TyreStewardship AUSTRALIA

Are we there yet?

Australia's journey towards a circular economy on tyres

Material Flow Analysis Report
2023-24

Published June 2025

Disclaimer

This report **(Report)** is made available by Tyre Stewardship Australia Ltd (ACN 164 971 939) (TSA).
By viewing, reading or otherwise using this Report you understand, acknowledge and agree that:

- this Report and the information, calculations, data and case studies included in this Report **(Report Information):**
  i. - is provided for general information purposes only
  ii. - does not take into account any or all of the specific circumstances relevant to you or any other person
  iii. - does not constitute a recommendation by TSA or any other person, and
  iv. - does not constitute any legal, financial or investment advice and is not to be relied upon as, nor to be used as a substitute for, legal, financial or investment advice.
- TSA provides no guarantee that the Report or any Report Information is accurate, current or complete
- to the extent permitted by law, TSA accepts no responsibility or liability for any loss which may be suffered or incurred by any person who acts, or refrains from acting, on or as a result of this Report or any Report Information, and
- unless stated otherwise, copyright in this Report is owned by TSA and no part of this Report may be reproduced or used for commercial purposes without the prior written consent of TSA.

Acknowledgment

Tyre Stewardship Australia acknowledges the Traditional Custodians of the land and waterways on which we live, work, and depend. We acknowledge the unique spiritual and cultural connection, and continuing aspiration that the Traditional Owners have for Country, and we pay respect to Elders, past, present, and emerging.

This report was written and produced by TSA with important contributions from Blue Environment, who reviewed the methodology and validated the resulting data.

blue environment pty ltd

Contents

Executive Summary

About this report

This report examines the lifecycle stages of tyres used in Australia, from when they enter the country to when they meet their end fate. It analyses a wide range of data to present a snapshot of tyre usage across all industries as at the end of financial year 2023-24, capturing information during the reporting period of 2019-20 to 2023-24.

It is intended to provide an objective benchmark every five years to enable all parties involved in the import, use, recycling and regulation of tyres to make informed decisions.

Tyre consumption

Annual consumption

In 2023-24 Australia consumed around 740,000 tonnes of tyres made up of 20 million Passenger tyres, 8.5 million Truck and Bus tyres, and 0.75 million Off-The-Road (OTR) tyres. Roughly five in six tyres entered Australia imported loose, with the remainder imported already fitted to a new vehicle.

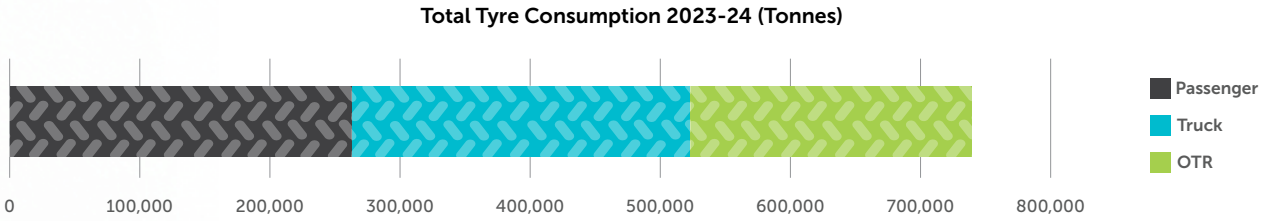


Figure 1

Five year trend

As the population of Australia grows, the import and consumption of tyres is steadily increasing. Although the volume of tyres consumed may fluctuate from year to year, the overall trend is rising, up from an estimated total consumption of 645,000 tonnes in 2019-20 to around 740,000 tonnes in 2023-24.

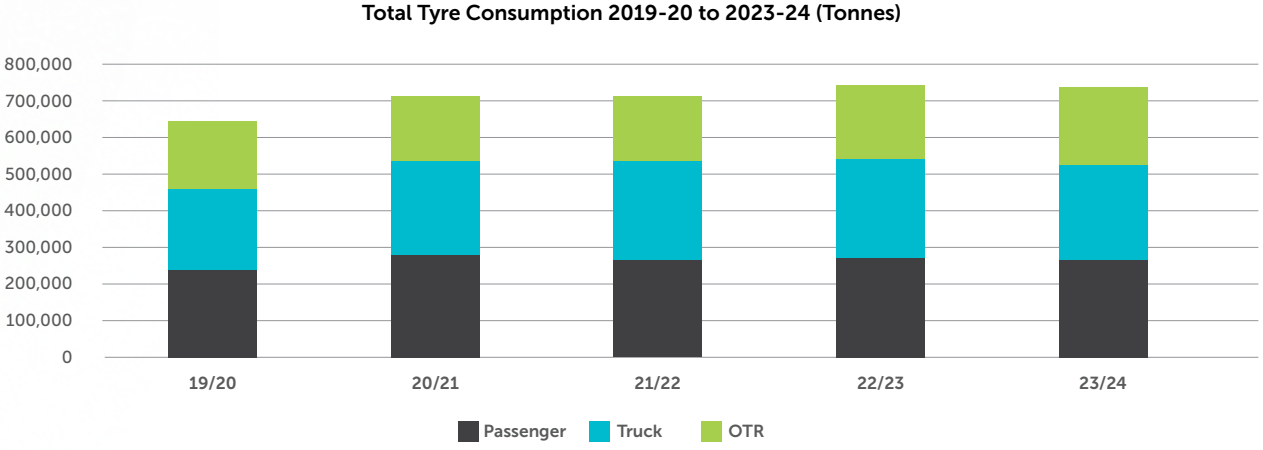


Figure 2

Tyres in use

Australia is the sixth largest country by size and one of the most sparsely populated in the world with more than 100 million tyres in use at any one time, equating to more than two million tonnes.

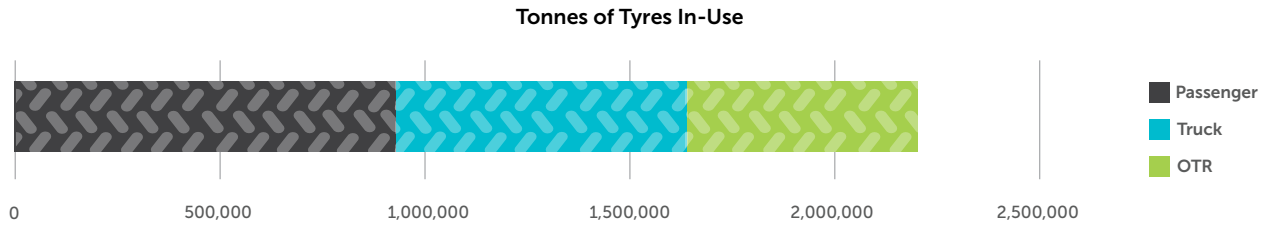


Figure 3

It is currently estimated that around 16% of a tyre's weight will be lost to tyre wear over its lifetime, which equates to around 100,000 tonnes of tyre rubber dispersed to the open environment annually in Australia.

Notably, up to 30% of this tyre wear can be attributed to driver behaviour, and proper tyre design, care and maintenance can prolong a tyre's life significantly.

Used tyre generation

In 2023-24, it was estimated that Australia generated 537,000 tonnes of used tyres, consisting of 190,000 tonnes of Passenger tyres, 192,000 tonnes of Truck and Bus tyres, and 155,000 tonnes of OTR tyres.

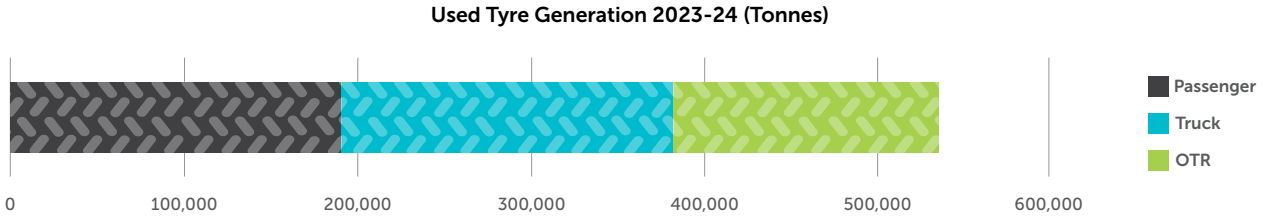


Figure 4

Insights

Consumer choices and Australia's economy have an impact on the types of tyres being bought. For Passenger tyres, consumers are increasingly preferring larger or heavier vehicles. In 2019-20, 1.75 times more SUVs were purchased than passenger cars[1] and by 2023-24, this had increased to over 3.2 times more SUVs than passenger cars.

For OTR tyres, the steps towards managing these tyres is not just related to the number of tyres, but also their size. OTR tyres only account for about 3% of the number of tyres consumed annually, but they represent nearly 30% by weight.

[1] as defined by FCAI vFacts data.

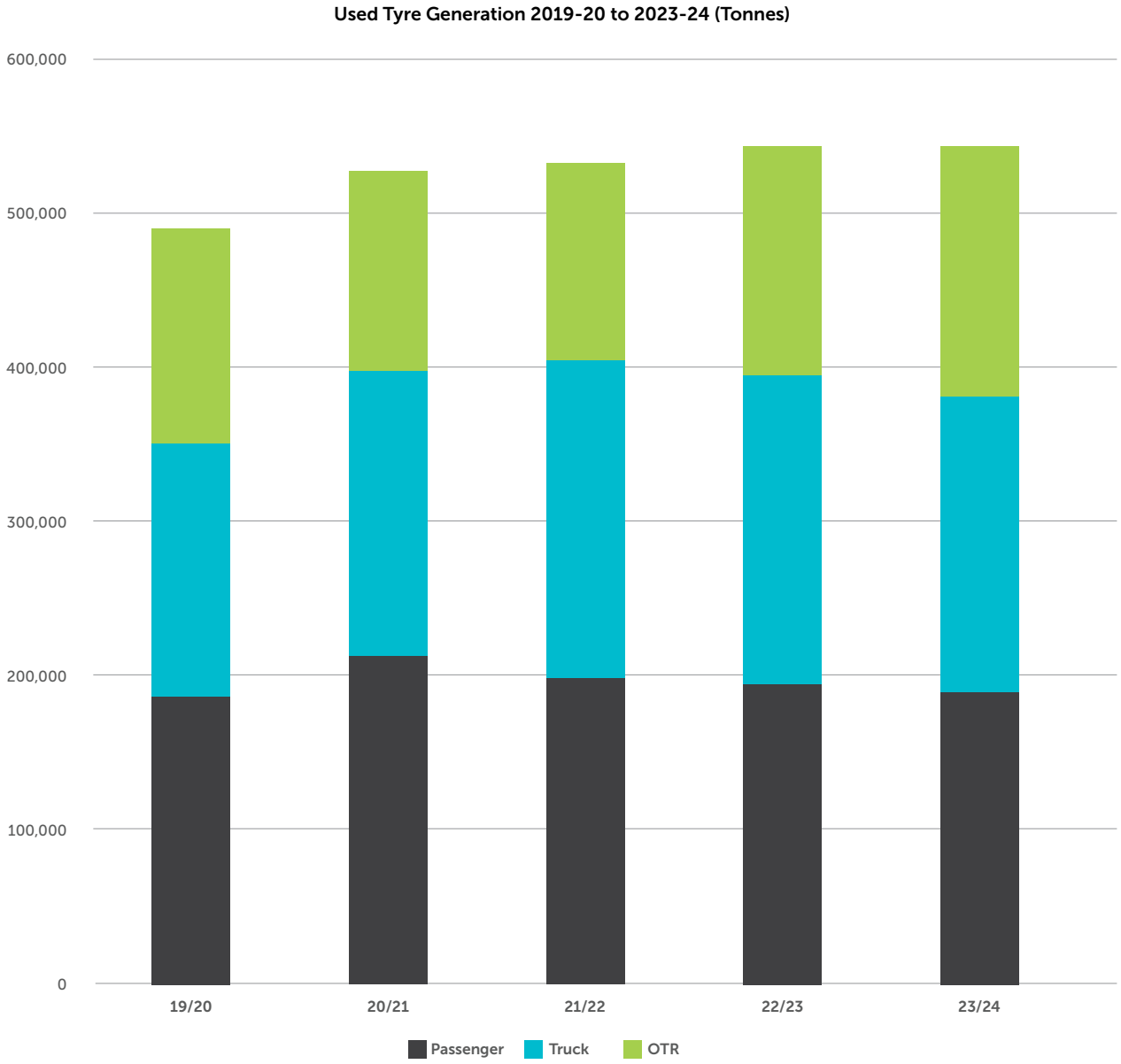


Figure 5

Changes over time

The generation of used tyres has varied from year to year, but it has generally increased over time, rising from approximately 490,000 tonnes in 2019-20 to 537,000 tonnes in 2023-24. This ongoing growth increases the size of the management challenge, meaning that markets for used tyre materials must expand at a rate that outpaces the increase in used tyre generation.

Used tyre management

As depicted in Figure 6, there are both legal and illegal management approaches for used tyres following their generation. The main management pathway and supply chain is for waste tyres generated at tyre retailers to be collected and delivered into the tyre re-processing industry.

At the point of collection, tyres that are deemed suitable can also go back into circulation as a second-hand tyre or be repaired and retreaded (adding a new layer of tread to the tyre), both in Australia and overseas.

General Management Pathways for Used Tyres

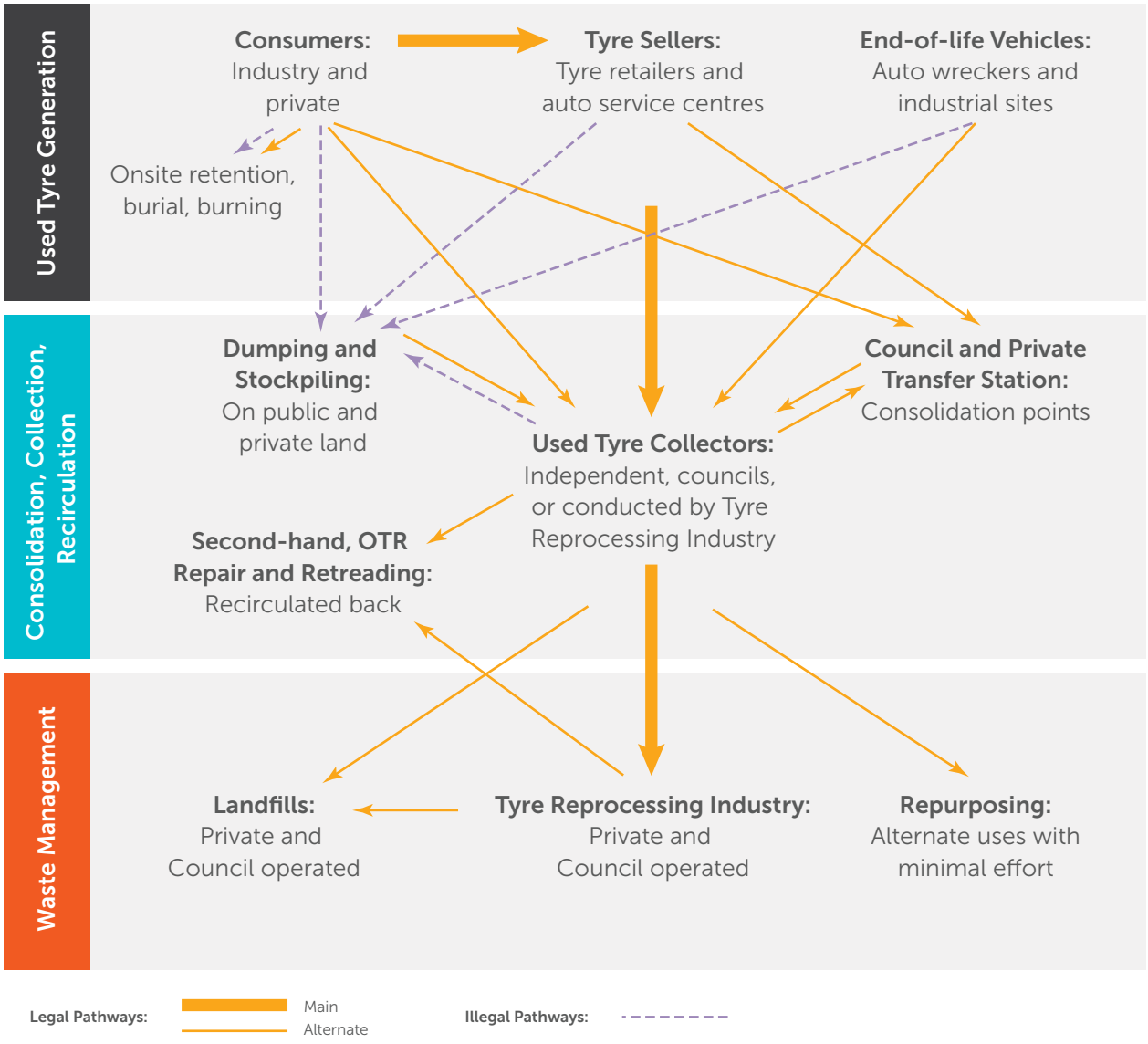


Figure 6

Used tyre fates

Of the 537,000 tonnes of used tyres generated in 2023-24, roughly 353,000 tonnes had their resources recovered, a recovery rate of 66%.

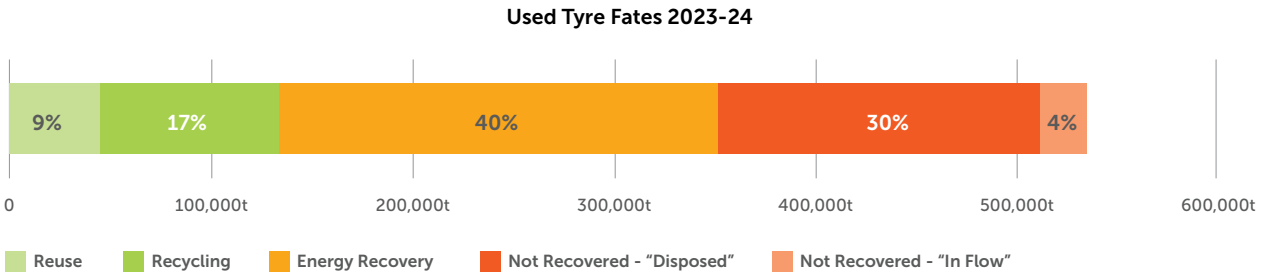


Figure 7

As this report will show recycling rates have been rising, but much of the balance were shredded and exported where most were burnt to produce energy. As a result, only about a quarter (26%) of tyres are contributing to material circular outcomes.

Recovery differences between segments

Recovery of Passenger, Truck and Bus tyres is comparatively strong, with a combined recovery rate of 87% in 2023-24, but only 13% of OTR tyres were recovered, with over 100,000 tonnes estimated to be buried in 2023-24.

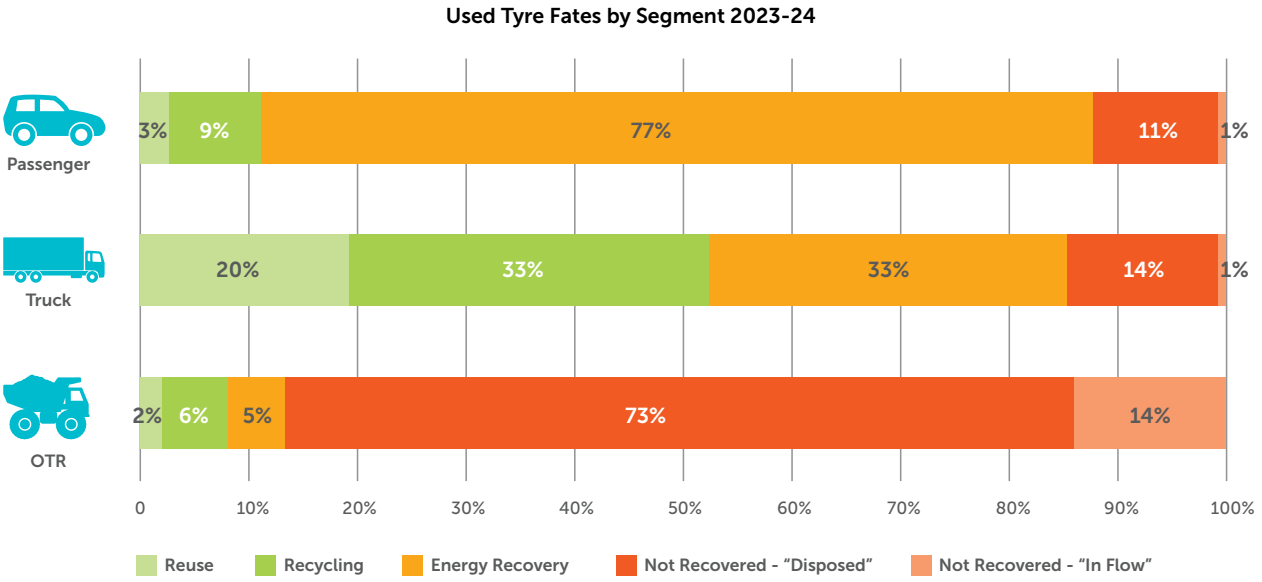


Figure 8

Markets

The international market represents most of the recovery market, at around 265,000 tonnes, meaning 75% of recovered material is exported.

Domestic and International Markets Percentage of Recovered Material by Weight 2023-24

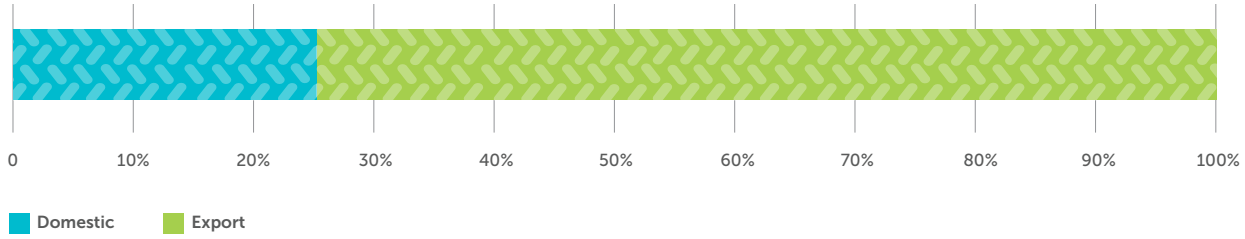


Figure 9

Fate trends

One notable change in the five-year period from 2019-20 to 2023-24 is the increase in the recycling rate, rising from 11% to 17%.

