Investigating global best practice waste tyre management

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THE WINSTON CHURCHILL MEMORIAL TRUST OF AUSTRALIA

Report by – Liam O’Keefe – 2016 Churchill Fellow

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In Australia, approximately 56 million end of life equivalent passenger tyres\(^1\) reach their end of life every year. Product stewardship and associated initiatives to manage this substantial resource in Australia are quite formative. However, many international territories have programs in place that have been addressing the tyre management challenge for decades. As the Market Development Manager at Tyre Stewardship Australia (TSA), the Churchill Fellowship provided me with a unique opportunity to consider the key characteristics of international approaches and reflect upon the Australian tyres product stewardship journey to date.

TSA is a not for profit environment oriented industry association set up to implement the National Tyre Product Stewardship Scheme (the Scheme) to enhance outcomes associated with the disposal of end of life tyres in Australia. The TSA approach includes the auditing and accreditation of the waste tyre supply chain; promotion of the end of life tyre management issue to industry and the community; and, to develop markets for waste tyre products.

The purpose of this Churchill Fellowship was to meet with practitioners of tyres product stewardship schemes around the world to identify the key characteristics of each and ascertain the effectiveness of differing models and approaches. From this, the intent was to analyse and compare these international approaches to the Australian management context and identify opportunities for enhancing end of life tyre management outcomes in Australia to improve the environmental, social and economic factors associated with this sector.

The management of end of life tyres is complex, however, approaches throughout the world share some fundamental principles. It is the contention of this report that developing and implementing an end of life tyre management solution needs to be contextually based upon the domestic ‘factors’ and ‘characteristics’ of a given region or territory such as geography, population, market conditions, regulatory instruments and political appetite.

There are many aspects of successful international approaches that can be drawn upon to enhance outcomes in the Australian sector. However, a uniquely Australian approach, that typifies the landscape, market, culture and political leaning, is fundamental for a tyre product stewardship scheme to succeed in Australia.

To achieve this, an essential starting point is to create a shared expectation and vision for waste tyre outcomes amongst key stakeholders including tyre importers, retailers, recyclers, government, end-users of tyre derived products and the community. With expectations and vision established, a tyres Scheme can then be ‘reverse engineered’ to utilise appropriate instruments and measures to deliver on the collective expectations for end of life tyre management in Australia.

This Churchill Fellowship report contains several recommendations to improve and enhance the existing approach to end of life tyre management and product stewardship in Australia. This is predominately based upon the content of ‘Chapter 7: Analysis’ of this report. The key recommendations can be summarised as:

• Undertake an analysis of the current capability and capacity of the end of life tyre sector to respond and manage the growing volumes of end of life tyres, now and into the future, in a cost-effective and environmentally sound way.

• Develop a strategic national approach between industry, government and the community to establish manageable expectations and a shared vision for end of life tyre management in Australia and then implement an appropriate model to deliver upon collective expectations.

• Continue market development activities to support existing and new end-markets for tyre derived products, through a coordinated national approach. In particular, through pursuing opportunities in key markets for tyre derived products.

• Investigate opportunities for regulatory reform and harmonisation to create consistency throughout Australian states and territories to support enhanced waste tyre storage, management and potential end markets.

• Develop effective tyre stockpile management approaches across Australia to prevent the emergence of future stockpiles and contribute to the recovery of resources from existing legacy stockpiles.

• Improve end of life tyre services throughout regional and remote Australia.

• Expand tyre product stewardship activities beyond passenger and truck tyres to the mining sector.

• See TSA assume greater regional leadership in the Asia Pacific region to develop a consistent approach with neighbours such as New Zealand and to better engage with end of life tyre destination markets including Singapore, Malaysia and India.

The observations, analysis and recommendations from my Churchill Fellowship journey are explored in greater detail in this document. The aim of this report and associated recommendations is to provide a realistic framework to address the challenges facing end of life tyre management in Australia with a view to ensuring a comprehensive and successful tyre management framework that benefits business, government and the Australian community.
3. ACKNOWLEDGEMENTS

My Churchill journey has been the highlight of my career and one of the best things I have ever done in my life. I am grateful, humbled and incredibly thankful for the opportunity the Churchill Trust has given me and am committed to playing an active role in providing benefit to the Australian community through using my Churchill experience in future endeavours.

I hope this report not only conveys technical and industry specific information to audiences, but also adequately represents the collegiate international community of dedicated people working together on this important global resource issue. I’ve always found that being productive and effective goes hand in hand with being happy and enjoying the people you work with. My Churchill experience has reiterated that to me even more.

