the current time. If Porsche withdraws, participation will be zero.

This decline underscores the urgent need for stronger regulation to ensure participation in stewardship schemes—and with it, shared accountability, and collective action on tyre sustainability. Without government intervention, Australia risks losing momentum on tyre stewardship. **TSA remains committed to demonstrating the value of Scheme participation to tyre importers and vehicle importers, however, voluntary participation has plateaued.**

TSA's informed view is that only government regulation can compel full participation of tyre importers into the stewardship scheme. Importers contributing to the current voluntary scheme recently wrote, as a collective, to Minister Watt<sup>17</sup> urging strong regulation. Their view, in part ...

*“... despite our sustained efforts, continued voluntary contribution alone cannot move the dial to more circular outcomes for all end-of-life tyres in Australia. Stronger regulation is essential.”*

Further, referring to the recently published [National Options Project](#)<sup>18</sup> report prepared by the Western Australian government, the contributing importers also note:

*“The Report’s findings align with various government inquiries and reports over the past 10 years. There is enough evidence to take action, now.”*

Soft signals, such as the inclusion of tyres on the Environment Minister’s Product Stewardship Priority List, and even an explicit call to action in the 2023-24 List to join the voluntary scheme or face regulation<sup>19</sup> have not had the desired influence on the tyre industry. In reality, the trend is away from these directives.

Given the rise in tyre imports from organisations not contributing to the Scheme - including new entrants and parallel importers - Australia faces a growing compliance gap. New market participants should be welcome, but only if they meet ADR and contribute to stewardship. Otherwise, they gain an unfair advantage: avoiding environmental obligations while free-riding on Scheme activities funded by compliant competitors. Enforcement remains feasible, given that tyres are still predominantly purchased through physical retail outlets rather than online.

## 1.3 Retail Trends

### 1.3.1 Market Make Up

Approximately 73% of replacement tyre units (predominantly passenger, bus and truck tyres are sold through 15 large networks representing around 1,900 retail outlets – most being aligned with one of the major global tyre manufacturer brands. There are approximately 1,700 TSA Accredited retailers participating in the Scheme.

The Australian Business Register (ABR) shows there are more than 28,000 independent retailers, mechanics, panel beaters, and other automotive related workshops which could potentially sell tyres. However, it is generally accepted that there are approximately 13,000 independent retailers (not aligned to major tyre manufacturing brands) responsible for the remaining 27% of total replacement tyre volume.

---

<sup>17</sup> A copy of the letter to the Minister is included as a confidential attachment to this submission

<sup>18</sup> <https://www.wa.gov.au/service/building-utilities-and-essential-services/waste-management/national-project-options-end-of-life-tyres>

<sup>19</sup> <https://www.dcceew.gov.au/environment/protection/waste/product-stewardship/ministers-priority-list-23-24#tyres>

Overall, non-accredited retailers represent between 87% - 94% of businesses selling, or potentially able to sell, tyres.

### 1.3.2 Landscape Changes

Over the last two years, there has been a significant reduction in the number of brand-owned retail tyre stores and significant job cuts. This includes the closure of the substantial Beaurepaire retail network (formerly owned by Goodyear & Dunlop Tyres), the global sale of the Dunlop brand and a shift in Goodyear's distribution strategy.

Data is also showing that premium brands are selling fewer tyres in Australia as they face competition from new entrants across all tyre segments.<sup>20</sup>

### 1.3.3 Commercial Pressures

The emergence of online sales and booking systems has intensified price competition, with most major retail networks now displaying pricing online. This, combined with growing demand for lower-cost tyres, a proliferation of brands, and the increasing complexity of the Australian car parc, has heightened competition among tyre retailers. In response, retailers consistently seek ways to minimise costs and protect margins.

Disposal costs present one such opportunity to ease the pressure on margins. Retailers typically choose their own collectors and recyclers, meaning that if consumer prices hold firm but cheaper disposal options are used, additional margin can be captured.

Retailers that voluntarily participate in the Scheme may only use TSA Accredited collector and recyclers, committed to manage the tyres sustainably. While all other retailers can increase their margins by using cheaper collectors and recyclers without concern for whether the used tyres are managed appropriately or simply send to landfill or dumped and not passing on those savings to consumers paying a disposal fee.

The consequences are predictable. In the past year, a retailer aligned with a major contributing brand was convicted of illegal dumping on the Gold Coast, with clean-up costs borne by the local council. Such incidents are difficult for brand owners to prevent and, under current conditions, inevitable (see [Gold Coast man fined for illegally dumping tyres | Department of the Environment, Tourism, Science and Innovation \(DETSI\), Queensland<sup>21</sup>](#)).

When participation in the voluntary Scheme carries real or perceived costs, commercial interests will reliably win out; and environmental public benefit motivation will wane.

---

<sup>20</sup> [https://storage.googleapis.com/tsa\\_craftcms\\_media/assets/Annual-Reports/TSA-Annual-Report-FY25-WR.pdf](https://storage.googleapis.com/tsa_craftcms_media/assets/Annual-Reports/TSA-Annual-Report-FY25-WR.pdf)

<sup>21</sup> <https://www.detsi.qld.gov.au/our-department/news-media/mediareleases/2025/gold-coast-man-fined-for-illegally-dumping-tyres>

## TOR 2 Current Practices

Investigating current practices in tyre reuse, retreading, recycling, and resource recovery, including reviewing federal, state, and local regulations governing tyre production, disposal, and recycling.

### Relevant Recommendations

[Recommendation 1: Mandatory Tyre Product Stewardship](#) on page 7

[Recommendation 4: Review OTR Tyre Burial Licensing Conditions](#) on page 11 above

[Recommendation 5: Boost Repair & Retread](#) on page 12 above

[Recommendation 6: Environment Ministers Meeting \(EMM\)](#) on page 12 above

[Recommendation 7: Amplify Enforcement of the Waste Export Ban](#) on page 14 above

## 2.1 Current Practices In Tyre Reuse, Retreading, Recycling, and Resource Recovery

This section examines how tyres flow through the Australian supply chain. The TSA’s 2025 [Material Flow Analysis Report 2023-24 Are we there yet? Australia’s journey towards a circular economy on tyres](#)<sup>22</sup> (MFA Report) breaks down the final stages of the supply chain into seven possible ‘end-fates’ for used tyres, reflecting the diverse pathways tyres take after their initial use.

It provides a comprehensive five-year benchmark of tyre consumption and end-fate distribution across all tyre segments. This benchmark offers critical insights into trends, recovery rates, and opportunities for improving resource efficiency and productivity, through greater circularity in the tyre lifecycle.

### 2.1.1 Terminology

Within the MFA Report, tyres are classified as either:

- **Recovered:** Tyres that have been collected and processed for a second use, such as reuse, recycling, energy recovery.
- **Unrecovered:** Tyres that may have been collected but are destined for disposal, including in landfill or burial, or are burnt, stockpiled or illegal dumped.

The seven possible end-fates are:

Recovered	Unrecovered
<ul style="list-style-type: none"> <li>▪ Reuse</li> <li>▪ Recycling</li> <li>▪ Energy recovery</li> </ul>	<ul style="list-style-type: none"> <li>▪ Onsite burial</li> <li>▪ Landfill</li> <li>▪ Burning</li> <li>▪ Stockpiled and illegal dumping</li> </ul>

Importantly, the terms ‘used’ and ‘end-of-life’ tyres are often used interchangeably in the tyre industry, but there is a distinction between the two based on the decision to extend the life of the

<sup>22</sup> [https://storage.googleapis.com/tsa\\_craftcms\\_media/assets/pdf-resources/TSA0047-L8-Material-Flow-Analysis-Report-WEB.pdf](https://storage.googleapis.com/tsa_craftcms_media/assets/pdf-resources/TSA0047-L8-Material-Flow-Analysis-Report-WEB.pdf)

tyre. When a tyre is removed from the vehicle it generates a ‘used’ tyre, which must then be managed responsibly. There are two pathways:

- Extend its life through reuse e.g., as a retread or second-hand tyre.
- Convert it to an end-of-life tyre (EOLT) if the owner decides they cannot or will not extend its life by reusing it.

‘Used tyre generated’ is a collective term that refers to both used tyres that are reused and used tyres that have reached their end-of-life.

### 2.1.2 From Recovery to Circularity

The overall material flow can be seen in the Sankey diagram below which shows the data for the material flow of tyres in Australia in 2023-24.

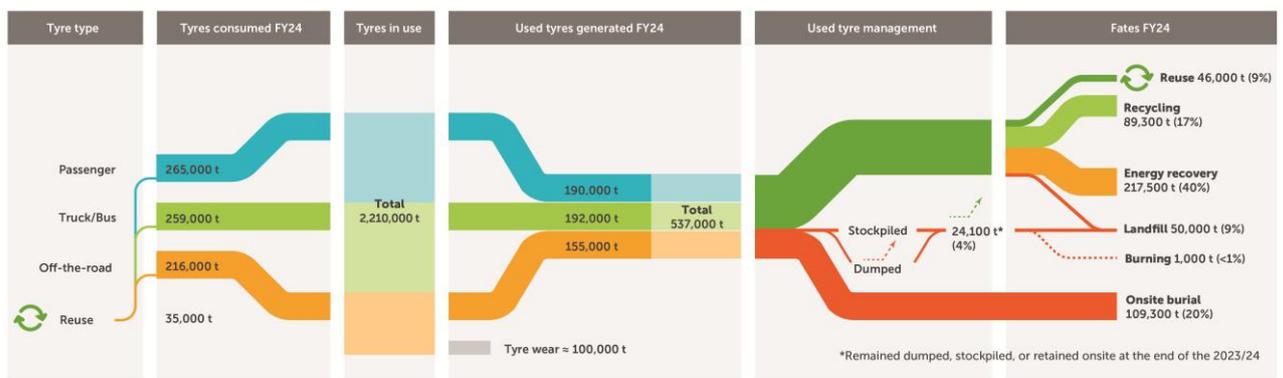


Figure 1 Material Flow of Tyres in Australia (2023 - 2024)

### 2.1.3 Used Tyre Fates

Of the **537,000 t of used tyres generated in 2023-24**, the report reveals seven fates – with only a quarter (26%) contributing to materially circular outcomes through reuse and recycling:

- **Reuse (9%):** Second-hand sales and re-treading, particularly strong for truck tyres (circular).
- **Recycling (17%):** Converting tyres into new products like road surfaces and playground materials (circular).
- **Energy recovery (40%):** Mostly exported as shredded fuel, primarily to India and Malaysia .
- **Onsite burial (20%):** Almost entirely mining tyres buried at mine sites.
- **Landfill (9%):** Formal disposal in licensed facilities.
- **Stockpiling/dumping (4%):** Including illegal dumping costing councils \$6.5 million annually, with each cleaned-up dumped tyre costing nearly three times the cost of proper disposal.
- **Burning (0.2%):** Open burning without energy recovery.

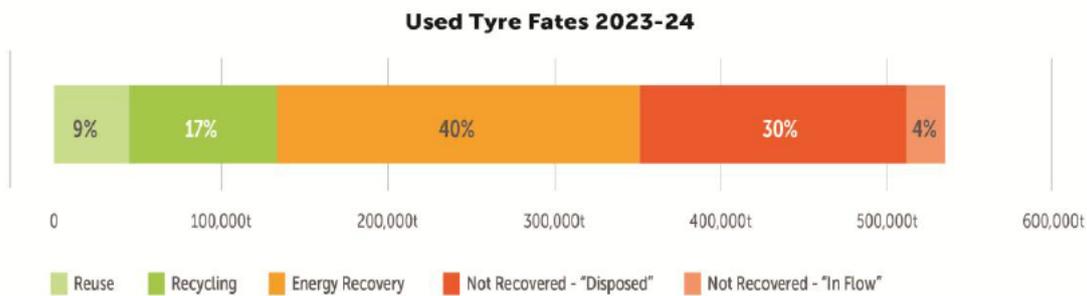


Figure 2 Volume of Used Tyres By Fate in Australia (2023 - 2024)

Of note, the overall resource recovery result is strongly impacted by the fact that almost all OTR tyres used in mining are being buried onsite, stockpiled or sent to landfill. This results in long term risks to the local environment and a complete loss of significant tonnages (~130,000 t) of valuable embodied materials each year.

Without considered regulatory intervention and market development, Australia risks locking in the current dominant waste management approach of disposal and energy recovery, over a more circular approach that directs material flows to higher-order fates, preferably onshore.

Importantly, end-fates vary widely between used tyre segments. The greatest end-fate proportions for each tyre type are as follows:

- Most mining tyres (87%) are not recovered for any useful purpose and are either buried on site or stockpiled.
- Due, in part, to their comparatively high energy value and emissions characteristics, 77% of passenger tyres are used for energy recovery, primarily in offshore cement kilns in India and Malaysia.
- With a high percentage of natural rubber and ease of processing, 53% of truck and bus tyres are reused and recycled.
- **All segment recovery rates:** Overall, only 66% of all end-of-life tyres are recovered in Australia.

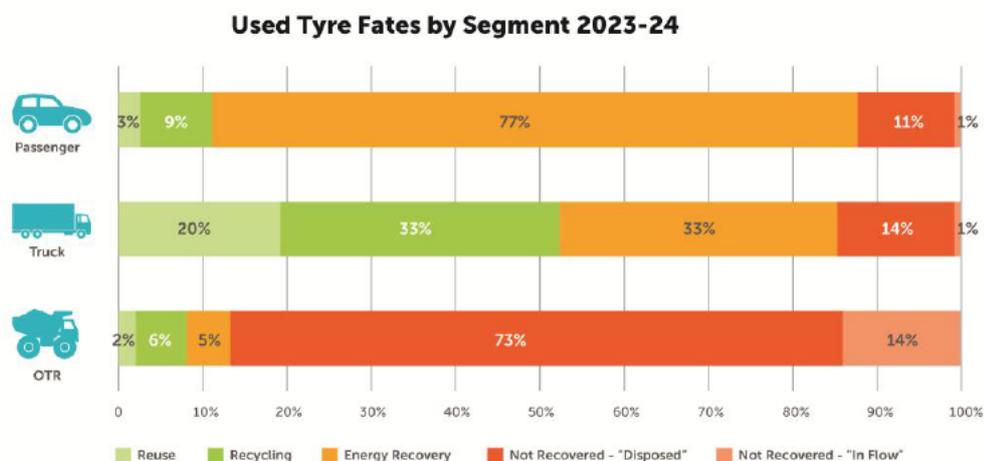


Figure 3 Volume and Mix of Used Tyres by Fate by Tyre Segment in Australia (2023 - 2024)

TSA’s 2025 Report, [Analysis of the Material Circularity of Management Options for Tyres and Conveyor Belts](#)<sup>23</sup> responded to a growing interest from mining companies in understanding the relative merits of management options as they consider a move away from onsite burial.

The report evaluates how a range of tyre management strategies align with the principles of a circular economy and the waste hierarchy, which prioritises management options from highest degree of circularity to least.

#### Appendix C: Management Options for End-Of-Life-Tyres and Conveyor Belts

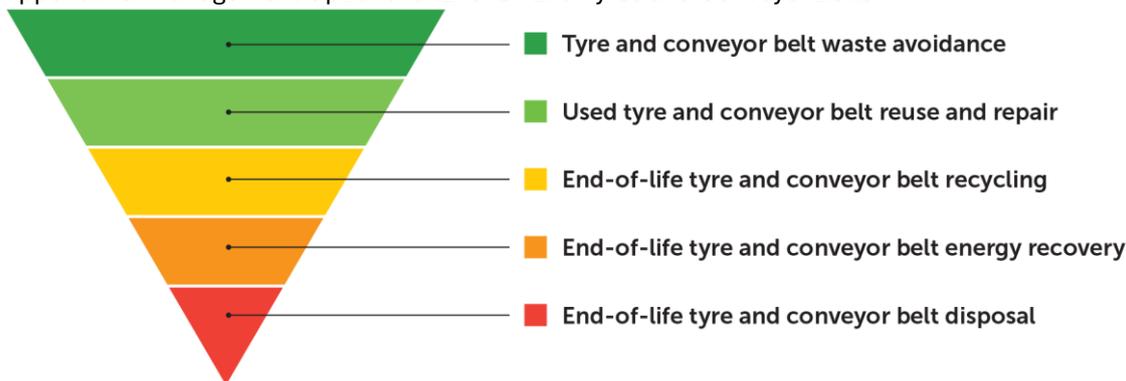


Figure 4 Waste Hierarchy Categories by Priority

By mapping these options, the analysis identifies pathways through technologies and end-use applications that deliver the greatest resource efficiency, productivity gains, and environmental benefits, while reducing reliance on low-value disposal and energy practices. A comprehensive illustration of management options is contained in [Appendix C: Management Options for End-Of-Life-Tyres and Conveyor Belts](#) on page 70 below.

### 2.1.4 Understanding Used Tyre Fates

#### End Fate Description: Reuse Including Retread

**Reuse: covers re-allocation of used tyres to their original purpose after minimal or no processing, including retread and second-hand sale.**

Reuse represented 9% of combined used tyre end fates in 2023–24 and is by far the most circular option. It includes retread and second-hand sale, both domestically and through export for reuse overseas, which extends tyre life and reduces resource demand.

The reuse opportunities for used tyres differ by tyre segment:

- **OTR tyres (currently 2% reuse):** Significant opportunity exists to extend the use phase for high value large OTR tyres, through retreading and repair and refurbishment. Large OTR tyre active management is common overseas; Australia needs comparable capability and uptake. Aviation tyres are often procured in a ‘tyres as a service’ model, i.e. they are charged per landing basis rather than as an outright purchase, like leasing. Aviation tyres in this model are retread tyres multiple times before they are recycled – all in an extreme safety-driven context.
- **Truck and bus tyres (currently 20% reuse):** Truck and bus tyres are at the core of the domestic retread remanufacturing industry, but this industry is in decline due to cheap single-use imports.
- **Passenger tyres (currently 3%):** Retreading is legal but rare for passenger tyres. Future sustainability strategies by manufacturers may enable a return to retreadable passenger tyre

<sup>23</sup> <https://www.tyrestewardship.org.au/tools-and-resources/material-circularity-of-management-options-for-tyres-and-conveyor-belts>

designs (e.g. [Continental Green Concept 2021](#)<sup>24</sup>) as manufacturers pursue sustainability and ‘tyres as a service’ as a core part of their future growth.

**While reuse offers the highest circularity, it is underutilised in Australia, and the key area of application - retread - is in structural decline.** The value of retreading is proven. Retreading a truck tyre can increase its lifespan by up to three times and only requires one-third of the oil to manufacture it compared to a new truck tyre.<sup>25</sup>

Action is needed to strengthen retreading and repair industries and align Australia with global best practice such as in the USA where the retread industry receives government support via the [Retreaded Truck Tire Jobs, Supply Chain Security and Sustainability Act \(2024\)](#)<sup>26</sup>

**More information on the science, and economic and environmental value of retreading can be downloaded from the TSA website: [Retreading: The repeated benefits](#)**<sup>27</sup>

#### Case Study: Retreading, the repeated benefits

Through retreading, a worn truck or bus tyre casing is given a second life. Instead of discarding the entire tyre, a new tread - just 12–18 kilograms - is applied to the existing casing. This simple process conserves 70–80% of the original materials, saving approximately 40 kilograms of valuable resources per tyre.