A key factor contributing to this improvement is the growing offshore demand for shredded tyres for further processing and recycling, rather than solely for energy recovery.

Fate Trends 2019-20 to 2023-24

Metric	19/20	20/21	21/22	22/23	23/24
Recovery rate (domestic only)	15%	14%	16%	17%	16%
Recovery rate (domestic & export)	67%	70%	64%	60%	66%
Reuse rate	10%	12%	13%	12%	9%
Recycling rate	11%	9%	11%	17%	17%
Energy recovery rate	46%	48%	40%	32%	40%
Landfill rate	7%	8%	13%	15%	9%

Table 1

Conclusions

Australia consumes roughly three quarters of a million tonnes of tyres every year, and this is increasing with the population. There are seven fates for end-of-life tyres in Australia, but dramatically different recovery rates: while 88% of Passenger tyres are recovered, only 13% of off-the-road tyres are recovered.

There's a clear economic incentive to build a circular economy for the materials, but it requires overcoming barriers such as the ability of mining companies to bury OTR tyres at their mine sites.

Voluntary schemes, legislation and export controls all have a role, as do the economics of supply and demand, but to create a circular economy for all types of tyres we need to make used tyre recovery a viable industry with a clear profit pathway.

This report makes it clear that we are wasting many thousands of tonnes of valuable materials each year. We need to find ways to extend tyre life and improve recovery rates, and we need to act now.

The lifecycle of tyres in Australia

This shows the flow of tyres through the Australian economy for aggregate Passenger, Truck & Bus, and OTR tyres.

The Lifecycle of All Tyres in Australia 2023-24

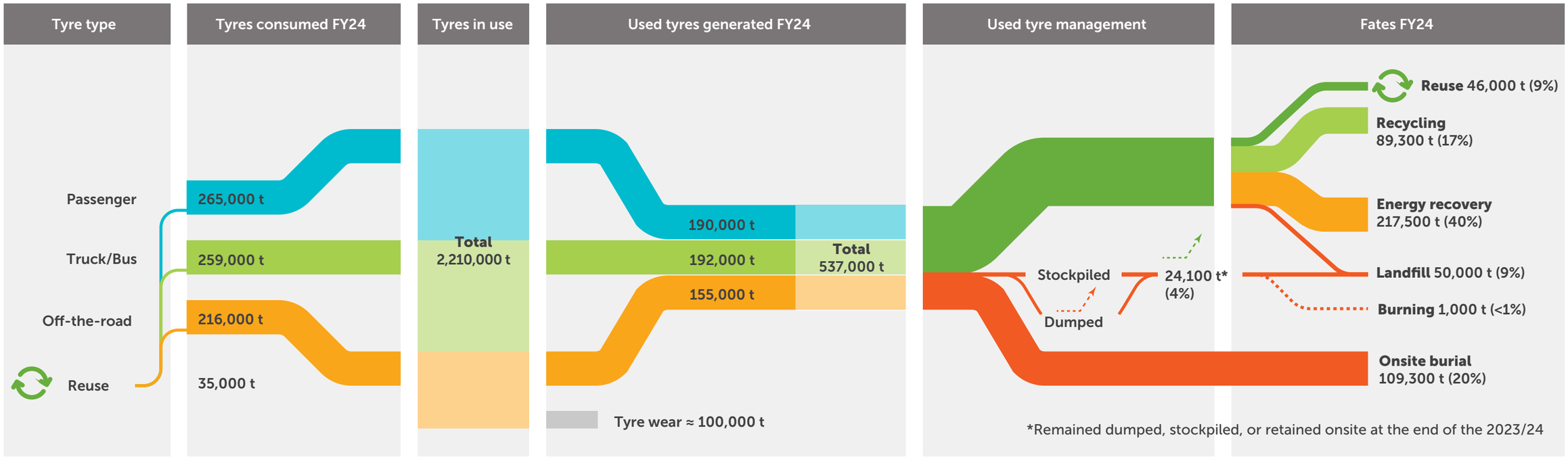


Figure 10

The Lifecycle of Passenger Tyres in Australia 2023-24

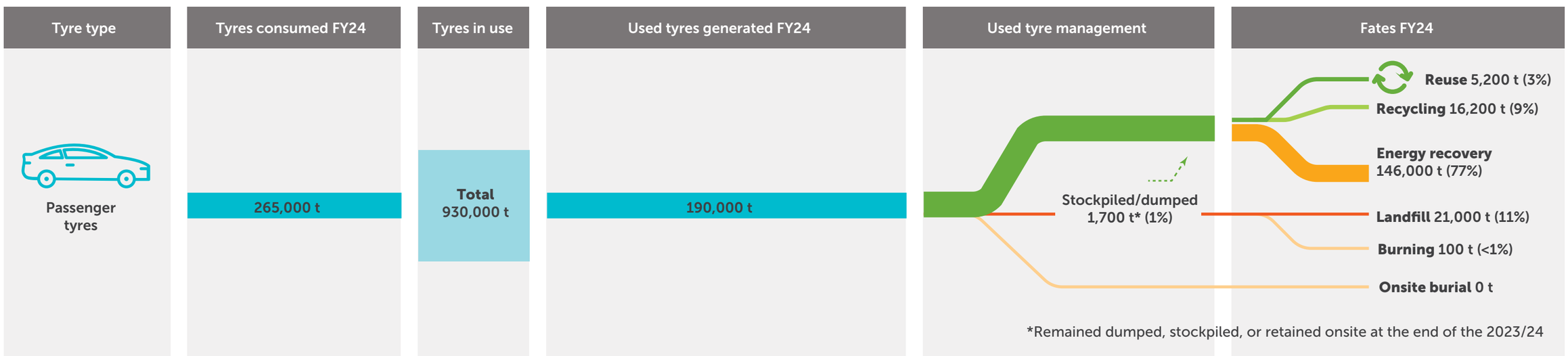


Figure 11

The Lifecycle of Truck and Bus Tyres in Australia 2023-24

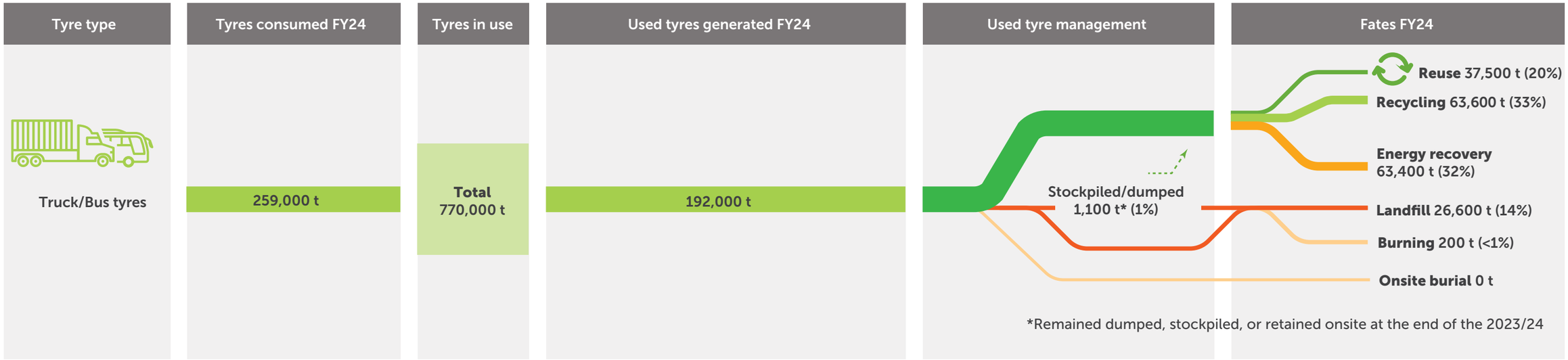


Figure 12

The Lifecycle of OTR Tyres in Australia 2023-24

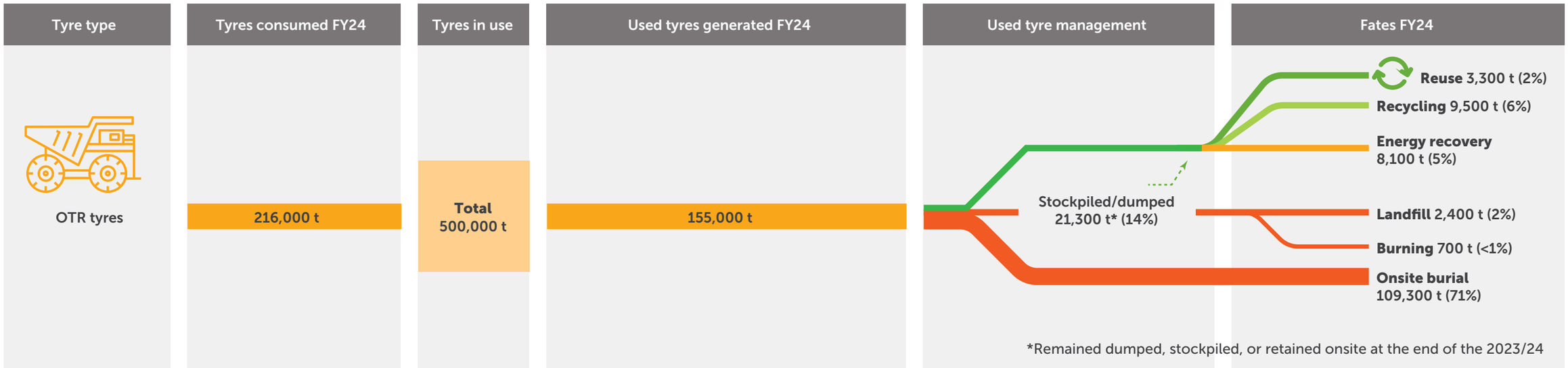


Figure 13

Section 1

Introduction

Purpose

This report takes a detailed look at the flow of tyres (and tyre-derived material) through the Australian economy.

It's intended to be the benchmark for tyre data, a foundation that industry and governments can rely on when making decisions about investment or regulation.

With this objective in mind, the report aims to answer the question: "Australia consumes roughly three quarters of a million tonnes of new and reused tyres each year: where do they all go?"

How to read this report

This report is TSA's summary of the lifecycle of tyres in Australia, with a deep dive on the 'end fates' of tyres. The report's emphasis is on circularity, that is, productive market uses for the recycled rubber and other materials contained in used tyres.

It aims to share the data, offer objective insights[2] and provide resources without stating opinions or taking positions.

The report has been designed to be read either in whole, or by chapter. The five main sections are:

- **Section One** – this introduction
- **Section Two** – explains the lifecycle of tyres once they enter Australia, from the number and tonnes of tyres entering Australia, and how they're used
- **Section Three** – gives an overview of the end fates and a detailed discussion of each end fate
- **Section Four** – draws some conclusions about the current and future state
- **Appendices** – data method, references, glossary and other appendices.

Readers primarily interested in the underlying data can refer to the accompanying *Material Flow Analysis Data Pack* (TSA, 2025) (the 'Data Pack'). For a detailed explanation of the modelling approach, assumptions, and definitions used throughout this report, see the *Tyre Supply Chain Fate Analysis – Method Report* (TSA, 2025) (the 'Method Report').

Frequency

Tyre Stewardship Australia (TSA) produces this report every five years to establish a data benchmark for the flow of tyres (and tyre-derived material) in Australia.

Methodology and data

Building on the previous 2020 edition (REC, 2020), the report is produced from TSA's material flow analysis (MFA) model. The model pulls information from multiple sources to produce estimated data on the lifecycle of a tyre once it enters Australia.

In partnership with Blue Environment, Tyre Stewardship Australia has made every effort to ensure the accuracy and completeness of the data in this report. If you have any queries about the numbers, please contact us.

Data used in this report is presented in the Appendices section. For additional data, including for each state and territory, please consult TSA's Data Pack.[3]

[2] For readers that are interested in TSA's policy positions please refer to the resources section of our website.
[3] TSA (Tyre Stewardship Australia), 2025. *Material Flow Analysis Data Pack* [Data set].

Peer review

The model was peer reviewed and updated by Blue Environment; a leading consultancy specialised in using data to support sustainability. As part of this process, Blue Environment produced a Methodology Report[4] that explains TSA's material flow analysis model.

To maintain consistency when comparing data over time, the updates to the model were backdated to 2018-19, and so numbers within this report may differ slightly from previously reported values.

To avoid doubt, the values in this report supersede previously reported numbers and will form the basis for future annual, five-year block reporting.

Scope

Tyres are a familiar, globally produced and traded product integral to our daily lives. They enable our economy, shape Australia's outdoor way of life, and influence vehicle safety, fuel efficiency and emissions. Tyres are also a persistent waste and pollution issue that requires ongoing deliberate management to reduce harm when they are in use, and to extract value from once they become used tyres.

Lifecycle phases

Tyres go through three lifecycle phases:

1. **Design and production:** materials, design, manufacturing.
2. **Consumption:** use, reuse, repair.
3. **Post-consumption:** recycling, energy recovery, and disposal.

The challenge is to make tyres as sustainable as possible at all three stages.

This is difficult. While the core elements in all tyres are natural and synthetic rubber, steel and carbon black, tyres are complex, highly engineered products whose composition and size differ greatly depending on their use (see Appendix 1).

Making the most of the resources in end-of-life tyres, particularly the rubber compounds, is the immediate focus in Australia.

Segments

This report follows the journey of the three tyre segments:

- **Passenger:** small and large Passenger tyres including motorcycle, car and SUV tyres
- **Truck and Bus:** light and heavy-duty Truck and Bus tyres
- **Off-the-road (OTR):** tyres (often very large ones) used in industries such as mining, agriculture, construction, manufacturing and aviation.

Each of these three segments have different journeys, and the report discusses the material flow of each.

The report examines the fates of these tyres for the five financial years between 2019-2020 and 2023-2024, as they enter Australia, become used tyres, and are reused or reach their end-of-life end fate.

Note: in places in this report we refer to 'automotive' tyres in general, meaning all tyres that are not OTR.

[4] TSA (Tyre Stewardship Australia), 2025. *Tyre Supply Chain Fate Analysis – Method Report* [Technical report].

About Tyre Product Stewardship Australia (TSA)

Tyre Stewardship Australia (TSA) was established in 2014 to implement the voluntary National Tyre Product Stewardship Scheme (the Scheme) and promote the development of viable markets for end-of-life tyres in Australia.

As tyre stewards for over a decade, Tyre Stewardship Australia (TSA) has published reports and policy submissions to help government and industry achieve progress.

TSA compiles this Report as an important part of its product stewardship role. It is not an assessment of TSA or performance of the Scheme.

TSA's Strategic Pillars

TSA bases its work on five pillars that focus on promoting a circular economy:

- **Advocate for better:** Advocate for higher order outcomes for used tyres for the benefit of Australia
- **Build markets:** Be a catalyst for innovation, commercialisation, and growth of higher value solutions, and maximise the use of locally sourced tyre-derived material
- **Influence behaviour:** Reach, engage and support stakeholders about their role and responsibility in maximising the circular value of the resources in used tyres
- **Informed decision making:** Facilitate the creation and delivery of trusted information to support decision-making that drives the circular economy for used tyres
- **Business excellence:** Drive for excellence in our operations and governance.

About the Stewardship Scheme

The Australian Tyre Product Stewardship Scheme (the Scheme) is a national, Australian Government accredited, Australian Competition and Consumer Commission (ACCC) authorised[5], voluntary product stewardship scheme, launched in 2014.

The Scheme was re-authorised by the ACCC on 2 September 2024 for a further period of three years to 2 September 2027.

The Scheme includes both automotive (Passenger, Bus, and Truck) and off-the-road (mining, agriculture, industrial) tyres.

[5] TSA/ACCC

Contributions

Tyre importers and distributors, as well as vehicle importers and distributors who voluntarily participate in the Scheme, contribute $0.25c per equivalent passenger unit (EPU) on every Passenger, Bus and Truck tyre they sell in Australia.

For off-the-road tyres, a levy is applied based on the type of tyre and rim size, capped at a maximum of $50 per tyre.

Participants

The Scheme has over 1,700 participants across the tyre supply chain, including tyre retailers, used tyre collectors, recyclers, fleet managers and local councils.

This creates a network of industry entities working together and contributing to the responsible management of end-of-life tyres to achieve sustainable outcomes. This includes by providing data that is used in this Report.

Companies Contributing Financially to the Tyre Product Stewardship Scheme, 2023-24

ASCENSO never stop rising
BEARCAT TYRES · WHEELS · RUBBER TRACKS
BRIDGESTONE
BRIDGESTONE Solutions for your journey
Continental
GETAGRIP
GOODYEAR
HANKOOK driving emotion
KALTIRE
KUMHO TYRES
Mercedes-Benz
MICHELIN
PIRELLI
PORSCHE
TOYO TIRES
YOKOHAMA

Figure 14

How the Scheme works

Participating in product stewardship means any part of the supply chain can contribute to positive outcomes for waste tyres.

Figure 15 shows how the supply chain is participating within the Tyre Product Stewardship Scheme.

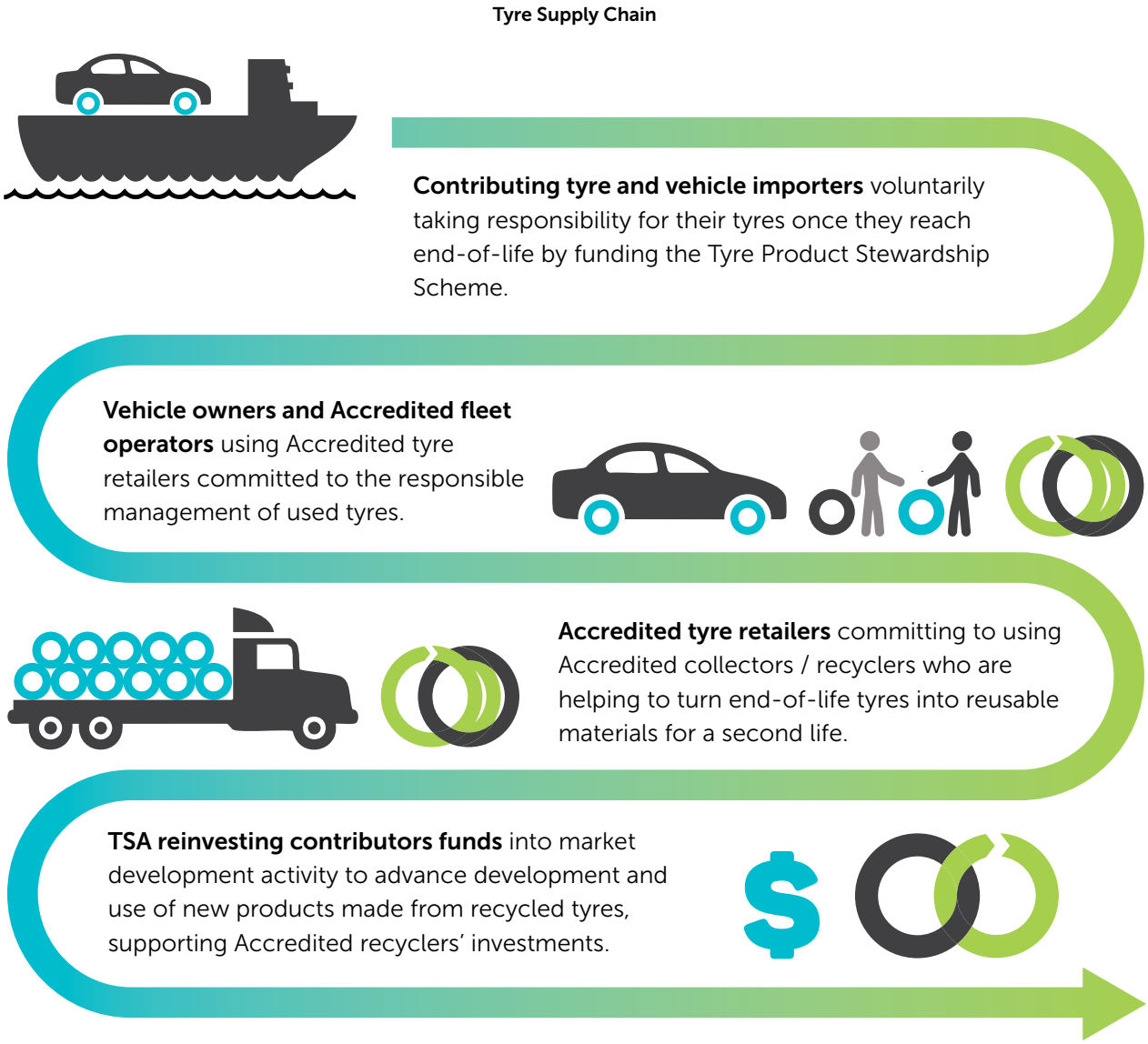


Figure 15

Policy goals

Australia's sustainability and economic development effort on tyres is occurring in the context of two primary global goals: transition towards a more circular economy and net zero emissions.

The Australian Government, along with state and territory governments, has introduced a range of policies to help achieve both policy goals, and tyre management can play a significant and beneficial role.

This Report touches on both policy goals where relevant.

The concept of a 'circular economy' looks beyond the current 'take-make-waste' extractive industrial model to redefine growth, focusing on positive society-wide benefits. It entails gradually de-coupling economic activity from the consumption of finite resources.

The circular economy is based on three principles[6]:

- design out waste and pollution
- keep products and materials in use for as long as possible (ideally at their highest and best value)
- regenerate natural systems.

