

TYRE STEWARDSHIP AUSTRALIA

IPWEA:

Circular Economy: Benefits of Using Crumb Rubber from Tyres in Australian Roads

August 25, 2019



Liam O'Keefe: Senior Strategy Manager
liam.okeefe@tyrestewardship.org.au
0491 269 431

CONTENTS

Tyre Numbers

About TSA

TSA Activity Areas

The Roads Sector & Rubber

Importance of Public Works

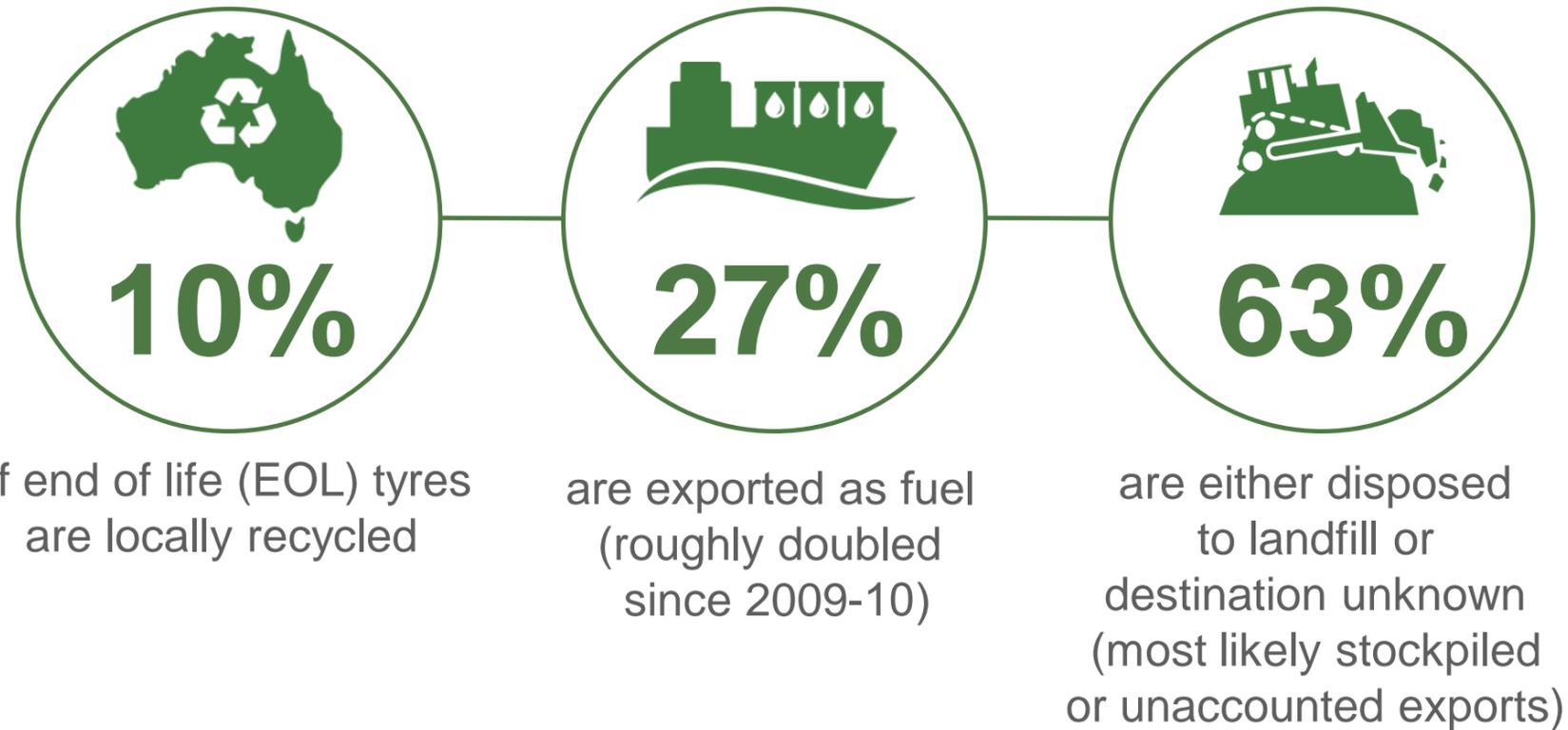
A stack of tires is shown from a top-down perspective, creating a repeating pattern of curved lines. The entire image is overlaid with a semi-transparent blue filter. In the center, the words "TYRE NUMBERS" are written in a bold, white, sans-serif font.