The use of retread for truck and bus vehicles is popular in developed markets worldwide. However, there is a global decline in the retread market as we see an increasing trend towards single use truck and bus tyres that are not manufactured to structurally withstand the retreading process.

Bandag is a local manufacturer retreading tyres for the transport industry. Located in Wacol (Qld), Bandag is making tyres that are safe, dependable, and cost effective. By retreading tyres Bandag is extending their life and keeping them on the roads for longer.

TSA recently commissioned a report [Retread Market Analysis](#)<sup>28</sup>. This report details how this 100-year-old circular economy process of retreading tyres is under threat. Between 2017 and 2025 there was a corresponding decline in the market share of retread tyres from 20% to 10%. The report identifies that the number of operating retread facilities in Australia has decreased by 64% over the same period. The underlying cause is well understood by the retreading industry – the increased uptake of lower quality, lower upfront cost, single-use truck and bus tyres.

**These trends are concerning and should be a call to action for the Australian Government to act and incentivise the use of retread in heavy commercial applications, reducing the commercial value over lower quality, lower upfront cost, single use tyres and preventing the loss of an important strategic sovereign industry that is fundamental to achieving our circularity targets.**

---

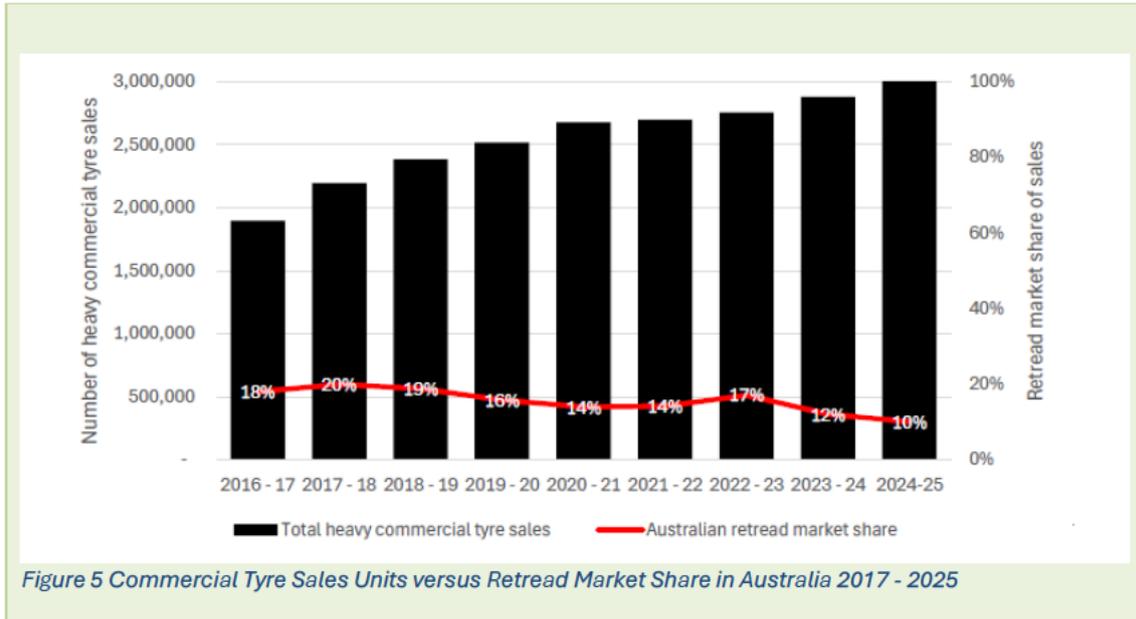
<sup>24</sup> <https://www.continental-tires.com/au/en/about-us/stories/greenconcept-iaa-mobility/>

<sup>25</sup> <https://www.tyrestewardship.org.au/tools-and-resources/retreading-fact-sheet>

<sup>26</sup> <https://www.congress.gov/bil/118th-congress/house-bill/8578>

<sup>27</sup> [https://storage.googleapis.com/tsa\\_craftcms\\_media/assets/pdf-resources/TSA-Retreading.pdf](https://storage.googleapis.com/tsa_craftcms_media/assets/pdf-resources/TSA-Retreading.pdf)

<sup>28</sup> <https://www.tyrestewardship.org.au/tools-and-resources/tyre-retreading-in-australia-market-analysis>



**Insight**

**Tyre Doctor: Maximising Uptime for Mining and Industrial Tyres Via Tyre Repairs**

The Tyre Doctor, an Australian business located in regional NSW with ability to service the agriculture and mining industry across the country, specialises in tyre repairs; delivering permanent repairs that reduce downtime, extend tyre life, and keep heavy duty fleet operational.

Repairing a large industrial tyre is cost effective, aligns with circular economy principles and avoids tyres being discarded prematurely.

See [Maximising Uptime and Durability for Mining & Industrial Tyres](#)<sup>29</sup>

**End Fate Description: Recycling**

**Recycling: covers activities that culminate in tyres being converted into products or raw materials that are returned to productive use, excluding energy.**

Recycling accounted for 17% of combined used tyre end fates in 2023-24, representing a significant but underutilised opportunity for material circularity. There are around twenty recycling options, yet their contribution to a circular economy varies widely. The key insights are that:

- **Circularity depends on product application:** Not all recycling delivers the same environmental benefit. High-value applications - such as devulcanizing rubber for new tyre manufacturing - offer strong circularity, while others provide little. See also: [Appendix C: Management Options for End-Of-Life-Tyres and Conveyor Belts](#) on page 70 below.
- **Processing intensity vs. value:** The most circular options typically require the most processing, investment, and energy input, creating cost and infrastructure challenges.
- **Market maturity is uneven:** Australia has small markets for options such as crumb rubber for roads and pavements that can and should be scaled significantly. Higher-circularity solutions, like devulcanisation are developing internationally but remain non-existent locally.

<sup>29</sup> <https://tyredoctor.com.au/news-and-video/articles/how-to-repair-punctured-tyre-heavy-duty-trucks/>

- **True circularity is limited:** Recycling rubber compounds back into new tyres is possible but not yet commonplace, highlighting a gap in Australia’s recycling capability.
- **Strategic risk:** Without investment in advanced recycling, Australia risks locking in low-value pathways and over-reliance on energy recovery. The retread industry stands out as one that is of strategic significance and deserves support such as that provided in the USA through tax incentives for the purchase and use of retreaded tyres<sup>30</sup>.
- **Opportunity:** Existing shredding capacity - built for energy recovery - can be leveraged for recycling, supporting a shift toward higher-value outcomes for capital investments.

**Overall, tyre recycling is underperforming in Australia relative to its potential.** To achieve a circular economy, Australia must prioritise investment in circularity technologies and markets, while leveraging existing energy recovery infrastructure to accelerate progress; and prioritise procurement of recycled materials.

#### Case Study: From Tyres to Triumph – Viva Energy Australia

Viva Energy is leading Australia’s shift to low-carbon liquid fuels through co-processing waste feedstocks at its Geelong Refinery. This approach produces renewable diesel, marine biofuel blends, and bio-LPG - critical for sectors with limited electrification options. By prioritising waste streams such as used tyres, Viva Energy can strengthen circular supply chains and deliver measurable carbon benefits.

In July 2025, Viva Energy successfully co-processed 10 tonnes of imported tyre-derived pyrolysis oil from Poland, proving technical feasibility and readiness for waste-derived inputs. [From tyres to triumph: Viva Energy takes another step in sustainable fuel production](#)<sup>31</sup>

The company is partnering with Klean Industries to explore a Melbourne tyre-recycling facility capable of processing 80,000 tonnes annually, creating a domestic source of sustainable feedstock.

Despite these advances, policy gaps remain. Under the National Greenhouse and Energy Reporting (NGER) framework, co-processed fuels lack full recognition, creating uncertainty for emissions accounting. This limits Safeguard Mechanism-covered facilities from claiming Scope 1 reductions - despite the potential to meet declining baselines. To unlock scale, reforms must codify co-processed fuels in NGER methods, align Safeguard guidance, and incentivise waste-derived feedstocks.

Closing these gaps will enable Australian-made low-carbon fuels to be recognised, credited, and deployed, accelerating industrial decarbonisation and supporting sovereign supply chains.

#### End Fate Description: Energy Recovery

**Energy recovery: covers all processes through which tyres are processed to recover energy, for example process heat, steam or in electricity generation.**

Globally, energy recovery plays an important role in managing end-of-life tyres and is preferable to disposal, but it is not a circular outcome and should not be confused with recycling. In Australia, energy recovery remains the dominant end fate for used tyres, accounting for around 40% of end-fate outcomes in 2023–24.

---

<sup>30</sup> H.R.8578 - 118th Congress (2023-2024): Retreaded Truck Tire Jobs, Supply Chain Security and Sustainability Act of 2024 | Congress.gov | Library of Congress

<sup>31</sup> <https://www.vivaenergy.com.au/media/news/2025/from-tyres-to-triumph-viva-energy-takes-another-step-in-sustainable-fuel-production>

The market has shifted significantly over the past decade. Following China's 2018 *National Sword* policy, Australia introduced measures to prevent overseas dumping and boost domestic recycling. The most significant change was the ban on exporting whole tyre bales, which previously posed potential health and environmental risks to receiving countries.

Today, tyre exports are regulated under the *Recycling and Waste Reduction Act 2020* and associated rules, requiring exporters to hold a licence and declare consignments. Only processed tyres - shredded to less than 150mm - or tyres destined for retreading or reuse overseas are permitted for export.

**When used for energy recovery, tyre-derived fuel offers clear benefits when it displaces coal, as it has a higher calorific value, and can significantly reduce CO<sub>2</sub> emissions.**<sup>32</sup> In cement manufacturing, for example, tyre-derived fuel can be used without compromising product quality when appropriate systems control emissions within regulated limits.

However, energy recovery lacks material circularity - rubber compounds are permanently lost during combustion. And a heavy reliance on this pathway risks deterring investment in reuse and recycling options essential for a circular economy. While the ban on baled-tyre exports reduced the volume exported for several years, shredded tyre exports have largely replaced the previous export tonnage. **Arguably, in practice, the export ban has only changed the form of waste tyre exports - from bales to shred – not the volume.**<sup>33</sup>

#### End Fate Description: Onsite Burial

**Onsite burial: covers burial of tyres on a site that is not a formal landfill, whether approved by a regulator or not, so that the tyres can't be recovered.**

In Australia, almost all off-the-road (OTR) tyres and conveyor belts used in mining are buried onsite or stockpiled because regulations allow it, dragging down the overall resource recovery rate for all tyres.

In 2023-24 **the recovery rate for all OTR tyres was 13% overall and less than 5% for mining**, driven by the absence of mandatory requirements and permissive waste management conditions. Current rules, if any, usually only specify burial batch sizes and cover depth. This is far below modern engineered landfill standards applied to all other landfills.

Mining tyres are a revered commodity in higher- circularity technology and applications because they contain significant amounts of natural rubber at their end-of-life.

The low OTR recovery rate is a lost opportunity. Valuable resources still in the tyre are wasted, landscapes and groundwater risk degradation, and the practice increasingly conflicts with sustainability and Aboriginal and Torres Strait Islander Peoples' cultural values.

Globally, countries like Denmark and France achieve 80–100% recovery through legislated targets, producer obligations, and modest fees that fund recycling infrastructure.

Recent investments in OTR processing infrastructure including in the WA Pilbara, where half of all OTR tyres are consumed by the mining industry, are struggling for supply. This is because onsite burial remains the cheapest option for mining operators. Only law reform can change this dynamic and unlock circular outcomes.

---

<sup>32</sup> <https://www.tyrestewardship.org.au/tools-and-resources/technical-information-for-tyre-derived-fuel>

<sup>33</sup> [https://storage.googleapis.com/tsa\\_craftcms\\_media/assets/pdf-resources/TSA0047-L8-Material-Flow-Analysis-Report-WEB.pdf](https://storage.googleapis.com/tsa_craftcms_media/assets/pdf-resources/TSA0047-L8-Material-Flow-Analysis-Report-WEB.pdf) at pg 51

TSA's [Tipping the Balance](#)<sup>34</sup> report was prepared with Australian Government funding and prepared with the participation of representatives from across the OTR supply chain, including mining, OTR tyre and conveyor manufacturers, parallel stewardship organisations and subject matter experts. The report was commissioned to uncover, for the first time, the scale and management of OTR tyres, rubber conveyor belts, and rubber tracks across the key industries of mining, agriculture, and construction in Australia. These products represent some of Australia's most complex and least understood rubber waste streams.

The report quantifies the challenge and identifies pathways to recovery and reuse that can shift the system toward more circular, accountable outcomes and contains:

- National estimates of OTR, conveyor, and track waste volumes.
- Geographies where OTR tyres reach their end-of-life.
- Industry-specific disposal practices and barriers to recovery.
- Environmental and economic implications of current end-of-life practices.
- Recommendations to improve traceability, infrastructure, and investment.

This report is essential reading for policymakers, regulators, procurement teams, and industry leaders committed to driving change in heavy industry and resource recovery.

### End Fate Description: Landfill

#### **Landfill: covers tyres disposed of in legal landfills.**

Landfills are legal waste disposal sites, with over 1,000 across Australia. Larger engineered landfills include liners and leachate systems to prevent environmental contamination, while smaller sites may have less robust controls.

While landfill is considered an undesirable outcome, it remains a necessary management option in exceptional circumstances, particularly in regional and remote areas where recycling facilities are unavailable or transport costs are prohibitive.

Australia is fortunate to have tyre collection and processing capacity to service most parts of the country. However, landfilling is often used because a cheaper option rather than as a legitimate need in exceptional circumstances.

**In 2023–24, approximately 50,000 tonnes of used tyres were disposed of in Australian landfills - around 9% of all used tyres.** This included 21,000 tonnes of passenger tyres, 26,600 tonnes of truck and bus tyres, and 2,400 tonnes of off-the-road tyres.<sup>35</sup>

Disposal practices vary significantly across jurisdictions: South Australia recorded only 2% of tyres going to landfill, while Tasmania reached 15%. Some states, such as Victoria and South Australia, mandate shredding of tyres before landfill, whereas others, like New South Wales, are considering rescinding these requirements, or have no requirements.

---

<sup>34</sup> <https://www.tyrestewardship.org.au/tools-and-resources/tipping-the-balance-research-report-off-the-road-tyres-conveyors-tracks> <https://www.tyrestewardship.org.au/tools-and-resources/tipping-the-balance-research-report-off-the-road-tyres-conveyors-tracks>

<sup>35</sup> TSA0047-L8-Material-Flow-Analysis-Report-WEB.pdf at table 15

### End Fate Description: Burning

**Burning: covers incineration of tyres in the open environment without recovery of energy, whether the act is intentional or not.**

The burning of tyres on farms and other locations remains an illegal and environmentally harmful practice in Australia.

Historically, some landholders burned tyres to dispose of stockpiles or use them as fuel for activities such as land clearing or heating. However, tyre combustion releases toxic pollutants, including heavy metals, volatile organic compounds, and carcinogenic substances, which pose serious health risks to humans and animals. It also produces dense black smoke and leaves behind hazardous residues that contaminate soil and water.

This practice is prohibited under state and territory environmental laws, with penalties for non-compliance. Despite this, it can still occur in rural and remote areas where enforcement is limited, and disposal options are scarce. Burning tyres undermines efforts to manage end-of-life tyres responsibly and contradicts circular economy principles.

Data on the annual tonnage of tyres intentionally burned, particularly on farms or remote sites, is not systematically recorded at a national level, so the scale of this practice is difficult to quantify accurately.

### End Fate Description: Not Recovered, in-flow – stockpiled and dumped.

**Not recovered – stockpiled and illegal dumping covers tyres whose final fate is yet to be determined. This includes tyres stored onsite, stockpiled or dumped illegally but not yet cleaned up<sup>36</sup>.**

**The illegal dumping and mismanagement of used remains a significant environmental and financial burden across Australia.** When dumped tyres are discovered and the responsible party cannot be identified, clean-up costs often fall to local councils, state agencies, or private landowners.

The Blue Environment and TSA 2024 report [Stockpiling and illegal dumping of tyres: Costs to local governments and others](#)<sup>37</sup> explores that these costs vary depending on whether the dumping occurs on public land, private property, or near roads, and can escalate for large-scale incidents. In some cases, individuals and community groups volunteer their time and resources to assist with clean-up efforts, further highlighting the strain on local communities.

Financial costs include staff wages for collection and transport, vehicle and equipment hire, disposal or recycling fees, and administrative overheads such as complaint handling and education campaigns. Investigations and enforcement add further expenses.

**The report conservatively estimates that in 2022–23, Australian councils spent approximately \$6.5 m cleaning up dumped tyres, equating to \$22 per tyre - almost three times the average cost of the legal disposal fee consumers pay to tyre retailers.** Around 300,000 tyres were cleaned up nationally, with regional councils facing the highest costs due to transport challenges and limited recycling infrastructure. State land managers incurred an additional \$2.4 m, while identified stockpiles exceeding 2.1 million tyres are estimated to cost \$8.3–\$23.3 m to remediate.

---

<sup>36</sup> This fate does not represent all dumping and stockpiling activity over the year, only what remained 'in flow' in the environment at the end of the financial year, as a snapshot in time. This distinction is necessary to avoid double-counting used tyres that are dumped or stockpiled throughout the financial year but later cleaned up and attributed to another fate before the end of the financial year.

<sup>37</sup> <https://www.tyrestewardship.org.au/tools-and-resources/stockpiling-and-illegal-dumping-of-tyres-cost-to-local-governments-and-others>

Beyond financial costs, dumped tyres impose significant non-market costs on communities. These include reduced amenity, safety concerns, and heightened fire risk. Tyre stockpile fires are particularly hazardous, producing toxic smoke and contaminated runoff that can impact health and ecosystems.

**The estimated non-market cost of dumped tyres is \$100 m, reflecting the broader social and environmental impacts.** Mismanagement often results in double costs - where tyres paid for disposal are later dumped or stockpiled illegally, requiring further clean-up by public authorities.

Once collected, dumped tyres are typically sent to recyclers, landfills, or stored in legal stockpiles, deferring future management costs.

Local governments and industry continue to advocate for improved compliance, stronger enforcement, and expanded recycling markets. However, until systemic gaps are addressed, dumped tyres will remain a costly nuisance - financially and socially - across Australia.

TSA's [Best Practice Guidelines for Tyre Storage and Fire and Emergency Preparedness](#)<sup>38</sup> provide practical advice for managing end-of-life tyres safely and responsibly.

### **Insight**

#### **Mining Sector: Right Approach, Wrong Scale**

The data from mining sector presents a complex picture of excellence and failure. When mining companies recover tyres, they demonstrate a commitment to circular outcomes, prioritising repair, and high-value recycling over convenient disposal for tyres worth up to \$50,000 each.

However, this approach applies to less than 5% of mining tyres, with an estimated 109,300 t buried or stockpiled onsite in 2023-24 alone.