Net zero aims towards an economy where the output of carbon emissions from human activities is 100% offset by measures to remove carbon dioxide from the atmosphere through natural or technological processes. Scientists worldwide have called for the need to achieve a net zero state by 2050 to avoid catastrophic and potentially permanent climate change.

[6] Ellen MacArthur Foundation, 2024

Section 2

Lifecycle stages

Stage 1 - Import and consumption

Tyre consumption 2023-24

In 2023-24 Australia consumed an estimated 740,000 tonnes of new and reused tyres.

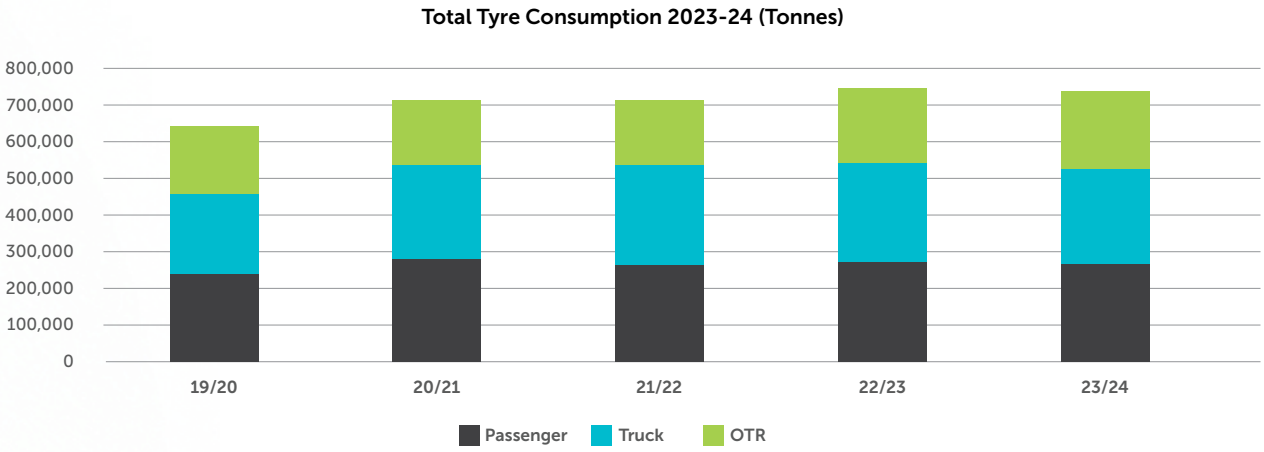


Figure 16

The largest portion of this consumption was the importing of 705,000 tonnes of new tyres, with 35,000 tonnes of reused - second-hand and retreaded - tyres consumed.

Passenger tyres made up around 36% of consumption by weight, closely followed by Truck and Bus tyres at 35%, with Off-the-Road tyres making up 29%:

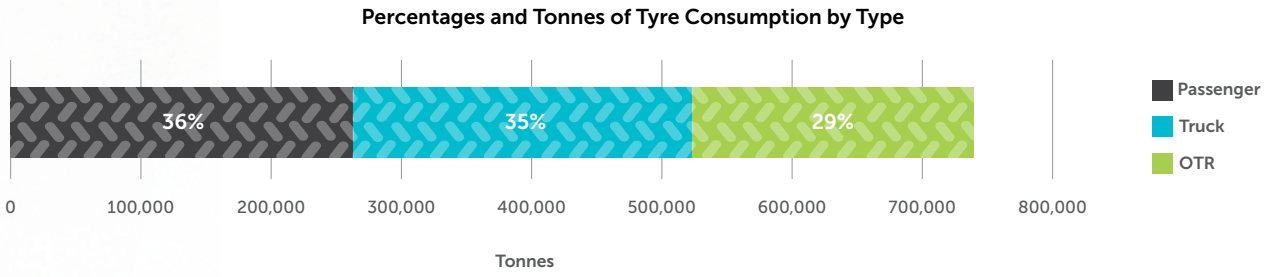


Figure 17

Although fluctuating year on year, the volume of tyres purchased continues to grow over time, up from an estimated total consumption of 645,000 tonnes in 2019-20.

A unit of measure for the material flow of tyres is the Equivalent Passenger Unit (EPU), which is a standard measurement for a Passenger car tyre.

The standardised weight of an EPU for a new standard Passenger car tyre is 9.5 kg, while the standardised weight of a used EPU is 8 kg.

Therefore, 740,000 tonnes of new and reused tyres equates to 77.9 million EPUs.

When it comes to the actual number of tyres consumed though, in 2023-24, there were around 20 million Passenger tyres, 8.5 million Truck and Bus tyres, and only 0.75 million Off-the-Road tyres.

New tyres

With the last local tyre manufacturer shutting its doors in 2010, Australia now imports all its new tyres: 74 million EPU in 2023-24 (see Table 2).

Of these, roughly five in six tyres enter Australia loose in containers. The remainder come in already attached to new vehicles.

Australia now imports all its new tyres:
74 million EPU in 2023-24

Tyres Imported (by Tonnes and EPU)

Year	Total (Tonnes)	Total (EPU)
2019-20	615,000	65 million
2020-21	678,000	71.5 million
2021-22	679,000	71.5 million
2022-23	707,000	74.5 million
2023-24	705,000	74 million

Table 2

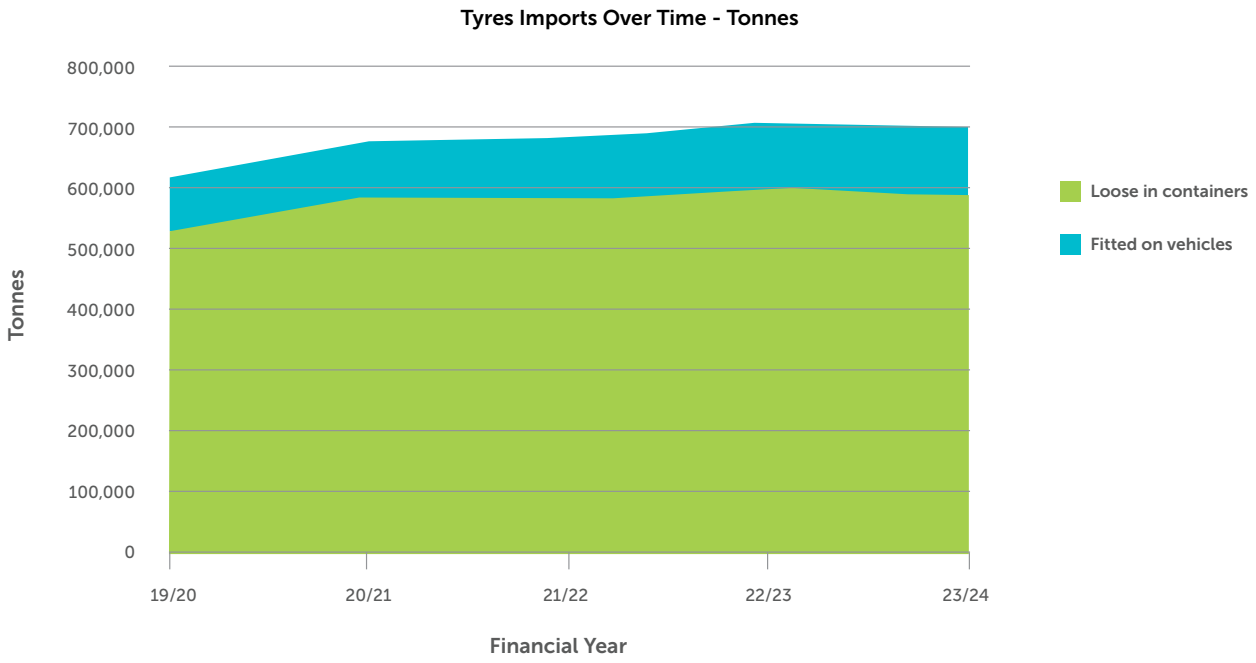
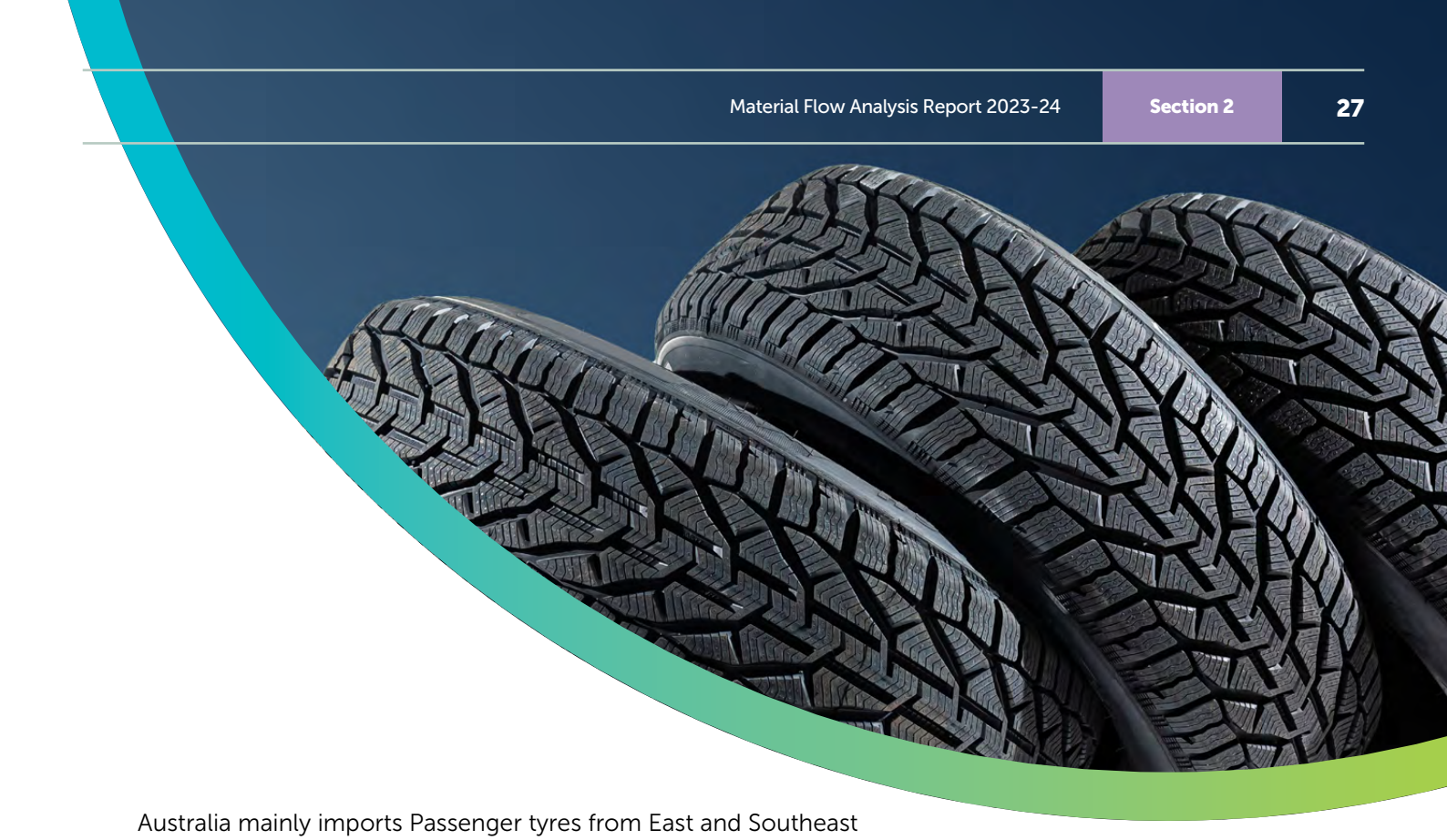


Figure 18

As a trend, over the past five years, new tyre imports have grown by an estimated 15% by weight or 7% by number of tyres.



Australia mainly imports Passenger tyres from East and Southeast Asia. The top import sources for Passenger tyres over the last 10 years were China, Thailand, Japan, Indonesia and South Korea (see Figure 19).

New, loose OTR tyres mainly come from Japan and China, but also from the USA, Spain and India (see Figure 19).

Percent Share of Loose Passenger and OTR Tyre Imports by Top 5 Importers (Over 10 Year Period)

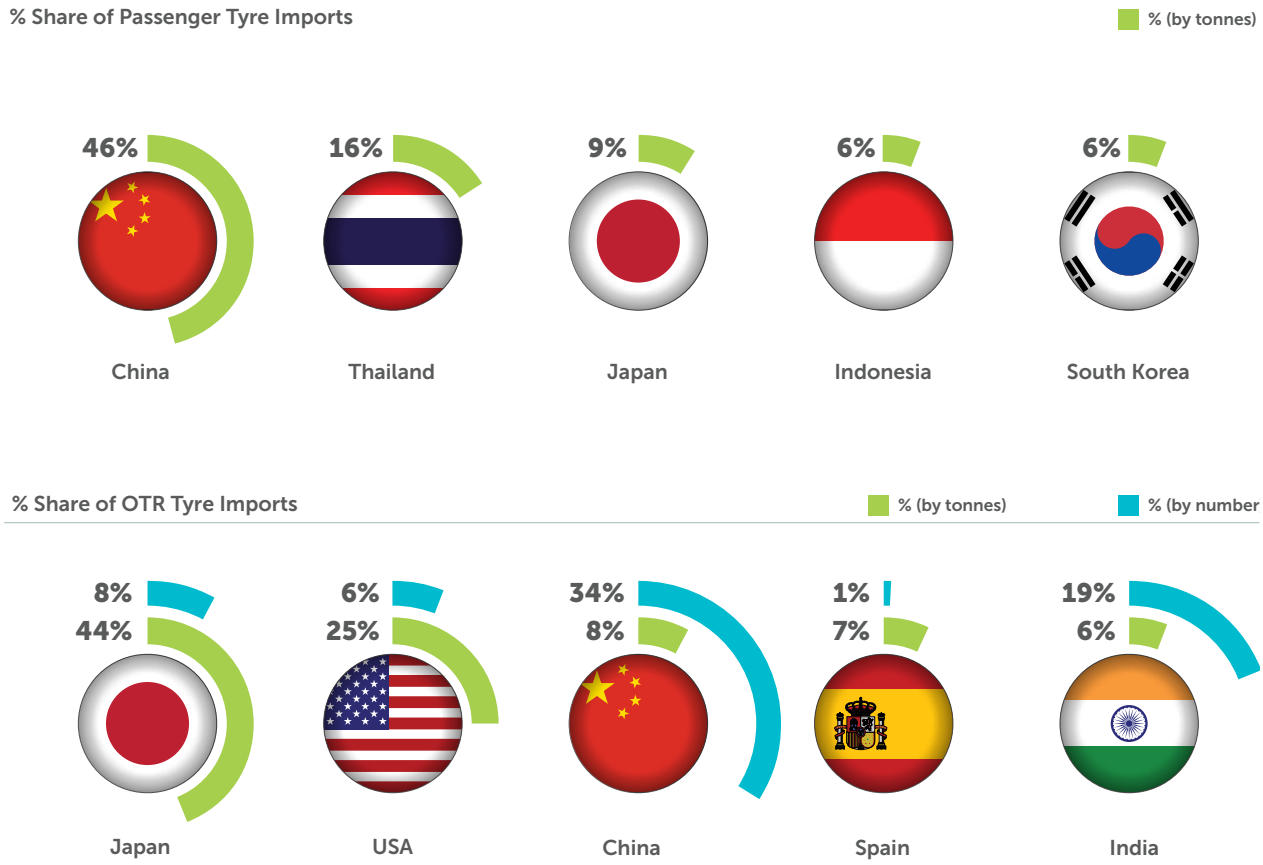


Figure 19

Over the past five years, Toyota has been the largest importer of tyres attached to vehicles:

Top 5 Importers Over Last 5 Years (FCAI, 2019-2024)

% Share of Automotive Vehicle Imports (by number of vehicles)

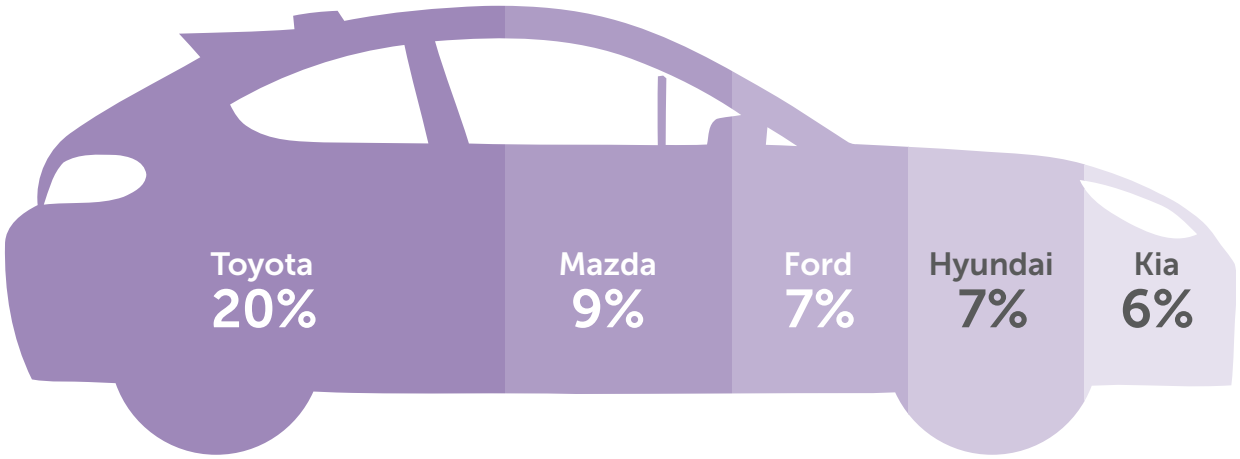


Figure 20

Tyre sizes – the increasing weight of Passenger tyres

Passenger tyre consumers are increasingly preferring larger and/or heavier vehicles.

In 2019-20, 1.75 times more SUVs were bought than passenger cars. By 2023-24, this had increased to over 3.2 times.

This change is accompanied by the growth in sale of electrical vehicles (EVs), which are generally heavier, due to the battery, than internal combustion engine (ICE) equivalents.

Larger, heavier vehicles need heavier tyres, increasing the materials needed, as well as the total weight of used tyres generated.

The average weight of an imported Passenger tyre has increased from just under 13.25kg between July 2014 and June 2017 to just under 13.6kg between July 2021 and June 2024.

Tyre sizes – large OTR tyres

Although OTR tyres account for only around 3% of the total number of tyres consumed annually, they represent nearly a third of the total tyre weight.

This is driven by the significant weight of mining dump truck tyres, which can weigh up to five tonnes each.

Stage 2 - Tyres in use

Tyres are used on the 21 million registered road vehicles and 4.7 million caravans, trailers and plant and equipment[7] until they reach the end of their working life.

This means there are more than 100 million tyres being used at any one time on our roads, or on vehicles and plant used in off-the-road industries such as mining and agriculture.

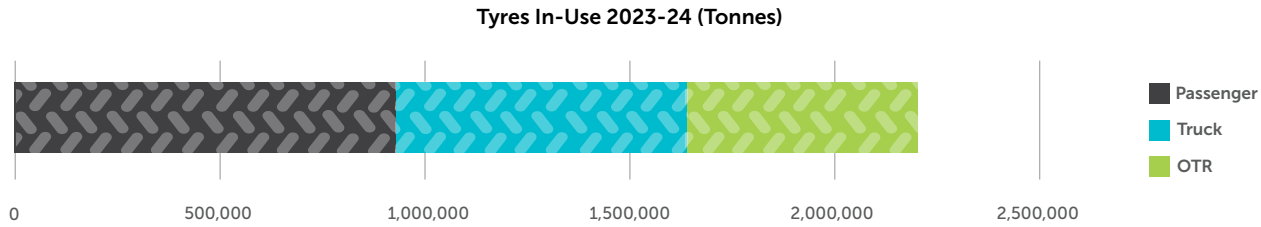


Figure 21

In 2023-24, this equated to 2,210,000 tonnes of tyres in use, an increase from 1,940,000 tonnes in 2019-20.

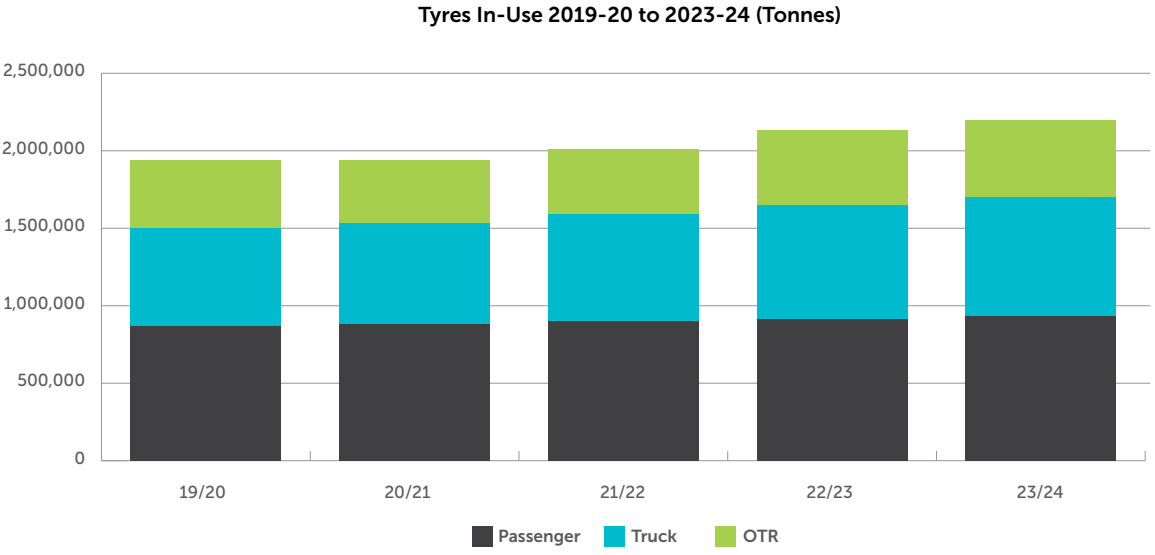


Figure 22

Passenger tyre trends

In Australia, there is just over one passenger vehicle for every two people[8], a ratio which has remained relatively consistent over the last five years. This means that the volume of Passenger tyres in use at any time is strongly related to Australia's population.