While there were a great many people who were of assistance to me in arranging and undertaking this journey, there are some that went ‘above and beyond’ who I would like to thank specifically. These are:

- My referees Stan Krpan (CEO, Sustainability Victoria) & Peter Brisbane (Director of Waste & Stewardship, Federal Department of Environment)
- Tyre Stewardship Australia: The Board, management and my colleagues who supported this initiative... and covered for me while I was away!
- Jade, Kim & David Barnaby: Jade has been a great colleague and friend for many years now and her parents David & Kim were fabulous hosts when I was in Vancouver as part of this journey
- Peter Taylor from the UK Tyre Recovery Association. Peter has been a great help for many years since we both presented at the European Tyre Recyclers Association in in Brussels 2015. He assisted in planning and connecting with people and organisations around the world
- Mark Belshe from the Rubber Pavement Association in Arizona
- Calvin Young from CalRecycle
- Rosemary Sutton from Tyre Stewardship BC in Canada
- Andrew Horsman from Ontario Tyre Stewardship in Canada
- Mike Berry from the Scottish Government
- Jean Phillippe Faure & Richard Durbiano from Aliupur in France
- Jean Pierre Tavern from the European & Tyre Rubber Manufacturers Association
- Paolo Silva from Valorpneu in Lisbon, Portugal
- Jorge De Souza from Consulpav in Lisbon
- Chris Lorquet, the CEO of Recytyre in Belgium
- Mr. S.S Gusain from Bridgestone in India
- Vishal Bhandari from Gemini in Mumbai
- Karl Shanley from Sustainability Victoria for reviewing the report and being a great collaborator for many years
- My very supportive and inspiring wife Jamie Nelson!

While we worked hard, we also had a lot of fun. I hope this report reflects that. Things can get challenging at times when you’re travelling around the world (literally) spending a whole day (10 hours on more than one occasion) with people you’ve never met in foreign places. However, the inclusive nature of the industry and our shared interests and passion for the job made connections easy to make and good times easy to share.

My Churchill journey has demonstrated to me that the global waste tyre community we work amongst is full of inspiring, funny, intelligent and dedicated people all working in a common, important area. When faced with such an immense challenge (over a billion waste tyres around the world annually!), it’s important to have others to lean on and enjoy the challenge with.

Thank you to all the people who assisted me and made this journey possible.
4. **Key Words**
Tyres, product stewardship, recycling, waste management

5. **www.rubberevolution.com**

To communicate my travels to an Australian audience and engage with those I visited, I created a blog of my Churchill Journey called [www.rubberevolution.com](http://www.rubberevolution.com). It received over 50 comments and has had extensive viewings via my [LinkedIn](https://www.linkedin.com) account.

I created the blog to have a dialogue with friends and colleagues in Australia and around the world. It has been a most beneficial medium to communicate broadly on the issues I explored in my travels. It allowed me to speak more freely and from a personal perspective without reflecting directly on any particular organisations, companies or industries.

It was also beneficial for those who I was visiting too. After I’d posted on a few destinations, others were able to see where I’d been and understand the nature of my journey better. This created more of a willingness to participate and pose for photos too.

In this industry, we write a lot of content for reports and documents which can be rather structured and technical in nature. Doing this blog allowed me to find a different ‘voice’ and to write about industry subject matter from a more creative and personal perspective.

**Qualification & Clarifications**

*tyre vs tire:*
The word tyre is spelt differently in Australia and the UK than it is in many other parts of the world – where it is spelt as tires.

I therefore use the spelling of tyres throughout to be consistent. If tires is used, it refers to the same thing and is most likely a quote from a region where the alternative spelling is used.

*A tyre and an ‘equivalent passenger unit’ (EPU)*

When referring to tyre numbers, I am referring to the commonly used metric of tyre weight and volume known as an ‘equivalent passenger unit’ (EPU).

An EPU is 8kg which is the accepted standard weight of a waste passenger tyre (they’re 9 or 10 kg’s when new). A large truck tyre is 5 EPU (40 kg) and some earth movers, mining and ‘off the road’ tyres can be hundreds of (4-600 generally) EPU!

In Australia, we generate around 56 million EPU annually. That’s quite a lot for a population of around 24 million. One of the reasons for this is the fact Australia has so many mining tyres relative to the per capita population. Therefore, we have a large ratio of EPU per capita given that each mining tyre has such a large EPU rate relative to a standard passenger tyre.

For more information on EPU ratios, please see the TSA [website](http://www.tsa.com.au).

*Scheme*

When using the term Scheme, I am referring to a tyre product stewardship scheme.
6. CONTEXT
In Australia, we generate around 56 million end of life equivalent passenger tyres every year. Australian stewardship and associated initiatives to manage this vast resource are quite formative. Many international territories have programs that have been addressing this resource challenge for decades. Therefore, the intent of my Churchill journey was to meet, engage and learn from the best practitioners around the world to better support efforts to improve the environmental, social and economic factors associated with end of life tyre management in Australia.