## **2.2 Reviewing Regulations Governing Tyre Production, Disposal, and Recycling**

Australia's tyre industry operates under multiple, inconsistent sets of rules, and illegal operations remain a persistent problem. Before reviewing federal, state, and local regulations governing tyre production, disposal, and recycling, it is worth examining the **current operating environment**.

### **2.2.1 Industry Stewardship Vs No-Stewardship**

Many tyre businesses participate in the voluntary Scheme, committing to responsible end-of-life tyre management. Accredited participants comply with Scheme Guidelines, and contributor importers pay a levy that funds market development, compliance audits, and consumer education.

To further drive sustainability, the Scheme incorporates the **Sustainable Outcomes Indicator (SOI)** - a star rating system applied to TSA Accredited tyre recycling facilities and collectors. The SOI promotes operational excellence and encourages the development and use of tyre-derived materials and products within the Australian market. By fostering innovation and accountability, the SOI underpins the Scheme's mission to create long-term, environmentally sound solutions for used tyres generated, reducing waste and supporting a circular economy.

---

<sup>38</sup> <https://www.tyrestewardship.org.au/tools-and-resources/storage-guidelines>



**In contrast, Scheme non-participants avoid these obligations**, often doing the right thing from a legal perspective, but with some rogue actors engaging in practices that lead to illegal dumping, unmanaged stockpiles, and environmental harm.

A well-designed mandatory stewardship scheme supports a level playing field and circular economy outcomes, while voluntary stewardship perpetuates risk, inefficiency, and significant external costs.

The current **dual system** of stewardship participation/non-participation creates an uneven playing field. Free-rider importers pose a standout issue, as they avoid levies, reducing funds for market development and other activities, and financially disadvantaging responsible contributors. See also: [1.3 Retail Trends](#) on page 19 above.

### 2.2.2 Every Business Vs Mining

Mining enjoys special treatment. OTR tyres can be buried onsite and without the standards applied to other landfill operations; while all other industries are prohibited from onsite burial and must comply with strict landfill, recovery, and transport rules. This exemption gives mining companies a cost advantage, creates an environmental standards gap, and removes incentives for mining to prioritize more circular recycling solutions – solutions that would also create more investment and jobs, particularly in regional and remote areas.

This **dual system** of mining/non-mining undermines the opportunity for Australia to achieve a much higher recovery rate for end-of-life OTR tyres; and new technology investment that prefers the high-quality resources is used OTR tyres.

### 2.2.3 States and Territories Vs Each Other

Australia's tyre management system is fractured by inconsistent state and territory regulations, creating major challenges for the recycling industry.

Businesses operating nationally face compliance complexity, navigating a maze of different licensing thresholds, storage limits, fire safety standards, and landfill rules. This patchwork of **multiple systems** increases administrative burden and costs, making it difficult for recyclers and collectors to expand beyond a single jurisdiction, hampering national competition and market dynamism.

This inconsistency fuels market uncertainty. Changing local rules - such as New South Wales's proposal to rescind current restrictions and allow whole tyres under 1.2m diameter to be sent to landfill - makes long-term planning for infrastructure and technology risky. This fragmentation is a

barrier to the circular economy, slowing progress toward national resource recovery targets and robust markets for tyre-derived products.

Without national harmonisation and federal leadership on a national mandatory stewardship scheme, Australia will continue to face inefficiencies, competitive distortions, and missed opportunities for innovation and productivity in tyre recovery.

#### 2.2.4 Imports Vs Exports

The Australian Government is largely inactive on the regulation of tyre imports, including the enforcement of the ADR, creating an ‘anything goes’ operating environment. Meanwhile, exports are tightly regulated.

This **dual system** imbalance fuels the import of low-quality tyres and so greater used tyre generation. Aligning import and export obligations with stewardship principles and investing in domestic recycling and remanufacturing capacity is critical to closing the loop on tyres.

#### 2.2.5 From Voluntary to Mandatory: The Missing Link

Australia’s RAWR Act creates a legal framework for reducing the impact of waste exports, including tyres, and for realising the economic and community benefits of product stewardship.

While the RAWR Act provides three types of stewardship schemes, there is no documented process, legislative mechanisms or other triggers to progress to stronger scheme options. Rather, progression to stronger options is left to the will of the government of the day.

Voluntary stewardship is a good place to start, but if left to plateau, as has been seen with the current Scheme, leads to an uneven playing field, significant free-riding, and fragile funding framework - constraining investment in market development and the achievement of circularity outcomes.

TSA commissioned Marsden Jacob Associates to prepare a literature review of pertinent reports to illustrate the ongoing, expansive, and long-standing advocacy for a mandatory stewardship scheme for tyres. The reports, all authored by governments or highly regarded and credentialed non-government organisations also included TSA’s internal research. The need for a mandatory scheme, the strengthening of the current voluntary scheme or the limited effectiveness of voluntary schemes was mentioned in every report reviewed. See [Appendix D: Advocacy for a Mandatory Product Stewardship Scheme for Tyres](#) on page 71 below.

The only mandatory scheme in operation in Australia is the oil stewardship scheme, which is governed by the separate *Product Stewardship (Oil) Act 2000* and the recently updated *Product Stewardship (Oil) Regulations 2022*. This scheme has been in operation for two decades and has achieved significant results. It has always been, and remains, Australia’s only mandatory stewardship scheme. Demonstrating the long-term effectiveness of regulated stewardship.

The **RAWR Act** simply has not worked as legal framework to advance product stewardship for the range of priority products that need the same level of regulation as oil.

#### 2.2.6 From Aspirations to Outcomes: Making RAWR Act Work

**TSA welcomed the 2025 review of the RAWR Act as an opportunity to strengthen Australia’s approach to circularity and resource recovery.** TSA participated in workshops and provided a

submission<sup>39</sup> and supports the Act's objects (objectives) which are well aligned with circular economy policy settings and international obligations.

However, without targeted government intervention, these objectives - and the targets in the [National Waste Policy and Action Plan](#)<sup>40</sup> and the more recent [Circular Economy Framework](#)<sup>41</sup>, remain largely aspirational.

The Australian Government has shown no appetite for progressing mandatory stewardship under the *RAWR Act*. In this context, TSA proposed in its submission to the Review a Plan B: practical measures that can be implemented within existing legislative settings, alongside minor amendments to the *RAWR Act* and export *Tyre Rules*. If properly prioritised and resourced, these changes can deliver significant progress towards greater recovery rates and circularity outcomes for tyres. Key recommendations included:

- Introducing import licensing tied to stewardship participation to eliminate free-riders.
- Applying landfill levy parity and stricter conditions for mining sites to discourage on-site burial.
- mandating recycled content in government procurement to create demand for Australian tyre-derived materials.
- Market development incentives to support advanced recycling technologies such as devulcanisation and recovered carbon black production.
- Clear pathway from the Environment Minister's Product Stewardship Priority List to stronger regulation, providing certainty for industry investment.
- Improved enforcement of ADR and harmonisation with United Nations Economic Commission for Europe (UNECE) standards, including tyre energy-efficiency labelling, would further drive consumer choice and emissions reduction.
- A shift from the current narrow waste management approach one that prioritises circularity across the value chain.
- Leveraging the waste export ban to limit low-circularity exports and protect domestic markets.
- Greater alignment between the *RAWR Act* and broader government policies, coupled with adequate resourcing for government policy and enforcement efforts, is essential to deliver a coordinated national approach.

## 2.2.7 Australia's Circular Future: CEMAG and Senate Push for a Circular Economy Act

**The Circular Economy Ministerial Advisory Group (CEMAG) was appointed in 2023 to advise the Australian Government on accelerating the transition to a circular economy by 2030.** Its role was to provide expert guidance on policy, investment, and innovation to reduce waste, improve resource efficiency, and create sustainable markets.

The CEMAG's final report [The Circular Advantage - Unlocking innovation, environmental resilience, productivity and net zero opportunities through a uniquely Australian circular economy transition](#)<sup>42</sup> makes recommendations for the Australian Government to accelerate the transition to a circular economy.

Central to the recommendations is the establishment of a [National Circular Economy Policy Framework](#)<sup>43</sup> supported by a **Circular Economy Act** to replace the current *RAWR Act* and provide a

---

<sup>39</sup> Submission 220 - Attachment: Submission to Review of the Recycling and Waste Reduction Act 2020 (RAWR Act) - Tyre Stewardship Australia (TSA) - Opportunities in the circular economy - Public inquiry.

<sup>40</sup> <https://www.dcceew.gov.au/environment/protection/waste/publications/national-waste-policy-action-plan>

<sup>41</sup> <https://www.dcceew.gov.au/environment/protection/circular-economy/framework>

<sup>42</sup> <https://www.dcceew.gov.au/sites/default/files/documents/circular-advantage-final-report-cemag.pdf>

<sup>43</sup> <https://www.dcceew.gov.au/environment/protection/circular-economy/framework>

clear, adaptable regulatory foundation to improve product durability, repairability, and recyclability, while harmonising fragmented rules across jurisdictions.

The CEMAG noted that:

- **Stronger mandatory product stewardship, better labelling, and consistent standards** will drive innovation, empower consumers, and create efficient national supply chains.
- **Harmonisation of rules across jurisdictions** will unlock demand for recycled materials, making them competitive with virgin resources and stimulating investment and growth.
- Australia already boasts world-leading innovators; **embedding circular economy priorities into research and commercialisation programs** will strengthen domestic investment and global competitiveness.
- Large-scale, **challenge-based innovation funding** and local transition brokers will enable collaboration across supply chains, tackling complex problems that single businesses cannot solve alone.
- **Integrating circular economy principles into ESG frameworks**, will help businesses address climate risks and opportunities while meeting growing expectations from governments, investors, and consumers.

The CEMAG's call for a Circular Economy Act was echoed in the recent report of the Senate Standing Committee on Environment and Communications, inquiry into Waste and Recycling Policies, [No time to waste](#).<sup>44</sup>

*'The committee recommends the Australian Government legislate a **Circular Economy Act**, in accordance with the recommendation of the Circular Economy Ministerial Advisory Group (CEMAG), to implement a full circular economy framework aimed at effectively supporting Australia's waste management and resource recovery sectors and improving environmental and economic outcomes. A legislated Circular Economy Act should reflect the findings and recommendations of the CEMAG and Productivity Commission and set a clear framework for imported and local product design, financial incentives, and regulatory enforcement.'*

---

<sup>44</sup> [https://www.aph.gov.au/Parliamentary\\_Business/Committees/Senate/Environment\\_and\\_Communications/Wastereduction/Report](https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/Wastereduction/Report)

## 2.2.8 Tyres in Focus: Achieving Australia’s Circular Economy Commitments

In 2024, the Australian Government acted on the CEMAG advice for policy and committed to the [National Circular Economy Framework](#)<sup>45</sup> to double Australia’s circularity rate, by reducing our material footprint by 10%, lifting materials productivity by 30% and safely recovering 80% of our resources. The targets are highly relevant because tyres represent a major material flow. Without meaningful government action, these targets will not be achieved for tyres.

### Case Study: NSW Act Signals Mandatory Stewardship Future: A Turning Point for Tyres

Different Australian states and territories regulate used tyres through varying frameworks - ranging from licensing and environmental controls to storage, tracking, and processing requirements. Stewardship, however, has been managed at Commonwealth level via the RAWR Act.

The [NSW Product Lifecycle Responsibility Act 2025](#)<sup>46</sup> (NSW Lifecycle Act) marks a turning point in Australia’s approach to managing high-risk and high-impact products through enabling mandatory product stewardship schemes, administered at a state-level.

While batteries are the first focus - driven by escalating fire hazards and groundwater contamination impacts when buried in landfills – the NSW Lifecycle Act is designed as a flexible framework capable of addressing other problematic waste streams. Among these, used tyres stand out as a logical next step.

By leveraging the NSW Lifecycle Act’s provisions, NSW can introduce mandatory stewardship obligations for tyres, and other states, or preferably the Commonwealth, can use the Act as the template for their own circular economy, product stewardship legislation.

In short, the NSW Lifecycle Act provides the legislative backbone to deliver stronger product stewardship regulation. If adopted by all states and territories consistently, it could take product stewardship legislation from a patchwork of systems and effort into a robust, single enforceable system - delivering environmental, safety, and economic public value to Australia. However, if there isn’t a consistent national approach, the NSW Lifecycle Act may create greater legislative fragmentation and a burden for small business.

## 2.2.9 Global Best Practice: Lessons for Australia’s Tyre Stewardship

In 2024 the CSIRO published its analysis of [Best practice case studies for increasing value recovery from end-of-life tyres and conveyor belts](#)<sup>47</sup>.

It found that Australia’s voluntary tyre stewardship scheme is less effective than compulsory models overseas, allowing landfilling and on-site disposal of end-of-life tyres, which reduces recovery and encourages illegal dumping. **Disposal fees at recycling points create disincentives, unlike international systems that embed recycling fees in purchase prices and offer return incentives.**

Recommendations include introducing a regulated national scheme covering tyres and conveyor belts, with mandatory inclusion of all importers and sellers. Fees, import levies, recycling charges, and refundable bonds - should be bundled at purchase to fund recycling and incentivise returns.

<sup>45</sup> <https://www.dceew.gov.au/environment/protection/circular-economy/framework>

<sup>46</sup> <https://legislation.nsw.gov.au/view/whole/html/inforce/current/act-2025-022>

<sup>47</sup> Kaksonen AH, Gazeau B, Caceres Ruiz AM, Cheng KY, Minunno R, Zaman A, Boxall NJ (2024) Best practice case studies for increasing value recovery from end-of-life tyres and conveyor belts. CSIRO, Australia.

Additional measures include banning landfilling, implementing robust tracking, and auditing, setting clear targets, and supporting remote industries. Consistent waste classification and harmonised codes will enable accurate monitoring, while incentives for retreading and tyre-derived products will drive circular economy outcomes.

### **2.2.10 Reimagining Stewardship: Innovation Opportunities for Australia**

Internationally, in developed countries, mandatory tyre product stewardship is increasingly the norm, with New Zealand (2024) being the most recent addition.

Innovation in product stewardship scheme design has been limited to date, and this is an area of innovation opportunity for Australia. The general trend internationally is the expansion of product stewardship to new product categories such as textiles, tyres and solar panels, and improvements in the use of technology to improve collection and recycling e.g., digital tools like material passports.

Green or eco-modulated payment systems – that modify levy/payments for stewardship actions based on environmental impacts – are another area often cited as having promise.<sup>48</sup>

While global best practice is instructive, it is clear Australia needs an Australian-bred solution, developed in close consultation with industries operating across the supply chain. This conclusion is consistent with that in [National Options Project](#)<sup>49</sup>.

## **2.3 Advocacy for a Mandatory Stewardship Scheme**

There have been numerous government reports including the WA Options Paper, the CEMAG report and examples across all jurisdictions that a focus on strengthening the existing voluntary tyre stewardship scheme with a regulatory framework is necessary. A summary of relevant reports published since January 2021 are included in [Appendix D: Advocacy for a Mandatory Product Stewardship Scheme for Tyres](#) on page 71.

---

<sup>48</sup> <https://stewardshipexcellence.com.au/wp-content/uploads/2023/06/Effectiveness-and-Benefits-of-Product-Stewardship-Themes-from-60-qualitative-interviews.pdf>

<sup>49</sup> <https://www.wa.gov.au/service/building-utilities-and-essential-services/waste-management/national-project-options-end-of-life-tyres>

## TOR 3 Technical Advancements

Exploring technological advancements in tyre design, recycling processes, and alternative materials

### Relevant Recommendations

[Recommendation 1: Mandatory Tyre Product Stewardship](#) on page 7 above

[Recommendation 2: Roads](#) on page 9 above

[Recommendation 4: Review OTR Tyre Burial Licensing Conditions](#) on page 11 above

[Recommendation 5: Boost Repair & Retread](#) on page 12 above

[Recommendation 6: Environment Ministers Meeting \(EMM\)](#) on page 12 above

### 3.1 Exploring Technological Advancements in Tyre Design

[TOR 1 Industry Review](#) on page 16 outlines how manufacturers are advancing tyre design. As mentioned, TSA collaborated with CSIRO to develop a literature review ([Exploring global influences on the tyre industry](#)<sup>50</sup>) of current changes under way in manufacturing design. See also [1.1 Tyre Manufacturing](#) on page 16 above.

While some tyre manufacturers are investing in new tyre designs to improve safety and environmental impact through reduced wear and removal of chemicals of concern, this is not the case for all tyre manufacturers. So again, Australia faces the effects of a dual system. If Australia does not keep parity with international tyres standards, particularly Euro 7, it runs the risk of being the dumping ground for lower standard tyres.

### 3.2 Exploring Technological Advancements in Tyre Recycling Processes

TSA has produced a comprehensive report on [Material Circularity of Management Options for Tyres and Conveyor Belts](#)<sup>51</sup> that evaluates various technologies for end-of-life tyres and their end market applications; focusing on their alignment with circular economy principles and the waste hierarchy. See also [Appendix C: Management Options for End-Of-Life-Tyres and Conveyor Belts](#) on page 70 below.

The report covers:

- Analysis of design, usage, and end-of-life phases for tyres.
- Evaluation of recycling, energy recovery, and disposal options based on material circularity.
- Identification of best practices to retain material value and reduce environmental impact.

Included in this framework are some recent technological advancements in tyre processing which boast high circularity. Notably, devulcanisation is an emerging technology that can regenerate tyre-derived materials into a raw rubber compound. This raw rubber product can be used to make new rubber products, including to the strict quality specifications for use in new tyre manufacturing. One such example is detailed in Tyre and Rubber Recycling article: [Tyre-to-Tyre Recycling](#):

<sup>50</sup> [https://storage.googleapis.com/tsa\\_craftcms\\_media/assets/pdf-resources/CSIRO-TSA-Global-Review-Report-2024.pdf](https://storage.googleapis.com/tsa_craftcms_media/assets/pdf-resources/CSIRO-TSA-Global-Review-Report-2024.pdf)

<sup>51</sup> <https://www.tyrestewardship.org.au/tools-and-resources/material-circularity-of-management-options-for-tyres-and-conveyor-belts>

[Partnership Between Tyromer and Continental Tires](#)<sup>52</sup>. Other advanced processing includes sophisticated equipment to manage and downsize giant OTR tyres and conveyor belts, a necessary precursory step to enable further processing, including devulcanisation.

Australia is fortunate to have some of the best tyre processing facilities in the world. These facilities include the capacity to process all tyre types including passenger, truck, OTR and conveyor belts. State and federal government agencies have provided funding (Recycling Modernisation Fund) to these processing facilities to increase the processing of tyres, as outlined in the following table.