The total tonnes of Passenger tyres in use increased steadily from 870,000 tonnes in 2019-20 to 930,000 tonnes in 2023-24, reflecting a 6.9% rise. During the same period, Australia's population grew by 7.3%, according to ABS data.

[7] Bureau of Infrastructure and Transport Research Economics (BITRE), 2024.

[8] The number of registered passenger vehicles per 1,000 persons in 2024 was 582.2 – (BITRE, 2024)

Truck and Bus tyre trends

The growth in Truck and Bus tyre usage has outpaced that of Passenger tyres over the last five years. In 2019-20, around 630,000 tonnes of Truck and Bus tyres were in use, which surged to 770,000 tonnes in 2023-24, an increase of 22.2%. This was driven by a 19.1% increase in truck registrations over this time.

OTR tyre trends

The volume of OTR tyres in use also grew, from 440,000 tonnes in 2019-20 to 500,000 tonnes in 2023-24. These figures fluctuate from year-to-year though, which could have been influenced by factors such as the COVID-19 pandemic and the opening and closing of mining operations during the analysis period due to industry volatility.

Prolonging a tyre's life-in-use

Tyre wear

A major principle of a circular economy is to maximise the life of products. In the case of tyres, extending their longevity can both delay end-of-life tyre management, and lessen the environmental demands of producing new tyres.

One way to extend a tyre's life is by reducing tyre wear from the abrasion caused by the friction between a tyre and the road surface. This friction is an essential aspect to ensure safe traction during variable conditions and driving behaviour, but it produces micro-sized 'tyre and road wear particles' that are released into the environment. Higher abrasion resistance slows the rate of tyre wear, increasing tyre longevity.

It is currently estimated that around 16% of a tyre's weight will be lost to tyre wear over its lifetime.

This equates to around 100,000 tonnes of tyre rubber dispersed to the open environment annually in Australia. Notably, tyre and road wear particles account for approximately 44% of microplastic pollution released into the oceans worldwide[9].

TSA's *Tyre Particle, Health, Environment and Safety Report* provides more detail about tyre wear and impacts.[10]

Automotive tyre wear

Globally, industry bodies are taking action to measure and limit tyre abrasion and incoming Euro 7 regulations propose to include validated performance requirements for tyre abrasion.[11]

Improvements in abrasion resistance can be achieved through tyre design changes to the structure of the tyre and tread pattern, or changes to the rubber compounding materials.

As well as design features, research undertaken by the Organisation for Economic Co-operation and Development indicates that up to 30% of tyre wear could be attributed to driving behaviour, in particular speed and acceleration behaviour.

Finally, tyre care also has a role to play in extending tyre life and reducing wear rate.

[9] (Boucher & Friot, 2017).

[10] TSA (Tyre Stewardship Australia), 2022. *Tyre Particle Health, Environment and Safety Report*.

[11] For example, tyre wear is proposed to be inversely proportional to tyre diameter and width (Non-exhaust Particulate Emissions from Road Transport | OECD).

For automotive tyres, tyre use factors that influence wear include:

- pressure
- alignment
- rotation
- balance
- checking tread.

You can find more details on each of these factors and how to manage them to maximise tyre lifespan in TSA's *Tyre Care Tips* document.[12]

Off-the-road tyre wear

For OTR tyres, many of the same factors apply, but there are other complications due to the difficult working environments they are exposed to.

- Specific mechanisms for extending the life of OTR products are discussed in TSA's *Tipping the Balance Report*.[13]

Tyre repair

Tyre repair involves addressing damage like punctures and cuts, to extend the useful life and avoid premature replacement. Repair methods include patching or plugging for small punctures, section repairs, and vulcanisation to restore airtightness. Tyre repair is guided by the Tyre and Rim Association of Australia Standards Manual.[14]

Case study – OTR tyre repair

Repairing partly worn but damaged mining tyres is common in Australia. This service is available through dedicated repair providers, such as Tyre Doctor and Bridgestone Mining Solutions Australia (BMSA) which has six mining OTR tyre repair service centres.

Due to the high cost of new mining tyres (around $40,000 to $50,000 for a large mining tyre) there is a strong financial driver to repair mining tyres where significant tread remains.

Apart from repair, some mine operators put chains around worn tyres to get more life out of the tyre before disposal.

Image credit: Bridgestone Mining Solutions Australia

[12] TSA (Tyre Stewardship Australia), 2024. *Tyre Care Tips*.
[13] TSA (Tyre Stewardship Australia), 2023. *Tipping the balance: Research report*.
[14] TRAA, 2023

Stage 3 - Used tyres

Generation

'Used' and 'end-of-life' tyres are terms that are often used interchangeably, but there is a distinction between the two based on the decision to extend the life of the 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 as a retread or second-hand tyre
- convert it to an end-of-life tyre if the owner decides they can't or won't extend its life by reusing it.

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

Overview

In 2023-24, Australia generated around 537,000 tonnes of used tyres.

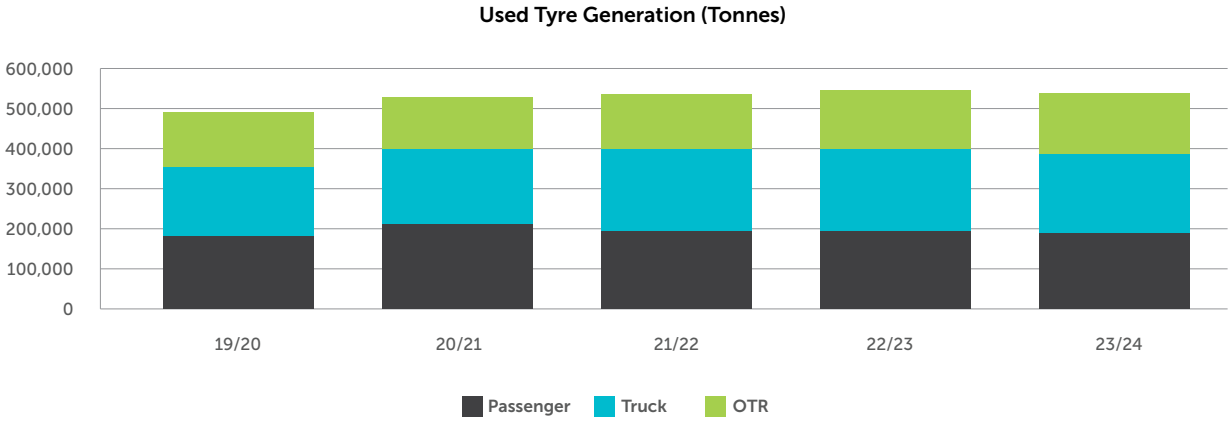


Figure 23

This consisted of 190,000 tonnes of Passenger tyres, 192,000 tonnes of Truck and Bus tyres, and 155,000 tonnes of OTR tyres (see Figure 24).

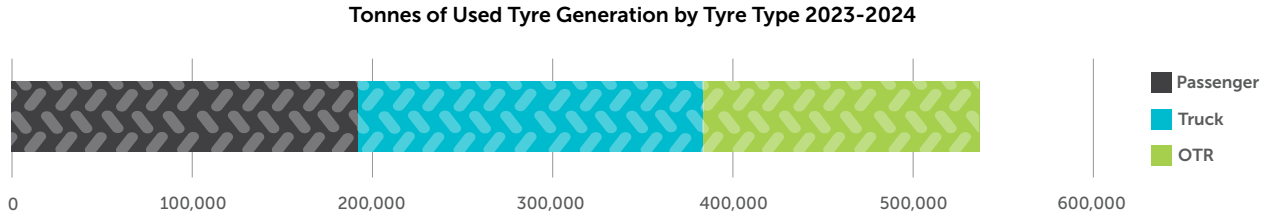


Figure 24

While the generation of used tyres has varied from year to year, it has generally increased over time, rising from approximately 490,000 tonnes in 2019-20 (see figure above).

This ongoing growth in generation increases the size of the used tyre material management challenge: it's not enough for resource recovery markets to simply grow; to create a sustainable outcome for a greater proportion of used tyres they must expand at a rate that outpaces the increase in used tyre generation.

Used tyre generation by jurisdiction

Used tyre generation varies widely across Australian jurisdictions, largely due to the differences in relative populations.

The other main differentiating factor is the tonnes of OTR tyres generated, which mainly depends on the level of mining activity (and to a lesser extent agricultural activity).

For total used tyre generation:

- New South Wales and Queensland both generated around 140,000 tonnes of used tyres, with large populations and significant mining and agricultural activity
- Victoria and Western Australia both generated just over 100,000 tonnes. For WA this mainly consisted of OTR tyres, while Victoria's generation was predominantly made up of Passenger, Truck and Bus tyres, driven by its large population.
- South Australia, Tasmania, the Northern Territory, South Australia, and the Australian Capital Territory followed, generating an estimated 33,500 tonnes, 10,250 tonnes, 6,000 tonnes, and 4,750 tonnes respectively.

Tonnes of Used Tyre Generation by Jurisdiction and Tyre Type 2023-2024

Juris	Passenger	Truck	OTR	Total
NSW	57,500	53,500	30,000	141,000
QLD	40,500	49,500	45,500	135,500
WA	20,500	24,500	60,000	105,000
VIC	48,500	42,000	10,500	101,000
SA	14,500	14,000	4,750	33,500
TAS	4,500	4,750	1,000	10,250
NT	2,000	2,500	1,500	6,000
ACT	2,000	1,500	1,250	4,750
AUS	**190,000**	**192,000**	**155,000**	**537,000**

Table 3

Used tyre generation locations

There are three main locations where used tyre generation will occur:

- where tyres are sold, typically retailers and auto service centres
- where tyres are consumed, typically mining and agricultural sites
- when vehicles and equipment reach their end-of-life.

Generation locations – Passenger tyres

Passenger tyres are typically generated at tyre retailers: businesses or organisations that offer tyres for sale. This includes business types such as tyre service centres, vehicle dealerships, and auto service centres.

In-store

For example, of the roughly 20 million Passenger tyres generated each year, used Passenger tyres are typically generated through an in-store exchange when the customer buys a new tyre. This means that used tyres are mostly generated at the place of business, where they can be consolidated and stored, awaiting collection from a tyre collection business.

Out-of-store

While most Passenger tyres are replaced in-store, there is a growing trend toward businesses such as mobile tyre retailers and internet-based sales, where tyres are transported directly to the consumer's location and fitted on-site. This presents both challenges and opportunities for tyre stewardship, as it requires innovative solutions to ensure that the used tyres are collected.

Additionally, when passenger vehicles reach their end-of-life, they are commonly consolidated at auto wreckers, where tyres are removed from the vehicles and stored before being collected.

In remote areas though, end-of-life cars are sometimes abandoned on roadsides, creating issues because the clean-up costs often rest with resource-constrained local councils.

The role of the Tyre Product Stewardship Scheme

One way tyre retailers can support proper management is by voluntarily participating in the Tyre Product Stewardship Scheme (TPSS) through TSA accreditation. By joining the scheme, retailers make a commitment to responsible tyre disposal and recycling.

My Tyres, My Choice

The *My Tyres, My Choice* campaign is one example of an initiative that can help raise awareness among consumers and businesses about the importance of choosing TSA-accredited retailers.

This campaign encourages consumers to make informed decisions, knowing that they are supporting retailers that comply with the best practices for tyre recycling and disposal.

This also ties into the broader effort to promote circular economy principles, where the life cycle of tyres is maximised, and materials are reused whenever possible.

Generation locations – Truck tyres

Like Passenger tyres, Truck tyres are often generated at a retail location when a customer buys a new replacement tyre.

Truck and Bus tyre replacement also occurs on the consumer’s site, including industrial sites and depots. This is often the case for fleet operators and the broader transport industry.

Generation locations – OTR

TSA’s *Tipping the Balance* report identifies 11 key catchment areas that account for most off-the-road tyre generation. The catchments typically cover major mining operations and agricultural regions, where tyres are disposed of on-site.

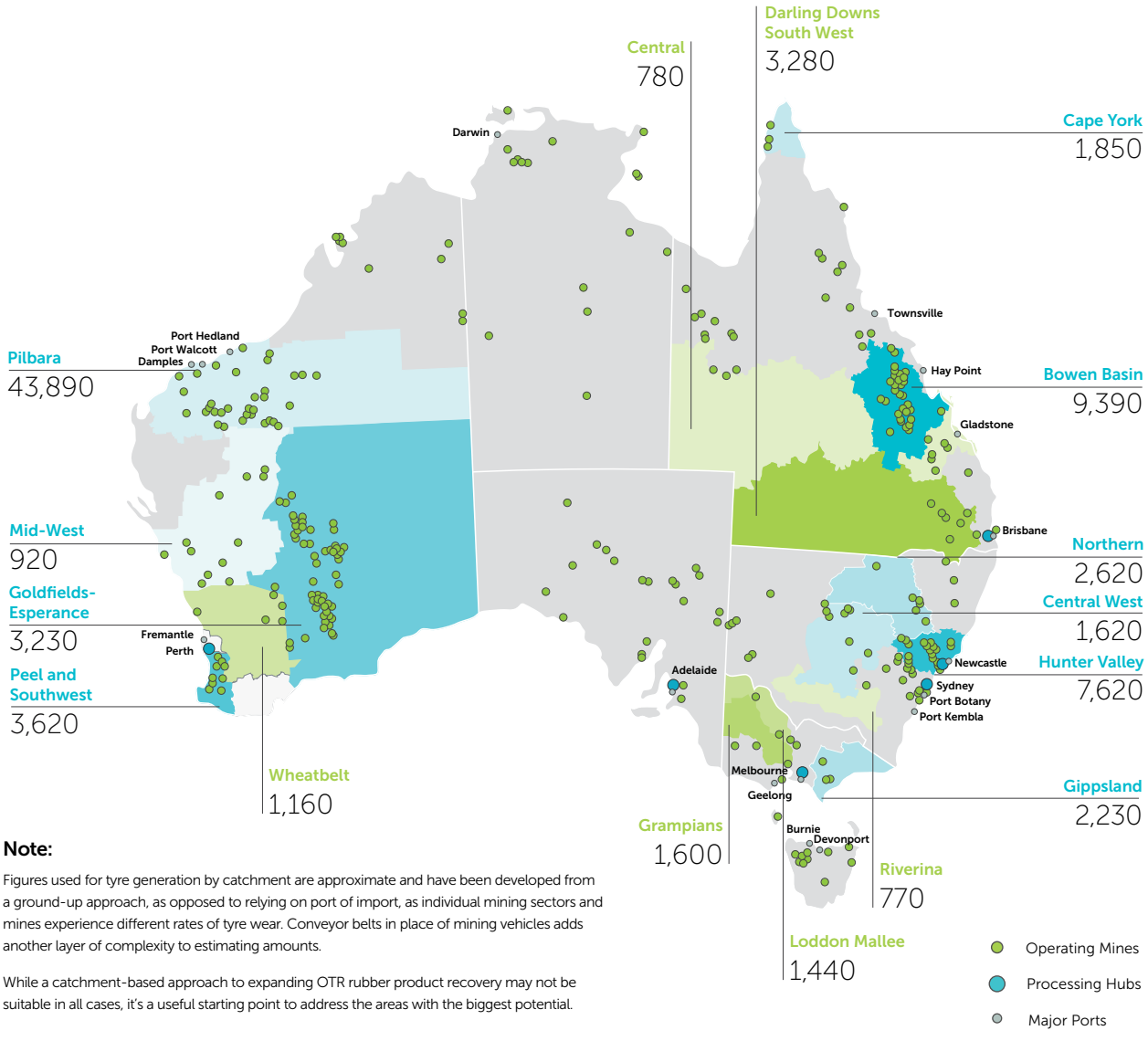
Many of these sites are in some of the country's most remote regions, far from the nearest tyre reprocessing facilities, which makes collection and recycling more difficult.

Annual OTR Generation in Priority Catchments (Source: TSA Tipping the Balance Report)

	Mining	Agriculture	Total OTR tyres (% of Priority Catchments)
Pilbara (WA)	43,890	-	43,890 (49%)
Hunter & Northern (NSW)	10,240	360	10,600 (12%)
Bowen Basin (Qld)	9,390	780	10,170 (11%)
Riverina, Murray & Central West (NSW)	1,620	1,500	3,120 (4%)
Peel, Southwest & lower Wheatbelt (WA)	3,620	1,180	4,800 (5%)
Mid-West & upper Wheatbelt (WA)	920	960	1,880 (2%)
Western Victoria (Vic)	50	3,040	3,090 (3%)
Goldfields-Esperance (WA)	3,230	380	3,610 (4%)
North & Yorke Peninsula (SA)	900	400	1,300 (1%)
Darling Downs & Surat Basin (Qld)	750	3,280	4,030 (5%)
Gippsland (Vic)	2,230	80	2,310 (3%)
			88,800

Table 4

Generation of OTR tyres by catchment (tonnes) (Source: TSA Tipping the Balance Report)



Note:

Figures used for tyre generation by catchment are approximate and have been developed from a ground-up approach, as opposed to relying on port of import, as individual mining sectors and mines experience different rates of tyre wear. Conveyor belts in place of mining vehicles adds another layer of complexity to estimating amounts.

While a catchment-based approach to expanding OTR rubber product recovery may not be suitable in all cases, it's a useful starting point to address the areas with the biggest potential.

Figure 25

Collection and transport

Collection – Passenger

Used Passenger tyres are generally stockpiled at locations selling tyres and collected by a 'tyre collector' who delivers them to their end fate (e.g. a processor). Collection may be regular (e.g. weekly/monthly) or organised on-demand when the location is reaching its legal or logistical storage limits.

Cost

In Australia, used tyre generators, such as tyre retailers, pay a 'disposal' fee to tyre collectors to manage used tyres. The fee varies with the type of tyre and its location, but the average cost at a tyre shop for responsible disposal of a car tyre is $7.60[15]. Tyre collectors pass some of this disposal fee to processors.

Method

A variety of vehicles collect tyres, from utility vehicles to semi-trailers. Large collection trucks often operate on routes, stopping and collecting from multiple retailers along the way as they fill the trailer/cage.

This can cause problems when collecting from rural locations where stores are more isolated. Collectors may be unable to fill their trucks in one pass, which can make it uneconomical until more volume is built up at the retailer, causing storage challenges.

Tyre collection is a labour-intensive task, as tyres typically need to be loaded individually by hand into the truck.

This task can be made more difficult at retail sites based on:

- disorganised or unclean storage
- hard-to-access storage locations
- dirty tyres.

Storage

Tyre storage regulations, which vary from state to state, limit the number of used tyres that can be stored without a waste storage licence (see TSA's *Best Practice Guidelines for Tyre Storage and Fire and Emergency Preparedness* for details).[16]

Without a waste storage licence, tyre retailers are subject to these storage limits. If they can't organise consistent collections, they risk breaching regulations, which can result in penalties.

Similarly, illegally dumped and stockpiled tyres require collection at locations outside the tyre retail supply chain.

Collection – Truck and Bus

The situation for Truck and Bus tyres is much the same. Truck and Bus tyres are more likely to be generated outside the retailer collection chain, at industrial sites and depots, but these sites are often accessible areas so collection is not significantly harder.

At the point of collection, Truck and Bus tyres are often visually inspected to determine whether the tyre is fit for second-hand sale, or for retreading.

[15] Blue Environment, 2024. *Stockpiling and illegal dumping of tyres: Cost to local governments and others.* Prepared for TSA (Tyre Stewardship Australia).

[16] TSA (Tyre Stewardship Australia), 2025. *Best practice guidelines for tyre storage and fire and emergency preparedness* (4th rev.).

Collection – OTR

OTR tyre collection is made difficult by multiple factors:

- OTR tyres are often generated at remote locations, far from the established used tyre processing industry
- the large size of OTR tyres, particularly mining tyres, means that specialist equipment and operations may be needed
- disposal on mining sites is practically free, due to exemptions from inert waste landfilling requirements and landfill levies that apply to every other sector.

For these reasons, among others, most OTR tyres are not collected and delivered to a processor.

Reverse logistics

One potential solution is for the tyre seller to collect the replaced OTR tyres and transport them back to a consolidation point, using the same logistics network that delivered the new tyres.

If widely adopted, this reverse logistics model could be an efficient approach for large-scale operations, ensuring that used tyres are collected and processed for recycling.

Transport distances – TSA-accredited retailers to recyclers

A key challenge for tyre retailers is the ability to secure consistent and timely collection.

For regional and remote retailers, securing a regular collection service is challenging when they are hundreds of kilometres away from a tyre re-processor, and collectors can't fill their truck because there are not enough tyres in the area to make collection economical.