I work at Tyre Stewardship Australia (TSA). TSA is a not for profit environment oriented industry association set up to implement the National Tyre Product Stewardship Scheme (the Scheme) to enhance outcomes associated with the disposal of end of life tyres in Australia.

TSA is funded by an Australian Competition and Consumer Commission (ACCC) endorsed 25 cent levy (per equivalent passenger tyre imported into Australia) paid by voluntary members of the Scheme by tyre importers Bridgestone, Yokohama, Pirelli, Michelin, Kumho, Goodyear Dunlop, Continental & Toyo Tires.

The payment of the voluntary levy provides funds to enable TSA to implement the following key activities:
1. Audit and accredit the waste supply chain
2. Promote the issue to industry and the community
3. Develop markets for waste tyre product

I’m the Market Development Manager at TSA. It’s my job to support the development of markets for Australian tyre derived product (TDP). This is based on the premise that we have no shortage of waste tyres and have adequate infrastructure to process them into secondary products (rubber shred, granules and powder as well as steel) that can be used as an input into new products (roads, explosives, polymers, playgrounds and alike) or processes (tyre derived fuels).

The real challenge with waste tyres is coming up with economically viable products that utilise tyre derived products in high enough volumes to consume the vast supply we generate annually whilst competing with existing conventional products both economically and performance-wise. We need to create more market demand for products that utilise Australian tyre derived product through diversified and enhanced markets. That’s my job as market development manager.

The Churchill Fellowship was a mind-expanding experience which has enabled me to better understand how we can more effectively approach this in Australia to deliver positive outcomes for the end of life tyre industry and the broader Australian community.

Additionally, the Churchill Fellowship enabled me to visit the best tyre product stewardship schemes around the world to identify the key characteristics that enable a robust and effective end of life tyres management system. This perspective has provided an incredible context to analyse where we’re at in the development of initiatives in Australia to identify mechanisms to improve outcomes locally.

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7. Analysis

Upon my return to Australia, I’ve often been asked; ‘what’s the one thing you learned that we can use to ‘solve’ the waste tyre problem in Australia?’ One of the more ‘cryptic’ responses I have for that question, but one which illustrates the learnings from the experience well, is to say:

*To see the house you live in, you’ve got to step outside it*

In simple terms, the ‘one thing’ I have taken with me from the Churchill journey is the perspective to see the many parts that constitute the Australian end of life tyre market in context.

There is no one thing we can do to ‘solve’ the waste tyre problem. The contention of this report is that there are many factors and characteristics that constitute an end of life management system. It is the manner in which these are aligned that determines the effectiveness of a system in delivering positive end of life tyres outcomes.

Key Learnings

The ‘key learnings’ I have taken out of the journey are quite simple, but far reaching in their implication. These are summarised as follows:

- There’s no ‘one thing’ that we can implement in Australia to ‘solve the tyre problem’... Unfortunately!
- Each territory (country, state or region) needs to address the unique challenges and opportunities they have in a manner that is appropriate to the context in which they operate
- There are fundamental principles and factors that underpin successful approaches
- Australia is unique. We therefore need a uniquely Australian approach that is built upon the characteristics that typify the Australian landscape, market, culture and political leaning
- We as Australians need to draw upon international experience and enhance our approach to deliver a more effective management framework
- The starting point for this is to create a shared expectation and vision for waste tyre outcomes amongst key stakeholders (importers, retailers, recyclers, government, end users of tyre derived products and the community)
- Based upon the realities of the Australian context (geography, population, market provision and orientation, political leanings and regulatory instruments available) an enhanced structure needs to be created (a tyre product stewardship scheme) that can deliver on the Australian vision for a successful tyre management framework.

The current Australian approach has high expectations in terms of the performance objectives and outcomes key stakeholders have for waste tyre management in Australia. However, this is not matched by the strength of the Australian tyres product stewardship scheme and associated regulatory and program support mechanisms required to deliver on these expectations given the challenges of implementing a cohesive program in Australian conditions.

If there is one thing a successful Australian tyre product stewardship scheme (Scheme) must deliver, it is effective collection (particularly in regional and remote areas) and processing of tyres to mitigate unmanaged stockpiling and the social, economic and environmental cost this entails. As Australia is subject to bush fires, unmanaged tyre stockpiles present an unacceptable risk to communities.

The current tyres management framework (including the tyre product stewardship scheme, regulations and market provisions) has not demonstrated that it can deliver as effectively as industry, the community and government expect in this regard in the short time it has been in operation. Until this occurs, the current approach requires further development.
Key Influencing Factors

As the body of this Churchill Report attests, each destination I visited exemplifies elements that determine the outcomes associated with the management of waste tyres in a given territory or jurisdiction. In this report, I talk in depth about each destination I visited and the key learnings they provide. From each of these destinations, I have identified key influencing characteristics that determine the structure and performance of Schemes around the world.