### Recycling Modernisation Funded Tyre Recycling and Processing Facilities

Organisations	Details
Complete Tyre Solutions (CTS) Recycling (WA).	<p>Awarded \$4.5 m to expand commercial applications of recycled tyre rubber crumb at its Neerabup facility. CTS Tyre Recycling has installed equipment to recycle OTR tyres into high value speciality rubber products.</p> <p>CTS is TSA Accredited and demonstrates a vertically integrated business of selling tyres via its retail network; investing in specialised equipment to process hard to recycle OTR tyres and then use the tyre derived material as feedstock into new value-added rubber products ready for sale into the Australian market.</p> <p><b>Risk:</b> OTR tyres in WA are permitted to be buried on mining sites. Without available feedstock, this advanced manufacturing facility is at risk of closure.</p>
RubberGem (WA)	<p>RubberGem was awarded \$5 m and has established a new end-of-life OTR tyre collection, sorting and re-manufacturing facility.</p> <p>RubberGem is TSA Accredited and is supporting a circular approach to the management of end-of-life tyres; accepting truck and OTR tyres for processing via specialised machinery prior to using the feedstock to devulcanise the tyre derived material and re-manufacturing high value products for sale in Australia and to overseas markets.</p> <p><b>Risk:</b> OTR tyres in WA are permitted to be buried on mining sites. Without available feedstock, this advanced manufacturing facility is at risk of closure.</p>
East-West Pilbara Rubber Recycling	<p>East West Pilbara has been awarded \$675,000 worth of land allocation to establish a dedicated OTR tyre recycling and devulcanisation facility in Port Hedland; this facility will produce devulcanised rubber compound that can replace natural and synthetic rubber at ratios of 20-50%.</p> <p><b>Risk:</b> OTR tyres in WA are permitted to be buried on mining sites. Without available feedstock, this advanced manufacturing facility is at risk of failing to commence.</p>

<sup>52</sup> <https://www.tyreandrubberrecycling.com/articles/news/tyre-to-tyre-recycling-partnership-between-tyromer-and-continental-tires/>

Organisations	Details
Tyrecycle	<p>Tyrecycle has invested in significant tyre recycling plant and equipment across the nation. With facilities and capacity in each state of Australia, Tyrecycle has been instrumental by investing in specialised equipment to recycle all types of tyres and produce a crumb suitable for Australia’s construction market. Australia would not be able to have a strong roads and construction market if Tyrecycle had not invested in equipment to produce product suitable for construction and road making purposes.</p> <p>All excess material that does not get sold in Australia is exported either as a tyre derived fuel or for use in high value applications in overseas markets.</p> <p><b>Risk:</b> Tyrecycle has invested in specialised equipment at its Port Hedland facility in Western Australia, but without adequate OTR tyre feedstock, the site is at risk of closure. Operations have already been scaled back, with reduced staffing and fewer operating days. Without government intervention to end the onsite burial and stockpiling of end-of-life OTR tyres at mine sites, permanent closure is imminent.</p> <p><b>Risk:</b> If local and state government fail to meet the in-road usage of crumb rubber as per specifications developed by road authorities, the volume of crumb rubber usage will decline, and dedicated recycling facilities are at risk of being mothballed.</p>
Autocycle	<p>Autocycle continues to invest in specialised equipment across its Victoria, Queensland, and NSW facilities to produce tyre-derived materials that meet advanced manufacturing specifications for the construction industry.</p> <p><b>Risk:</b> If Local and State Government fail to meet the in-road usage of crumb rubber as per specifications developed by road authorities, the volume of crumb rubber usage will decline, and facility investment is at risk of creating low value material for export only.<sup>53</sup></p>

---

<sup>53</sup> Whilst all states have begun the process of updating specifications, to date only Western Australian has mandated the use of crumb rubber in state roads.

### 3.3 Exploring Technological Advancements in Alternate Materials

Material science is a critical enabler of sustainability and performance improvements across the tyre lifecycle. Several emerging materials are demonstrating promise in global tyre manufacturing, such as:

- **Advanced graphene compounds** are being trialled in tyre formulations to tackle abrasion, to cut microplastic pollution and improve durability. Graphene is also being considered as an alternative option to avoid certain chemicals of concern.
- **Newly developed silica compounds** are being reformulated in tyres to improve rolling resistance, fuel efficiency, and grip in tyres.
- **Recycled and bio-based materials** are being developed to reduce reliance on virgin resources, including other renewable alternatives for natural rubber and alternatives to fossil-derived carbon black.

These alternative material technologies can provide significant benefits, including reduced emissions, greater fuel efficiency, and reduced environmental impact. However, the design challenge for tyres is complex, as improvements in one area can come at the cost of another.

True circular design encourages manufacturers to adopt strategies to reduce the environmental impact of tyres alongside design-for-recycling principles. This design approach considers how tyres are compatible with downstream mechanical processing, advanced recycling technologies like pyrolysis and devulcanization as well as their final application such as high-value as recovered carbon black and devulcanised rubber for re-use in tyre manufacturing.

Across the supply chain, these innovations can also enable better-quality tyre-derived materials for roads, pavements, moulded products, and even green steel applications, and reduce the reliance on energy recovery methods such as tyre-derived fuel.

Australia's strong research capability and market advantages position it to lead in material science innovation. Such advantages include abundant natural resources and renewable energy leadership, advanced manufacturing capabilities, strategic location, and strong trade relationships.

Given all tyres are currently manufactured internationally and imported into Australia, current research efforts are generally focused on reprocessing technologies and market development for tyre-derived materials.

Australia's market development and innovation in tyre-derived materials is world leading. For example, the volume of research and development projects dedicated to using crumb rubber in roads is significant and only outpaced by one or two American states.

#### Case Study: Unlocking the potential of Tyre Derived Fuel (TDF)

Tyre-derived fuel is a product produced through mechanical downsizing, shredding, generally to a range of around 50-150 mm. Tyre-derived fuel can be added as a solid fuel to replace fossil fuels, for combustion in cement kilns, boilers, furnaces, and pulp and paper mills if the appropriate processing and feed systems are in place.

In 2021, TSA commissioned a foundational research report to review the emission factors associated with tyre-derived fuel. The objective was to ensure that the energy and emissions profile of tyre-derived fuel was more accurately reflected in the National Greenhouse and Energy Reporting (NGER) Scheme.

The Federal Government took action to amend the NGER Scheme legislation based on the report commissioned by TSA. This came into force on July 1, 2022, where two new fuel types for tyres were included to reflect emissions more accurately from tyre-derived fuel

combustion. These new emission factors will approximate a 30% emissions reduction when TDF replaces coal in a combustion application. The details of this research and legislative engagement can be found in [Technical Information for Tyre Derived Fuel](#)<sup>54</sup>.

Several kilns in Australia have been working towards significant technology and system upgrades, to claim future carbon benefits, including safeguard mechanism credits (SMCs), and use tyre-derived fuel as an alternative fuel.

**Significant capital and investment** are required to overcome these barriers, and Government funding can play an important role. In 2024, Cement Australia's Railton Kiln Upgrade Receives \$52.9 million in Australian Federal Government funding as support for a \$106 m investment that will reduce CO<sub>2</sub> emissions from the plant by 107,000 tonnes per year. The Railton Kiln upgrade will enable the co-processing of Wood Waste and tyre-derived fuel in the existing kiln, reducing the use of coal by 35%. See: [Railton Upgrade: New Alternative Fuels | Cement Australia](#)<sup>55</sup>

In 2023/24, around 5,000 tonnes of tyre-derived fuel were used in local energy recovery applications. This is a measurable increase from previous years (there was no domestic tyre-derived fuel usage in 2018/19) but still pales in comparison to the 212,200 tonnes of shredded tyres which were exported the same year. This slight increase over the last five years indicates progress towards local uptake of tyre-derived fuel is occurring, however progress is slow and competition with export markets still dominates.

For Australia, government legislative instruments such as the Safeguard Mechanism, are in place to support an increased uptake of lower carbon alternative fuels in heavy emitting industries.

It is now crucial for government to provide greater support in the form of education, funding, and simplify claiming carbon benefits for facilities that fall under the Safeguard Mechanism policy and can make the necessary infrastructure changes to use tyre-derived fuel.

TSA estimates that Australia could consume 120,000 tonnes of used tyres as tyre-derived fuel in safeguard mechanism facilities, should there be support for plant upgrades and removing the red tape associated with approvals that support the emissions reduction offered by tyre-derived fuel. This replacement of fossil fuels could lead to a potential emissions reduction of 100,000 per year of CO<sub>2</sub> equivalent.

---

<sup>54</sup> <https://www.tyrestewardship.org.au/tools-and-resources/technical-information-for-tyre-derived-fuel>

<sup>55</sup> <https://www.cementaustralia.com.au/news/railton-upgrade-new-alternative-fuels>

## TOR 4 Identify High Value Opportunities

Identifying opportunities to develop high-value uses for waste tyres and tyre-derived materials, including applications in construction, manufacturing, and other commercial sectors.

### **Relevant Recommendations**

[Recommendation 1: Mandatory Tyre Product Stewardship](#) on page 7 above

[Recommendation 2: Roads](#) on page 9 above

[Recommendation 3: Australian Design Rules \(ADR\)](#) on page 10 above

[Recommendation 4: Review OTR Tyre Burial Licensing Conditions](#) on page 11 above

[Recommendation 5: Boost Repair & Retread](#) on page 12 above

[Recommendation 6: Environment Ministers Meeting \(EMM\)](#) on page 12 above

[Recommendation 7: Amplify Enforcement of the Waste Export Ban](#) on page 14 above

### 4.1 Context

**Tyre recycling is a well-established process globally, with mechanical size reduction technologies being the dominant process to manage tyres.** As the market options for using waste tyres and tyre derived materials are dependent on the tyre recycling process, so too are the opportunities to develop high-value market options.

Mechanical size reduction processes also dominate tyre recycling in Australia and provide the essential feedstock for various high-value markets. These processes use shredders, granulators, and milling equipment to physically section and downsize the tyres, with magnets, raspers, aspirators and screens are used to separate the steel and textiles from the tyre-derived materials.

Tyre-derived materials in Australia are currently used in a variety of markets, such as crumb rubber in roads, pavements and concrete, and rubber granules in recreation and sports surfaces and commercial properties (rubber ramps, vibration layers in buildings).

#### **Case Study: Crumb Rubber Proven to Create More Resilient Roads**

Australia has a vast and critical road network that is closely managed by both state road authorities and local governments. **Local governments manage more than 80% of Australia's road network, often under constrained capital and maintenance budgets.**

Rising construction costs, heavier traffic loads and more frequent extreme weather events are increasing pressure on councils to deliver resilient, better performance and longer service life from each dollar invested in road infrastructure.

As infrastructure needs evolve, the construction and repair of roads require both skilled engineering and strict adherence to specifications.

Crumb rubber is proven performance modifier for asphalt and sprayed seals, which delivers extensive performance benefits such as longer pavement life, greater resistance to cracking and rutting, and reduced maintenance costs. With decades of use in Australia, there are technical specifications for crumb rubber use in roads across every jurisdiction, including a specification for local government road networks.

TSA is supportive of crumb rubber in roads as a high-value and circular outcome for all tyres and is actively working with the industry in technology transfer, specification developments, performance assessments and training.

**Spotlight research:**

*[Paving the Way: Recycling Tyres for Roads](#)*<sup>56</sup>: In 2023, the Southern Sydney Regional Organisation of Councils (SSROC) led one of Australia's largest multi-council demonstration projects using recycled rubber from end-of-life tyres in road construction. Each of the 12 councils resurfaced a road section using recycled rubber-modified asphalt mix, creating a comprehensive network of demonstration sites to evaluate the performance, durability, and environmental benefits of crumb rubber in road infrastructure.

After 12 months of monitoring, the results showed promising outcomes, with clear performance benefits and environmental life cycle assessment benefits reported compared to conventional asphalt. The project also achieved significant scale across the participating councils, including 40,000 square metres of asphalt laid, and 28,500 kg of crumb rubber used in a variety of road designs. The environmental impact was substantial, with 4,500 passenger car tyres and 1,000 truck tyres used for productive outcomes through this single initiative.

*[Sunshine Coast's Smarter Roads](#)*<sup>57</sup>: In 2024, Sunshine Coast Council launched a demonstration project to test the use of OTR tyre-derived crumb rubber in road construction and repairs. The OTR crumb rubber used in the road binder was tested for all standard performance properties to ensure the material satisfies specification requirements. Properties such as ageing from UV radiation, demonstrating greater resistance to environmental cracking compared with conventional bitumen.

After 12 months of monitoring, the project not only confirmed that crumb rubber from OTR tyres can replace traditional crumb rubber in bitumen blends and asphalt mixes, but also provided valuable technical data on performance, constructability, and durability.

**Looking ahead:**

Local governments need infrastructure solutions that last longer, cost less to maintain, and perform under pressure. Crumb rubber is a proven technology and is now an engineered input already being used in roads across leading Australian councils to meet these challenges. With the trials completed and specifications in place, the research offer a roadmap for councils across Australia to adopt this untapped resource and build longer-lasting, cost-effective roads.

The emergence of technologies such as waterjet, micronisation, devulcanisation and pyrolysis are providing new processing options for tyres and feedstock materials for new markets. Section [3.2 Exploring Technological Advancements in Tyre Recycling Processes](#) on page 38 above, outlines the investment and progress for these emerging technologies that has recently occurred in Australia. This diversification of technology is opening many higher circular opportunities and markets for tyres.

Tyres are highly engineering materials, manufactured to be durable and strong, and difficult to pull apart. So, whilst they are challenging to break down and remanufacture, once they are processed, these extremely high-value materials are of great importance to new engineering markets, such as construction, manufacturing, and commercial sectors.

---

<sup>56</sup> <https://ssroc.nsw.gov.au/projects/waste/procure-recycled-paving-the-way-rubber/>

<sup>57</sup> <https://www.tyrestewardship.org.au/case-studies/sunshine-coasts-smarter-roads-12-month-crumb-rubber-results>

## 4.2 High Value Opportunities for Tyre-Derived Material

TSA’s report, [Analysis of the Material Circularity of Management Options for Tyres and Conveyor Belts Report](#)<sup>58</sup> – analyses the opportunities available for highest circular outcomes and a full breakdown of these market development options is listed in [Appendix C: Management Options for End-Of-Life-Tyres and Conveyor Belts](#) on page 70. By considering the various options in this framework, advancing the use of tyre-derived material for high value applications can be considered in two ways:

1. **Opportunities: The technologies and innovation that turn used tyres into high value-added materials; materials that can then command higher prices, are circular and create long lasting jobs.**
2. **Options: Tyre-derived material that can be used at scale to support high volume consumption, onshore in Australia as a priority.**

Listed below are the various options and opportunities available to develop high-value uses for waste tyres and tyre-derived materials, with a particular focus on construction, manufacturing, and other commercial sectors.

### Material Circularity Actions and Impacts

Highest Circularity – Waste Avoidance	
Opportunities	Examples of Development and Impact
<ul style="list-style-type: none"> <li>▪ Product design for reduced environmental harm, low toxicity, resource efficiency, and recyclability.</li> </ul>	<ul style="list-style-type: none"> <li>▪ An ADR enforcement program for all imported tyres that are supplied on-vehicle and loose for replacement.</li> <li>▪ Harmonisation with UN Regulation No. 108, 109, 117, and Euro 7 to ensure Australia is aligned with international circular and industry practices.                             <ul style="list-style-type: none"> <li>▪ UNR No. 108 and 109 improves the conditions of tyres being imported for eventual retread and repair.</li> <li>▪ UNR No. 117 improves the fuel efficiency, health and safety, reusability, and overall quality of tyres.</li> </ul> </li> </ul> <p><b>Euro 7 standards will provide rules to effectively reduce transport emissions, including tyre wear particles.</b> See <a href="#">Euro 7: Deal on new EU rules to reduce road transport emissions   News   European Parliament</a><sup>59</sup></p>

<sup>58</sup> [https://storage.googleapis.com/tsa\\_craftcms\\_media/assets/pdf-resources/TSA0368-Material-Circularity-Report-PR7-1.pdf](https://storage.googleapis.com/tsa_craftcms_media/assets/pdf-resources/TSA0368-Material-Circularity-Report-PR7-1.pdf)

<sup>59</sup> <https://www.europarl.europa.eu/news/en/press-room/20231207IPR15740/euro-7-deal-on-new-eu-rules-to-reduce-road-transport-emissions>

<ul style="list-style-type: none"> <li>Repair, retread, re-condition tyres.</li> </ul>	<ul style="list-style-type: none"> <li>Enforcement of the ADR to improve the standard of tyres in Australia and support local retread and repair markets.</li> <li>Introduction of legislation to boost tyre retreading via tax credits for fleet purchasers of Australian-made retreaded commercial tyres. <a href="#">USTMA Reinforce Support for Legislation Boosting Tire Retreading</a><sup>60</sup></li> <li>Funding support for technologies, such as <a href="#">waterjet processing</a><sup>61</sup>, could enable <a href="#">regrooving and retreading</a><sup>62</sup> to occur in alignment with global trends.</li> <li>This includes evolving practices for retreading of commercial vehicles, and the introduction of retread for OTR tyres.</li> </ul>
<p><b>Medium Circularity – Processing Outputs and Applications</b></p>	
<p><b>Opportunities</b></p>	<p><b>Examples of Development and Impact</b></p>
<ul style="list-style-type: none"> <li>Devulcanised rubber: high performance rubber products.</li> <li>Recovered carbon black via a pyrolysis process.</li> <li>Manufacture of finished goods from used tyres.</li> </ul>	<ul style="list-style-type: none"> <li>A tyre product stewardship scheme that enables the commercial support of advanced manufacturing in Australia.             <ul style="list-style-type: none"> <li>Globally, the manufacturing of highly engineered products from used tyres is supported by a stewardship scheme framework that has placed a cap on energy recovery and created an incentive structure for used tyre consumption in advanced manufacturing.</li> </ul> </li> <li>Some global examples of where advanced manufacturing has been successful include:             <ul style="list-style-type: none"> <li><a href="#">Tyromer</a><sup>63</sup>, with multiple plants globally, are successfully inputting devulcanised rubber back into high performance rubber goods.</li> <li><a href="#">CIRCTEC</a><sup>64</sup>, a global leader in pyrolysis, is currently undergoing significant investment and scale-up to generate recovered carbon products to be used in rubber goods and chemicals manufacturing.</li> <li><a href="#">Pliteq</a><sup>65</sup>, a company headquartered in Toronto, Canada, is a sustainable acoustic engineering and flooring products company that uses recycled crumb rubber and granules in building products.</li> </ul> </li> </ul>

<sup>60</sup> <https://www.ustires.org/newsroom/ustma-reinforce-support-legislation-boosting-tire-retreading>

<sup>61</sup> <https://roverresearch.it/>

<sup>62</sup> <https://www.kaltiremining.com/en/region/australia/>

<sup>63</sup> <https://tyromer.com/>

<sup>64</sup> <https://www.circtec.com/>

<sup>65</sup> <https://pliteq.com.au/>

**Medium Circularity – Processing Outputs and Applications**

Options	Examples of Development and Impact
<ul style="list-style-type: none"> <li>▪ Crumb and granules into construction projects.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Enforcement of specifications of crumb rubber use in local and state roads networks, including major builds.</li> <li>▪ Current consumption of crumb rubber in construction projects amounts to approximately 30,000 t<sup>66</sup>, mandating the adherence to current specifications can elevate this volume to approximately 160,000 t.</li> <li>▪ A reduction in GHG emissions when tyres are recycled into crumb rubber (compared to landfill) and used as an alternative to polymer for enhancing asphalt properties.<sup>67</sup> This emissions reduction aligns with the Federal <a href="#">Net Zero Plan</a><sup>68</sup>, in particular, the Transport and Infrastructure Net Zero Roadmap and Action Plan.</li> <li>▪ Numerous performance and economic benefits when crumb rubber is used in asphalt applications: <a href="#">Crumb Rubber in Roads</a><sup>69</sup>.</li> <li>▪ Support to scale up construction and engineering projects, via sustainable procurement levers, recycled content incentives, and project funding. This could enable the growth of several Australian innovations in the construction and manufacturing sector that are ready to scale: <ul style="list-style-type: none"> <li>▪ <a href="#">Rubberised Particleboard: New Research Develops Australian-Made Wood Products for Manufacturing</a><sup>70</sup></li> <li>▪ <a href="#">Porous Lane: Waste Tyre Permeable Pavement</a><sup>71</sup></li> <li>▪ <a href="#">Golflex: Paving the Way for a Greener Course</a><sup>72</sup></li> <li>▪ <a href="#">Turning End-of-Life Tyres into Safer, More Durable Surfaces</a><sup>73</sup></li> </ul> </li> </ul>

<sup>66</sup> [https://storage.googleapis.com/tsa\\_craftcms\\_media/assets/pdf-resources/TSA-Crumb-Rubber-Road-Surfacing.pdf](https://storage.googleapis.com/tsa_craftcms_media/assets/pdf-resources/TSA-Crumb-Rubber-Road-Surfacing.pdf)

<sup>67</sup> <https://www.sciencedirect.com/science/article/abs/pii/S030147972201862X>

<sup>68</sup> [https://www.dcceew.gov.au/climate-change/emissions-reduction/net-zero%23toc\\_1](https://www.dcceew.gov.au/climate-change/emissions-reduction/net-zero%23toc_1)

<sup>69</sup> <https://www.tyrestewardship.org.au/tools-and-resources/crumb-rubber-in-roads>

<sup>70</sup> <https://www.tyrestewardship.org.au/case-studies/rubberised-particleboard-new-research-develops-australian-made-wood-products-for-manufacturing>

<sup>71</sup> <https://www.tyrestewardship.org.au/case-studies/porous-lane-waste-tyre-permeable-pavement>

<sup>72</sup> <https://www.tyrestewardship.org.au/case-studies/golflex-paving-the-way-for-a-greener-course>

<sup>73</sup> <https://www.tyrestewardship.org.au/case-studies/coloured-recycle-group-safe-t-rubber>

### Case Study: Innovative Use - Rubber T-Lok Barrier

Australia has long grappled with two persistent challenges: improving road safety and finding sustainable solutions for the millions of tyres that reach end-of-life each year.