For example, Table 5 shows that a total of **12% of TSA-accredited retailers are more than 300km driving distance away from a TSA-accredited tyre recycler.**

Percentage of retailers within set distances from accredited recyclers (October 2023)

Distance	% of Retailers w/ a Recycler within distance
0-30km	40%
30-125km	28%
125-300km	19%
300-500km	7%
500-1,000km	3%
1,000+ km	2%

Table 5

Map of TSA-accredited tyre retailers and TSA-accredited tyre recyclers

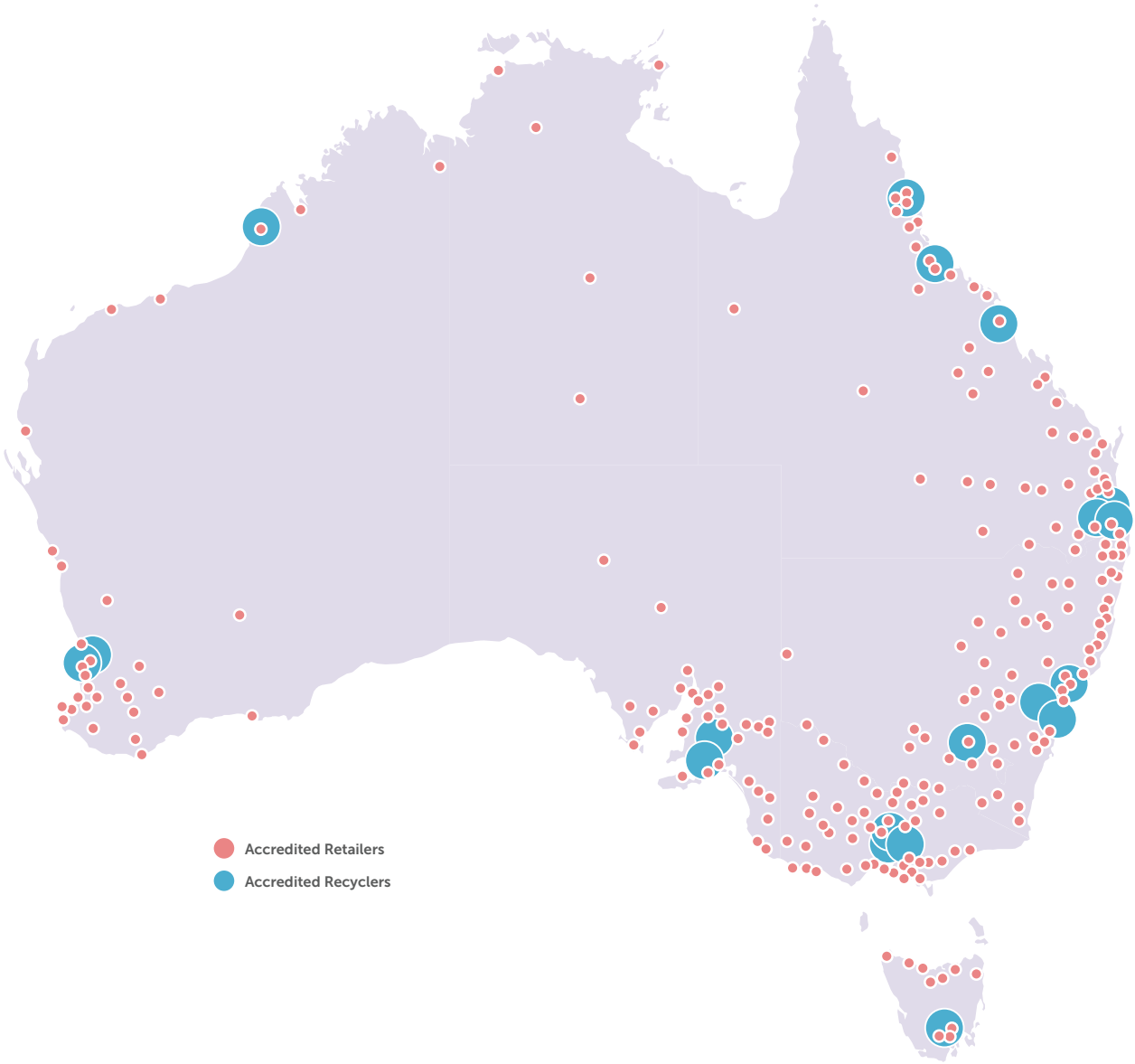


Figure 26

Transporting across jurisdictions

In 2023-24, data reported to TSA demonstrated that tyres collected in one state or territory were often transported across borders for processing.

This movement is understood to have been ongoing for decades, with some states becoming hubs for tyre processing, potentially because they have the processing capability and capacity, or because of other economic drivers.

Figure 27 shows reported high volume (>500t across the whole FY) transfers of tyres between jurisdictions for processing in 2023-24:

Used Tyre Interjurisdictional Flow 2023-24 (Flows of less than 500 tonnes are excluded)

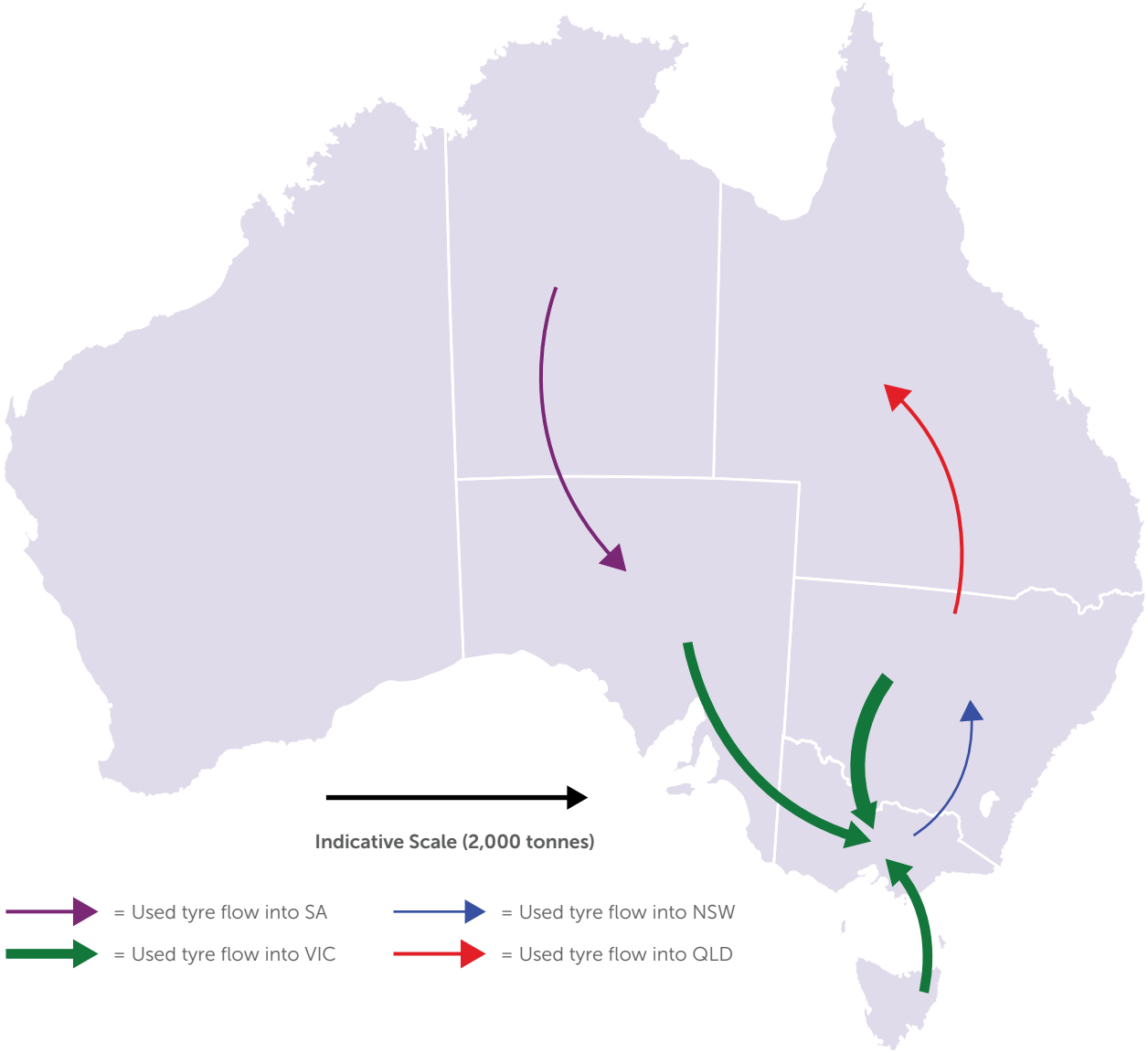


Figure 27

Challenges

Interstate transportation of used tyres in Australia presents numerous challenges for industry, due to inconsistent state laws and differing environmental standards.

While there is some coordination through national policies and regional agreements, the lack of a unified system creates operational and compliance difficulties for waste tyre transporters, particularly those operating nationwide.

Victoria stands out as a hub because of its high processing capacity, particularly for granulation and crumbing, and because Melbourne is the cheapest port to export this material from.

Opportunities

Processors will often collect and transfer Truck tyres (which are easier to granulate and crumb) to Victoria, where they are processed into these refined products. This allows for higher order management approaches which have material circularity.

Transferring between jurisdictions gives access to more advanced processing technologies not available locally, so operators can contribute to circular product applications without infrastructure investment.

Rogue operators

The disposal/collection fees charged at each step of the used management approach creates a market for illegal activity. Unscrupulous operators can undercut the legitimate market and illegally dump tyres in forests, parks, roads, or on local government or private land.

Operators have also been known to hire and fill warehouses with tyres before vacating.

These bad actors make a profit on the charged disposal fee and pass the cost of proper management onto other parties, typically Australian council ratepayers.

Blue Environment's report *Stockpiling and illegal dumping of tyres: cost to local governments and others*[17] estimated that **local governments alone spent approximately $6.5million on cleaning up dumped tyres in 2022-23, at an average cost of about $22 per tyre**. The report found that this was particularly prevalent in rural councils and particularly expensive for regional and fringe councils.

Processing

Overview

Once collected, some tyres come back into use through second-hand sale and retread, but the most common pathway is through the tyre processing industry, which converts them back into useable commodities.

A range of technologies and equipment are used in Australia and globally to process waste tyres, which typically involves one or two stages of processing.

Primary processing

This involves reducing the tyre's size and recovering the steel, either for direct use or for secondary processes that create products for recycling and energy recovery. This is the main form of processing done around the world to manage waste tyres.

Common primary processing machinery includes:

- shears, shredders and raspers
- granulators and cracker mills
- buffing machines

Developing primary processing machinery includes:

- micronisation
- cryogenic granulators
- waterjets

Secondary processing

This stage extracts resources through more complex and still-developing processes such as devulcanisation, reclamation, gasification, and pyrolysis.

[17] Blue Environment, 2024

These processes are less established but unlock a new range of product applications with high value and higher material circularity, and usually require the material first to be reduced to smaller particles through primary processing.

Figure 28 overleaf shows the integration of common and developing technologies and the products they generate.

Processing – Passenger tyres

While there is no exact or average composition of a tyre, Passenger tyres typically come with a textile component. To produce a granule or crumb this needs to be separated, requiring extra processing. To avoid these additional requirements, Passenger tyres are mainly shredded.

Processing – Truck and Bus tyres

Truck and Bus tyres don't have textile reinforcement and are composed entirely of steel and rubber compound. This makes them preferable for processing into granules and crumb.

Processing – OTR tyres

Processing OTR tyres often requires specialist equipment. They are generally coarsely shredded or sectioned using general-purpose heavy-duty shredders or hydraulic shears. They can then be fed into processing equipment designed to receive smaller-sized tyres.

Applications of materials or products from processing options

There are many applications for the material contained in end-of-life tyres, depending on the level of processing conducted. Typically, the more advanced the processing, the more refined the material, allowing it to be turned into other products, including back into tyres.

Figure 28 shows a variety of product applications for the materials and products coming out of the different processing options for tyres.

Examples of applications of the outputs from different processing options

Figure 28

Current processing capability and capacity in Australia

Mechanical processing with machinery and equipment underpins Australia tyre reprocessing industry.

The main infrastructure installed is shredding equipment to produce a shred, primarily for export, see Figure 29 and Table 6.

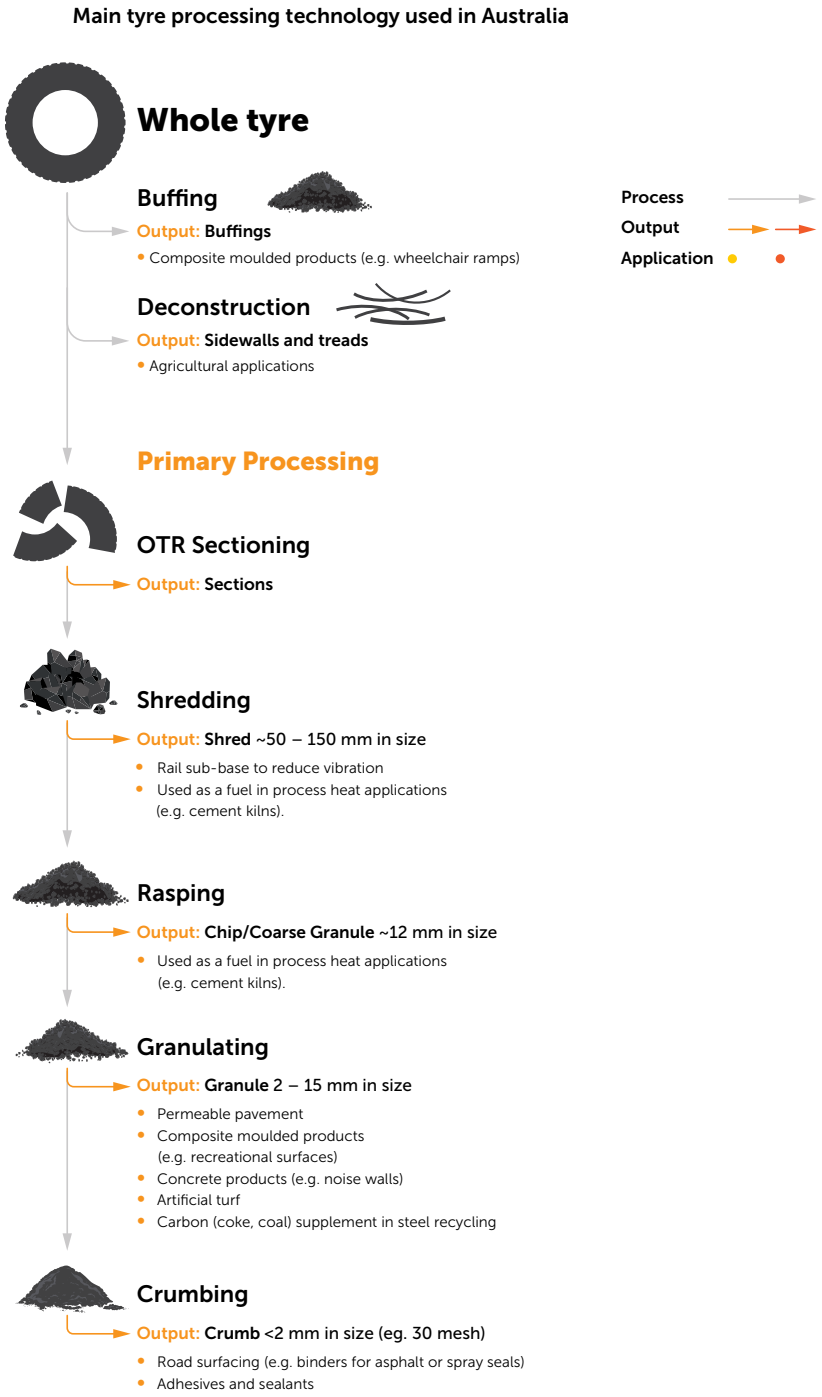


Figure 29

Estimated Used Tyre Processing Capacity December 2024

Jurisdiction	No. of facilities	Shredding Capacity (Tonnes)	Granulating + Crumbing Capacity (Tonnes)
NSW	9	121,000	18,750
VIC	10	80,000	32,000
QLD	9	117,000	15,500
WA	5	84,000	20,000
SA/TAS/NT	4	33,000	0
AUS	**37**	**435,000**	**86,250**

Table 6

Capacity

Australia's tyre processing industry is estimated to have a capacity of around 435,000[18] tonnes.[19] Excluding used tyres being recovered for reuse, this represents close to 90% of end-of-life tyres in 2023-24, but actual processed volumes historically fall far below theoretical capacities. This is discussed in more detail in Section Three: Tyre fates.

A number of the facilities that shred tyres across the country have also installed rasping, granulating and crumbing capacity, as well as shredding equipment, to produce a recycled rubber granule or crumb/powder sold mainly into domestic manufacturing.

Current capacity of granulating and crumbing is estimated to be just under 90,000 tonnes (see Table 6).

There are also a few businesses in Australia using whole tyres or basic processing to create mats, and a few shredding facilities (mainly in Queensland) who also separate side walls to sell to the agricultural industry.

Several companies have been investing in secondary processing facilities across Australia, but to date no facility is operating at a commercial scale.

Australia's tyre processing industry is estimated to have a capacity of around **435,000 tonnes**.

[18] As of December 2024

[19] Shredding is an initial downsizing step to produce a rubber granule or crumb rubber and as such Australia's shredding capacity is considered a proxy for total capacity..


BUS
ONL

Section 3

Tyre fates

The seven possible fates for tyres

As the generation of used tyres continues to rise, understanding what ultimately happens to Australia's tyres becomes increasingly important.

Fate: *the ultimate destination of a used tyre.*

Examining the fates of generated used tyres is crucial for evaluating the sustainability and effectiveness of current used tyre managements systems, while also revealing potential areas of improvement.

Within the context of this report, there are seven possible fates for used tyres:

1. **Reuse:** covers re-allocation of used tyres to their original purpose after minimal or no processing, including retread and second-hand sale.
2. **Recycling:** covers activities that culminate in tyres being converted into products or raw materials that are returned to productive use, excluding for energy.
3. **Energy recovery:** covers all processes through which tyres are processed to recover energy, for example process heat, steam or in electricity generation.
4. **Onsite burial:** covers burial of tyres on a site that is not a formal landfill, whether or not approved by a regulator, so that the tyres can't be recovered.
5. **Landfill:** covers tyres disposed of in legal landfills.
6. **Burning:** covers incineration of tyres in the open environment without recovery of energy, whether or not the act is intentional.
7. **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. 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.

Note: the export of tyres is not a fate.

Fates – some collective terms

- **End fate 'rates':** refers to the weight of material allocated to the respective end fate, divided by the total weight of used tyres generated.
- **Resource recovery (recovery)** is a collective term for the end fates of reuse, recycling, and energy recovery. These fates are considered to be 'sustainable outcomes'. Resource recovery activities recover resources and culminate in reprocessing products or materials that are returned to productive use.
- **Non-recovered** is a collective term that includes the non-productive end fates of landfill, onsite burial and burning. It also includes the 'in flow' component that is stockpiled, dumped illegally, or retained onsite at the end of the financial year.
- **Recovery rate (domestic only)** means the sum of tyres allocated to the fates reuse, recycling, or energy recovery (within Australia) divided by the weight of used tyres generated.

Resource recovery rates

After two years of declining resource recovery rates, Australia experienced a rebound in 2023-24, with resource recovery estimated at 353,000 tonnes (seen in shades of green and orange) of the 537,000 tonnes of used tyres generated.

This equated to an aggregate resource recovery rate of 66% in 2023-24, up from an estimated 60% in 2022-23. This improvement was mainly due to the diversion of material from landfill.

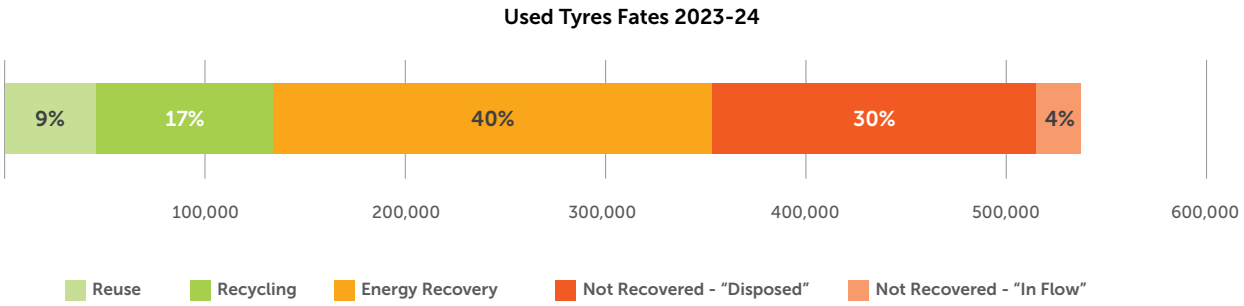


Figure 30

The composition of this recovered material:

- reuse for re-sale as second-hand and retreaded tyres accounted for 46,000 tonnes or **9%** of used tyres
- recycling accounted for 89,300 tonnes or **17%**
- the remaining 217,500 tonnes, or **40%** were recovered through energy recovery.

Used Tyre Fates 2023-24 (Tonnes)

Fate	Passenger	Truck/Bus	OTR	Total
Reuse	5,200	37,500	3,300	46,000
Recycling	16,200	63,600	9,500	89,300
Energy Recovery	146,000	63,400	8,100	217,500
Recovered	**167,400**	**164,500**	**20,800**	**352,800**
Not Recovered - Remaining in Flow	1,700	1,100	21,300	24,100
Landfill	21,000	26,600	2,400	50,000
Burning	100	200	700	1,000
Onsite Burial	0	0	109,300	109,300
Not Recovered	**22,800**	**27,900**	**133,600**	**184,300**
Total	**190,200**	**192,400**	**154,400**	**537,000**

Table 7

Distinguishing the recovery rates, and fates of different tyre segments is important as there are marked differences.

It's worth noting that the recovery rate for automotive tyres is strong at 87% in 2023-24 compared to only 13% of OTR tyres.

