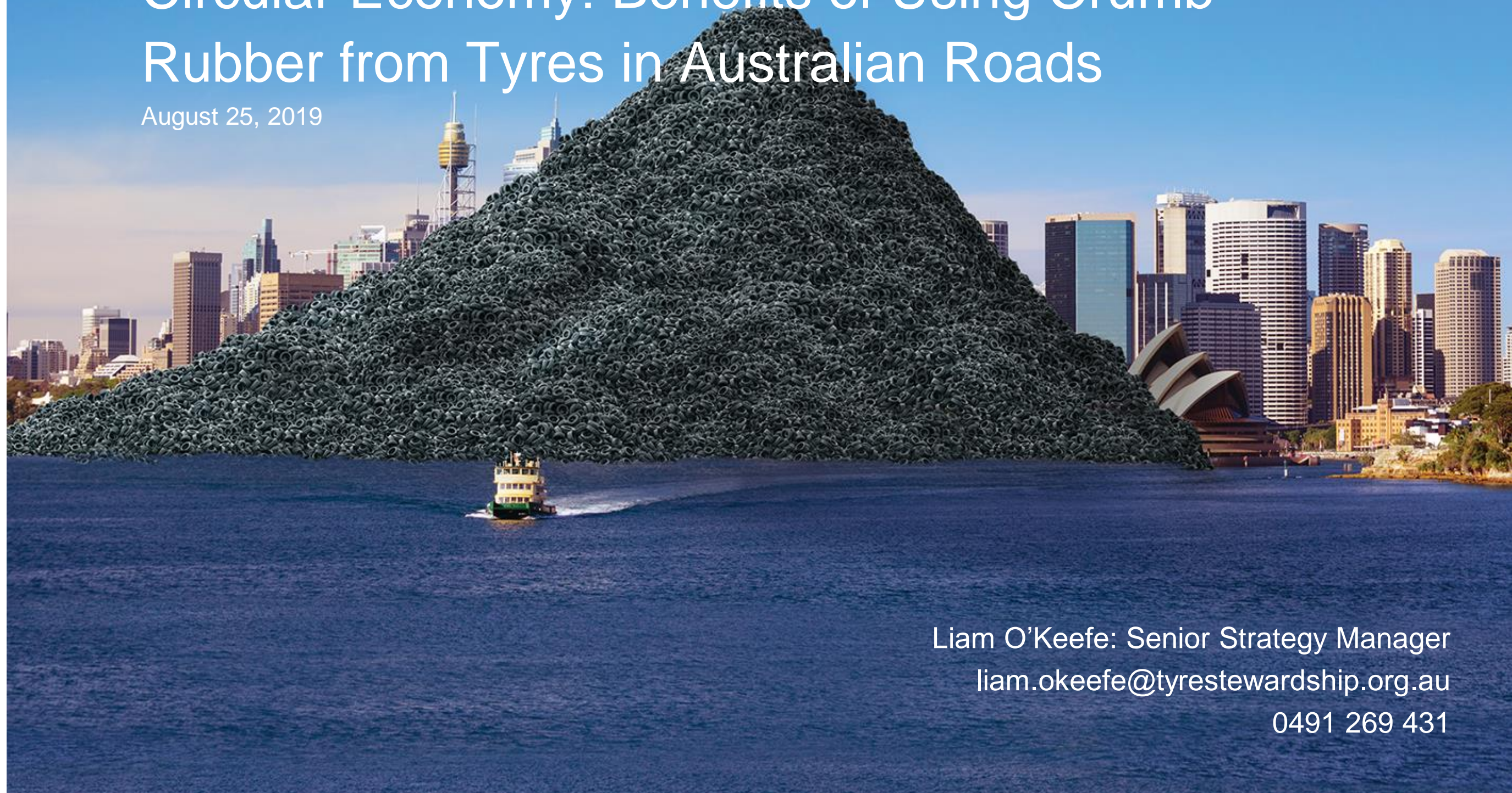


# TYRE STEWARDSHIP AUSTRALIA

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](mailto:liam.okeefe@tyrestewardship.org.au)  
0491 269 431



## CONTENTS

---

Tyre Numbers

About TSA

TSA Activity Areas

The Roads Sector & Rubber

Importance of Public Works





# TYRE NUMBERS



## THE NUMBERS – LATEST REPORT INDICATES (2017):

# 56.3 million

 (Approx.)