Traditional concrete road barriers, while effective at stopping vehicles, often shatter on impact - creating dangerous debris and increasing the risk of injury. At the same time, tyre waste continues to pile up, with thousands of tonnes ending up in landfills or illegal stockpiles.

Recognising this dual problem, Saferoads, in partnership with the University of Melbourne's Advanced Protective Technologies of Engineering Structures Research Group, and supported by TSA, set out to create a solution that could save lives and reduce waste. See also [Rubber Reinvented: Enhancing Road Safety](#)<sup>74</sup>

The result? The T-Lok Rubber Safety Barrier a world-first innovation that transforms discarded tyres into life-saving infrastructure. The numbers tell the story:

- One km of T-Lok barriers uses 12 t of recycled rubber, equivalent to 2,000 passenger tyres.
- Every 10 km of barriers recovers 115 t of tyres.
- Projected annual usage: 60,000 tyres (360 t).
- TSA invested \$180,000 to support design, testing, and commercialisation.

Professor Tuan Ngo, who leads the Research Group, highlighted the human benefit: *'Road users are the winners here. The test showed that rubberised concrete barriers reduce impact force and the likelihood of injury and death.'*

The T-Lok Rubber Safety Barrier is more than a product; it's a proof point for sustainable innovation. It enhances public safety, reduces environmental impact, and offers a cost-effective solution for industries ranging from construction and engineering to government road safety programs, particularly in regional and remote areas.

## 4.3 Current limitations

Australia has seen significant market development in the last 10 years, with the current voluntary scheme contributing to more than \$10 m in investment in over 70 projects. Many of these projects are within the construction and manufacturing sector and are often Australian innovations.

Given Australia's leading commitment to market development for tyre-derived materials, there has also been interest and feasibility studies from overseas operators to set up advanced technologies, such as pyrolysis, devulcanisation and water jet, locally.

While these opportunities have been realised overseas, without a strong stewardship scheme framework that incentivises high-value markets for tyre-derived materials and discourages disposal in non-circular options, there is low confidence to invest.

Despite strong recovery rates overall and targeted market development, it is estimated that only 16% of the 537,000 t of used tyres generated in Australia in 2023-2024 were used productively in domestic end markets.

---

<sup>74</sup> <https://www.tyrestewardship.org.au/case-studies/t-lok-rubber-safety-barrier>



## TOR 5 Effectiveness of Existing Models

Evaluating the effectiveness of the existing circular economy models and identifying opportunities for research and development to support improved sustainable practices.

### Relevant Recommendations

[Recommendation 1: Mandatory Tyre Product Stewardship](#) on page 7 above

[Recommendation 4: Review OTR Tyre Burial Licensing Conditions](#) on page 11 above

[Recommendation 6: Environment Ministers Meeting \(EMM\)](#) on page 12 above

### 5.1 Effectiveness of the Existing Circular Economy Models

The RAWR Act is the legislative mechanism for the creation of product stewardship schemes in Australia, including the Tyre Product Stewardship Scheme. The ACCC authorises the Scheme including setting Scheme Guidelines, setting metrics and regular review of the Scheme's effectiveness.

While the RAWR Act objects are based on circular economy principles, in practice the product stewardship framework for tyres has been focused on waste recovery, rather than circularity across the entire supply chain – a situation that is common amongst all voluntary products stewardship schemes<sup>75</sup>

The voluntary nature of the Scheme makes it inherently fragile. In particular, the ability for contributors and participants to withdraw at any time has the potential to undermine the achievement of the Scheme's objectives. In addition, the short-term authorisation periods constrain market development and limit investment to short-term projects. Combined with the Scheme's focus on waste recovery, this voluntary framework restricts progress toward genuinely circular outcomes for tyres.

Despite these limitations, TSA is pleased to report that through the efforts across the tyre recovery industry, the current voluntary Scheme for tyres has achieved measurable progress - increasing resource recovery, transforming waste tyres into value-added products and strengthening partnerships. See [TSA 2024–25 Annual Report](#)<sup>76</sup> for latest information.

However, the lack of circularity in Australia's tyre industry is well documented in this submission – noting only about a quarter of our tyres are going to recycling or reuse; the remaining 74% of our end-of-life tyres are still going to end fates that are not circular<sup>77</sup>. The current mostly linear material economy must be transformed to a more circular economy - driven by the right regulations and supporting interventions, tyres can become the circular shaped mascot for the circular economy in Australia.

Australia has much to gain from a circular economy in tyres, as outlined in RPS Group's report [Opportunities in the Circular Economy: Regulated Product Stewardship](#) and [TSA's Submission to the Productivity Commission](#)<sup>78</sup> inquiry into Australia's opportunities in the circular economy. Summarised below:

---

<sup>75</sup> [https://assets.pc.gov.au/2025-10/circular-economy.pdf?VersionId=kzNYni.c\\_7M8UjMSOx3bhMmrRnJ.fWXa](https://assets.pc.gov.au/2025-10/circular-economy.pdf?VersionId=kzNYni.c_7M8UjMSOx3bhMmrRnJ.fWXa)

<sup>76</sup> <https://www.tyrestewardship.org.au/news-and-insights/tsa-annual-report-2024-25>

<sup>77</sup> <https://www.tyrestewardship.org.au/tools-and-resources/material-flow-analysis-report-2023-24>

<sup>78</sup> [https://assets.pc.gov.au/387678/sub148-circular-economy.pdf?VersionId=lvxUFqnEq\\_M0y\\_lTsd6BHf5o0VMq22jv](https://assets.pc.gov.au/387678/sub148-circular-economy.pdf?VersionId=lvxUFqnEq_M0y_lTsd6BHf5o0VMq22jv) at pg 75

- **Driving Economic Growth:** Increased resource recovery will generate jobs and foster economic growth. Effective incentives can create strong onshore and offshore markets for recycled products, leading to new business opportunities. Encouraging research and development (R&D) and technology transfer of advanced recycling technologies and sustainable alternatives will position Australia as a leader in circular economy practices on the international stage.
- **Enhancing Resource Efficiency:** By embracing a circular economy model and enhancing resource efficiency, we can reclaim valuable resources from used tyres, mitigate against the risks associated with the current reliance on exporting end-of-life tyre materials to foreign destinations, and deliver advanced products at scale.
- **Protecting the Environment:** By ensuring all tyres are recovered, we can end our reliance on landfills, avoid the onsite burial of tyres at mines, and assist farmers and other businesses to dispose of end-of-life tyres and conveyor belts responsibly to protect our natural environment.
- **Promoting Public Health and Safety:** By stamping out illegal dumping and stockpiling we can reduce public health and safety hazards like mosquito breeding, rodent infestations, and toxic fires, ensuring a safer, cleaner Australia.
- **Ensuring Compliance and Fairness:** A regulated product stewardship approach will provide all stakeholders with consistent environmental and safety standards, increasing compliance, reducing administration, streamlining enforcement, and promoting fairness across the country including in regional and remote areas.

### 5.1.1 Achieving Circularity in Australia

For tyre circularity to be achieved in Australia:

- **Stewardship frameworks should drive circular principles.** Designed well, the Scheme can support the industry to achieve increased circularity, including fostering relationships and co-ordination across the entire value chain to tackle complex problems.
- **Innovation needs an environment in which it can thrive.** In the tyre sector, extensive analysis has identified regulatory barriers as the key constraint to investment and innovation.
- **Circularity requires time, investment and milestones.** A focus on quick results can jeopardise innovation success. Accepting existing low-circularity pathways further hinders investment to innovate.

The chorus of independent voices questioning the effectiveness of the current circular economy model for tyres includes the ACCC, Independent Reviewers, the Productivity Commission, and Australia's Environment Ministers' Meeting. Their perspectives are summarised below, with a focus on the road ahead.

#### ACCC Views

In September 2024, following consultation with industry and government, the ACCC reauthorised TSA until September 2027 for the conduct necessary to run the voluntary Scheme. **The ACCC reaffirmed in its [Final Determination](#)<sup>79</sup> that the Scheme delivers benefits for the environment and public health but acknowledged that its voluntary nature limits its effectiveness.**

Of interest, having regard to the submissions of TSA and interested parties, the ACCC considered the following points to be the public value benefits of the Scheme:

- Environmental and public health and safety benefits from sustaining or increasing the volume of tyres being recovered.

---

<sup>79</sup> <https://www.accc.gov.au/public-registers/authorisations-and-notifications-registers/authorisations-register/tyre-stewardship-australia-limited-0>

- Benefits arising from levy-funded research and development into effective uses for EOL tyres.
- Benefits arising from TSA's promotion of tyre-derived product.
- Benefits arising from transitioning to a Regulated Scheme.

Together these benefits directly support the principles of circularity - by reducing waste, fostering innovation through research and development, promoting markets for tyre-derived products, and paving the way for a regulated framework that embeds circular practices across the supply chain.

### Independent Reviewer's Views

As required as part of TSA's ACCC reauthorisation, Marsden Jacob Associates were commissioned to undertake an [Independent Review of the Tyre Product Stewardship Scheme and of TSA](#)<sup>80</sup>, found that the Scheme is performing well within its voluntary framework and that TSA is administering it effectively.

The review concluded that while TSA has achieved significant progress under the voluntary model, further gains are likely to be limited without a shift to a mandatory or co-regulatory approach.<sup>81</sup>

### Productivity Commission Views

The Productivity Commission's final report, [Australia's circular economy: Unlocking the opportunities \(2025\)](#)<sup>82</sup> recognises that despite some progress, Australia's uptake of circular economy opportunities has been slow – See [Case Study: Why Australia's Current Circular Economy Model Falls Short](#) on page 54. below

The Commission's recommendations of relevance to tyres and this submission, include:

- **Streamlining regulations** to encourage circular activities<sup>83</sup>.
- **Expand product stewardship** for high-risk, high-value products. It noted the Australian Environment Ministers were informed by the [National Options Project](#)<sup>84</sup> best placed to decide on policy actions regarding end-of-life tyre management.
- Facilitate coordination and innovation diffusion through **information-sharing** platforms, **challenge-based funding**, and sustainable procurement policies.

Improve information for decision-making, including **product labelling** for repairability and durability, and better monitoring of material flows and outcomes.

### Environment Ministers' Meeting Views

The [National Options Project](#)<sup>85</sup> prepared for the Environment Ministers' Meeting by the Government of Western Australia, found Australia has achieved strong recovery rates for car and truck tyres and growing investment in infrastructure. However, structural weaknesses and compliance gaps persist, limiting circular economy opportunities and creating environmental, social, and financial risks. And that addressing these challenges is critical for sustainable outcomes and can be best achieved through the introduction of a regulated stewardship approach.

---

<sup>80</sup> <https://www.tyrestewardship.org.au/independent-review-of-tpss>

<sup>81</sup> Ibid pg 9

<sup>82</sup> [https://assets.pc.gov.au/2025-10/circular-economy.pdf?VersionId=kzNYni.c\\_7M8UjMSOx3bhMmrRnJ.fWXa](https://assets.pc.gov.au/2025-10/circular-economy.pdf?VersionId=kzNYni.c_7M8UjMSOx3bhMmrRnJ.fWXa)

<sup>83</sup> Notably out of step with this recommendation, the report does not support transitioning away from licences permitting mining companies to bury tyres in pit, p59.

<sup>84</sup> <https://www.wa.gov.au/service/building-utilities-and-essential-services/waste-management/national-project-options-end-of-life-tyres>

<sup>85</sup> <https://www.wa.gov.au/service/building-utilities-and-essential-services/waste-management/national-project-options-end-of-life-tyres>

### 5.1.2 Analysis of Existing Research – Circularity Constraints and Solutions

The TSA 2026 [Tyre Supply Chain Analysis: Opportunities to grow Australia's circular economy for tyres](#)<sup>86</sup> (Supply Chain Analysis) analyses exiting research, including the [National Options Project](#)<sup>87</sup>, to identify barriers to greater circularity in the current tyre supply chain and how best to address these issues.

The report **identifies 33 systemic issues, five rated as very high impact** and exposes structural weaknesses across every stage of Australia's tyre supply chain. These gaps undermine progress toward a circular economy, leaving the nation vulnerable to environmental harm, market distortions, and missed opportunities. See [Appendix F: Supply Chain Analysis](#) on page 74 below for a summary of the issues and solutions.

The **5 Very High Impact** issues constraining the progress of Australia's tyre industry moving towards a more circular economy are:

1. 'Free riding' tyre importers.
2. Rogue collectors undercut accredited collections resulting in illegal dumping and significant communication, environmental and financial impacts.
3. Free on-site burial at mining sites.
4. On-farm dumping and burning.
5. Australia recycles just 17% of used tyres. Development of circular end-markets are constrained by lack of tyre-derived material procurement, an over reliance on energy recovery and in-pit mining burial.

Three options were considered to resolve the circularity constraints:

1. **A Mandatory Scheme is Best:** The report concludes that the single most effective way to deal with the issues is to introduce a Mandatory Scheme at the national or jurisdictional level.
2. **Supporting Measures:** The report recommends supportive measures that should be pursued and that would become even more critical if a mandatory scheme is not implemented, as they can strengthen current supply chain performance.
3. **Major Amendments to voluntary Scheme:** The report recommended several changes to the Scheme. While these changes require ACCC approval and are important for improving the existing scheme, they will only deliver limited growth in the tyre circular economy compared to the transformative impact of a mandatory participation scheme.

The findings are clear: Australia's tyre supply chain is constrained from achieving higher levels of material circularity due to fragmented policy, laws, implementation, and enforcement. After reviewing several solution options, implementing a mandatory participation product stewardship scheme resolves most very high and high impact issues – significantly more than any other option.

Australia has much to gain from a circular economy for tyres. The gains, constraints and solutions have been thoroughly examined, all pointing towards the urgent need for a well-designed, mandatory products stewardship scheme fit for Australia.

---

<sup>86</sup> <https://www.tyrestewardship.org.au/tools-and-resources/opportunities-to-grow-australias-circular-economy-for-tyres>

<sup>87</sup> <https://www.wa.gov.au/service/building-utilities-and-essential-services/waste-management/national-project-options-end-of-life-tyres>

### Case Study: Why Australia's Current Circular Economy Model Falls Short

TSA's 2026 [Supply Chain Analysis](#)<sup>88</sup> highlights several systemic weaknesses across the tyre lifecycle in Australia. In summary:

- **Australia's tyre lifecycle faces critical structural weaknesses.** Unlike the EU and US, Australia lacks regulations promoting circular design and restricting harmful chemicals in tyres, leaving our market vulnerable to low-quality imports. Weak enforcement of Australian Design Rules further undermines competitiveness, especially for domestic retread, which is struggling against cheap, single-use tyres.
- **The voluntary stewardship Scheme fails to secure universal participation,** with nearly half of loose imports and most fitted imports avoiding the levy. A stagnant \$0.25 per equivalent passenger unit fee erodes financial sustainability. Retailer engagement remains low, procurement opportunities are unrealised, and confusing Scheme guidelines may also deter participation.
- **Collection and recovery systems are** compromised by illegal dumping, poor tracking, and weak enforcement of export bans. Domestic processing capacity and end markets remain insufficient. Disposal practices are equally problematic: free onsite burial of over 100,000 tonnes of mining tyres annually persists, and rural dumping and burning remain the cheapest options.

## 5.2 Identifying Opportunities for Research and Development

TSA suggests the Committee focus research and development or funding recommendations towards projects that deliver the highest circularity impact. For example they address the very high impact circularity constraints identified in the [Supply Chain Analysis](#)<sup>89</sup>; and the highest value circularity applications identified in [Appendix C: Management Options for End-Of-Life-Tyres and Conveyor Belts](#) on page 70 below. We recommend the government prioritises long-term research and development over short-term initiatives.

With over 76 projects funded via TSA's market development fund and a further 15+ research and evidence-based reports prepared for industry, there is significant research and development to support improved sustainable practices and achieve a circular economy that shouldn't be unnecessarily replicated.

Further, we advise government explores international research and development, as well as experience, including from the global tyre, recycling, mining and stewardship community.

What is lacking is the regulatory framework to reach sustainable best practice in Australia.

### *Insight*

#### **Alignment with Strategic Examination of Research and Development**

The Department of Industry, Science and Resources recently released six issue papers<sup>90</sup> which are exploring how Australia can encourage more home-grown ideas, more research and more translation.