There are several key influencing characteristics that determine the effectiveness of a Product Stewardship Structure. Diagram 1: Relationship of Key Influencing Factors below represents the Key Influencing Factors (KIF) areas and the relationship they share to each other.

KIFs are presented from the broader national context (Geography & Population) down to the more specific elements (‘Organisation/Scheme Structure).

![Diagram 1: Relationship of Key Influencing Factors](image)

The reason these relations are portrayed as such is quite simple:

*It’s important to articulate the broader contexts in which a Scheme operates. No Scheme operates in isolation. All Schemes are a product of the geographic, market, regulatory and political landscape in which they operate. As such, each Scheme needs to be harmoniously aligned with these factors to create a functional operating framework that delivers positive outcomes.*
**Key Characteristics**

Within each Key Influencing Factor, there are several ‘Characteristics’. These ‘Characteristics’ encapsulate the context, structure and performance of the Schemes in the territories I visited.

Table 1 below is a ‘key’ to explain how to interpret ‘Characteristics’ detailed in Table 2:

<table>
<thead>
<tr>
<th>Category</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item number</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td><strong>Influence Factor</strong></td>
<td>The type of factor that influences the Product Stewardship Structure. These are presented from the larger/broader national characteristics that typify the context in which a waste tyre management system operates in. The ‘Influence Factor’ then gradually works down the table to more specific elements of the ‘Scheme’ itself. That is, we start with: 1. the Geography &amp; Population of a territory. 2. how the geography and population determines the Market 3. following from this is the political context and philosophy, which leads to 4. the principles of an Implementation Framework. 5. Finally, these factors culminate in a representative Organisation that implements a Scheme or programme. As we progress down the table, we go from the broader context to the specifics of a scheme and program. This is also reflected in Diagram 1 which goes from the broader context (Point 1 above) through to the specifics of the Scheme (Point 5). The contention of this report is, that these factors need to be aligned to create a successful and well implemented Scheme.</td>
</tr>
<tr>
<td><strong>Characteristic</strong></td>
<td>Within each Influence Factor, we then have several more specific characteristics. These factors are common to all tyre management schemes. However, the context and influence of each varies with each territory. Therefore, so too should the resultant scheme or program.</td>
</tr>
<tr>
<td><strong>Characteristic Description</strong></td>
<td>Self-explanatory.</td>
</tr>
</tbody>
</table>
Table 2: Key to factors and characteristics

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Influence Factor</th>
<th>Characteristic</th>
<th>Characteristic Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Geography &amp; Population</td>
<td>Distribution of population and associated feedstock</td>
<td>Economies of scale due to population and feedstock distribution (collection service)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Economies of scale</td>
<td>Demand for service or product to justify investment and/or service provision</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Comprehensive and inclusive collection system</td>
<td>The extent to which the collection system encompasses and services the entire territory</td>
</tr>
<tr>
<td>4</td>
<td>Market Factors</td>
<td>Good information</td>
<td>Understanding of the market from participants, stakeholders &amp; regulators</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Price transparency</td>
<td>Clarity at transaction points for the type of service provided</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Sectoral relationships</td>
<td>The extent to which elements of the supply chain are engaged around factors that influence other participants</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Appropriate and effective investment support mechanisms</td>
<td>Diverse, integrated &amp; appropriate investment mechanisms to support a strong tyre recovery and consumption markets</td>
</tr>
<tr>
<td>8</td>
<td>Political &amp; Regulatory Context</td>
<td>Political Orientation/Philosophy</td>
<td>The political ' leaning' of a territory and the extent to which a responsible authority will intervene</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>Political Coordination and integration</td>
<td>The extent to which governments coordinate activity to create a cohesive and supportive regulatory and market context for business</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Regulatory context &amp; strength</td>
<td>The extent of the regulatory framework and strength of implementation to support the function of market</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Policy framework and strength</td>
<td>Closed loop/Circular economy principles and adherence to the 'Waste Hierarchy'</td>
</tr>
<tr>
<td>12</td>
<td>Implementation Framework</td>
<td>System 'inclusiveness'</td>
<td>The strength of the 'incentive' or mandate to participate in the Scheme</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>Framework principles</td>
<td>Closed loop/Circular economy principles and adherence to the 'Waste Hierarchy'</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>Cohesive Vision</td>
<td>The extent to which all market participants (recyclers, government and tyre importers) have a shared understanding and vision for the expectations of the Scheme</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Agility &amp; flexibility of model and structure</td>
<td>The manner in which an organisation is structured and able to respond to changes in conditions or circumstance</td>
</tr>
<tr>
<td>16</td>
<td>Organisational/Scheme Factors</td>
<td>Organisational Orientation</td>
<td>The extent to which the the operational instruments of the Scheme are aligned to performance expectations/measures (aligned to Point 14 - Cohesive Vision)</td>
</tr>
<tr>
<td>17</td>
<td></td>
<td>Governance Strength</td>
<td>The ability of the governance structure to effectively support the requirements of the organisation/Scheme</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td>The ability of the administrative structure to effectively support the requirements of the organisation/Scheme</td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td>Open and transparent financial management system</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>Responsive and engaged</td>
<td>Engagement of the organisation with important stakeholders and ability to accommodate differing demands and expectations</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td>Performance</td>
<td>Extent to which the Scheme meets performance objectives</td>
</tr>
</tbody>
</table>
Implications for Australia
The following commentary discusses the relationship of the Australian context to the elements represented in Table 2. It highlights that there are several ‘Key Influencing Factors’ and associated ‘Characteristics’ within the Australian end of life tyre management landscape that pose significant challenges to delivering a strong and comprehensive management regime.