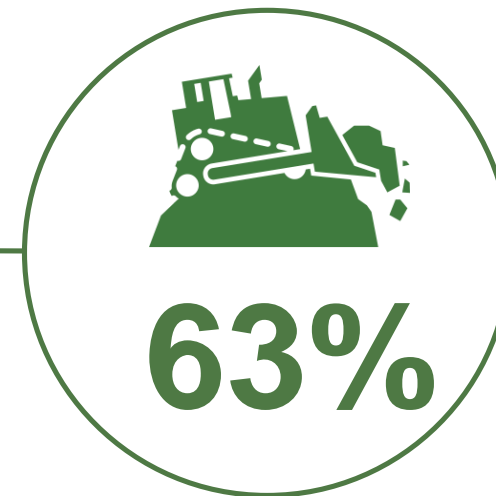
EPU\* disposed in Australia 2015-16, equivalent to 447,000 tonnes (an increase of 16%)\*



of end of life (EOL) tyres  
are locally recycled



are exported as fuel  
(roughly doubled  
since 2009-10)



are either disposed  
to landfill or  
destination unknown  
(most likely stockpiled  
or unaccounted exports)



POOR PRACTICES HAVE LEAD TO THIS.....



Campbellfield Victoria  
January 2016



An aerial photograph of a multi-lane highway with traffic, overlaid with a green tint. The text "ABOUT TSA" is centered in white. The highway has multiple lanes in both directions, with a median and shoulder. There are many cars and a few buses visible. The surrounding area includes trees and a small body of water on the left.

# ABOUT TSA



**BRIDGESTONE**

**Continental**



# TSA Levy Paying Members



Volkswagen

**KUMHO TYRE**



**TOYO TIRES**



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:

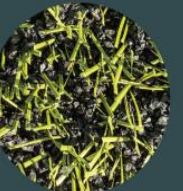
- Council fleet
- Council approved collections
- Dumped items