<sup>88</sup> <https://www.tyrestewardship.org.au/tools-and-resources/opportunities-to-grow-australias-circular-economy-for-tyres>

<sup>89</sup>

<https://www.tyrestewardship.org.au/tools-and-resources/opportunities-to-grow-australias-circular-economy-for-tyres>

<sup>90</sup> <https://consult.industry.gov.au/strategic-examination-rd-issues-papers>

Whilst the strategic examination is still underway, the issue paper topics are a useful framework to consider how various **technological advancements in tyre design, recycling processes, and alternative materials can be translated from research into real world impact.**

#### **National coordination for RD&I impact – issue paper 1**

Australia's tyre waste challenge is a clear area of national need, and a focus on the whole R&D pipeline is required. Strategies across federal, state, and territory levels should be coherent and synergistic, supporting circular economy goals and reducing reliance on export markets.

Strengthening performance measurement and measuring outcomes, such as reductions in stockpiling, landfill diversion, and carbon savings, rather than just inputs (e.g., number of projects funded) will demonstrate the real impact of tyre stewardship initiatives.

#### **Scaling the system: A proactive approach to scaling the RD&I system – issue paper 2**

Tyre recycling technologies such as devulcanisation, pyrolysis, and advanced material recovery require investment across the entire innovation pipeline, from lab-scale research to commercial deployment. TSA's role in funding R&D and facilitating pilots aligns with this principle, but scaling up requires national coordination and industry buy-in.

#### **RD&I incentives: Incentivising breakthrough innovation and ambitious R&D – Issue paper 3**

Technologies like devulcanisation and other advanced processing are high-risk but transformative. Current funding models often favour incremental improvements; shifting toward bold, experimental projects could position Australia as a global leader in tyre circularity.

Complex grant processes and fragmented programs slow innovation in tyre recycling. Streamlining funding and reducing administrative overheads would accelerate technology adoption and market development.

#### **Investment and capital: growing investment and capital for RD&I – issue paper 4**

Unlocking investment for tyre recycling ventures is critical. Sovereign funds and private equity could support scaling of technologies like devulcanisation and pyrolysis, reducing reliance on offshore markets.

Furthermore, economic value cannot be created without industry. Mining companies, tyre manufacturers, and recyclers must be central to planning and scaling solutions. TSA's mining hubs and partnerships with global tech providers (e.g., Canadian devulcanisation firms) exemplify this approach.

#### **Foundational research: Creating knowledge – issue paper 5**

High quality research is a cornerstone of the tyre industry. Australia has strong research capabilities in materials science and engineering. Leveraging these strengths for tyre-derived materials and advanced recycling technologies can create new industries and high-growth firms, turning environmental challenges into economic opportunities.

Training and career pathways need to be prioritised. The tyre recycling sector needs engineers, chemists, and technicians with commercial acumen. Building STEM pathways and industry training programs, ensuring skills for advanced recycling and circular economy business models.

#### **Government as an Exemplar – issue paper 6**

Government procurement, such as specifying crumb rubber in road projects, can drive demand for recycled tyre products. TSA's work with councils and infrastructure agencies aligns with this recommendation.

## TOR 6 Stewardship Scheme Role

Considering the role of commercially viable product stewardship schemes and whether these should be made mandatory, and identifying infrastructure gaps in collection, processing, and recycling facilities.

### **Relevant Recommendations**

[Recommendation 1: Mandatory Tyre Product Stewardship](#) on page 7 above

[Recommendation 2: Roads](#) on page 9 above

[Recommendation 3: Australian Design Rules \(ADR\)](#) on page 10 above

[Recommendation 4: Review OTR Tyre Burial Licensing Conditions](#) on page 11 above

[Recommendation 5: Boost Repair & Retread](#) on page 12 above

[Recommendation 6: Environment Ministers Meeting \(EMM\)](#) on page 12 above

[Recommendation 7: Amplify Enforcement of the Waste Export Ban](#) on page 14 above

### 6.1 The Role of Product Stewardship Schemes

Product stewardship schemes are more relevant than ever. They are integral to the creation of a more circular economy in Australia. Where resources are used more productively and efficiently, and waste is minimised.

Operating since 2014, the current voluntary Scheme for tyres is accredited under the RAWR Act, applies nationally to all automotive and off-the-road tyres, and is funded by contributing first importers by a \$0.25 levy per equivalent passenger unit (EPU), capped at \$50 per tyre - generating around \$7 m annually.

The Scheme is supported by more than 1,700 accredited businesses, including retailers, fleets, collectors, and recyclers who participate to manage end-of-life tyres responsibly, and to build a more circular economy for tyres over the whole product lifecycle.

TSA, a not-for-profit organisation, implements the Scheme under ACCC authorisation (renewed in 2024 until September 2027). TSA's strategy is built on five pillars: Build Markets; Advocate for Better; Informed Decision Making; Influence Behaviour; Business Excellence. Importantly, TSA provides national data insights valued by government and industry as the basis for investments.

Since commencing, the Scheme has helped to transform used tyres into valuable resources and created new industries and jobs by investing over \$11 m in 70+ market development projects. It has also provided resources for consumer education and engagement, and the audit of Scheme participants and verification of foreign end markets.

Unfortunately, despite these efforts, tyres remain one of Australia's largest and most problematic waste streams, both in terms of volume and environmental impact.

The efficacy of the voluntary scheme has plateaued and is held back most significantly by 'free riders', who are the first importers that benefit from the existence of the voluntary scheme, but who choose to not contribute to its costs or obligations. Free riding is an inherent feature of voluntary product stewardship schemes.

Free riding undermines stewardship, fails totally to support valuable end markets in Australia, and fundamentally supports an environment where illegal (rogue) operator tyre collectors are left to flourish.

Rogue operators operate outside the industry, shirk regulations or industry norms, and engage in practices such as illegal dumping, stockpiling, or exporting tyres without proper environmental safeguards. Their actions create significant risks such as fire hazards and pollution, and long-term risks that include the collapse of the legitimate tyre recycling and circular economy markets.

There is consensus that this situation needs to change and that the key solution is to introduce a mandatory product stewardship scheme that requires all first importers to contribute financially and participate.

## 6.2 Whether Product Stewardship Schemes Should be Mandatory

The Australian Government has long recognised the role of mandatory product stewardship schemes in achieving its environmental, social and economic policy objectives. This recognition commenced over 25 years ago with the enactment of the *Product Stewardship (Oil) Act 2000 (Cth)*, which continues to collect levies and pay incentives to industry to achieve its objectives. The commitment to mandatory schemes subsequently shifted in favour of voluntary and co-regulatory arrangements.

Twenty years on, in 2020, this Committee (the House of Representatives Standing Committee on Industry, Innovation, Science and Resources) released its landmark report [From Rubbish to Resources: Building a Circular Economy](#)<sup>91</sup>. The report was clear: Australia cannot rely on voluntary stewardship for problematic waste streams. It called for Commonwealth leadership to identify priority products, progress co-regulatory or mandatory schemes, align state and territory action, and intervene with regulation where market-led approaches fail.

Tyres were added to the Environment Minister's Product Stewardship Priority List in 2022-23, and industry was cautioned in the 2023-24 list that:

*“To avoid government regulation, tyre importers not currently members of the Tyre Stewardship Scheme should commence formal participation. By November 2024.”*

In 2023, Australia's environment ministers tasked the WA Government with leading the development of a national project for tyre stewardship. Following preliminary findings and extensive stakeholder consultations, the [National Options Project](#)<sup>92</sup> delivered its final Project Report, including a review of regulatory settings, industry practices, markets for tyre-derived products, and the voluntary Scheme. The Project Report found that while the voluntary scheme has delivered benefits, significant gaps remain including:

- Risks and costs borne by communities and the environment.
- Missed opportunities for material recovery.
- Free-riding by non-participants.

Accordingly, the Project Report concluded that broad-based approaches are required to address these systemic issues. And among the options assessed, **regulated product stewardship emerged as the most effective solution.**

This regulated product stewardship scheme option (option 2) would involve mandatory participation by first importers, supported by funding mechanisms, targets, incentives, and differential fees. A government fees-and-rebates system (option 3) was identified as a close runner-up. Below is the description of the characteristics of these two best options.

---

<sup>91</sup> [https://www.aph.gov.au/Parliamentary\\_Business/Committees/House/Former\\_Committees/Industry\\_Innovation\\_Science\\_and\\_Resources/WasteandRecycling/Report](https://www.aph.gov.au/Parliamentary_Business/Committees/House/Former_Committees/Industry_Innovation_Science_and_Resources/WasteandRecycling/Report)

<sup>92</sup>

<https://www.wa.gov.au/service/building-utilities-and-essential-services/waste-management/national-project-options-end-of-life-tyres>

### Comparison of Options

Category	Option 2 (Best Option)	Option 3 (Next Best Option)
<b>Option class</b>	Regulated product stewardship	Government fees and rebate system
<b>Description</b>	Regulated approach, usually with an economic instrument and some oversight of an independent administrator/s to coordinate a scheme and its financial transfers.  Many possible settings, with some variants only specifying higher-level aims, while others might specify a scheme in detail.	Regulated approach, employing economic instruments, with the government managing compliance and financial transfers relating to fees and rebate payments.
<b>Drivers</b>	Product fees can be used to incentivise collection, recycling and higher-order recovery, and support waste minimisation.	Rebates from product fees used to incentivise collection and/or recovery.
<b>Costs incurred</b>	Brand owners (medium). Potential for lower costs to government with schemes helping to manage some tyre issues.	Brand owners (variable). High government cost to administer and regulate (unless cost recovered).
<b>Recovery</b>	Alberta: 2022–23 recovery: on-road tyres 97%; OTR tyres 78%. British Columbia: 2023 recovery around 97% (OTR tyres not covered). Finland/Sweden/Norway: 2014 recovery: 92.9%, 98.8%, 96.4% respectively.	California: 2019 recovery: 80% diversion; 35% material recovery, but lower recovery since 2019. Denmark: typically, more than 90% recovery (includes OTR tyres).
<b>Challenges</b>	Optimisation of fees and incentives is needed to support coverage, access and higher-order recovery. Gaining representation across the value-chain for decisions and governance.	Better outcomes may need special measures or reviews to respond to market changes, along with variable rebates and fees. Usually low industry involvement in governance.
<b>Opportunities</b>	Can focus on key issues and drive market changes. Some types of schemes may support governance with better representation.	Can support good outcomes by improving recovery competitiveness with respect to disposal.

Importantly, the analysis also recommended that complementary ‘no regrets’ measures - such as market development, improved standards, and design rules be implemented to strengthen outcomes. And that any future framework must be fit-for-purpose for Australia and implemented in stages to allow market readiness, infrastructure expansion, and industry preparation.

Without the shift to a broad-based stewardship approach, Australia risks stagnation or decline in resource recovery and continued environmental harm from unmanaged tyres. Voluntary measures, while valuable, are no longer sufficient to scale circular outcomes.

In respect to benefits of regulated product stewardship, the TSA funded, 2024 Product Stewardship Centre of Excellence White Paper, [Investing in Intelligent Regulation – The Economic Benefits to Government of Regulated Product Stewardship](#)<sup>93</sup> argues that regulated stewardship delivers stronger economic, environmental, and social outcomes than voluntary schemes and is critical to realising Australia’s circular economy vision.

Most importantly, mandatory stewardship provides long-term certainty for industry. To enable this change, TSA has echoed the recommendations of **Circular Economy Ministerial Advisory Group** (CEMAG) final report, [The Circular Advantage](#)<sup>94</sup>, and the Senate Standing Committee on Environment and Communications, Inquiry into Waste and Recycling Policies, report [No Time to Waste](#)<sup>95</sup>. Both advocate that Australia requires a new Circular Economy Act and regulations that better enable the creation of mandatory product stewardship schemes for priority products such as tyres.

TSA has advocated that any process to create a regulated product stewardship scheme for tyres should include industry engagement and co-design of options.

### **Insight**

#### **International Best Practice**

The CSIRO and Curtin University, under the National Environmental Science Program (NESP) Sustainable Communities and Waste Hub, examined global best practices for tyre management from Canada, Chile, Europe, and New Zealand.

Their report, [Best Practice Case Studies for Increasing Value Recovery from End-of-Life Tyres and Conveyor Belts](#)<sup>96</sup> found that the cornerstone of international success is a regulated product stewardship scheme. Their view being that the ideal scheme should capture all stakeholders - from importers and retailers to collectors and processors - and embed recycling costs into the purchase price through bundled fees, including import levies. With complementary measures such as banning landfilling and on-site disposal, auditing compliance, and setting clear targets to provide certainty and prevent stockpiling.

As an example, in Canada, the British Columbia (BC) province tyre stewardship system offers Australia clear lessons about designing a scheme that is both effective and sustainable. BC’s shift from a government run to an Extended Producer Responsibility framework demonstrates the value of placing clear obligations on those introducing tyres to market, supported by transparent incentives that encourage broad and efficient collection - particularly across remote and regional areas. The program’s tiered incentive structure shows how policy can stimulate higher value recycling by rewarding processors who produce advanced end products. BC’s emphasis on financial audits highlights the importance of traceability, while also illustrating a need for stronger oversight of material end destinations - an area where Australia could improve through more robust mass balance and digital tracking. Overall, the BC model underscores that stable funding, clear producer obligations, strong regional service standards, and incentives tied to environmental

<sup>93</sup> [https://stewardshipexcellence.com.au/wp-content/uploads/2024/12/PSCOE\\_108062\\_whitePaper\\_Investing\\_in\\_Intelligent\\_Regulation\\_Final.pdf](https://stewardshipexcellence.com.au/wp-content/uploads/2024/12/PSCOE_108062_whitePaper_Investing_in_Intelligent_Regulation_Final.pdf)

<sup>94</sup> [The%20Circular%20Advantage%20-%20Unlocking%20innovation,%20environmental%20resilience,%20productivity%20and%20net%20zero%20opportunities%20through%20a%20uniquely%20Australian%20circular%20economy%20transition](#)

<sup>95</sup> [https://www.aph.gov.au/Parliamentary\\_Business/Committees/Senate/Environment\\_and\\_Communications/Wastereduction/Report](https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/Wastereduction/Report)

<sup>96</sup> [https://www.nespsustainable.edu.au/sites/default/files/documents/IP5.02\\_Stage%20%20tyre%20and%20conveyor%20belt%20case%20study%20report%20final-20240716.pdf](https://www.nespsustainable.edu.au/sites/default/files/documents/IP5.02_Stage%20%20tyre%20and%20conveyor%20belt%20case%20study%20report%20final-20240716.pdf)

outcomes can build reliable end markets, attract investment, and drive innovation. These insights provide a practical roadmap for strengthening Australia's own tyre stewardship approach.

### 6.3 Gaps in Collection, Processing and Recycling Facilities

Infrastructure gaps exist across Australia but are most pronounced in rural and remote areas where there are lower volumes of tyres, longer distances to existing resource recovery and recycling infrastructure, and lax rules about the burial of tyres onsite at mines or in landfills. This lack of services and infrastructure manifests a host of issues and impacts and cost burdens on communities and governments, and the environment.

TSA has analysed these infrastructure and service issues and how to resolve them in a series of reports and business cases.

The TSA report [Tipping the Balance](#)<sup>97</sup>, found that for OTR tyres, the high tyre consumption sectors, such as iron ore, brown coal, and black coal, have operations clustered in the Pilbara, the Latrobe Valley, and Bowen Basin and regional northern NSW. This analysis has subsequently enabled public and private investment to be targeted to these locations, including the specialised equipment needed for processing giant OTR tyres.

Furthermore, this work highlighted the critical need for a mandatory scheme that includes all tyres, as high recovery rates from mining and agricultural interests in rural and remote areas can support the viability of the logistics, recovery services and infrastructure needed in those catchments to also recover automotive tyres in regional and outback Australia.

In more dispersed situations, such as solitary mining operations and farmers based in more isolated locations, a critical role of a national mandatory scheme is likely to be to focus on the logistics of recovering tyres from these locations.

TSA has developed business cases for several of these locations, such as the [Challenges and Opportunities for Tyre Recovery in the NT](#)<sup>98</sup>. This business case showed the potential for establishing a local processing facility producing tyre derived products that can be utilised within the NT. And that a new local facility would reduce reliance on interstate transport and keep local ownership of valuable materials.

---

<sup>97</sup> <https://www.tyrestewardship.org.au/tools-and-resources/tipping-the-balance-research-report-off-the-road-tyres-conveyors-tracks>

<sup>98</sup> <https://www.tyrestewardship.org.au/tools-and-resources/tyre-recycling-in-the-nt>

## TOR 7 Safety Concerns

Investigate environmental, community, and health and safety concerns related to tyre waste and recycling operations.

### **Relevant Recommendations**

[Recommendation 1: Mandatory Tyre Product Stewardship](#) on page 7 above

[Recommendation 4: Review OTR Tyre Burial Licensing Conditions](#) on page 11 above

[Recommendation 6: Environment Ministers Meeting \(EMM\)](#) on page 12 above

[Recommendation 7: Amplify Enforcement of the Waste Export Ban](#) on page 14 above

### 7.1 Environmental and Community Risks from Poor Tyre Management

#### 7.1.1 Environmental and Community Harms

The [National Options Project](#)<sup>99</sup> **Problem category 1: risks and costs to the environment and communities** found that used tyres can be poorly managed in several ways, including illegal dumping, stockpiling, and trafficking to inappropriate overseas destinations; and lawful management where poor practices create risks to people and the environment such as onsite burial. These failures lead to significant environmental, social, and economic impacts.

One of the most severe risks is **tyre fires**, which release harmful emissions to air, water, and land, posing serious threats to public health and safety, particularly where fires occur near communities. Such incidents, often the result of arson, can result in **injuries or fatalities**, affecting emergency responders, site workers, and community members. Tyres also function as accelerants, causing extensive **fire damage** to property.

Beyond fire-related hazards, poor management of end-of-life tyres increases **disease risk**, as water collected in dumped tyres creates breeding grounds for **mosquitoes** and vector-borne pathogens. Illegal dumping also causes **amenity impacts**, degrading landscapes and reducing community enjoyment of the environment.

Commercial consequences include loss of social licence for businesses involved in end-of-life tyres incidents, reputational damage to associated industries, and increased costs through tighter regulation and **higher insurance premiums**. Broader social and cultural impacts include **harm to Country**, diminished heritage values, and reduced property values in areas affected by dumping.

Given Australia exports over 40% of end-of-life tyres, these environmental harms are no less relevant to the markets to which such products are exported. If Australia is to earn and hold a reputation as a responsible exporter it must act to ensure foreign markets are not simply used as dumping grounds. To do so is to abrogate its global responsibilities.

---

<sup>99</sup>

<https://www.wa.gov.au/service/building-utilities-and-essential-services/waste-management/national-project-options-end-of-life-tyres>

## Insight

### Foreign End Market (FEM) Verification

TSA recognises that to contribute to a more responsible and safer end-of-life tyre industry, all stakeholders need transparency over their supply chains in Australia and overseas.

In Australia, TSA Accredited collectors and recyclers of end-of-life tyres are monitored through the national Tyre Product Stewardship Scheme. However, when it comes to Australian tyre-derived material, tyre seconds and casings exported overseas, we lose sight of how the material is being managed. That's where the Foreign End Market Verification program, developed by TSA in partnership with Intertek, comes in.