TYRE NUMBERS

THE NUMBERS – LATEST REPORT INDICATES (2017):

56.3 million (Approx.)

EPU* disposed in Australia 2015-16, equivalent to 447,000 tonnes (an increase of 16%)*



POOR PRACTICES HAVE LEAD TO THIS.....



Campbellfield Victoria

January 2016





ABOUT TSA

BRIDGESTONE

Continental

MICHELIN
service centre

GOODYEAR
AUTOCARE

DUNLOP

TSA Levy Paying Members



Volkswagen

KUMHO TYRE

YOKOHAMA

TOYO TIRES

PIRELLI

Member Brands

ABOUT TSA

A voluntary Scheme under the National Product Stewardship Act in 2014.

TSA is a not-for-profit company created to administer the National Tyre Product Stewardship Scheme.

Formed by the tyre industry with endorsement of Federal, State and Territory Governments.

Funded by an ACCC endorsed levy of 25c per passenger tyre equivalent paid voluntarily by the member tyre importers.

Participation is free for participant categories.





TSA ACTIVITY AREAS

TSA ACTIVITY AREAS



Accreditation, Audit and Compliance



Education and Awareness



Market Development



Administration and Reporting



Tyre Stewardship Australia

Life of a tyre with Local Government

1. Procure

1. Specify fleet vehicles have TSA accredited tyres affixed.
2. Specify replacement tyres purchased are TSA accredited.
3. Source tyre supply and fitment through a TSA accredited tyre dealer or workshop.
4.  Specify Australian tyre-derived rubber products in your procurement and asset management. For:

Roads

Asphalt Mix
Spray seal

Playing surfaces

Footy/ Soccer Fields
Hockey Pitches
Netball Courts
Equine applications
Playground Matting
Running/athletics tracks
Access tracks/Walking trails

Parks & Gardens

Composite irrigation pipe
TDA mulch/groundcover

Civil/Commercial Construction

Permeable Pavements
Retaining walls
Pavement sub-base stabilisation
Access roads
Hard stand areas
Erosion protection
Noise walls
Water walls
Bridge abutments
Impact barriers
Cyclone rated structures



2. Dispose

When disposing of EOLTs choose a TSA accredited collector or recycler. For:

- Council fleet
- Council approved collections
- Dumped items

LOOK FOR TSA STAR ACCREDITATION



3. Engage

1. TSA & Councils communicates on tyre recycling and collection options in the municipality
2. Promote positive stories using recycled materials for a circular economy.
3. Work together to stamp out stockpiling