Geography, Population & Associated Market:
In many of the destinations I visited in the UK and the USA there is a high concentration of population relative to the size of that territory. This consolidated market (high population in smaller areas) enables the conditions to underpin a market based approach. That is, given the high population in concentrated areas, there is sufficient demand for waste tyre collection services to underpin investment in services and infrastructure. This provides good service coverage, demand for waste material and a competitive market.

On the other hand, Australia is a massive land mass with a very sparse population (aside from the east coast major cities). As with all waste markets, this creates challenges due to a lack of economies of scale to underpin viable collection service provision requirements in regional and remote areas.

Therefore, more needs to be done with service provision to support feedstock collection in regional and remote areas. As the market cannot efficiently provide such service provision, additional mechanisms need to be considered if stockpiling and lack of service provision is deemed collectively to be an unacceptable outcome.

The Canadian examples provide an excellent reference point in this regard given their shared political, geographic and population challenges to Australia. Canada has some of the most ‘overt’ collection support mechanisms based upon high up front ‘eco-fees’. These upfront ‘eco-fees’ ‘distribute’ the costs associated with effective waste tyre management across the supply chain. The extended producer responsibility (EPR) model that typifies the ‘European’ approach also represents examples of such models, although not so overt. Regardless of the reference point, given the geographic challenges of end of life tyre collection in Australia, stronger models and mechanisms need to be considered if the current collection and stockpiling issues are to be overcome.

Market Factors
The Australian market for waste tyres is structured around an extensive land mass and small population. As such, there is a distributed population without the economies of scale to underpin investment in waste tyre collection and markets predicated on tyre derived product (TDP) consumption. This manifests in the following aspects of the end of life tyre and tyre derived product markets:

Collection
There aren’t the economies of scale to underpin comprehensive collection service provision in remote areas. This leads to dumping and stockpiling as the high cost of disposal and management incentivises unmanaged disposal.

Consumption
As the roads example in California exemplifies (of around 40 million people in the sixth biggest economy in the world – see page 19 of this report), a consolidated market increases the uptake of TDP. Government can lead and be more likely to legislate activities (such as mandated use of crumb in roads) when industry can invest with a surety of long term demand to justify investment.

Australia has segmented markets along the east coast. This lack of consolidated markets means investment in long terms infrastructure to service ‘emerging’ and ‘boutique’ TDP markets that require specific investment and niche applications, reduces service provision and demand.
Given this, Australia needs to create coordinated national programs and strategies to facilitate such investment on a national scale. This investment needs to be underpinned by principles such as the ‘circular economy’ (as is the case in with the EU) and be integrated into government policy and procurement practices.

TSA and the governments of Victoria, NSW, Queensland & WA have invested in the creation of the ‘National Market Development Strategy for Used Tyres’. This strategy (completed and approved but yet to be published at the time of writing) provides a sound basis for collaboration in the areas highlighted above moving forward.

Political Context
Australia has come a long way in the last five to ten years in terms of initiatives to manage end of life tyres. The Federal Government and the tyre importers should be commended for the progress that has been made with the creation of TSA and the momentum this has initiated more broadly in government and industry. The creation of TSA is a significant and important step in establishing a structure and forum for initiatives in Australia and the region.

However, the voluntary nature of TSA and the fact that the Scheme does not fund collection, processing and support recycled tyre product markets directly puts Australia at odds with other territories (namely Canada) that share similar geographic, population and market challenges as Australia.

There are several reasons for this. One of which is the fact that a market based approach is currently preferred by the Australian Federal Government and many current State governments (although not all). Additionally, waste is predominately managed by the States in Australia – there is little direct Federal government responsibility. There is a Product Stewardship Act that provides a framework for States to work collaboratively on nominated waste streams (such as tyres, batteries and paint) that are a priority issue. However, there is a lack of drive from the Australian Government to regulate participation in waste product stewardship schemes.