TSA's Foreign End Market Verification program is helping to deliver supply chain transparency and improvement opportunities in areas such as Modern Slavery, Health & Safety, Environment and Distribution.

In April 2025, in a UK Parliament debate, Tessa Munt MP cited the Foreign End Market Verification program as an example of how targeted licensing, stewardship-led oversight and independent verification can prevent environmental harm, eliminate unsafe offshore processing and support the growth of domestic tyre recycling industries.

See [Foreign End-Market Verification](#)<sup>100</sup>

## 7.1.2 The Hidden Price of Tyre Mismanagement

Governments and communities bear significant financial burdens to address the problems associated with tyre mismanagement; this includes through compliance, enforcement, emergency response, and clean-up activities. As well as through amenity impacts.

The 2024 Blue Environment report [Stockpiling and Illegal Dumping of Tyres: Cost to Local Government and Others](#)<sup>101</sup> estimated that local governments collectively spend around **\$6.5 m per year** cleaning up illegally dumped tyres, while managing legacy stockpiles could cost between **\$8.3 million and \$23.3 m**. Non-financial amenity costs associated with dumped tyres were estimated at approximately **\$100 m**, though these figures are likely conservative. Importantly, managing dumped tyres is far more expensive per unit than lawful recycling or disposal, meaning that **preventing illegal disposal delivers substantial cost savings**.

Persistent stockpiling and dumping - **especially in remote regions without strong collection and recovery systems** - create long-term risks and costs. Even near major population centres, clandestine dumping and stockpiling continue, requiring ongoing enforcement and clean-up efforts.

These challenges underscore the need for robust regional collection systems, effective stewardship mechanisms, and strong compliance frameworks to prevent poor management and its associated impacts.

---

<sup>100</sup> <https://www.tyrestewardship.org.au/find-services/foreign-end-market-verification>

<sup>101</sup> <https://www.tyrestewardship.org.au/tools-and-resources/stockpiling-and-illegal-dumping-of-tyres-cost-to-local-governments-and-others>

The [North Queensland Regional Association of Councils](#)<sup>102</sup> (NQROC) in its submission to the ACCC in respect to the latest reauthorisation of TSA summed up the situation in regional Australia succinctly:

*‘Local Governments are at the forefront of resource recovery, managing waste; delivering on national and state sustainability targets; and educating their communities about recycling, reusing, and disposing of waste responsibly.*

*It is our experience that the current industry-led Tyre Product Stewardship Scheme (Scheme) fail our community.*

*This failure does not stem from TSA’s administration of the scheme. It is due to its voluntary nature, allowing poor practices to continue; and burdening the government level with the least capacity, Local Governments with the management of used tyres.’*

## 7.2 Tyre Waste and Recycling Operational Risks

### 7.2.1 Managing Quality and Performance Risks for Tyre-Derived Material in Australia

Australian tyre recyclers produce and sell a variety of materials, notable several sizes of rubber granules and crumb rubber, which are then used in numerous products and markets. These markets include sprayed seal, asphalt, soft-fall and play surfaces, artificial turf, permeable pavements, concrete infrastructure and many more.

Each of these markets for used tyres will have specific requirements for size and other physical attributes. To ensure a consistent product that is safe and reliable, manufacturers of new products require a standardised tyre derived material and often develop specifications for crumb rubber and/or granules.

As an example, Austroads have developed the technical specification [ATS-3110 | Austroads](#),<sup>103</sup> which specifies size, moisture, contamination and other properties for crumb rubber, to ensure the material is appropriate and safe to use in roads.

TSA is currently working with accredited recyclers across Australia in developing a robust testing program for recycled rubber. This program is aligned with local manufacturing specifications, and will support the ongoing quality, performance, and sustainability of products in the Australian circular economy.

Currently, the importation of low-quality recycled rubber and rubber products is undermining the local circular economy. These imported materials are not part of product stewardship activities and are displacing recycled rubber products that are in desperate need of solutions in Australia. Without clear traceability on the source and standard of imported materials, they may end up diluting the local market with products that are a risk to the safety of the community and environment.

Ongoing support to incentivise quality assurance, testing and high-quality outputs is crucial to ensure safe and sustainable recycled rubber products.

---

<sup>102</sup> <https://www.accc.gov.au/system/files/public-registers/documents/Submission%20by%20North%20Queensland%20Regional%20Organisation%20of%20Councils%20Inc%20-%2001.02.24%20-%20PR%20-%20AA1000655%20TSA.pdf?ref=0&download=y>

<sup>103</sup> <https://austroads.gov.au/publications/test-methods/ats-3110>

## 7.2.2 Managing Tyre Particle Risks in Australia

In the Australian context, other than the direct risks identified above, tyre safety concerns arise primarily during two stages of the tyre lifecycle that both relate to tyre particles: firstly, when tyres wear down during use on vehicles, and secondly, when tyres are recycled through size reduction and particles are used in products.

During use, tyres shed **Tyre and Road Wear Particles (TRWPs)** - microscopic fragments produced by friction from driving, braking, and acceleration. These particles, a mixture of rubber and road materials, represent a significant source of microplastic pollution, with an estimated 100,000 t released into the Australian environment each year. TRWPs contain chemicals of concern that can enter air, soil, and water, impacting ecosystems and potentially human health. Of particular concern is 6PPD-Q, a compound highly toxic to aquatic life.

At end-of-life, tyres are typically recycled by mechanically grinding them into smaller pieces. TSA supports the critical role of **Safety Data Sheets (SDS)** in managing chemical risks from a work, health and safety perspective and has assisted in preparing these resources for industry. An SDS is a document that provides essential information about hazardous chemicals, helping workplaces assess and control risks effectively.

Tyres can be processed to small particles which are then used as loose material or bound into **tyre-derived products**, such as asphalt road surfaces, flooring, artificial turf, playgrounds, running tracks.

**This dual challenge - minimising the impacts of TRWPs during tyre use and ensuring safe recycling practices - underscores the need for a supply chain approach to tyre stewardship in Australia.**

TSA's 2022 [Tyre Particle Health, Environment and Safety Report](#)<sup>104</sup> conducted a comprehensive literature review, contextualised for Australian conditions through risk analysis, to evaluate concerns related to TRWP and tyre-derived products, based on human and environmental exposure pathways.

The literature evidence indicates that tyre particles generally pose a **minor risk** to the environment and human health. Importantly, several initiatives and management practices can be put in place to further minimise risk.

One of these initiatives is industry research to improve abrasion resistance, discussed in [TOR 1 Industry Review](#) on page 16 above, to reduce the volume of TRWP in the environment, in tandem with replacing chemicals of concern in tyres, to make TRWP less ecotoxic. Importantly, all these initiatives are occurring overseas, so harmonisation of the ADR with UN regulation 117 and alignment with Euro 7, as discussed in section [4.2 High Value Opportunities for Tyre-Derived Material](#) on page 45 above, will ensure similar initiatives could be embedded in Australian tyres.

For tyre-derived product applications incorporating tyre particles, good circular design considerations, particularly installation and maintenance practices for these materials is crucial. This is most important for those applications with loose material such as artificial turf. The NSW Chief Scientist recently found similar findings for artificial turf and recommended the adoption of best practice guidelines and appropriate planning for end of life.<sup>105</sup>

While these findings suggest low levels of risk, the benefits of recycling end-of-life tyres are significant, reducing waste, conserving resources, and improving material performance in infrastructure and recreational applications. However, TSA recognises that these benefits must be

---

<sup>104</sup> [https://storage.googleapis.com/tsa\\_craftcms\\_media/assets/pdf-resources/TSA-Tyre-Particle-Safety-Report.pdf](https://storage.googleapis.com/tsa_craftcms_media/assets/pdf-resources/TSA-Tyre-Particle-Safety-Report.pdf)

<sup>105</sup> [https://www.chiefscientist.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0013/1543/CSE-Synthetic-Turf-Review-Final-Report.pdf](https://www.chiefscientist.nsw.gov.au/__data/assets/pdf_file/0013/1543/CSE-Synthetic-Turf-Review-Final-Report.pdf)

balanced with safety. Any use of recycled tyre material should be managed responsibly to protect communities and ecosystems.

TSA will continue to monitor global developments and undertake targeted research to ensure that tyre stewardship in Australia remains both sustainable and safe.

### 7.3 Risk Assessment

Throughout this submission, we have recommended a mandatory product stewardship scheme for tyres in response to the various risks and opportunities identified under each Term of Reference. A mandatory scheme will have significant benefits for the Australian circular economy. See [Recommendation 1: Mandatory Tyre Product Stewardship](#) on page 7

Prudent advocacy demands the risks associated with such a recommendation are also considered. To that end, TSA commissioned an independent review of the economic, social, legal, technological, and environmental risks associated with implementing (or failing to implement) a mandatory scheme. The review categorises each risk on a likelihood and consequence basis to assign an overall classification of each risk from low to extreme.

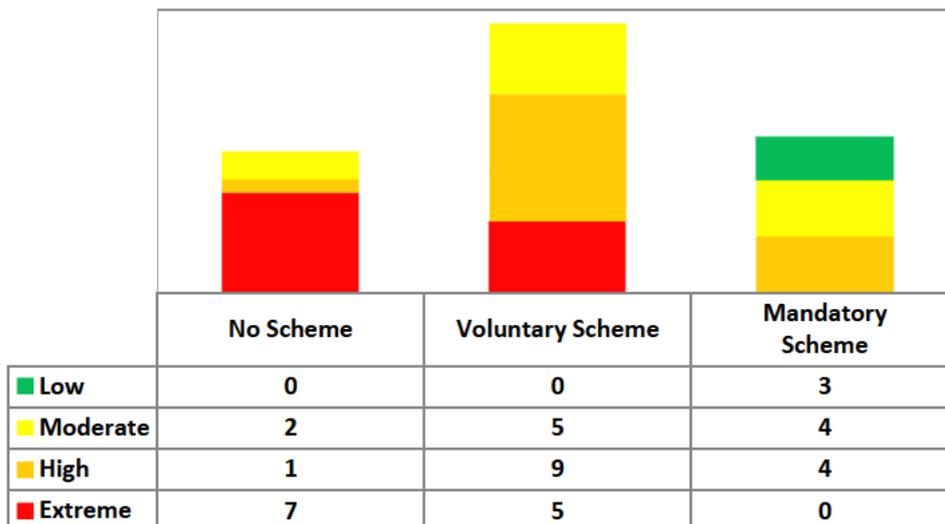


Figure 6 Count of Risks Associated With Stewardship Scheme Options by Category

This risk review shows that a mandatory scheme addresses risk, adds further weight to the recommendations contained in this submission, the widespread support for a mandatory scheme across industry, and the persistent and repeated calls for such action as contained in the literature review detailed earlier.

This is reinforced by the [Supply Chain Analysis](#)<sup>106</sup> and the summary infographic in [Appendix F: Supply Chain Analysis](#) on page 74). This report identified 33 issues constraining circular outcomes in the tyre supply chain; 5 that were rated as highly critical. Only a full participation mandatory scheme resolved the majority of issues.

<sup>106</sup> <https://www.tyrestewardship.org.au/tools-and-resources/opportunities-to-grow-australias-circular-economy-for-tyres>

# Appendices

## Appendix A: About Tyre Stewardship Australia

Australia's tyre supply chain is supported by one of the nation's longest-running and most successful voluntary product stewardship programs - the **Tyre Product Stewardship Scheme (Scheme)**. Accredited under the *Recycling and Waste Reduction Act 2020*, the Scheme was first accredited in 2014 and reaccredited in 2021 until March 2026. It applies nationally to all automotive and OTR tyres, ensuring strong governance, transparency, and alignment with circular economy principles.

Funded by a \$0.25 levy per equivalent passenger unit (EPU), capped at \$50 per tyre, the Scheme generates around \$7 million annually. More than 1,700 accredited businesses - including retailers, fleets, collectors, and recyclers - participate to manage end-of-life tyres responsibly. Since 2014, the Scheme has helped to transform used tyres into valuable resources, created new industries and jobs, reduced illegal dumping, and support market development through levy-funded research and innovation.

**Tyre Stewardship Australia (TSA)**, a not-for-profit organisation, implements the Scheme under ACCC authorisation (renewed in 2024 until September 2027). Established in 2013, TSA collaborates with industry, government, and communities to reduce waste and drive circular outcomes. While TSA does not physically collect or recycle tyres, it accredits and audits participants across the supply chain, ensuring best practice and ethical standards.

TSA's strategy is built on five pillars:

- Build Markets.
- Advocate for Better.
- Informed Decision Making.
- Influence Behaviour.
- Business Excellence.

To date, TSA has invested \$11 million in 70+ market development projects, dedicating about 40% of its annual budget to research, development, and innovation. It also leads education, advocacy, compliance programs, and provides national data insights valued by government and industry. Internationally recognised as a sustainability leader, TSA acts as Australia's think tank on tyres, advancing policy innovation and circular economy goals.

## Appendix B: Definitions

### Acronyms and Abbreviations

Term	Definition
ABR	Australian Business Register
ACCC	Australian Competition and Consumer Commission
ADR	Australian Design Rules
BC	British Columbia
CEMAG	Circular Economy Ministerial Advisory Group
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DETSI	Department of the Environment, Tourism, Science, and Innovation (Qld)
EOLT	End-of-life tyres
EPR	Extended Producer Responsibility
ESG	Environmental, Social, and Governance
EV	Electric Vehicle
NGER	National Greenhouse and Energy Reporting
NQROC	Northern Queensland Regional Association of Councils
OTR	Off the Road (tyres)
PC	Productivity Commission
PSR	Literally Passenger Car Radial but including passenger, SUV and 4WD tyres
RAWR Act	Recycling and Waste Reduction Act
SDS	Safety Data Sheets
SMC	Safeguard Mechanism Credits
SOI	Sustainable Outcomes Indicator
TBR	Literally Truck and Bus Radial tyres
TDF	Tyre Derived Fuel
TDM	Tyre Derived Material
TDP	Tyre Derived Products
TRWP	Tyre and Road Wear Particles
TSA	Tyre Stewardship Australia
TSBC	Tyre Stewardship British Columbia
UNECE	United Nations Economic Commission for Europe
USTMA	United States Tire Manufacturers Association
MFA	Material Flow Analysis report produced by TSA <sup>107</sup>

<sup>107</sup> [https://storage.googleapis.com/tsa\\_craftcms\\_media/assets/pdf-resources/TSA0047-L8-Material-Flow-Analysis-Report-WEB.pdf](https://storage.googleapis.com/tsa_craftcms_media/assets/pdf-resources/TSA0047-L8-Material-Flow-Analysis-Report-WEB.pdf)

## Technical References

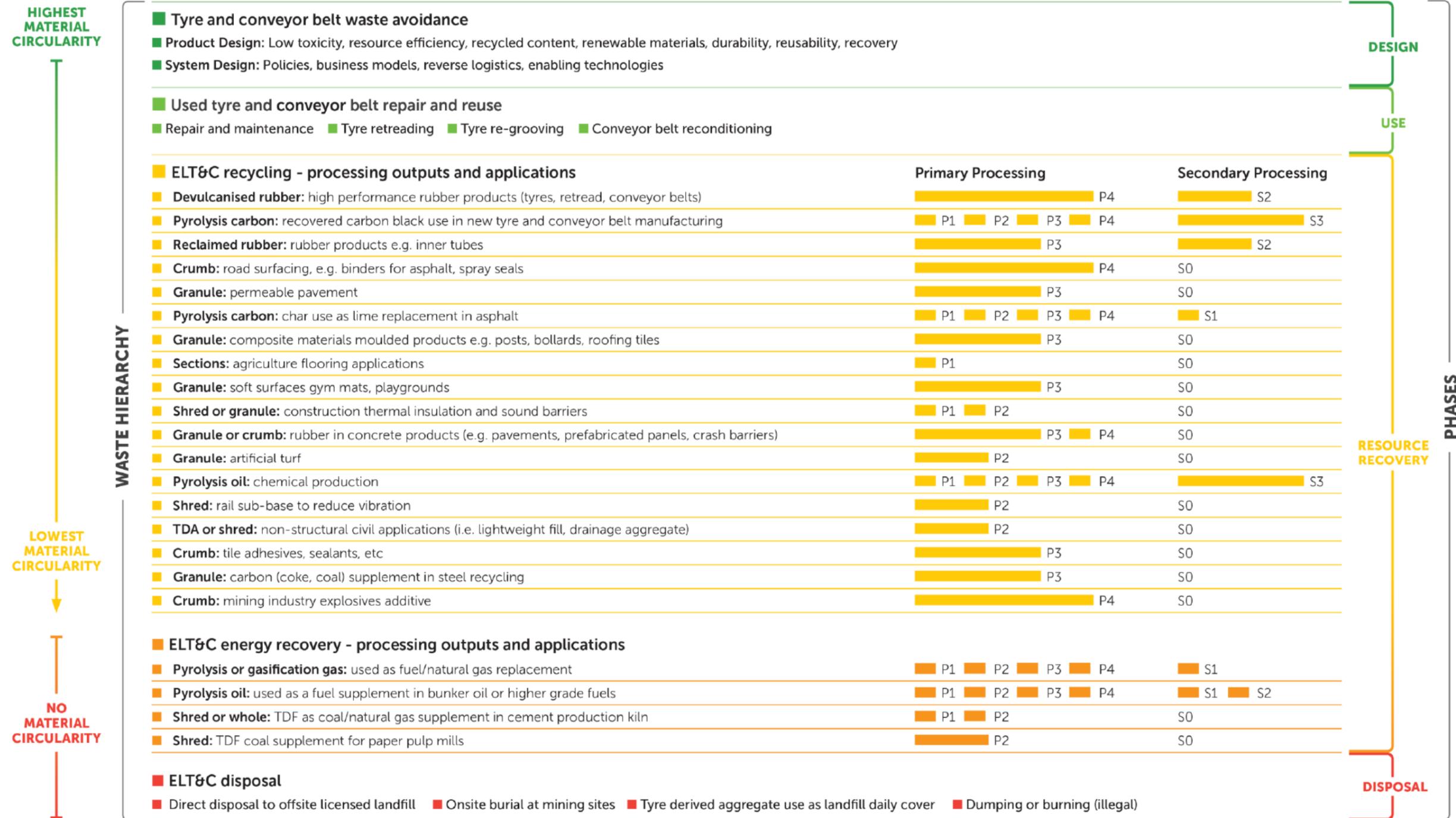
Term	Definition
Euro 7	<p>Proposed European Union regulations relating to motor vehicles and components largely focussing on emissions standards. This latest version incorporates the type-approval of brake systems and tyres, particularly related to particle emissions and abrasion. See also.</p> <ul style="list-style-type: none"> <li>Regulation - 2024/1257 - EN - EUR-Lex</li> <li><a href="https://eur-lex.europa.eu/eli/reg/2024/1257/oj/eng">https://eur-lex.europa.eu/eli/reg/2024/1257/oj/eng</a></li> </ul>
UN 108, 109, 117	<p>United Nations Regulations: Uniform provisions concern the approval:</p> <p>For the production of retreaded pneumatic tyres for motor vehicles and their trailers:</p> <ul style="list-style-type: none"> <li>Regulation No. 108</li> <li><a href="https://unece.org/sites/default/files/2024-01/GRBP-79-25e.pdf">https://unece.org/sites/default/files/2024-01/GRBP-79-25e.pdf</a></li> </ul> <p>For the production of retreaded pneumatic tyres for commercial vehicles and their trailers:</p> <ul style="list-style-type: none"> <li>Regulation No. 109</li> <li><a href="https://unece.org/sites/default/files/2025-03/R109r1am7e.pdf">https://unece.org/sites/default/files/2025-03/R109r1am7e.pdf</a></li> </ul> <p>Of tyres with regard to rolling sound emissions and/or to adhesion on wet surfaces and/or to rolling resistance:</p> <ul style="list-style-type: none"> <li>Regulation No. 117</li> <li><a href="https://unece.org/sites/default/files/2025-09/R117r5e.pdf">https://unece.org/sites/default/files/2025-09/R117r5e.pdf</a></li> </ul>
6PPD	<p>A chemical additive in tyres that provides anti-degradation properties, to prevent the breakdown of rubber from reaction with atmospheric ozone, providing durability and safety for tyres.</p> <ul style="list-style-type: none"> <li>N-(1,3-dimethylbutyl)-N'phenyl-p-phenylenediamine (chemical formula for 6PPD)</li> <li><a href="https://doi.org/10.1126/science.abd6951">https://doi.org/10.1126/science.abd6951</a></li> </ul>
6PPD-Q	<p>A transformation product of 6PPD, 6PPD-Q (or 6PPD-quinone) is recognised as a global contaminant, and since its discovery in 2021 has been found to be acutely toxic to several salmon and trout species.</p> <ul style="list-style-type: none"> <li>2-anilino-5-[(4-methylpentan-2-yl)amino]cyclohexa-2,5-diene-1,4-dione (chemical formula for 6PPD-Q)</li> <li><a href="https://6ppd.itrcweb.org/">https://6ppd.itrcweb.org/</a></li> </ul>

## Appendix C: Management Options for End-Of-Life-Tyres and Conveyor Belts

For best readability, this Appendix should be printed on A3

# The Options Assessment Tool

The Options Assessment Tool presents material circularity for management options from the highest material circularity to no material circularity. This scale aligns with the waste hierarchy.