ROLE OF TSA IN MARKET DEVELOPMENT

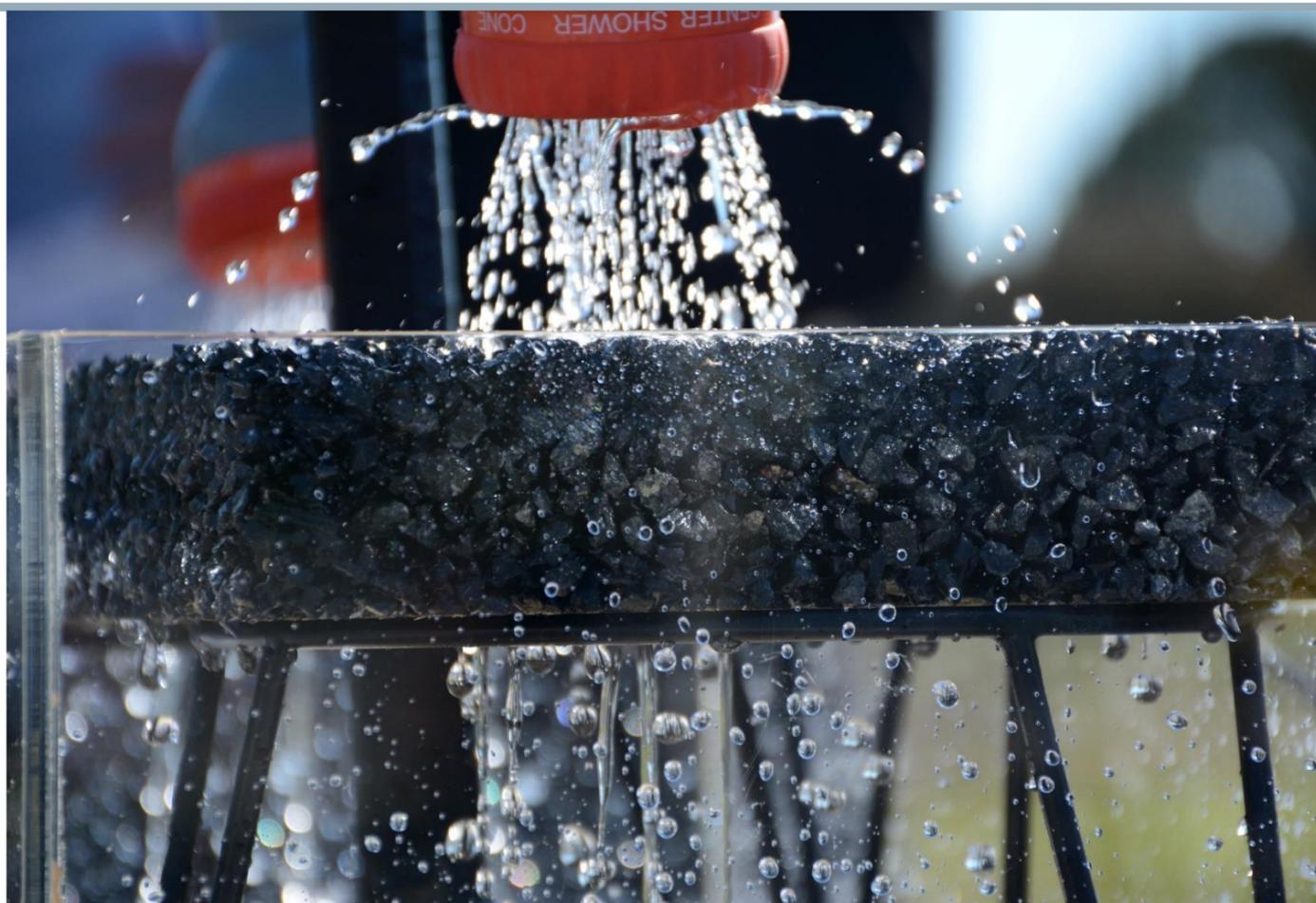
- ✓ TSA is an **enabling** agency
- ✓ We **support** industry to deliver the best solution
- ✓ Provide the resources and **investment**
- ✓ **Demonstrate the benefit**
- ✓ **Facilitate** relationships
- ✓ We **advocate and influence** to drive uptake