There is only one mandatory Australian product stewardship scheme that ensures universal participation (the Product Stewardship for Oil Program). While waste Schemes in Australia are voluntary, the mechanisms, participation rates and resource leverage Schemes have available will be compromised relative to the reach of mandatory models. There may be individual States willing to regulate, however, small state-based product stewardship Schemes are hard to administer and have limited reach.

Implementation Framework
The geographic, market and political context in Australia provides the following key factors that underpin the implementation framework for end of life tyre management in Australia:

- a market-based approach is preferred by most stakeholders
- there is little appetite to regulate participation in a Scheme nationally
- there is no drive for tyre importers to pay additional product stewardship levies to extend the scope of the Scheme given the current voluntary framework (because of the unfair advantage to ‘free riders’)
- States would have limited scope in implementing an independent tyre product stewardship scheme
- there are no coordinated regulations nationally

Organisational/Scheme Factors
As represented in Diagram 1, the resultant tyre product stewardship scheme sits within the geographic, market, political and resultant implement framework context. These factors have determined that Australia has a product stewardship scheme that is:
- voluntary to participate in terms of the financial contribution to fund the Scheme
- does not charge an ‘eco-fee’ or manage collection and/or recycling
- has little leverage to impact the mitigation and removal of stockpiles (particularly in regional and remote areas)
- is focused on research and development to enhance productive utilisation of end of life tyres (as opposed to using an ‘eco-fee’ to pay or subsidise recycled tyre product utilisation)
- has voluntary participation in end of life supply chain (collection, recycling)

**Conclusion:**

Australia is a very challenging environment to cost effectively manage waste tyres and associated risks. Great progress has been made to create a framework to manage this via Tyre Stewardship Australia. The availability of funds for research and development, implementation of end of life supply chain accreditation audits and the maturity of the industry dialogue has improved the sector markedly over the five years TSA has been in operation.

However, the first 5 years of TSA should be viewed as foundational in the commencement of a longer journey. While TSA is a good start, the current framework is compromised in its ability to meet the expectations of community, industry and government stakeholders given the geographic and associated market challenges Australia must confront.

Australia has a Scheme that is set up in a manner that is reflective of what Scheme stakeholders (government, the community and industry) are willing to accept in terms of the imposition it places upon ‘business as usual’ (no scheme) conditions. However, what stakeholders expect of the Scheme requires substantially more overt mechanisms to deliver.

If I was to summarise the current Australian tyres management framework in a simple ‘formula’ it would be:

\[ \text{Accept} \neq \text{Expect} \]

This means: What Scheme participants will collectively accept in terms of the imposition of a regime for end of life tyre management in Australia does not equate to the outcomes stakeholders expect.

Until this can be reconciled, the implementation framework we have will not align with the geographic and market realities we face in Australia. This will continue to result in a market failure and pose risks to the community, industry and government via the mismanagement of end of life tyres.

Other countries have shown that these risks can be successfully managed in equally challenging environments. However, the implementation of such initiatives comes through substantial co-ordination, commitment and cost.

Are we willing and capable of taking the next step in Australia? My Churchill journey has shown me that all the ‘successful’ schemes around the world had to start somewhere. We’ve done the hardest part in Australia by starting. The question is now about where we go from here.

**Recommendations**

Based upon my visitation of the many destinations on my Churchill journey, Table 3: Recommendations (over page) contains recommendations for activities to be considered to assist in the development of the Australian end of life tyre sector.

While I believe there are some substantial structural changes that need to occur to deliver better and broader outcomes for the Australian waste tyre sector, I believe Australia has a strong foundation to build upon. The recommendations in Table 3 offer some manageable activities that can bring together
important stakeholders and provide better information to inform collective decision making. These recommendations will facilitate the creation of a shared understanding and vision for the Australian sector – an essential starting point for collaborative efforts moving forward.