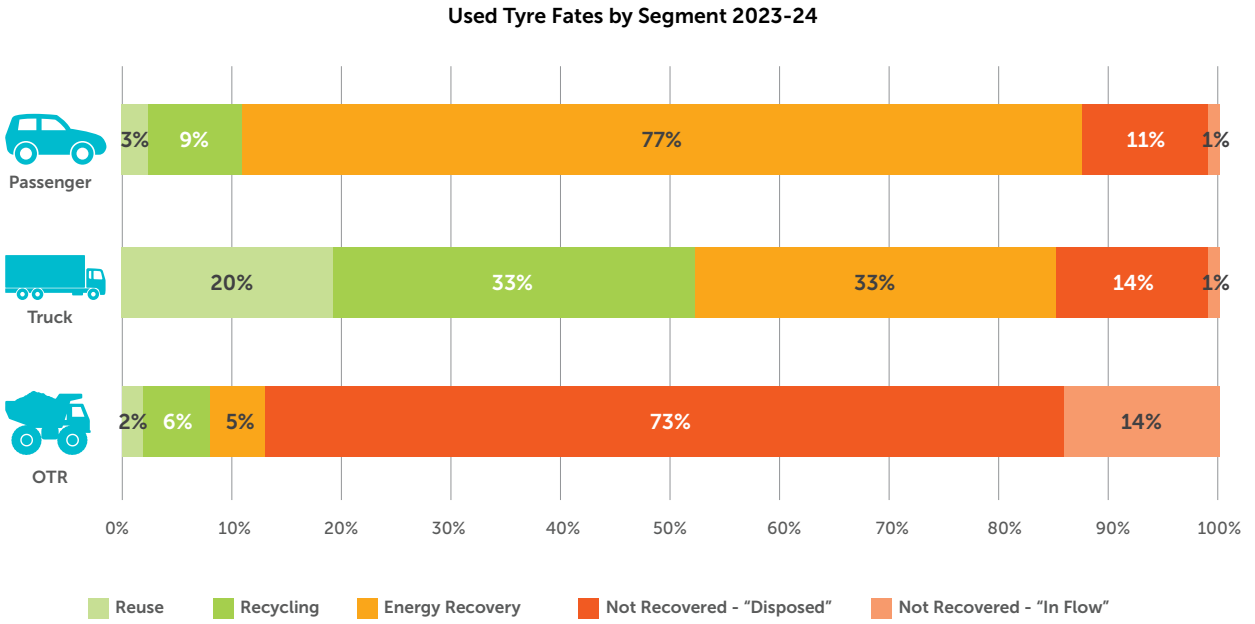


Figure 31

Passenger tyres

An estimated 88% of Passenger tyres were recovered in 2023-24. Of these, more than three quarters were used for energy recovery purposes.

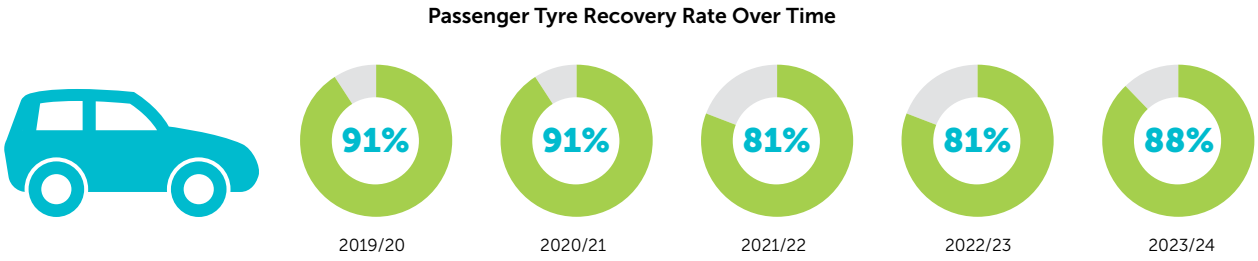


Figure 32

Truck and Bus tyres

An estimated 85% of Truck and Bus tyres were recovered in 2023-24. Importantly, compared to other tyre segments, more Truck and Bus tyres were processed into granules and crumb, which are the products most commonly used for recycling applications (see Processing – Truck tyres on page 41).

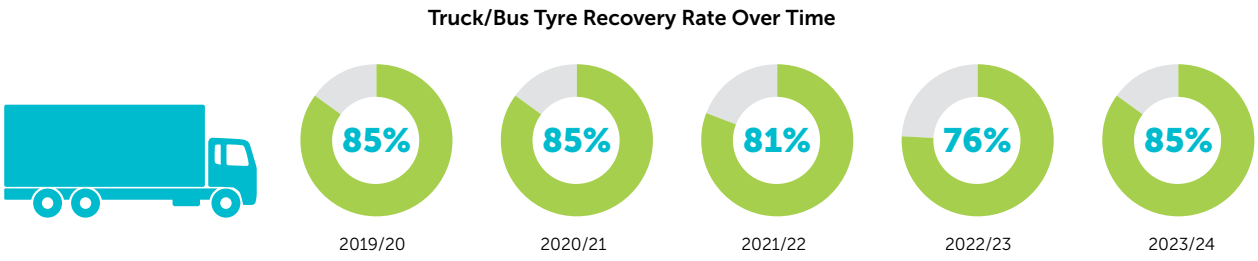


Figure 33

33% of Truck and Bus tyres were recycled in 2023-24, which was a far higher rate than both Passenger and OTR tyres.

20% of Truck tyres were also reused in 2023-24, which was largely driven by the market for retreaded Truck tyres in Australia and overseas.

Finally, 32% of Truck and Bus tyres were used for energy recovery purposes.

OTR tyres

Only an estimated 13% of OTR tyres were recovered in the 2023-24 financial year.

Low OTR recovery is partly due to their size and structural features that make for difficult handling, and the remoteness of the places where they are mostly used.

That said, the main reason for low recovery is that states and territories commonly allow the mining sector—the main OTR user by weight—to bury used tyres at mine sites. Over 100,000 tonnes were estimated to be buried at mines in 2023-24, with a recovery rate of less than 5%.

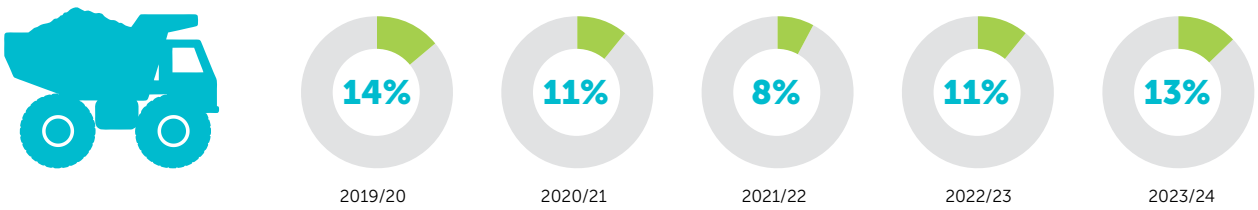


Figure 34

End Fate Rates by Segment 2023-24

Metric	Passenger	Truck	Automotive	OTR	Total
Recovery rate (domestic only)	9%	35%	22%	2%	**16%**
Recovery rate (domestic & export)	88%	85%	87%	13%	**66%**
Reuse rate	3%	20%	11%	2%	**9%**
Recycling rate	9%	33%	21%	6%	**17%**
Energy recovery rate	77%	33%	55%	5%	**40%**
Landfill rate	11%	14%	12%	2%	**9%**

Table 8

Only an estimated **13%** of OTR tyres were recovered in the 2023-24 financial year.

Fates by jurisdiction

End fate rates by jurisdiction are based on the jurisdiction where the used tyre is generated, not where the used tyre is processed.

Recovery of automotive tyres is above 75% in all jurisdictions, but OTR recovery is low across the board [20]. Therefore, the proportion of used tyres generated within the jurisdiction that are OTR tyres needs to be considered when assessing aggregated recovery rates.

Low OTR recovery rates suppress overall recovery rates in jurisdictions that generate a high proportion of OTR tyres, like Western Australia and Queensland.

Despite having relatively low processing capacity, NT and SA can maintain decent recovery rates due to transfers between states, as discussed in *Transporting across jurisdictions* on page 38.

End Fate Rates by Jurisdiction 2023-24

Metric	NSW /ACT	VIC	QLD	WA	TAS	SA	NT
Recovery rate (domestic only)	20%	26%	16%	3%	17%	18%	9%
Recovery rate (domestic & export)	70%	86%	61%	38%	75%	90%	63%
Reuse rate	7%	14%	11%	2%	6%	9%	6%
Recycling rate	16%	20%	20%	10%	13%	16%	18%
Energy recovery rate	47%	51%	30%	26%	55%	65%	39%
Landfill rate	10%	9%	10%	9%	15%	2%	11%

Table 9

Fates by destination (domestic or export)

There are domestic and international (export) markets for tyre-derived products.

The international market is the largest at around 75% of the weight of recovered material in 2023-24, matching the average over the past five years. Of this export market, most (around 80% by weight) is exported for energy recovery. The rest is exported for further processing and recycling, or for reuse and retreading.

The portion going to the domestic market is largely being recycled or reused, with energy recovery at very low levels in 2023-24.

[20] Recovery of different tyre types by jurisdiction is not shared here to protect potentially commercially sensitive data.

Domestic and International Markets Percentage of Recovered Material by Weight (2023-24)

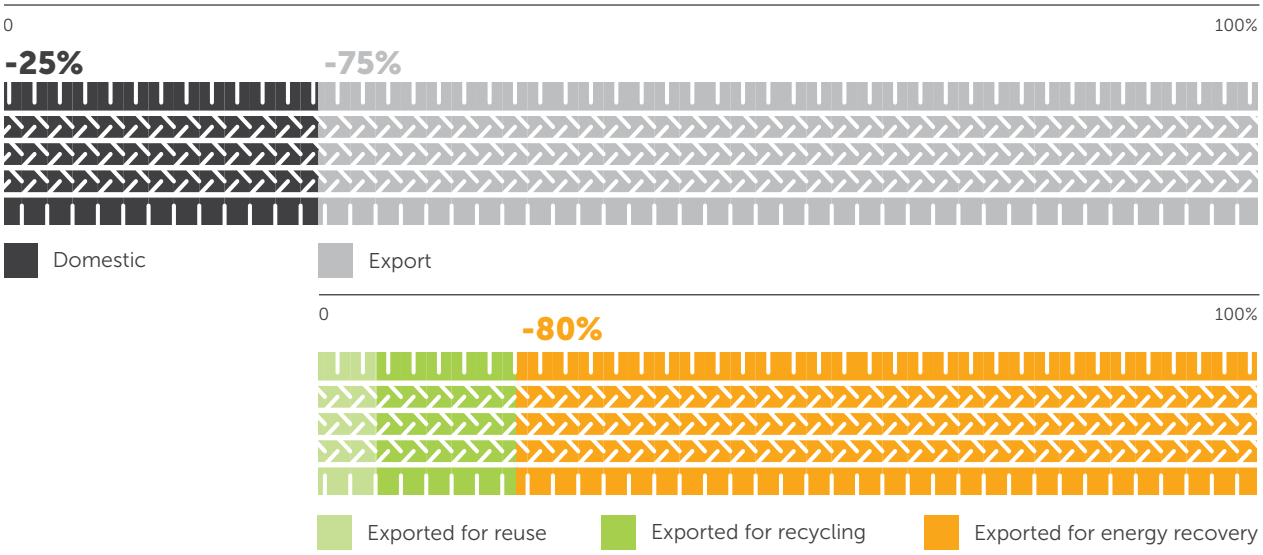


Figure 35

Domestic and International Markets of Recovered Material 2023-24 (Tonnes)

Fate	Domestic	Export
Reuse	31,000	15,000
Recycling	52,300	37,000
Energy Recovery	5,300	212,200
Recovered	**88,600**	**264,200**

Table 10

Tyre Export Restrictions

In March 2020, the Australian and state and territory governments agreed that the export of waste glass, plastic, tyres, and paper should be regulated by the Australian Government.

Within the export rules, licences can be obtained to export tyres that have been:

- shredded into fuel
- sent for retreading
- sent for reuse
- processed into shreds, crumbs, buffings or granules for recycling.

The framework for the restrictions was set out in the *Recycling and Waste Reduction Act 2020,* and the *Recycling and Waste Reduction (Export – Waste Tyres) Rules 2021*.

Australian Customs Regulations

The Customs Act 1901 provides the legislative framework for exporting goods from Australia, including setting requirements or prohibiting exports. Generally, goods to be exported from the country must be declared to the Australian Border Force. There is an exemption for goods with a value of less than $2,000 unless they also need an export permit. Before the export restriction, many tyres were not reported for that reason.

Fate trends

One notable success in the five-year period from 2019-20 to 2023-24 is the increase in the recycling rate, rising from 11% to 17%.

A key contributor to this is the growing offshore demand for shredded tyres for processing and recycling, rather than for energy recovery. This market grew by just under 30,000 tonnes from 2019-20 to 2023-24, and was supported by an increase of almost 10,000 tonnes in domestic recycling over this period.

Also of note is the initial decrease in energy recovery rate following the waste export ban (December 2021). Before the export restrictions, large volumes of tyres were baled and exported whole for use as input in unregulated pyrolysis processes. The export restrictions put an end to this practice—at least legally—resulting in a decline in energy recovery.

Energy recovery as a fate appears to be stabilising though, as processing capacity grows to meet export restrictions (material must be in pieces less than 150mm) while keeping up with international demand. In 2023/24 it rose back to 40%.

End Fate Rates from 2019-20 to 2023-24

Metric	19/20	20/21	21/22	22/23	23/24
Recovery rate (domestic only)	15%	14%	16%	17%	16%
Recovery rate (domestic & export)	67%	70%	64%	60%	66%
Reuse rate	10%	12%	13%	12%	9%
Recycling rate	11%	9%	11%	17%	17%
Energy recovery rate	46%	48%	40%	32%	40%
Landfill rate	7%	8%	13%	15%	9%
Passenger tyre recovery rate	91%	91%	81%	81%	88%
Truck tyre recovery rate	85%	85%	81%	76%	85%
OTR tyre recovery rate	14%	11%	8%	11%	13%

Table 11

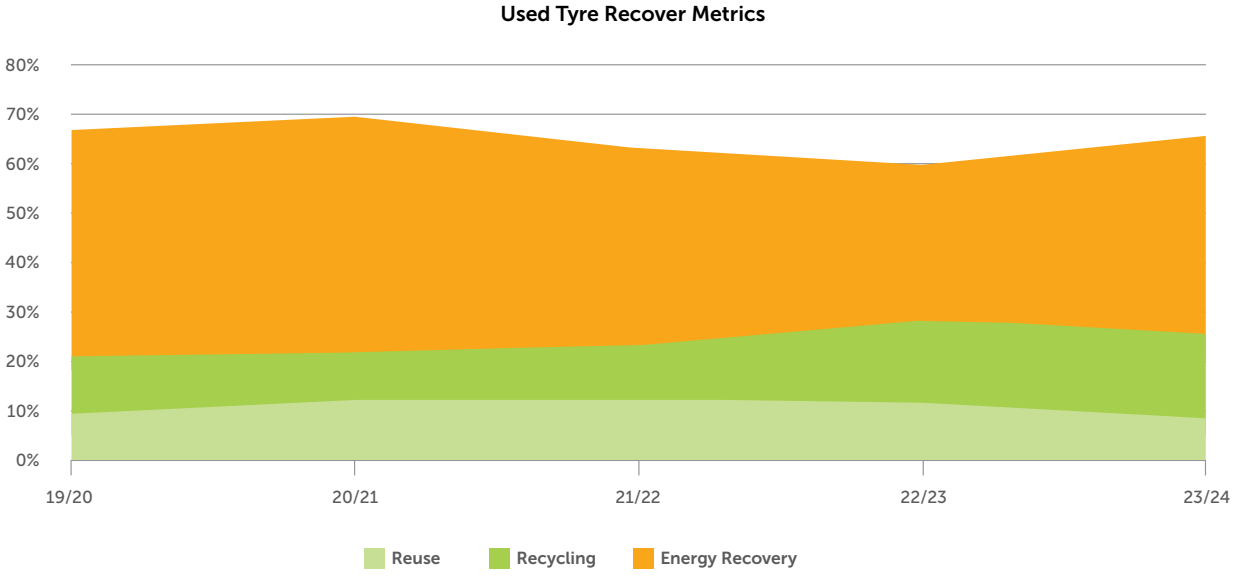


Figure 36

Fates in detail

Reuse and recycling

Reuse and Recycling by Tyre Segment 2023-24 (Tonnes)

Fate	Passenger	Truck/Bus	OTR	Total
Reuse	5,200	37,500	3,300	46,000
Recycling	16,200	63,600	9,500	89,300

Table 12

The critical step in improving Australia's used tyre fates is to move towards used-tyre management approaches that have material circularity.

Broadly these are:

- reuse, which enables a used tyre to be reused for its original purpose, and
- recycling, which converts used tyres into products for use in other physical systems

These two approaches are fundamental to circular economy outcomes and aim to keep the material in productive, physical use for as long as possible.

Tyre reuse requirements

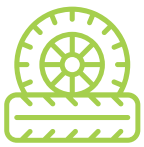
Reuse includes retreading or second-hand sale, which recirculate the tyre into use for its original purpose.

If reuse is a possibility, tyre collectors typically visually inspect the used tyre for damage and determine whether the tyre is fit for second-hand sale or retreading.

Importantly, not all used tyres can be retreaded. A tyre must be:

1. Designed for retreading, with thick side walls and high-quality, durable casing (Patricio, et al., 2021), meaning that low-quality, low-price Truck and Bus tyres can't be retreaded.
2. Well maintained and have no significant punctures or exposures to wear (such as exposed cords, damaged sidewalls, or irregular wear patterns).

To meet these conditions, the whole supply chain, from manufacturers and designers through to used tyre managers, must commit to supporting reuse.



Currently not all tyres can be retreaded. **The whole supply chain must commit to supporting reuse.** Ideally, Australia should support tyres that are designed for retread.

Second-hand tyres and retreading in Australia

Second-hand tyres and retreaded tyres play an important role in delaying when a used tyre becomes an end-of-life tyre and ends up in the waste tyre processing industry both in Australia and overseas.

The opportunities and benefits of retreading in Australia

While retreading of airline tyres is commonplace and completed overseas, Australia has an opportunity to build its truck and bus retreading industry and develop an earthmoving tyre retreading industry.

Retreading tyres is a form of local manufacturing, supporting employment, knowledge growth and building supply chain resilience. It provides social and environmental benefits by:

- **reducing demand for raw materials:** retreading reduces the demand for new tyres and hence the consumption of raw materials such as natural rubber and petroleum
- **creating energy savings:** the energy required to manufacture a new tyre is considerably higher than that needed for the retreading process. Local retreading also reduces the GHG emissions of transportation throughout the supply chain
- **having a lower carbon footprint:** producing new tyres produces more carbon than retreading, so retreading helps reduce the environmental impact of the tyre industry.

"If you have flown on a commercial airliner, you have likely taken off and landed on retreaded tyres"[21] and according to industry experts, certain aviation tyres can be retreaded up to 12 times.[22]

Mining Tyre Recapping – Bailac, Chile

Bailac have been retreading tyres since 1925, and have been successfully retreading (re-capping) mining tyres since 2009 to:

- extend the lifespan of the tyres.
- reduce equipment downtime.
- promote sustainability.

Reuse within Australia

In Australia, Passenger tyres and most types of OTR tyres were not retreaded in significant quantities in 2023-24, but Truck tyres are being retreaded here, and aviation tyres are retreaded overseas before returning for use in Australia.

There is a market for second-hand Passenger and Truck tyres, although industry sources say that demand in this market has gradually declined over the past few decades.

In 2023-24, an estimated total of 31,000 tonnes (6% of generation) of used tyres were used for local retreading or sold second-hand in Australia. Most of these were Truck tyres.

As a result, sales of reused Truck tyres were around 15% of sales of new Truck tyres in 2023-24.

Historically, retreads and new tyre sales were almost equivalent.[23] The decline in reuse is understood to be influenced by competition from casings that are not being designed for retread, and are discarded into the waste stream after their first life.

[21] Dunlop, 2024

[22] Goodyear, 2020

[23] TSA (Tyre Stewardship Australia), 2019. *Retreading: The repeated benefits* [Fact sheet].

Reuse through export

Exporting used tyres for second-hand sale and retreading remains robust, driven by strong demand in export markets for truck casings.

These exports are regulated under the *Recycling and Waste Reduction Act 2020*, meaning the following waste tyres can be exported for reuse under a waste export licence:

- tyres for retread by an appropriate retreading facility, for example, one that is verified by Tyre Stewardship Australia's Foreign End Market Verification program
- tyres sent to an appropriate importer for reuse as a second-hand tyre on a vehicle.

In 2023-24 an estimated total of 15,000 tonnes of used tyres (3% of generation) were sent overseas for reuse, either as second-hand tyres or for retreading and resale.

Based on ABS data, the main destination countries of tyres exported for retreading are the US, Malaysia, Singapore, Spain and Thailand.

Recycling

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

The most common form of tyre recycling involves refined products such as rubber granules, buffings and crumb (powder).

These products have a variety of applications, such as:

- roadworks applications including crumb rubber modified binders for asphalt and sprayed seals
- sports, recreational and moulded applications including soft surfacing products used in gyms and playgrounds created using granules, and granules used in artificial turf
- adhesives and sealants applications including tile adhesives and sealants for walls and floors.

The Need to Support Australian Recycling

Despite strong recovery rates overall, it is estimated that only 16% of the 537,000 tonnes of used tyres generated in Australia in 2023-2024 were used productively in domestic end markets. TSA supports and encourages initiatives (like those listed above) that utilise used tyres in value-added recycling applications within Australia.

Increased procurement of these locally recycled products is essential to strengthen the domestic market and reduce reliance on exports. Visit the Find Recycled Tyre Products page on TSA's website to discover products that support tyre recycling in Australia.

Shredding

There are also recycling outcomes for tyres that involve less advanced processing, such as repurposing them whole or exporting shredded tyres for further processing and recycling.

This latter application saw the most significant change in tyre recycling outcomes during the 2023-24 fiscal year, driven by a surge in global demand for shredded tyres for recycling purposes.

As a result, recycling through exports increased, rising from 29,500 tonnes in 2022-23 to 37,000 tonnes in 2023-24.

Steel

Steel recovered through processing is generally recycled through the scrap metal market. Steel is highly sought after due to its value, with metal waste commonly having higher resource recovery rates than other material categories. [24]

Metal recycling can be sensitive to global metal prices, but in general the high material value and the maturity of the recycling industry means that finding markets for extracted steel has not been a problem for the tyre reprocessing industry.