MARKET DEVELOPMENT ACROSS MANY SECTORS

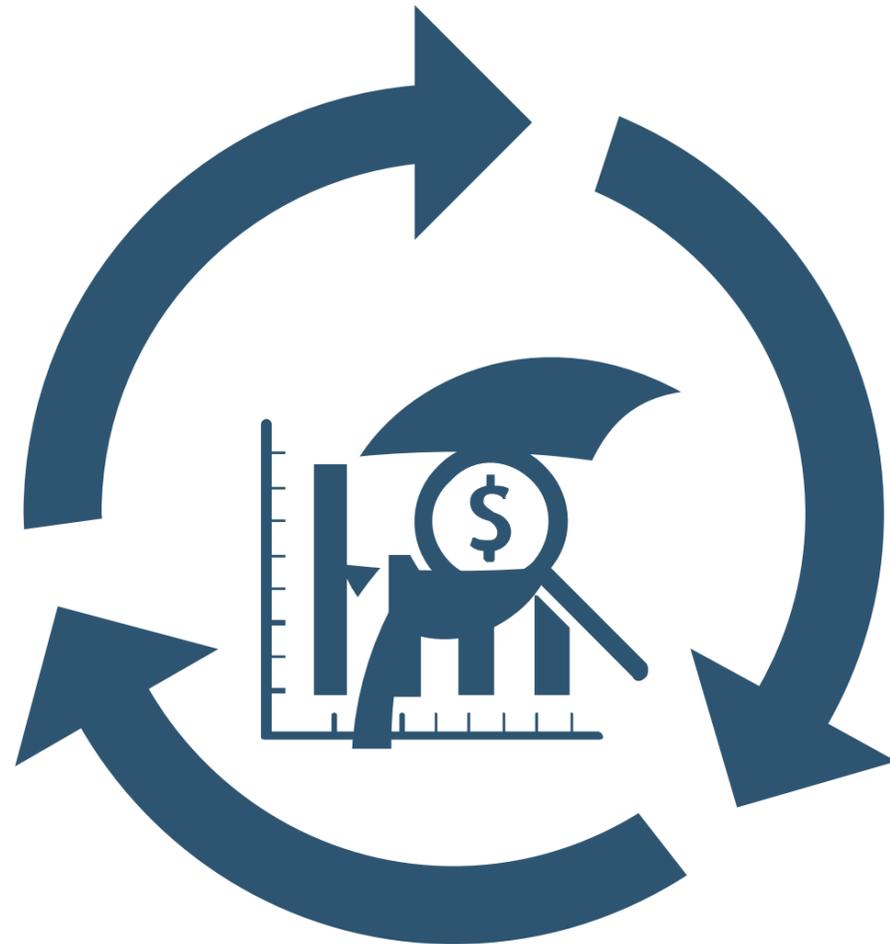
| Lead Organisations | Project Title | TSA Contribution | Potential Market Volumes (tonnes) p.a |
|--|---|------------------|---------------------------------------|
| University of Melbourne & Merlin Site Services | Recycled tyre in permeable pavement applications | \$290,000 | 3-5,000 |
| Chip Tyre, BioAust Energy, Sequence Blast & Drill | High speed polymer coating of rubber crumb fuelled explosives. | \$198,500 | - |
| University of Wollongong and the Rail Innovation Cooperative Research Centre | Performance of recycled rubber inclusion for improved stability of railways | \$200,000 | - |
| Polymeric Powders | Production of tyre crumb derived composite material | \$213,000.00 | 1,000 |
| Flexiroc, Tuff Turf and Pakenham Racing | Equine Air Pakenham Racing Club Project | \$70,000.00 | 1,500 |
| Flexiroc & Australian Defence Force | Protectiflex Pumped & Composite Blast Mitigation Project | \$63,000.00 | 635 |

CASE STUDY: PERMEABLE PAVEMENT



PRIORITY IS ROADS: WHY?

- Crumbed rubber **provides proven benefit** to the longevity and performance of roads creating life cycle cost savings
- It is a **high consumer** of highly refined, high quality material that **supports the local tyre recycling industry**
- There is a **consistent domestic demand** for the product on an annual basis.
- It's has a **centralised stakeholder** group with respected industry associations
- Government is a large procurer



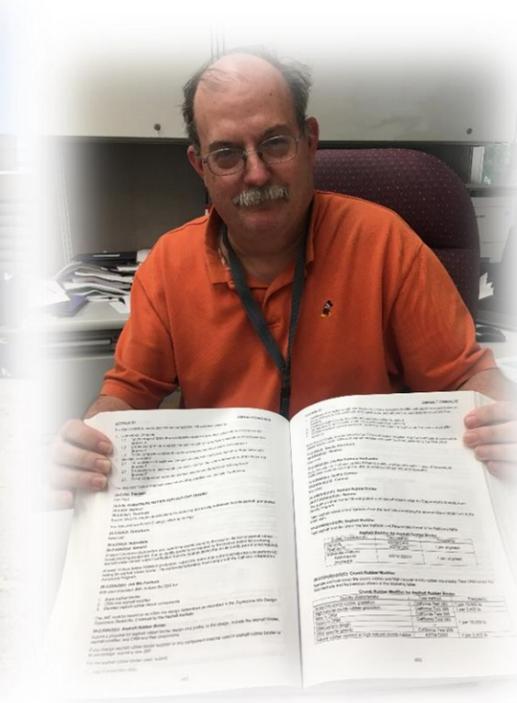
Circular Economy:

Tyres are made to service the roads industry. Therefore, if there is a mechanism to utilise the material productively in the industry that demands the products use in such high volumes, there is an additional imperative to support its utilisation.