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



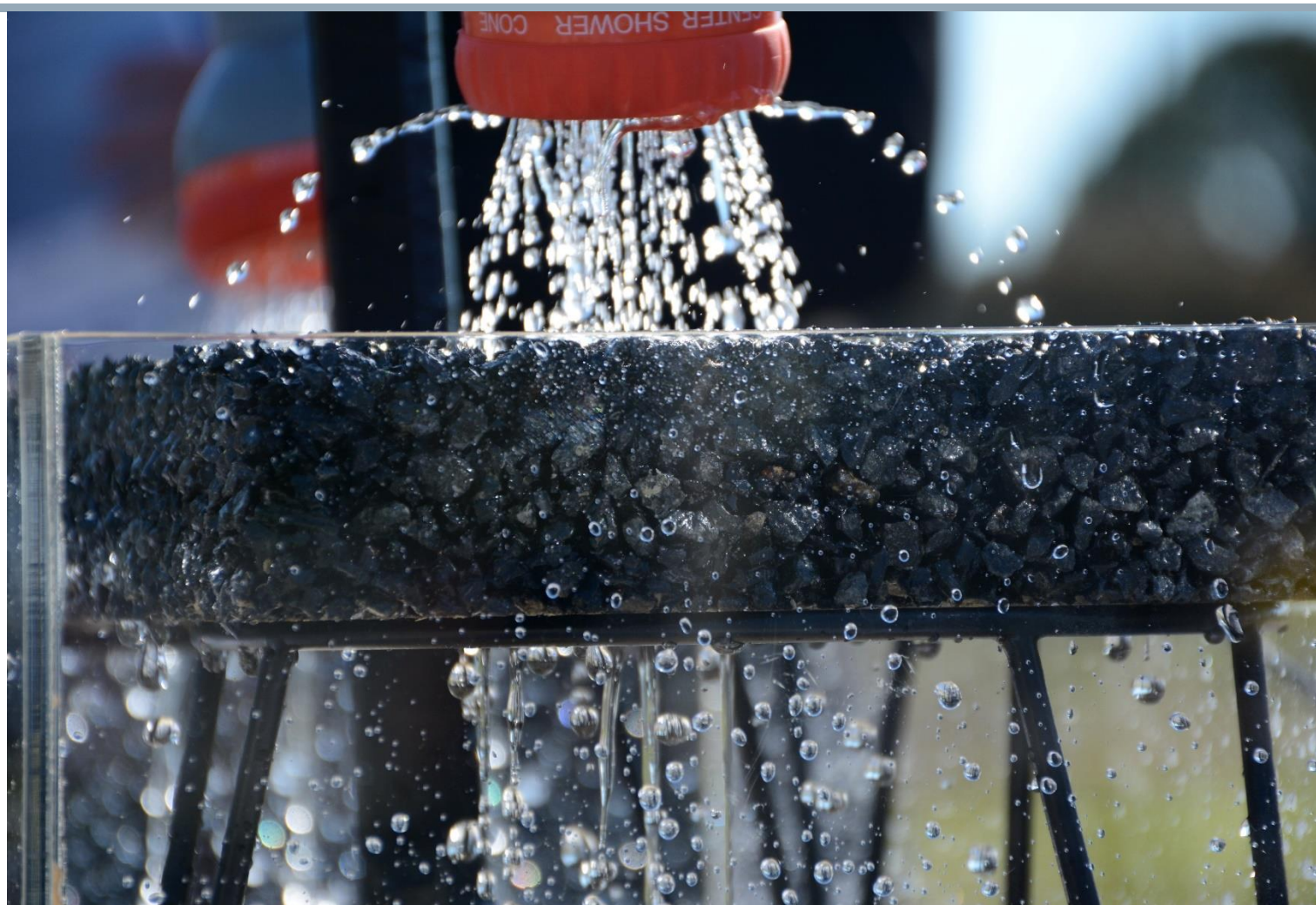


## MARKET DEVELOPMENT ACROSS MANY SECTORS

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



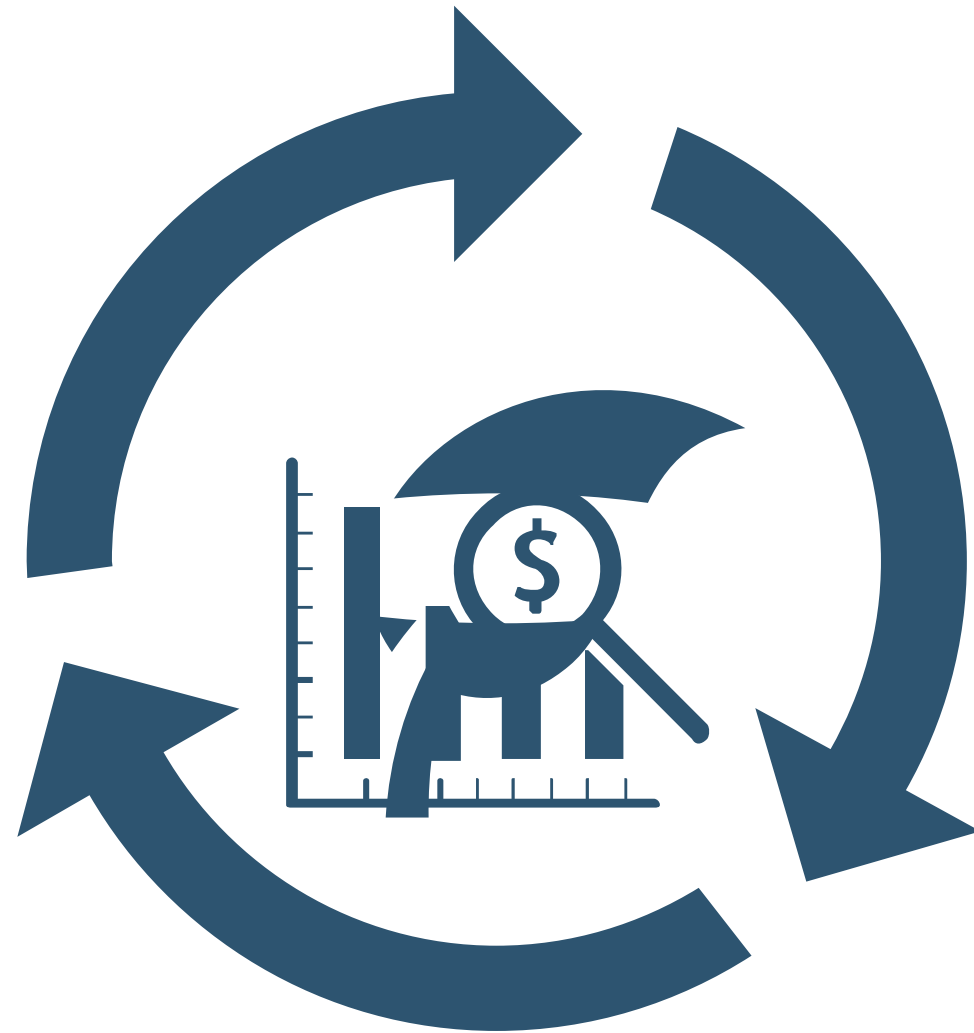


## PRIORITY IS ROADS: WHY?

---

- 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:**

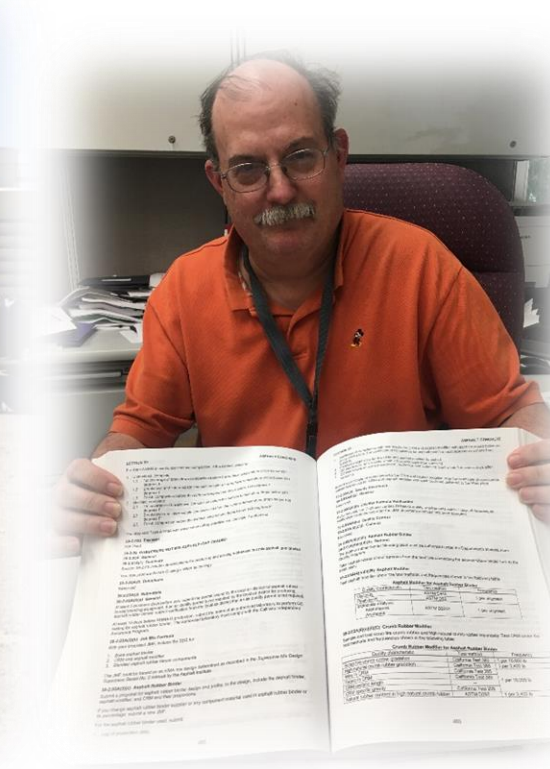
Tyres are made to service the roads industry. Therefore, if there is a mechanism to utilise the material productively in the industry that demands the products use in such high volumes, there is an additional imperative to support its utilisation.