Table 3: Recommendations

<table>
<thead>
<tr>
<th>Number</th>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>National Waste Tyre Management Strategy</td>
<td>A process that engages with government, community and industry stakeholders in Australia and associated territories that creates a shared vision for standards in relation to waste tyre management. The creation of shared expectations can then underpin the formulation of performance measures and strategies to achieve these expectations. The Australian Scheme can then be oriented to implement activities to achieve these objectives.</td>
</tr>
<tr>
<td>2</td>
<td>Industry Capability Analysis</td>
<td>The TSA model is predicated on a market based approach. The expectations of TSA in terms of the performance measures it is expected to achieve are very high. However, there has been little analysis of the capability and capacity of current service providers to collect and process Australian tyres in a cost effective manner. Additionally, there has been no analysis of the extent to which current TSA mechanisms can realistically achieve the objectives of the organisation (which are reflective of stakeholder expectations). Therefore, an analysis of current industry capability relative to the implementation mechanisms TSA has available is required to ascertain the capability of the Scheme and market to deliver the expectations required of it.</td>
</tr>
<tr>
<td>3</td>
<td>Market Development Strategy</td>
<td>This has already been created via a co-funded collaboration between TSA and the governments of Victoria, Queensland, NSW and WA. More work needs to be done in the implementation of this initiative.</td>
</tr>
<tr>
<td>4</td>
<td>National Regulations Working Group</td>
<td>There is a lack of coordination and synergy between State regulatory frameworks. A closer alignment would assist in administration and implementation of more consistent practice across the country. Further integration of reporting protocols and data reconciliation could also be considered. Longer-term goals around harmonisation of regulations can also be considered.</td>
</tr>
<tr>
<td>5</td>
<td>National Stockpile Analysis</td>
<td>Currently there is no data on analysis that quantifies and categorises legacy stockpiles. Work is required to understand where stockpiles are located and create a map of these locations (confidentially). Each stockpile should then be categorised. The costs associated with clean-up can then be undertaken (individually and regionally). The regulatory basis for intervention on each can be assessed. The intersection of roles and responsibilities and coordinating methods to address associated issues also analysed. Finally, a national business case for action is proposed using a cost benefit analysis.</td>
</tr>
<tr>
<td>6</td>
<td>Creation of a separate organisation for stockpile management</td>
<td>As per the Recycler example in France, Australia could consider the creation of an organisation specifically set-up to clean up stockpiles. In doing so, the responsibility for historical stockpile remediation can be ‘externalised’ to a separate non-industry/government organisation. Once the task has been addressed, the organisation can be folded, thereby not encouraging further stockpile creation.</td>
</tr>
<tr>
<td>7</td>
<td>Regional service provision analysis</td>
<td>There is obviously a lack of extensive service collection in regional and remote areas. Analysis is required to map the current distribution of the services, identify the failures in service provision and identify mechanisms to support regional collection efficiency.</td>
</tr>
<tr>
<td>8</td>
<td>Recycling Efficiency Options</td>
<td>Australia being a large and sparsely populated landmass has challenges effectively collecting and transporting waste tyres efficiently. Therefore, an analysis of current logistics routes and collection hubs that identifies current service provision as well as gaps would be beneficial. From this, business models and infrastructure that supports greater efficiency and service provision could be proliferated through funding and other support mechanisms.</td>
</tr>
<tr>
<td>9</td>
<td>Industry assessments in key tyre derived product consuming areas</td>
<td>Individual market assessments are required to identify potential market uptake in key sectors. The National Market Development Strategy for Used Tyres focuses on Roads &amp; Rail. More work needs to be done in the concrete, polymer, carbon, infrastructure and moulded product sectors.</td>
</tr>
<tr>
<td>10</td>
<td>Mining Sector Analysis</td>
<td>TSA currently works in the passenger and truck tyre sectors. No headway has been made into the mining sector. More work needs to be undertaken in this sector to ascertain the current market, barriers to entry and the scope for leveraging outcomes.</td>
</tr>
<tr>
<td>11</td>
<td>Greater Regional Leadership</td>
<td>TSA has become a focal point for the development of the industry in Australia. However, TSA could do more to become a hub for activities in the Asia Pacific. This is particularly so with NZ and large end of life destination markets such as Singapore, Malaysia and India.</td>
</tr>
<tr>
<td>12</td>
<td>Downstream Vendor Analysis</td>
<td>TSA needs to undertake substantial work to align Australian reporting and verification methods with international organisations and processes. The example in India demonstrated that there are existing industry and government bodies aligned to TSA objectives for enhanced environmental outcomes for waste tyre utilisation. Therefore, an analysis of all major destinations for Australian waste tyres needs to be undertaken to identify key stakeholders, regulations and processors to ensure Australian verification systems are aligned with the ‘downstream’ markets.</td>
</tr>
</tbody>
</table>
### 8. Programme

Table 4 below outlines the destinations and contacts I visited in my travels for this project.