HOW DO WE (AS AN INDUSTRY) REALISE THE POTENTIAL?

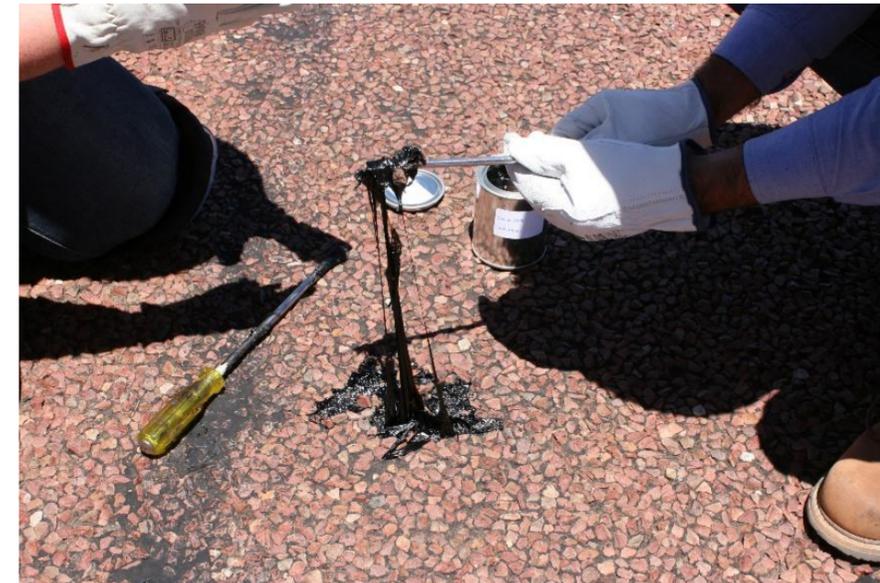
The California example is driven by:

- a **political vision** and commitment to alleviate an environmental issue
- via coordinated **interdepartmental programs**
- based **upon verified performance benefits** and **circular economy principles**.
- underpinned by a **consolidated and agile industry**
- that has a **critical mass of demand** to provide surety of long-term investment to service these market requirements.



Brief History

- Crumb rubber modified binder first used in Arizona 1960s
- Introduced to Australia in mid-1970s
- Used mainly for sprayed-seals (VIC and NSW)
- Limited use in asphalt
- Internationally used and continuous growth



Benefits of CRA

Engineering

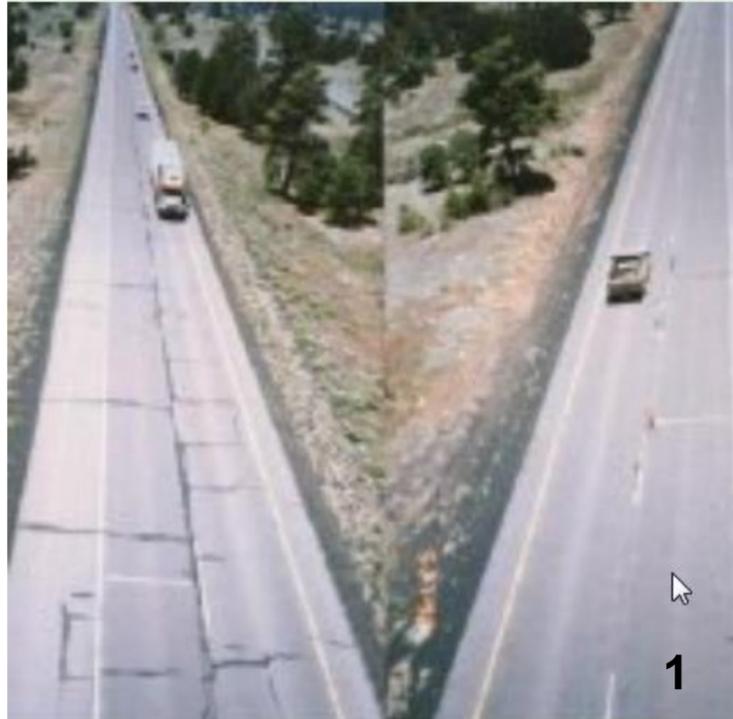
- Overall increases pavement life
- Improved durability
- Rut resistance
- Lower maintenance costs
- Reduced spray back
- Improved aging and oxidation resistance