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

The California example is driven by:

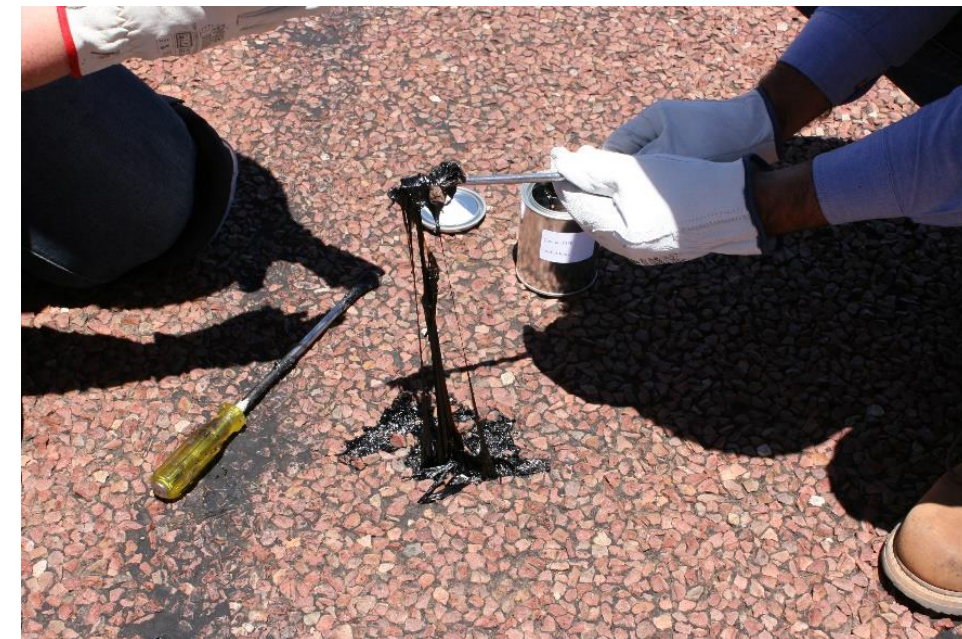
- a **political vision** and commitment to alleviate an environmental issue
- via coordinated **interdepartmental programs**
- based **upon verified performance benefits** and **circular economy principles**.
- underpinned by a **consolidated and agile industry**
- that has a **critical mass of demand**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