Overall

In 2023-24, an estimated 89,300 tonnes (17%) of used tyres were used for recycling applications. These were mainly Truck and Bus tyres (63,600 tonnes), because the lack of textile fibre makes them easier to process into granules and crumb.

Recycling by Tyre Segment 2023-24 (Tonnes)

Fate	Passenger	Truck and Bus	OTR	Total
Recycling	16,200	63,600	9,500	**89,300**

Table 13

[24] Blue Environment, 2025

Crumb rubber in roads

There is significantly more market potential for recycled crumb rubber in road surfacing applications in Australia. Fulfilling this potential could help boost levels of recycling, reduce emissions, and support Australia's circular economy.

TSA's market report, *Tyre Derived Crumb Rubber in Road Surfacing Applications in Australia*[25] identified a readily achievable potential market for 76,255 tonnes of crumb rubber by the end of 2026, compared to an estimated current scenario of 31,275 tonnes. For this to happen, at least 70% of the bitumen used in the sprayed sealing needs to be modified and 30% of the bitumen used in asphalt needs to be modified. These targets could be achieved through partial mandates such as the one for OGA by Main Roads WA, tenders with specific requirement to use crumb rubber, and providing incentives to contractors for using crumb rubber.

It's well accepted that crumb rubber can be used at an average of 15% by weight, so if this were applied to all the bitumen used in road surfacing applications in 2026, it is estimated that 158,866 tonnes of crumb rubber could be consumed. TSA's *Life Cycle Assessment*[26] also showed that using crumb rubber in roads could reduce potential emissions by up to 9%, depending on how it is used.

Energy recovery

Energy Recovery by Tyre Segment 2023-24 (Tonnes)

Fate	Passenger	Truck	OTR	Total
Energy Recovery	146,000	63,400	8,100	**217,500**

Table 14

Overview

Energy recovery covers all processes through which used tyres are collected, sorted and processed to recover energy in a usable form.

This is mainly in the form of shredded end-of-life tyres commonly called tyre-derived fuel (TDF) being used directly in cement kilns, paper pulp mills or industrial boilers.

TDF is currently understood to be the most cost-effective resource recovery pathway for tyres, with comparatively low barriers of entry due to lower processing requirements. As such, it is the largest end fate for used tyres in Australia.

In 2023-24, an estimated 217,500 tonnes were used for energy recovery, representing 40% of used tyre generation, mainly Passenger tyres (146,000 tonnes).

Energy recovery destinations

There is large overseas demand for tyre-derived fuel in East and South-East Asia.

Combined with current low domestic demand, this leads to a significant weight of shred being exported annually for use in energy recovery applications. In 2023-24, an estimated 212,200 tonnes were exported.

Based on available ABS data[27], the main destination countries for tyre-derived fuel are India and Malaysia, with increasing demand from Japan and Korea in recent years due to decarbonisation drivers.

[25] Edge Impact, 2024. *Life cycle assessment of end-of-life tyres*. Prepared for TSA (Tyre Stewardship Australia).

[26] TSA (Tyre Stewardship Australia), 2024. *Tyre derived crumb rubber in road surfacing applications in Australia: Market overview*.

[27] ABS data on processed waste tyre exports is understood to be incomplete.

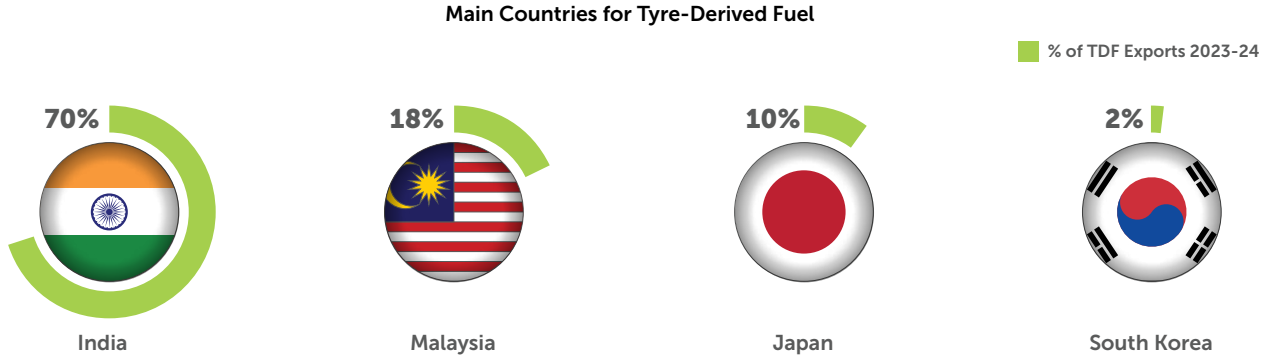
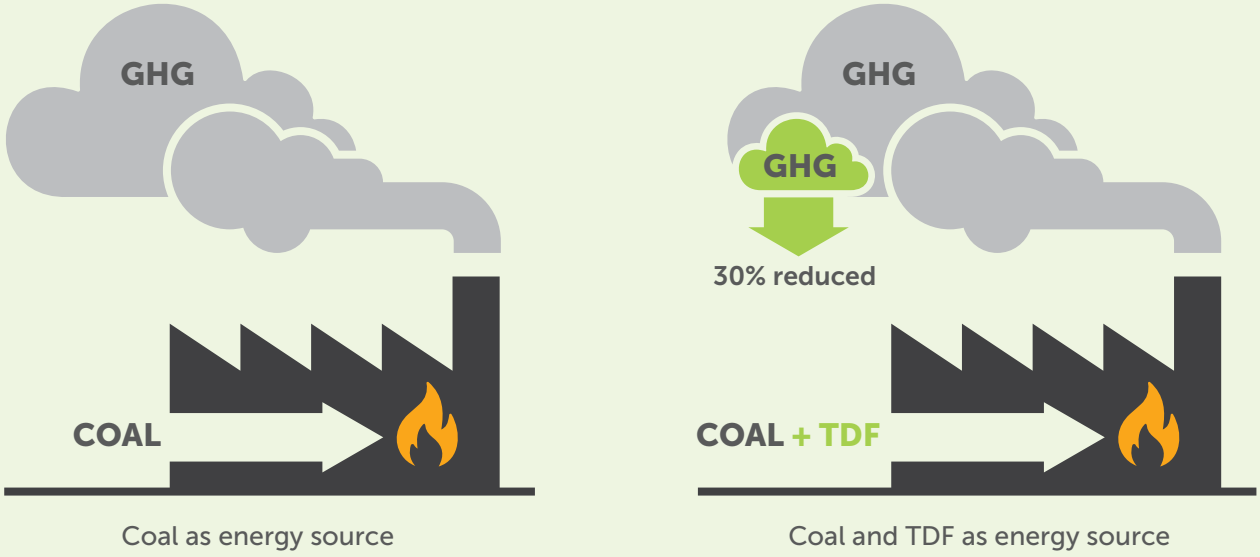


Figure 37

Emission reduction and disposal avoidance

Amendments to the National Greenhouse and Energy Reporting (NGER) Scheme Legislation in 2022 created two new fuel types for tyres, to reflect emissions more accurately from TDF combustion.[28]



As a fossil fuel replacement, TDF has a higher calorific value than coal, and reduces greenhouse gas emissions by around 30% for the same energy input.

Energy recovery is also above disposal on the National Waste Policy's definition of the waste hierarchy, and TDF is cost effective and efficient, with low barriers of entry. This makes it an ideal alternative to disposal outcomes in the short term.

That said, while energy recovery uses the embodied energy value of a tyre, the material is consumed in the process. As there's no way to recover any more material value, this process has no material circularity and so has limited long-term value in a genuine circular economy.

The impacts of net zero targets, decarbonisation, renewable energy, waste reduction and the circular economy make the exact future of tyre-derived fuel uncertain.

[28] McGrath, B., 2021. *Australian National Greenhouse Accounts and End-Of-Life Tyre Combustion Emission Factor.*

Energy Recovery Opportunities

The emissions reductions that Tyre Derived Fuel (TDF) offer are a significant opportunity for Australia's largest greenhouse gas emitters—those emitting over 100,000 tons of CO2-e annually. Under the Safeguard Mechanism, these companies must keep their net emissions below a baseline set by the Clean Energy Regulator. Replacing coal with TDF could be an effective way for industries like cement and concrete to lower their emissions, and many have already committed to increasing their use of alternative fuels, including TDF.

Landfill, burial, stockpiling and dumping, burning

Landfill

Landfilling includes landfilling of:

- whole or shredded end-of-life tyres
- the residues from recycling or energy recovery processes.

Most waste types can be compacted, but whole tyres spring back to their normal shape and tend to 'float' in the waste mass. To prevent this, landfill licences and regulations often require tyres to be shredded before being deposited in the landfill.

In 2023-24 an estimated 50,000 tonnes of used tyres were landfilled. This is a reduction from 2022-23, mainly due to a diversion from landfill disposal towards energy recovery, particularly in Queensland and New South Wales.

Landfill by Tyre Segment 2023-24 (Tonnes)

Fate	Passenger	Truck	OTR	Total
Landfill	21,000	26,600	2,400	**50,000**

Table 15

Onsite burial

Current regulations allow onsite disposal at mining sites, which is a very different regulatory standard than that applied to other industries. Under these regulations, whole OTR mining tyres can be buried onsite.

This method of disposal is practically free, because mining is exempt from the landfilling requirements, such as highly engineered landfill cells and landfill levies, that apply to every other sector.

TSA's *Tipping the Balance* report[29] discusses this disposal pathway and other barriers to OTR tyre recovery in greater detail, outlining the risks of current behaviour and proposing possible solutions.

In 2023-24, an estimated 109,300 tonnes of used OTR tyres were buried onsite.

Onsite Burial by Tyre Segment 2023-24 (Tonnes)

Fate	Passenger	Truck	OTR	Total
Onsite Burial	0	0	109,300	**109,300**

Table 16

[29] TSA (Tyre Stewardship Australia), 2023. *Tipping the balance: research report*.

Retention onsite

Retention onsite refers to tyres stored on the site where they were generated, potentially indefinitely. This is particularly prevalent for OTR mining tyres at mine sites that don't have access to legal burial or lack a disposal location.

Mines are not the only place where retention occurs, as tyres are often stored indefinitely in farmland, backyards or at industrial sites, to delay disposal costs.

Dumping

It is illegal to litter or dump any waste, including tyres, yet there remains a market for illegally dumping used tyres to avoid the costs of proper management or to make a quick profit. Dumped tyres pose significant risks, being both an environmental hazard and a potential threat to human health.

Those left responsible for the costs of cleaning up dumped tyres include local governments and ratepayers, forests, parks, water and road management agencies, and private landowners.

On average, local governments spend $22 per tyre on cleanup—nearly three times the average disposal fee at a tyre retailer ($7.60). Blue Environment estimates that local governments spent approximately $6.5 million in 2022-23 on cleaning up dumped tyres.[30]

Stockpiling

Stockpiling tyres within licensed conditions is legal and relatively common, but tyres in stockpiles must eventually be dealt with, and mismanagement can cause licensed stockpiles to become illegal over time.

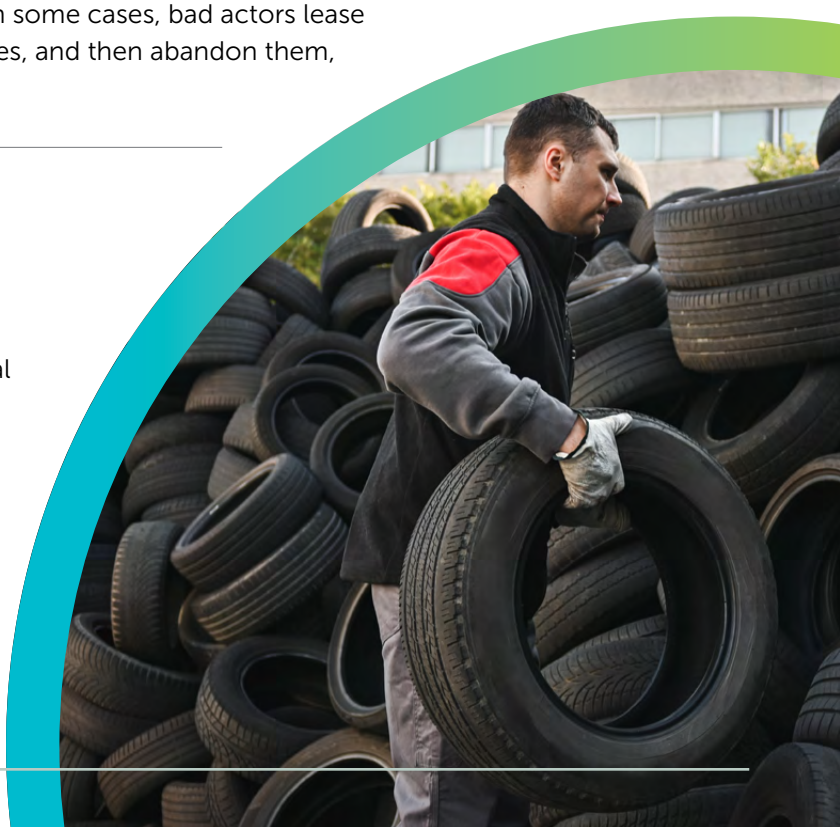
Stockpiling without appropriate licenses and approvals is illegal. Unmanaged stockpiles pose serious risks, including becoming breeding grounds for mosquitoes, catching fire and releasing toxic smoke, and leaching harmful chemicals into the environment through firefighting runoff.[31]

Tyre fires are particularly difficult to extinguish and can result in the evacuation of entire towns.[32] Emergency response and clean-up costs far exceed those of responsible disposal.[33]

Tyre stockpiles are most commonly found on rural properties, in warehouses, storage units, industrial premises, and council waste facilities. In some cases, bad actors lease storage units under fake names, fill them with tyres, and then abandon them, leaving landholders to cover the cleanup costs.

Not recovered – stockpiled and illegal dumping

Tyres that haven't reached their final disposal or recycling destination by the end of the relevant 2023-24 period—due to flowing outside of typical tyre collection and management pathways—are classified as remaining in-flow.



[30] Blue Environment, 2024.
[31] EPA Victoria, 2023a
[32] Black and Rollason, 2018; ABC News, 2016
[33] Fattal et al., 2016

This category includes tyres retained onsite, dumped tyres, and stockpiled tyres, but only those that remain in this state at the end of the financial year. Any tyres cleaned up within that period are attributed to the fate they reach after cleanup. These tyres are considered remaining in-flow because they may still be recovered or disposed of in the future and thus have not yet reached their final fate.

The following numbers relate to the estimated volume of tyres that remained dumped, stockpiled, or retained onsite at the end of the 2023-24 financial year. They do not represent all dumping, stockpiling, and retention activity over the year.

At the end of 2023-24, an estimated 24,100 tonnes of used tyres remained in the location where they were dumped, stockpiled, or retained on-site. A significant volume of tyres is understood to have been cleaned up in addition to this amount, meaning the overall problem is bigger than the number presented here.

Stockpiling and Illegal Dumping by Tyre Segment 2023-24 (Tonnes)

Fate	Passenger	Truck	OTR	Total
Not recovered – stockpiled and illegal dumping	1,700	1,100	21,300	**24,100**

Table 17

Burning

Tyres may just be burned without any attempt at recovering the energy, including in stockpile fires and farm bonfires. A small proportion of agricultural used tyres, as well as Passenger, Truck and Bus tyres are expected to be burned in piles of waste material (primarily vegetation with the addition of other combustible items).

In 2023-24, it is estimated that burning without energy recovery accounted for roughly 1,000 tonnes of used tyres. However, this quantity is difficult to determine, and may underestimate the true scale.

Burning Without Energy Recovery by Tyre Segment 2023-24 (Tonnes)

Fate	Passenger	Truck	OTR	Total
Burning	100	200	700	**1,000**

Table 18

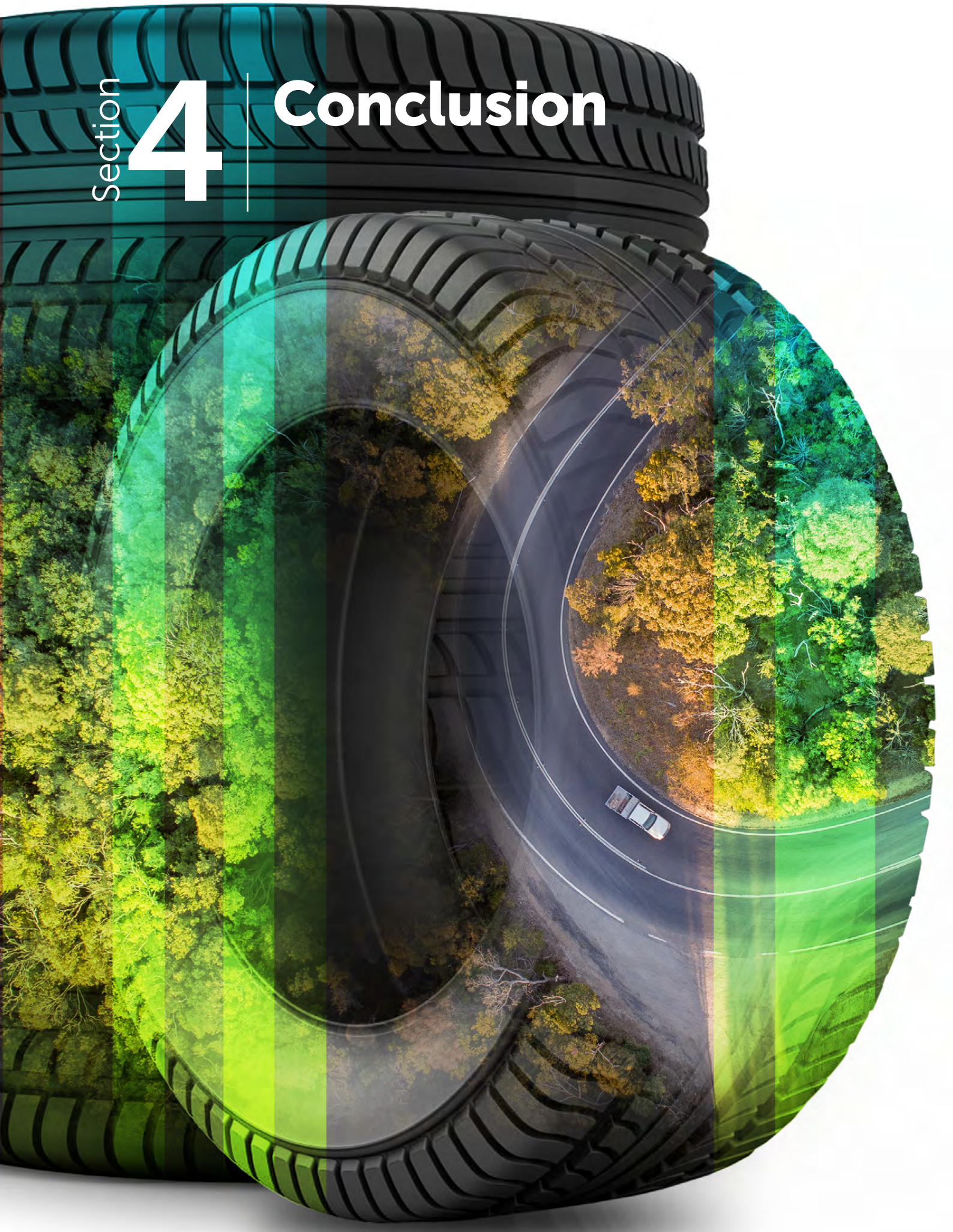
Illegal exports

Demand for whole, baled tyres is understood to remain strong despite export regulations, creating an environment for lucrative illegal exports. The illegal export of waste is an environmental crime that can be damaging to the environment and human health, and creates unfair financial competition that threatens legitimate Australian processors.

It is understood that these tyres often end up in unregulated, unsafe pyrolysis plants. For example, 730 tonnes of used tyres intended for illegal export were seized in the 2023-24 financial year as a result of a joint effort by the Australian Border Force and Department of Climate Change, Energy, the Environment and Water (Schultz, 2024).

Section 4

Conclusion



Where do they all go?

At the beginning of this report we set out to answer the question: "Australia consumes roughly three quarters of a million tonnes of new and reused tyres in Australia each year: where do they all go?"

We know from this report that there are seven fates for end-of-life tyres in Australia, and that the different tyre types experience differing levels of these fates. To give two examples, on average around 88% of Passenger tyres are recovered, mostly to be shredded, exported and burnt to produce energy. By contrast, only an average of 13% of off-the-road tyres are recovered.

So when it comes to a circular economy for tyres, are we there yet? No, not by some margin. As this report reveals, there are many reasons for this, often involving geography, recycling capabilities and regulations, but disparities like this present opportunities.

An opportunity

The reuse and recovery rates of Passenger, Truck and Bus tyres show that there is a clear economic incentive to get the most out of these resources. That an existing infrastructure makes this possible is significant, but leads to the question "how can we create a similar recovery infrastructure for all types of tyres across Australia?"

The logistical difficulties of organisations such as mining companies operating in extremely remote parts of the country can't be ignored. Similarly, the huge and expensive tyres they consume represent a cost that they currently absorb as 'the cost of doing business', foregoing the value of the tyre materials. This means that, for OTR, there is a significant opportunity to improve the quantity of reuse, recycling and broader recovery, and this would be a significant step closer to a circular economy for tyres in Australia.

Tools and levers

Voluntary schemes such as the TPSS 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.

Similarly, the economics of supply and demand have also demonstrated success in changing behaviours. Businesses will always follow the money, and if we are to create a circular economy for all types of tyres in Australia, then we need to foster an economic environment in which used tyre recovery, especially of OTR tyres, is a viable industry with a clear profit pathway.