**Legend:** Primary processing: P1: Sectioning into pieces P2: Shredding P3: Granulation P4: Crumbing  
 Secondary processing: S0: No secondary processing S1: Low level additional refinement of secondary processing outputs  
 S2: Moderate level additional refinement of secondary processing outputs  
 S3: High level additional refinement of secondary processing outputs  
 ELT&C: End of life tyres and conveyor belts TDF: Tyre derived fuels TDA: Tyre derived aggregate



## Appendix D: Advocacy for a Mandatory Product Stewardship Scheme for Tyres

For best readability, this Appendix should be printed on A3

The table below lists relevant reports / papers in which the authors make recommendations regarding a mandatory scheme, the limited effectiveness of the current voluntary scheme or the need for strengthened regulation

Title and Authors	Date Published	Position Regarding a Mandatory Scheme or Strengthened Regulations
<b>Externally Authored Reports / Papers</b>		
ACCC: Determination	Sep-24	<ul style="list-style-type: none"> <li>A mandatory or co-regulatory Scheme may deliver greater public benefits than the current voluntary Scheme.</li> </ul>
Blue Environment: National Waste and Resource Recovery Report 2024	Jan-25	<ul style="list-style-type: none"> <li>The report is a quantitative analysis of waste streams. It does show different stewardship schemes, such as for clothing, packaging and electronics but remains positive rather than providing a normative judgement. It does include tyres as hazardous material due to fire risks.</li> </ul>
Blue Environment and Centre for International Economics (CIE): Stockpiling and illegal dumping of tyres: cost to local governments and others by Joe Pickin	Apr-24	<ul style="list-style-type: none"> <li>A stronger stewardship scheme is needed to reduce illegal dumping and ensure all sectors participate.</li> </ul>
CSIRO: National circular economy roadmap for plastics, glass, paper and tyres	Jan-21	<ul style="list-style-type: none"> <li>The roadmap implies that voluntary arrangements are insufficient to achieve full recovery, especially for OTR tyres and non-metropolitan areas.</li> <li>Calls for stronger national governance, which aligns with a mandatory stewardship approach to ensure all tyres are collected, processed and tracked.</li> </ul>
CSIRO and Curtin University under the research program of the NESP Sustainable Communities and Waste Hub: Exploring global influences on the tyre industry: Chemicals of concern, microplastics and design - Literature review	Jul-24	<ul style="list-style-type: none"> <li>Voluntary schemes are insufficient; a regulated nationwide stewardship scheme is recommended for consistency, compliance, and effective material recovery.</li> </ul>
CSIRO for TSA: Exploring global influences on the tyre industry: Chemicals of concern, microplastics and design - Literature review	Nov-24	<ul style="list-style-type: none"> <li>Highlights the need for strengthened national tyre stewardship aligned with international trends.</li> <li>Suggests that voluntary measures may be insufficient; consistent national standards and regulated end-of-life management are required.</li> </ul>
DWER (Government of Western Australia Department of Water and Environmental Regulation): National End-of-Life Tyres Options project - Project report	Aug-25	<ul style="list-style-type: none"> <li>The project findings strongly support moving towards a mandatory, broad-based product stewardship scheme for end-of-life tyres in Australia. International experience shows voluntary schemes often leave gaps in participation, allow free-riding, and result in lost recovery value, with costs falling on communities and governments. A mandatory scheme could address these issues by ensuring producers and importers bear the costs, incentivising higher-order recovery, and reducing rogue trading.</li> </ul>
DWER (Government of Western Australia Department of Water and Environmental Regulation): National End-of-Life Tyres Options project Investigation report – off-the-road tyres and related products (OTR Investigation)	Aug-25	<ul style="list-style-type: none"> <li>No mention of Scheme options in the investigation report. However, the project report mentions that a specific measure for OTR tyres (Option 4) operating alongside the current voluntary scheme (and other existing settings) might also achieve some significant improvements, primarily by addressing aspects of problem category 2 (lost value).</li> </ul>
Federal Chamber of Automotive Industries (FCAI) and the Motor Trades Association of Australia (MTAA): The outlook for end-of-life vehicles in Australia	Aug-24	<ul style="list-style-type: none"> <li>Voluntary schemes are inadequate due to fragmented industry, lack of tracking, and poor non-metal recovery.</li> <li>Strong case for a co-regulated, nationally consistent scheme with enforceable standards.</li> <li>Mandatory elements (CoD, accreditation, national rules) are positioned as essential to reduce landfill, prevent waste leakage, and improve recycling of materials like tyres.</li> </ul>
Parliament of the Commonwealth of Australia House of Representatives Standing Committee on Industry, Innovation, Science and Resources: From Rubbish to Resources: Building a Circular Economy	Dec-20	<ul style="list-style-type: none"> <li>The report does not explicitly mandate tyre regulation but establishes a clear policy rationale for mandatory stewardship where voluntary schemes underperform.</li> </ul>
Product Stewardship Centre of Excellence (PSCoE): Investing in Intelligent Regulation - The economic benefits to government of regulated product stewardship White paper	Dec-24	<ul style="list-style-type: none"> <li>Mandatory schemes address the “recovery without reuse” problem seen with tyres and other products. Combined with supporting policies, a mandatory scheme can reduce waste, create jobs, and advance Australia’s circular economy.</li> </ul>
Productivity Commission: Australia’s Circular Economy: Unlocking the Opportunities (Final Report)	Jan 26	<ul style="list-style-type: none"> <li>Mandatory schemes are justified for high-risk/high-value waste streams; fit-for-purpose regulation enables innovation and market growth.</li> </ul>
Senate (Environment and Communications References Committee): No time to waste (Waste reduction and recycling policies)	Apr-25	<ul style="list-style-type: none"> <li>The Senate inquiry signals a shift toward mandating a tyre stewardship scheme, due to low industry participation, poor recovery rates, and environmental risks. The committee acknowledges the current voluntary TPSS is failing to deliver circular economy outcomes.</li> </ul>

Title and Authors	Date Published	Position Regarding a Mandatory Scheme or Strengthened Regulations
Senate (Environment and Communications References Committee): Never waste a crisis: the waste and recycling industry in Australia	Jun-18	<ul style="list-style-type: none"> <li>▪ The Committee concludes that voluntary schemes are not delivering sufficient environmental outcomes, and that this shortfall applies directly to tyres.</li> <li>▪ The report repeatedly highlights the need for stronger regulatory intervention where voluntary industry-led schemes fail to achieve adequate performance.</li> </ul>
<b>TSA Authored Reports / Papers</b>		
Tyre Supply Chain Analysis: Opportunities to grow Australia's circular economy for tyres	Nov-25	<ul style="list-style-type: none"> <li>▪ The report strongly advocates for a national or jurisdictional mandatory participation product stewardship scheme for tyres, finding it to be the most effective and comprehensive intervention to address Australia's tyre circular economy constraints. While existing interventions (including the voluntary Scheme) have the capability to improve outcomes, they are inconsistent across jurisdictions, often unenforced, and focused largely on end-of-life rather than the full supply chain.</li> </ul>
Are We There Yet? Australia's Journey Towards a Circular Economy on Tyres: Material Flow Analysis Report 2023–24	Jun-25	<ul style="list-style-type: none"> <li>▪ Voluntary schemes such as the voluntary Scheme, and legislation at federal and state level covering waste reduction, export controls and pollution have all played a role in promoting the high recovery rates of Passenger, Truck and Bus tyres. Whether it's through restrictions, incentives or both, regulation has demonstrated success in changing behaviours.</li> </ul>
Maximising Material Circularity: Management Options for Tyres and Conveyor Belts	Jan-25	<ul style="list-style-type: none"> <li>▪ Scheme effectiveness: The research shines a light on where the voluntary scheme has been less effective from a circularity perspective – both in terms of product categories (OTR tyres and conveyor belts) and reliance on low circularity activities (use of TDF in industrial power applications; disposal).</li> </ul>
Tyre derived Crumb Rubber in road surfacing applications in Australia – Market overview Version 1.0	Jul-24	<ul style="list-style-type: none"> <li>▪ The report does not explicitly address a mandatory Scheme, it mentions mandating a certain percentage of crumb rubber in roads and sealing.</li> </ul>
Tipping the balance – The business case for a circular economy for Australia's off-the-road tyres, conveyors and tracks	Jun-23	<ul style="list-style-type: none"> <li>▪ Need for regulatory change: The report acknowledges that some regulatory intervention is necessary to grant confidence in high recovery rates and overcome structural, logistical, and economic barriers.</li> </ul>

## Appendix E: Risk Assessment

This document was submitted as a separate file.

## Appendix F: Supply Chain Analysis

For best readability, this Appendix should be printed on A3

# Tyre Supply Chain Analysis: Opportunities to grow Australia's circular economy for tyres

### The Issue:

Circularity is constrained in current supply chain

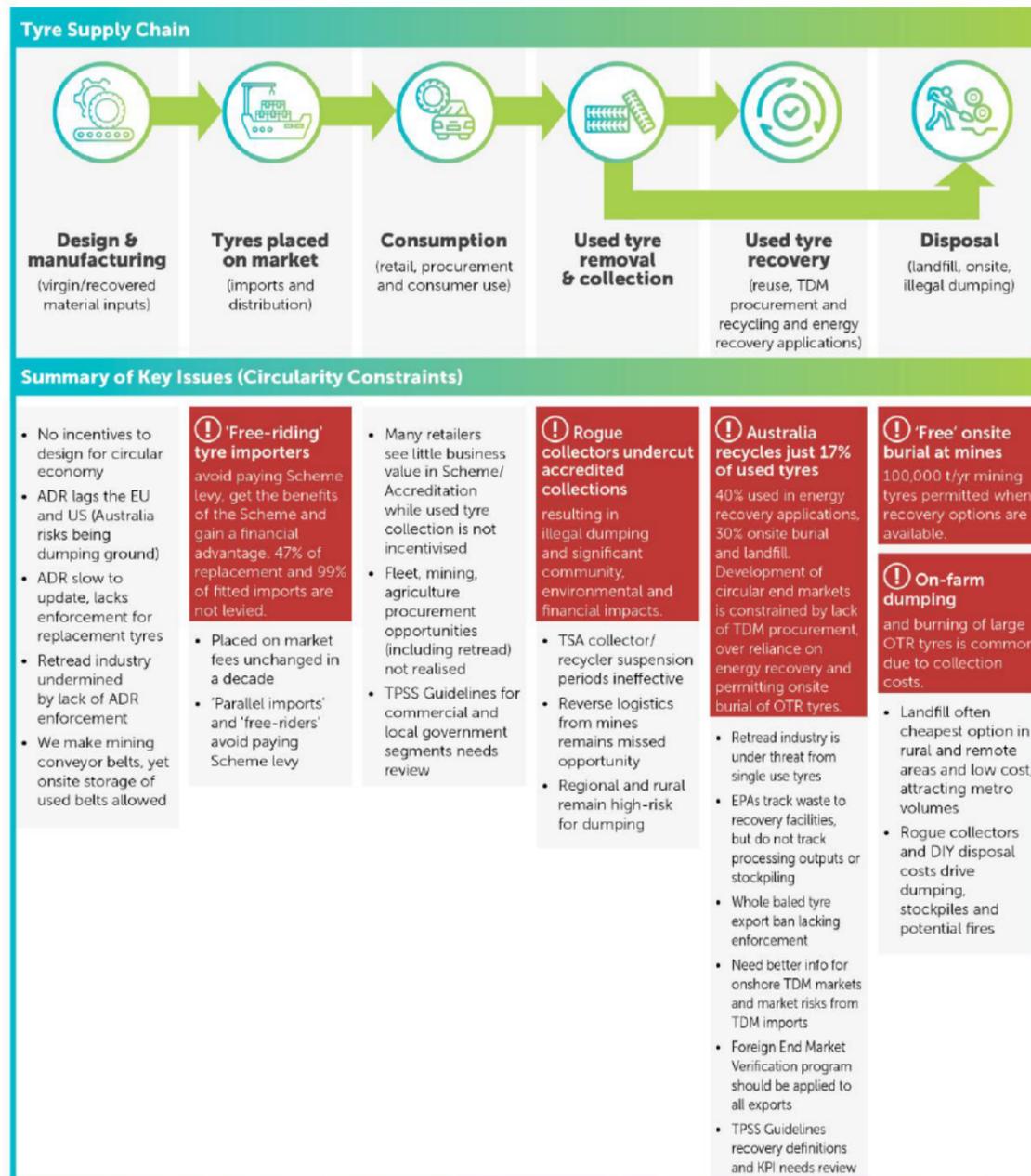
Australia's tyre supply chain is constrained from achieving higher levels of material circularity due to fragmented policy, laws, implementation and enforcement.

### The Solution:

Mandatory participation in the Scheme and implement supporting interventions

To fix the circularity constraints for tyres and ensure all operate by the same rules, Australia needs to implement a mandatory participation product stewardship scheme and implement supporting interventions. Meanwhile, continue to improve the existing tyre product stewardship scheme.

## The tyre supply chain and circularity issues



## How to fix the tyre supply chain and circularity issues

What's needed and who is responsible	What circularity constraints are addressed
<b>IMPLEMENT A MANDATORY PARTICIPATION SCHEME</b>  Responsibility to implement: Federal Government or relevant jurisdiction agency (if legislated)	'Free-riding' tyre importers avoid paying Scheme levy, get the benefits of the Scheme and gain a financial advantage. 47% of replacement and 99% of fitted imports are not levied. Rogue collectors undercut accredited collections resulting in illegal dumping and significant community, environmental and financial impacts.
	Australia recycles just 17% of used tyres – 40% used in energy recovery applications, 30% onsite burial and landfill. Development of circular end markets is constrained by lack of TDM procurement, over reliance on energy recovery and permitting onsite burial of OTR tyres.
	On-farm dumping and burning of large OTR tyres is common due to collection costs.
	No incentives to design for circular economy.
	Retread industry is under threat from single use tyres.
	EPAs track waste to recovery facilities, but do not track processing outputs or stockpiling.
	Rogue collectors and DIY disposal costs drive dumping, stockpiles and potential fires.
	ADR lags the EU and US (Australia risks being dumping ground).
	We make mining conveyor belts, yet onsite storage of used belts allowed.
	'Parallel imports' and 'free-riders' avoid paying Scheme levy.
<b>IMPROVE SUPPORTING INTERVENTIONS (e.g. ADR, licensing, procurement requirements)</b>  Responsibility to implement: Federal and State Governments/EPAs	Many retailers see little business value in Scheme/ Accreditation while used tyre collection is not incentivised.
	Reverse logistics from mines remains missed opportunity.
	Regional and rural remain high-risk for dumping.
	Landfill often cheapest option in rural and remote areas and low cost, attracting metro volumes.
	'Free' onsite burial at mines – 100,000 t/yr mining tyres permitted when recovery options are available.
	Australia recycles just 17% of used tyres – 40% used in energy recovery applications, 30% onsite burial and landfill. Development of circular end markets is constrained by lack of TDM procurement, over reliance on energy recovery and permitting onsite burial of OTR tyres.
	ADR slow to update, lacks enforcement for replacement tyres.
	EPAs track waste to recovery facilities, but do not track processing outputs or stockpiling.
	Retread industry undermined by lack of ADR enforcement.
	Fleet, mining, agriculture procurement opportunities (including retread) not realised.
<b>IMPROVE THE EXISTING TYRE PRODUCT STEWARDSHIP SCHEME</b>  Responsibility to implement: Tyre Stewardship Australia	Landfill often cheapest option in rural and remote areas and low cost, attracting metro volumes.
	Whole baled tyre export ban lacking enforcement.
	Placed on market fees unchanged in a decade.
	We make mining conveyor belts, yet onsite storage of used belts allowed.
	Fleet, mining, agriculture procurement opportunities (including retread) not realised.
	Landfill often cheapest option in rural and remote areas and low cost, attracting metro volumes.
	Need better info for onshore TDM markets and market risks from TDM imports.
	TPSS Guidelines recovery definitions and KPI needs review.
	TPSS Guidelines for commercial and local government segments needs review.
	TSA collector/recycler suspension periods ineffective.
Foreign End Market Verification program should be applied to all exports.	

### Legend:

ADR: Australian Design Rules  
 EPA: State/Territory Environmental Protection Authorities  
 FEMV: Foreign End Market Verification

OTR: Off-the-road  
 TDM: Tyre-Derived Material  
 TPSS: Tyre Product Stewardship Scheme  
 TSA: Tyre Stewardship Australia

### Criticality Level:

Very High (Red)  
 High (Orange)  
 Medium (Yellow)  
 Low (Grey)

## Appendix G: Australia's Tyre Supply Chain

For best readability, this Appendix should be printed on A3

Figure 1 Australia's tyre supply chain – new tyre design to used tyre recovery