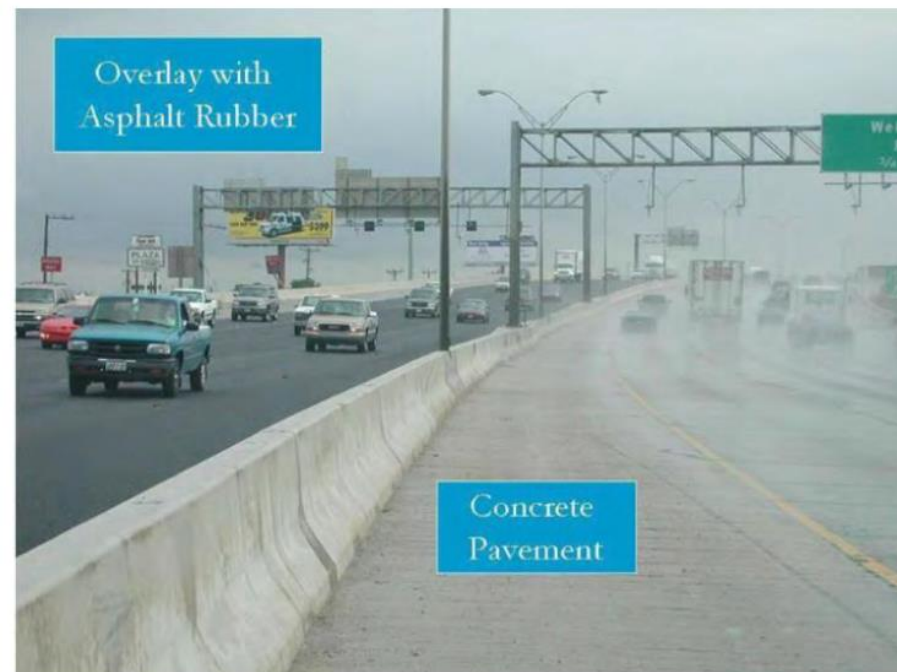
# Benefits of CRA

## Engineering

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

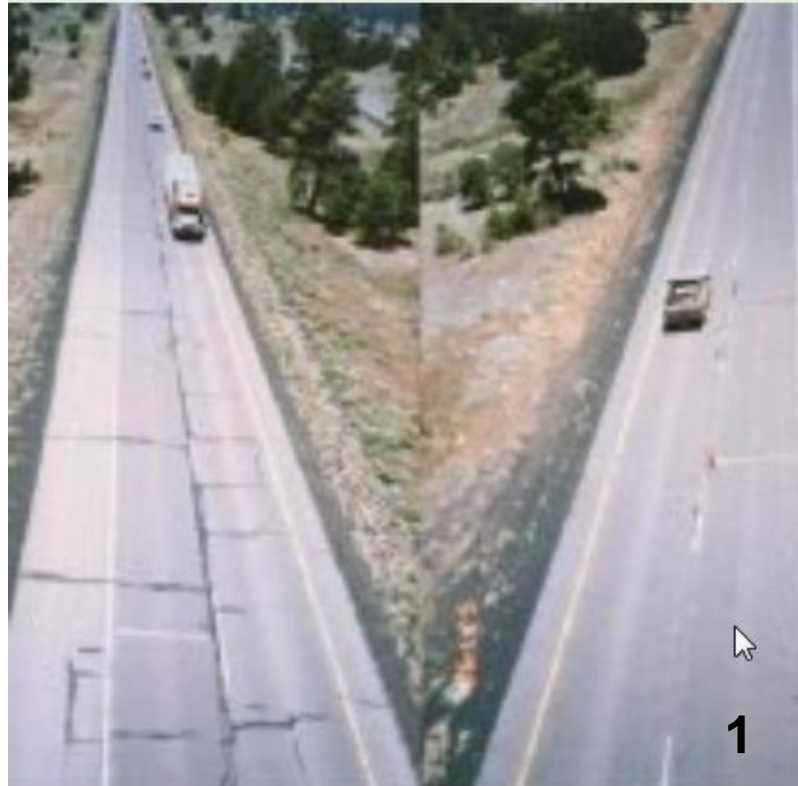
## Environmental

- 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
Austroads	National Specifications for crumb rubber binders in asphalt and seals	\$200,000.00	-
<b>TOTAL</b>		<b>\$886,777</b>	<b>14,900</b>