Supported by regulatory incentives and government funding, organisations that currently put tyre recovery in the "too-hard basket" will have a clear bottom-line reason to replace behaviours such as burying tyres with recovery options.

Next steps

It's not within the scope of this report to propose solutions. The role of this report is to be a trusted source that presents the facts every five years, so that we can observe trends in tyre use in Australia objectively and make informed decisions.

This report makes it clear what the fates of tyres are in Australia when they reach the end of their useful life, and that many thousands of tonnes are being lost each year, tyres that could be reused or recycled. The question is what can we do to extend those lives and then recover the maximum value of every used tyre?

If you're reading this report, you probably have a role to play in achieving this objective.

Appendices

Data method

The following section summarises the core calculations and data sources underpinning the Material Flow Analysis. For a more detailed explanation of the modelling approach and assumptions, refer to the TSA (Tyre Stewardship Australia) *Tyre Supply Chain Fate Analysis – Method Report, 2025*.

Material flow analysis

The analysis detailed in this report is founded on a comprehensive material flow analysis for tyres constructed by TSA.

The material flow analysis consists of four main components:

- consumption of tyres
- tyres in use
- end-of-life tyre generation
- fate of end-of-life tyres.

Consumption of tyres

Import data is used to determine the loose tyres coming into Australia which is supplemented with tyres imported on new vehicles and tyres retreaded domestically. Some tyres are consumed on truck and OTR vehicles built in Australia, these are subtracted to prevent double counting with tyres fitted to new vehicles, as they come from the loose imported pool of tyres.

Tyres in use

Registration data is used to calculate the tyres fitted to trucks and passenger vehicles with estimates on the number of wheels on each different vehicle type. The number of tyres on OTR vehicles is estimated from the annual consumption of OTR tyres multiplied by the expected lifetime of an OTR tyre.

Used tyre generation

Used tyre generation is based on:

- the consumption of tyres following a one-on, one-off methodology, plus
- used tyres generated from end-of-life vehicles determined through the difference between the yearly change in registrations and the number of new vehicles purchased.

Fate of end-of-life tyres

The fate of end-of-life tyres is the amount of these generated distributed between different fates based on TSA reporting data, external data sources, industry consultation and gap filling assumptions/estimates.

Tyre sizes and weights

Table 19 and Table 20 show the ranges in size and weights across the two main groups of tyres, with the greatest ranges occurring within OTR tyres. OTR tyres range from forklift tyres with a rim size of eight inches to mining dump truck tyres with a rim size of 63 inches (nearly two metres) that weigh up to five tonnes.

Passenger and Truck tyres

Automotive tyre size range examples

Tyre type	Smaller tyre size example	Dimensions		Larger tyre size example
Passenger	Small hatch 180/60 R15	Diameter: Rim diameter: Width: Mass:	600 mm 15 inches 180 mm ~7 kg	Large sedan 235/45 R18
SUV	Small SUV 195/65 R15	Diameter: Rim diameter: Width: Mass:	635 mm 15 inches 195 mm ~8 kg	Large sedan 275/45 R21
Truck	Small rigid truck 3.5 t 195/85 R16	Diameter: Rim diameter: Width: Mass:	740 mm 16 inches 195 mm ~26 kg	Prime mover 295/80 R22.5

Table 19

Note: Imperial measures are the industry standard in tyres.

Off-the-road tyres

Off-the-road tyres size range examples

Tyre type	Smaller tyre size example	Dimensions		Larger tyre size example	Dimensions	
OTR	Forklift 15/4.5 R8	Diameter: Rim diameter: Width: Mass:	380 mm 8 inches 120mm ~9 kg	Loader 29.5x25	Diameter: Rim diameter: Width: Mass:	1,900 mm 25 inches 873 mm ~650 kg
Aviation	Light aircraft 18x4.4	Diameter: Rim diameter: Width: Mass:	460 mm N/A 110 mm ~6 kg	Commercial airliner 1400x530 R23	Diameter: Rim diameter: Width: Mass:	1,400 mm 23 inches 530 mm ~125 kg
OTR	Small tractor 280/85 R24	Diameter: Rim diameter: Width: Mass:	1,090 mm 24 inches 270 mm ~41 kg	Large tractor 1400/30 R46	Diameter: Rim diameter: Width: Mass:	2,084 mm 46 inches 1,354 mm ~750 kg
OTR	Small mining truck 7.50 R15	Diameter: Rim diameter: Width: Mass:	840 mm 15 inches 230 mm ~51 kg	Large mining truck 59/80 R63	Diameter: Rim diameter: Width: Mass:	4021 mm 63 inches 1458 mm ~5,370 kg

Table 20

Data sources

This appendix shows the supply chain analysis summary of information and data sources and key assumptions.

Data packs

New Tyres Imported into Australia 2023-2024 (Tonnes)

State	Passenger	Truck	OTR	Total
VIC	71,500	57,500	14,000	**143,000**
NSW	80,000	49,000	41,500	**170,500**
QLD	60,500	59,000	63,000	**182,500**
WA	29,000	38,500	85,500	**153,000**
SA	18,500	17,000	6,500	**42,000**
NT	2,000	2,000	2,000	**6,000**
ACT	1,000	250	<100	**1,250**
TAS	2,500	2,000	1,500	**6,000**
AUS	**265,000**	**226,000**	**214,000**	**705,000**

Total Tyre Consumption Over Last 5 Years (includes reused tyres) (Tonnes)

Tyre Type	19/20	20/21	21/22	22/23	23/24
Passenger	242,000	281,000	265,000	268,000	265,000
Truck	216,000	255,000	273,000	271,000	259,000
OTR	187,000	176,000	178,000	206,000	216,000
Total	**645,000**	**712,000**	**716,000**	**745,000**	**740,000**

Total Tyre Consumption Over Last 5 Years (includes reused tyres) (Units)

Tyre Type	19/20	20/21	21/22	22/23	23/24
Passenger	18,400,000	21,100,000	19,800,000	20,900,000	19,900,000
Truck	8,100,000	9,000,000	9,000,000	9,000,000	8,500,000
OTR	850,000	830,000	900,000	870,000	750,000
Total	**27,400,000**	**30,900,000**	**29,700,000**	**30,800,000**	**29,150,000**

Tyres In-Use Over Last 5 Years (Tonnes)

Tyre Type	19/20	20/21	21/22	22/23	23/24
Passenger	870,000	880,000	900,000	910,000	930,000
Truck	630,000	650,000	690,000	740,000	770,000
OTR	440,000	410,000	420,000	480,000	500,000
Total	**1,940,000**	**1,940,000**	**2,000,000**	**2,130,000**	**2,210,000**

Tyres In-Use Over Last 5 Years (Units)

Tyre Type	19/20	20/21	21/22	22/23	23/24
Passenger	70,300,000	71,100,000	72,300,000	73,700,000	75,400,000
Truck	24,200,000	25,250,000	26,300,000	27,350,000	28,450,000
OTR	1,990,000	1,950,000	2,130,000	2,050,000	1,760,000
Total	**96,500,000**	**98,400,000**	**100,700,000**	**103,100,000**	**105,500,000**

Used and End-of-Life Tyre Generation 2023-24 (Tonnes)

State	Passenger		Truck		OTR		Total	
	EOL	Used	EOL	Used	EOL	Used	EOL	Used
NSW	55,500	57,500	46,000	53,500	29,500	30,000	**131,000**	**141,000**
VIC	46,000	48,500	31,500	42,000	9,000	10,500	**86,500**	**101,000**
QLD	40,000	40,500	35,500	49,500	45,000	45,500	**120,000**	**135,500**
WA	20,500	20,500	23,000	24,500	59,500	60,000	**103,000**	**105,000**
TAS	4,500	4,500	4,000	4,750	1,000	1,000	**9,500**	**10,250**
NT	2,000	2,000	2,250	2,500	1,500	1,500	**5,500**	**6,000**
SA	14,500	14,500	11,500	14,000	4,500	4,750	**30,500**	**33,500**
ACT	2,000	2,000	1,500	1,500	1,250	1,250	**4,750**	**4,750**
AUS	**185,000**	**190,000**	**155,000**	**192,000**	**151,000**	**155,000**	**491,000**	**537,000**

Used Tyre Generation Over Last 5 Years (Tonnes)

Tyre Type	19/20	20/21	21/22	22/23	23/24
Passenger	185,000	213,000	199,000	196,000	190,000
Truck	165,000	188,000	204,000	201,000	192,000
OTR	140,000	127,000	130,000	148,000	155,000
Total	**490,000**	**528,000**	**533,000**	**545,000**	**537,000**

Australian Tyre Fates by Tyre Type 2023-24 (Tonnes)

Fate	Passenger	Truck	OTR	Total
Reuse	5,200	37,500	3,300	46,000
Recycling	16,200	63,600	9,500	89,300
Energy Recovery	146,000	63,400	8,100	217,500
Recovered	**167,400**	**164,500**	**20,800**	**352,800**
Not Recovered - Remaining in Flow	1,700	1,100	21,300	24,100
Landfill	21,000	26,600	2,400	50,000
Burning	100	200	700	1,000
Onsite Burial	0	0	109,300	109,300
Not Recovered	**22,800**	**27,900**	**133,600**	**184,300**
Total	**190,200**	**192,400**	**154,400**	**537,000**

Australia Tyre Fates by Destination 2023-24 (Tonnes)

Fate	Domestic	Export
Reuse	31,000	15,000
Recycling	52,300	37,000
Energy Recovery	5,300	212,200
Recovered	**88,600**	**264,200**

Australian Domestic Recovery Fates Over Last 5 Years (Tonnes)

Recovery Fate	Destination	19/20	20/21	21/22	22/23	23/24
Reuse	Domestic	27,900	31,000	32,200	31,100	31,000
Recycling	Domestic	42,600	41,500	52,600	62,100	52,300
Energy Recovery	Domestic	3,400	3,100	2,200	1,300	5,300
Recovered	**Domestic**	**73,900**	**75,600**	**87,000**	**94,500**	**88,600**

Australian Export Recovery Fates Over Last 5 Years (Tonnes)

Recovery Fate	Destination	19/20	20/21	21/22	22/23	23/24
Reuse	Export	21,300	34,500	35,900	32,300	15,000
Recycling	Export	9,300	7,900	4,400	29,500	37,000
Energy Recovery	Export	224,100	250,300	211,200	171,500	212,200
Recovered	**Export**	**251,900**	**292,700**	**251,500**	**233,300**	**264,200**

Australian Not Recovered Tyre Fates Over Last 5 Years (Tonnes)

Fate	19/20	20/21	21/22	22/23	23/24
Not Recovered - Remaining in Flow	24,900	27,700	28,600	27,100	24,100
Landfill	36,400	41,500	70,200	84,500	50,000
Burning	900	1,000	1,000	1,000	1,000
Onsite Burial	99,600	89,700	94,800	104,800	109,300
Not Recovered	**161,800**	**159,900**	**194,600**	**217,400**	**184,300**

Australian Used Tyre Recovery Metrics 2023-24

Metric	Passenger	Truck	Automotive	OTR	Total
Recovery rate (domestic only)	9%	35%	22%	2%	**16%**
Recovery rate (domestic & export)	88%	85%	87%	13%	**66%**
Reuse rate	3%	20%	11%	2%	**9%**
Recycling rate	9%	33%	21%	6%	**17%**
Energy recovery rate	77%	33%	55%	5%	**40%**
Landfill rate	11%	14%	12%	2%	**9%**

Australian Used Tyre Recovery Metrics Over Last 5 Years

Metric	19/20	20/21	21/22	22/23	23/24
Recovery rate (domestic only)	15%	14%	16%	17%	16%
Recovery rate (domestic & export)	67%	70%	64%	60%	66%
Reuse rate	10%	12%	13%	12%	9%
Recycling rate	11%	9%	11%	17%	17%
Energy recovery rate	46%	48%	40%	32%	40%
Landfill rate	7%	8%	13%	15%	9%

Used Tyre Recovery Metrics by Jurisdiction 2023-24

Metric	NSW / ACT	VIC	QLD	WA	TAS	SA	NT
Recovery rate (domestic only)	20%	26%	16%	3%	17%	18%	9%
Recovery rate (domestic & export)	70%	86%	61%	38%	75%	90%	63%
Reuse rate	7%	14%	11%	2%	6%	9%	6%
Recycling rate	16%	20%	20%	10%	13%	16%	18%
Energy recovery rate	47%	51%	30%	26%	55%	65%	39%
Landfill rate	10%	9%	10%	9%	15%	2%	11%

Glossary

Term	Definition
Passenger Tyres	Covers motorcycle, small and large passenger tyres including SUV tyres.
Truck Tyres	Covers light and heavy-duty truck and bus tyres.
OTR Tyres	Covers tyres used on OTR equipment such as construction and mining equipment, agricultural tractors, industrial equipment, aircraft, and defence equipment.
New Tyre Imports	All new tyres imported into Australia and sold in Australia. Excludes tyres that are reused or retread within Australia.
Loose Tyres	New tyres imported without attachment to a vehicle. May be sold as a replacement tyre or fitted on a new vehicle constructed in Australia.
Fitted Tyres	Tyres that were imported attached to a vehicle.
In-Use Tyres	Tyres currently on a registered passenger vehicles, trucks or registered and unregistered off-the-road vehicles.
Used Tyre Generation	A tyre removed from a vehicle generates a 'used' tyre, which must then be managed responsibly. There are two pathways: • extend its life through reuse as a retread or second-hand tyre. • convert it to an end-of-life tyre if the owner decides they can't or won't extend its life by reusing it. 'Used tyre generation' is a collective term that refers to both used tyres that are reused and used tyres that have reached their end-of-life.
End-of-Life Tyre Generation	A subsection of used tyres where it has been determined that their life cannot or will not be extended.

Term	Definition
Fate	The final process of an end-of-life tyre before becoming a new product or unrecoverable. Includes reuse, recycling, energy recovery, burning, onsite burial and landfill.
Reuse	Covers reallocation of a tyre after its initial use, for the same purpose for which it was originally designed. Includes tyre retread and second-hand sale.
Recycling	Covers activities that culminate in tyres being converted into products or raw materials that are returned to productive use, excluding for energy.
Retread	Adding a new layer of tread to the tyre.
Energy Recovery	Covers all processes through which tyres are collected, sorted, and processed to recover energy in usable form, for example process heat, steam or in electricity generation.
Resource Recovery (Recovery)	A collective term for the fates of waste reuse, recycling, and energy recovery. Therefore, the quantity of waste allocated to the fate 'resource recovery' is the sum of the quantities allocated to waste reuse, recycling, and energy recovery.
Not Recovered - Remaining in Flow	Refers to tyres where final fate is yet to be determined, which includes tyres retained onsite, dumped but not yet cleaned up, and stockpiled. Does not represent all dumping and stockpiling activity over the year, only what remained at the end of the relevant period.
Not Recovered - Disposed	Processes through which tyres are managed without deriving significant productive use. Includes deposit in landfill, onsite burial, and incineration without energy recovery.
Retention Onsite	Withholding of used tyres on the property of the person or business that owned that tyre for at least 12 months, with the possibility of subsequent application of a fate.
Dumping	Incidental disposal of tyres on public or private land, with the possibility of subsequent application of a fate.
Stockpiling	The process of aggregating used tyres on a site not belonging to the original tyre owner for more than 12 months, with the possibility of subsequent application of a fate.
Landfill	Refers to tyres disposed of in landfill.
Burning	Incineration of end-of-life tyres in the open environment without recovery of energy, regardless of whether the act is intentional.
Onsite Burial	Burial of tyres on a site that is not a formal landfill, regardless of whether approved by a regulator, such that the tyres are no longer recoverable.
Domestic	Refers to used tyres that reach their fate in Australia (domestic is not a fate in itself)
Export	Refers to used tyres that reach their fate overseas following export (export is not a fate in itself).
Shred	ELT shredded into pieces ranging from 50 - 300mm. Generally for use as tyre derived fuel for energy recovery shred will be 50 - 80mm.
Granules/Crumb	ELT processed into pieces generally ranging from 2 - 15mm.
Steel	Scrap steel extracted as a product of processing.
Recovery rate (domestic only)	The sum of tyres allocated to the fates reuse, recycling or energy recovery (within Australia) divided by the weight of used tyres generated.
Recovery rate (domestic & export)	The sum of tyres allocated to the fates reuse, recycling or energy recovery divided by the weight of used tyres generated.
Reuse rate	The sum of tyres allocated to the fate reuse divided by the weight of used tyres generated.
Recycling rate	The sum of tyres allocated to the fate recycling divided by the weight of used tyres generated.
Energy recovery rate	The sum of tyres allocated to the fate energy recovery divided by the weight of used tyres generated.
Landfill rate	The sum of tyres allocated to the fate landfill divided by the weight of used tyres generated.

References

ABS (Australian Bureau of Statistics), 2023. *Population Projections, Australia.* [Online]
Available at: **https://www.abs.gov.au/statistics/people/population/population-projections-australia/latest-release**

ABS (Australian Bureau of Statistics), 2024. *National, state and territory population (reference period december 2023)*. [Online]
Available at: **https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/dec-2023**

ABS (Australian Bureau of Statistics), n.d. *Import and export data set*. s.l.:s.n.

BE (Blue Environment), 2024. *Stockpiling and illegal dumping of tyres: cost to local governments and others,* s.l.: s.n.

BITRE (Bureau of Infrastructure and Transport Research Economics), 2024. *Road Vehicles, Australia, January 2024*. [Online]
Available at: **https://www.bitre.gov.au/publications/2024/road-vehicles-australia-january-2024**

Blue Environment, 2025. *National waste and resource recovery report 2024*, s.l.: s.n.

Boucher, J. & Friot, D., 2017. *Primary Microplastics in the Oceans: a Global Evaluation of Sources*, Gland, Switzerland: IUCN.

Bus Industry Confederation, 2021. *Moving People - Australia Bus and Coach Industry: a snapshot*, s.l.: s.n.

Climate Council, 2023. *What does net zero emissions mean?*. [Online]
Available at: **https://www.climatecouncil.org.au/resources/what-does-net-zero-emissions-mean/**
[Accessed 11 2024].

Ellen Macarthur Foundation, 2024. *Circular economy principles*. [Online]
Available at: **https://www.ellenmacarthurfoundation.org/circular-economy-principles**
[Accessed 12 2024].

FCAI (Federal Chamber of Automotive Industries), n.d. *vFacts - data set*. s.l.:s.n.

Giustozzi, F., Ogu, V. & Tushar, Q., 2024. SSROC - *Life Cycle Assessment and Potential Environmental Benefits of Crumb Rubber Asphalt using Field Data*, s.l.: RMIT University.

McGrath, B., 2021. *Australian National Greenhouse Accounts and End-Of-Life Tyre Combustion Emission Factor*. [Online]
Available at: **https://www.tyrestewardship.org.au/tools-and-resources/technical-information-for-tyre-derived-fuel**

OECD, 2020. *Non-exhaust Particulate Emissions from Road Transport: An Ignored Environmental Policy Challenge*, Paris: OECD Publishing.

Patricio, J., Andersson-Skold, Y. & Gustafsson, M., 2021. *End-of-life tyre applications*, s.l.: VTI.

REC (Randell Environmental Consulting, Envisage Works and Brock Baker Consulting), 2020. *Used tyres supply chain and fate analysis*. [Online]
Available at: **https://www.tyrestewardship.org.au/tools-and-resources/used-tyres-supply-chain-fate-analysis-report**

Remtulla, A., 2024. *Tyre derived Crumb Rubber in road surfacing applications in Australia*. [Online]
Available at: **https://www.tyrestewardship.org.au/tools-and-resources/crumb-rubber-in-roads**

Schultz, A., 2024. 'A lucrative business': Why 730 tonnes of tyres have been seized in Australia in the past year. *Sydney Morning Herald*, 8 June.

TRAA (Tyre & Rim Association of Australia), 2023. *Standards Manual*, s.l.: s.n.

TSA (Tyre Stewardship Australia), 2019. *Retreading: The repeated benefits*. [Online]
Available at: **https://www.tyrestewardship.org.au/tools-and-resources/retreading-fact-sheet**

TSA (Tyre Stewardship Australia), 2022. *Understanding the safety of tyre particles*. [Online]
Available at: **https://www.tyrestewardship.org.au/tools-and-resources/tyre-particle-health-environment-safety-report**

TSA (Tyre Stewardship Australia), 2023. *Tipping the Balance*. [Online]
Available at: **https://www.tyrestewardship.org.au/reports-facts-figures/tipping-the-balance-research-report-into-off-the-road-tyres-conveyors-and-tracks/**

TSA (Tyre Stewardship Australia), 2024. 2023/24 *Annual Report*. [Online]
Available at: **https://www.tyrestewardship.org.au/company/annual-report/**

TSA (Tyre Stewardship Australia), 2024. *Best practice guidelines for tyre storage and fire and emergency preparedness*. [Online]
Available at: **https://www.tyrestewardship.org.au/guidelines/storage-guideline/**

TSA (Tyre Stewardship Australia), 2024. *Life Cycle Assessment of End-of-Life Tyres*. [Online]
Available at: **https://www.tyrestewardship.org.au/reports-facts-figures/life-cycle-assessment-of-end-of-life-tyres/**

TSA (Tyre Stewardship Australia), 2024. *TSA Tyre Care Tips*. [Online]
Available at: **https://www.tyrestewardship.org.au/handbooks/tsa-tyre-care-tips/**

TSA (Tyre Stewardship Australia), 2025. *Material Flow Analysis Data Pack* [Data set].

TSA (Tyre Stewardship Australia), 2025. *Tyre Supply Chain Fate Analysis – Method Report* [Technical report].

TyreStewardship AUSTRALIA

ABN: 44 164 971 939
Address: Suite 101, 271 Bridge Road, Richmond, VIC 3121
Phone: 03 9977 7820
Email: getonboard@tyrestewardship.org.au
Website: tyrestewardship.org.au

Australian Government Accredited Product Stewardship Scheme