Environmental

- Increase use of waste tyres
- Reduced noise
- Savings in energy and natural resources
- Less use of non - renewable resources



Benefits of CRA



Source:
<http://www.clemson.edu/ces/arts/benefitsofRA.html>

WHAT HAVE WE DONE? R&D & TRAINING

| Lead Organisations | Project Title | TSA Contribution | Potential Market Volumes (tonnes) p.a |
|--|---|------------------|---------------------------------------|
| Swinburne University & VicRoads | Tyre-derived aggregate as a supplementary material in pavement sub-bases | \$91,812 | 2,000 |
| Australian Road Research Board (ARRB) Queensland, Transport and Main Roads Queensland, Department of Environment and Heritage Queensland | Transfer of crumb rubber modified asphalt and sealing technology to Queensland | \$150,000 | 6,500 |
| ARRB Victoria, VicRoads and Sustainability Victoria | Desne graded and structural fatigue layer assessment | \$113,715 | - |
| Australian Asphalt Pavement Association | Training course for engineers and road manufactureres on how to utilise crumbed rubber in various road applications | \$51,250.00 | - |
| University of Melbourne | Concrete road barriers performance with crumb rubber additive | \$280,000.00 | 6,400 |
| Austrroads | National Specifications for crumb rubber binders in asphalt and seals | \$200,000.00 | - |
| TOTAL | | \$886,777 | 14,900 |

WHAT HAVE WE DONE? DEMONSTRATION: MITCHAM, LOGAN

| Lead Organisations | Project Title | TSA Contribution | Potential Market Volumes (tonnes) p.a |
|---|---|---------------------|---------------------------------------|
| City of Mitcham (SA), Australian Road Research Board, Topcoat | Dense Grade Crumb Rubber Asphalt Trial – City of Mitcham | \$200,000.00 | 6,000 |
| ARRB - Vic Roads | Crumb rubber asphalt trial | \$200,000.00 | 100 |
| AAPA, ARRB, RMS | Demonstration of crumb rubber modified asphalt as overlay to concrete | \$59,357.00 | 600 |
| Topcoat | CalTrans Gap Graded Technology Transfer | \$275,000.00 | 1,650 |
| City of Logan | RAP Crumb rubber asphalt mix | \$150,000.00 | TBC |
| Main Roads WA, Fulton Hogan AAPA | Investigation of recyclability of crumb rubber modified asphalt | \$59,357.00 | - |
| TOTAL | | \$943,714.00 | 8,350 |

WHAT HAVE WE DONE? INFRASTRUCTURE

| Lead Organisations | Project Title | TSA Contribution | Potential Market Volumes (tonnes) p.a |
|--------------------|---|---------------------|---------------------------------------|
| Industry Partner | High Shear Crumb Rubber Mixer | \$175,000.00 | 2,500 |
| Industry Partner | Fume minimisation of crumb rubber asphalt investigation | \$90,000.00 | - |
| Industry Partner | Automated crumb rubber hopper system for asphalt production | \$90,000.00 | 1,000 |
| Industry Partner | Advanced crumb rubber bitumen plant | \$250,000.00 | 1,500 |
| Industry Partner | Crumb Rubber Capacity Expansion | \$300,000.00 | 2,000 |
| TOTAL | | \$905,000.00 | 7,000 |

SUCCESS TO DATE

| | |
|---|----------------------|
| TSA investment in infrastructure demand creation | \$2, 735, 491 |
| TOTAL potential demand created (tonnes) | 30, 250 |

| Category | Rubber (tonnes) | Steel (tonne) | Total | % of the Market |
|--|-----------------|---------------|---------------|-----------------|
| Total Material Recovery (2018/19) | 24,231 | 9,627 | 33,858 | |
| Road market estimate (2018/19) | 12,300 | 4,887 | 17,187 | 51% |
| Potential (2020/21): Increased uptake & 15% modified binder | 18,480 | 7,342 | 25,822 | 76% |

| | |
|---|----------------|
| CURRENT ACCESSIBLE MARKET (Passenger & truck collected tonnes) | 230,000 |
| ROADS AS A % OF TOTAL ACCESSIBLE MARKET | 11% |