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

---

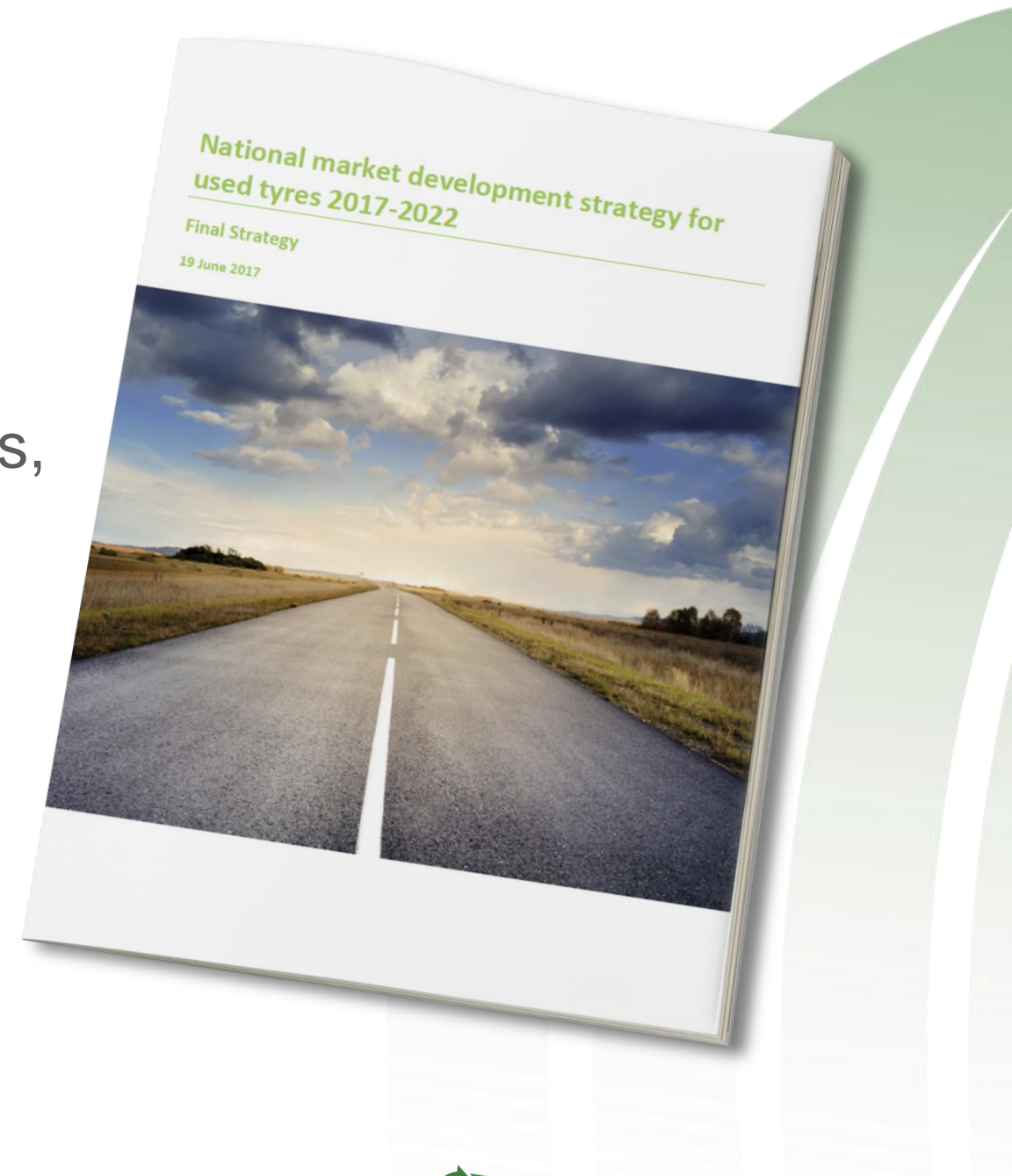




In 2017, all Environment Ministers endorsed the **National Market Development Strategy for Used Tyres.**

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 that curves through lush green hills. The scene is captured during the 'golden hour' of sunset, with warm, low-angle light creating long shadows and a soft glow over the landscape. The hills are covered in dense green vegetation, and a few large rocks are visible in the foreground. The overall mood is serene and scenic.

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