ROADS VIDEO: ROAD SEAL APPLICATIONS

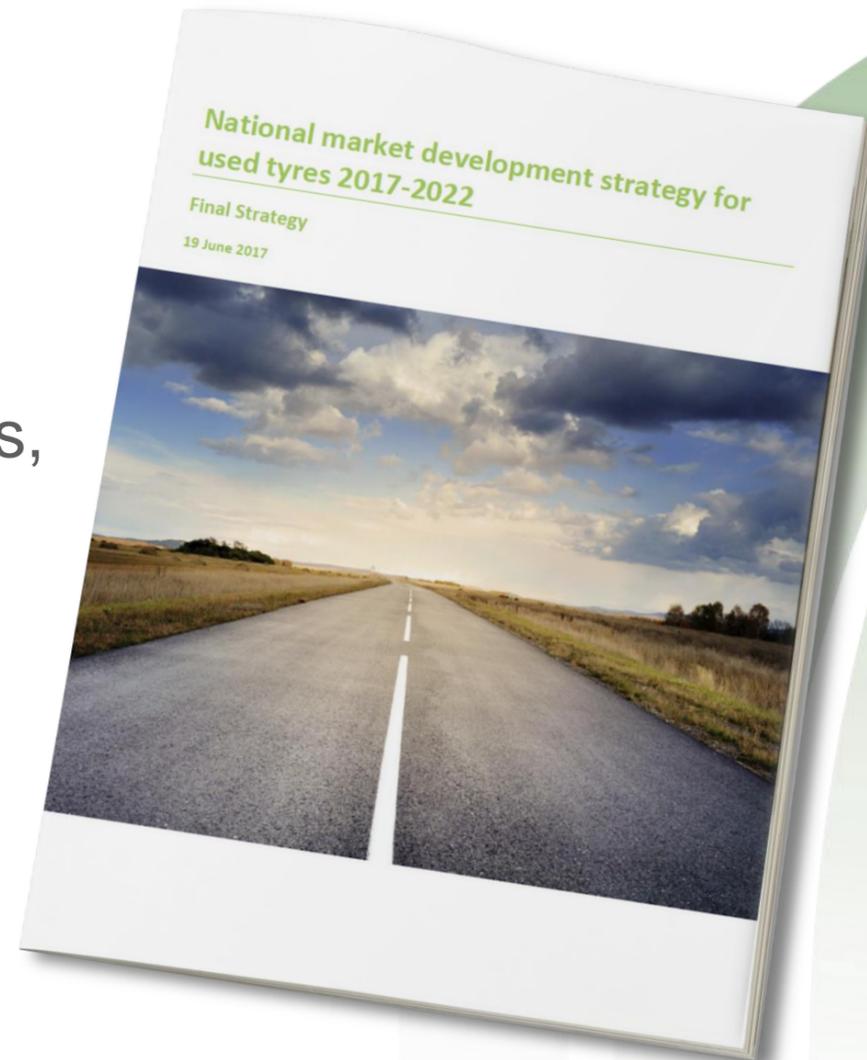


TSA ACTIVITY AREAS

In 2017, all Environment Ministers endorsed the **National Market Development Strategy for Used Tyres.**

This was completed as a co-funded collaboration between TSA and the governments of Victoria, New South Wales, Queensland and Western Australia.

This creates a collaborative national framework for projects between multiple government agencies, key stakeholders and TSA.



Current state of play...

- ✓ We've come a long way
- ✓ Demonstrating benefit & creating impact
- ✓ We're seeing substantial growth
- ✓ We need to continue to evolve and drive uptake...



An aerial photograph of a winding asphalt road through a lush green valley. The road curves through the landscape, which is covered in dense vegetation and scattered rocks. In the background, rolling hills and mountains are visible under a clear sky. The overall scene is bright and scenic, suggesting a natural or rural setting.

The public works sector will underpin the emerging shift to a circular economy...