<table>
<thead>
<tr>
<th>Destination</th>
<th>Contact</th>
<th>Dates Visited (2017)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona, USA</td>
<td>Mark Belshe (my fine host) from the Rubber Asphalt Pavement Association</td>
<td>May-30</td>
</tr>
<tr>
<td></td>
<td>Arizona Department of Transport</td>
<td>Jun-03</td>
</tr>
<tr>
<td></td>
<td>Crumb Rubber Manufacturers: Tyre recyclers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Holly Frontier &amp; Alon: Asphalt binder producers</td>
<td></td>
</tr>
<tr>
<td>California, USA</td>
<td>Calvin Young and the CalRecycle team</td>
<td>3-Jun</td>
</tr>
<tr>
<td></td>
<td>Chuck Suzcko of Caltrans (Californian Transport Authority)</td>
<td>10-Jun</td>
</tr>
<tr>
<td></td>
<td>University of California Davis Pavement Research Centre: Dr. David Jones</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brian from the National Blending Company &amp; Mike from Syar Industries (asphalt binder producers)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tire Recycling &amp; Disposal in Stockton: Ricardo</td>
<td></td>
</tr>
<tr>
<td>Vancouver, Canada</td>
<td>Rosemary Sutton from Tyre Stewardship British Columbia was my fine host</td>
<td>10-Jun</td>
</tr>
<tr>
<td></td>
<td>Bob Pitr from Western Rubber Products</td>
<td>14-Jun</td>
</tr>
<tr>
<td>Toronto, Canada</td>
<td>Andrew Horsman, CEO, was my host at Ontario Tyre Stewardship. Claudia Hawkins (Director of Promotion and Education) &amp; Steve Gluckowski (Operations Manager) also showed me around</td>
<td>14-Jun</td>
</tr>
<tr>
<td></td>
<td>Crumb Rubber Manufacturers: Ontario</td>
<td>17-Jun</td>
</tr>
<tr>
<td></td>
<td>Carmelina Macario - Program Lead, WEEE &amp; Used Tyres</td>
<td>22-Jun</td>
</tr>
<tr>
<td>London, England</td>
<td>Peter Taylor: Director of the UK Tyre Recovery Association</td>
<td>17-Jun</td>
</tr>
<tr>
<td></td>
<td>Paul Hallett from the Department of Environment Food &amp; Rural Affairs (DEFRA)</td>
<td>22-Jun</td>
</tr>
<tr>
<td>Edinburgh, Scotland</td>
<td>Mike Berry from Zero Waste Scotland</td>
<td>22-Jun</td>
</tr>
<tr>
<td>Lyon, France</td>
<td>Aliupur: Jean Phillipe Faure &amp; Richard Durbiano were fine hosts for my visit to beautiful Lyon.</td>
<td>24-Jun</td>
</tr>
<tr>
<td>Brussels, Belgium</td>
<td>European Tyre Rubber Manufacturers with Jean Pierre Tavern</td>
<td>28-Jun</td>
</tr>
<tr>
<td></td>
<td>Recyctyre: The Belgian Scheme where Chris Lorquet, the CEO was a fine host.</td>
<td>Jun-02</td>
</tr>
<tr>
<td>Lisbon, Portugal</td>
<td>Valorpneau with Paolo Silva</td>
<td>2-Jul</td>
</tr>
<tr>
<td></td>
<td>Dr. Jorge B. Souza of Consulpav. A great proponent of rubber in roads around the world, particularly in California &amp; Portugal</td>
<td>12-Jul</td>
</tr>
<tr>
<td>Mumbai &amp; Pune, India</td>
<td>Bridgestone India: Mr. S. S Gusain was my host in Pune</td>
<td>12-Jul</td>
</tr>
<tr>
<td></td>
<td>Mr. Vishal Bhandari from Gemini Corporation was my host in Mumbai. Gemini were very helpful in planning my trip too.</td>
<td>19-Jul</td>
</tr>
</tbody>
</table>

Table 4: Destinations and contacts
9. **THE JOURNEY**

**Arizona: Rubber hits the road**

I had a most enlightening time in Phoenix Arizona with Mark Bleshe of the Rubber Pavement Association ([http://www.rubberpavements.org/](http://www.rubberpavements.org/)). Mark was an exemplary host, creating an action-packed agenda that included Crumb Rubber Manufacturers (a tyre recycler), Arizona Department of Transport (ADOT) and asphalt and binder manufacturers Alon & HollyFrontier.

Overall, the combination of these destinations and the expertise of Mark provided a comprehensive overview of the life cycle of rubber when used as an input into road manufacturing in Arizona.

First off, we visited the high-quality tyre crumb rubber manufacturing site called Crumb Rubber Manufacturers (funnily enough). Dawn Helms was our host and has been in the industry for nearly 2 decades and is a wealth of information. Key points of note from this site visit include:

- At this plant (they manage 4 or 5 in Arizona and California) they process around 500 tonnes a day of tyres into rubber crumb for roads and sports fields with a mixture of ambient (grinding) and cryogenic (frozen) deconstruction methods
- The primary end markets are (roughly) 50% asphalt and 50% turf (sports fields)
- There is a mandated $2 disposal fee paid by the consumer which is used to cover State costs to dispose of the tyres. This is managed by the Arizona Department of Environment Quality.
- According to Dawn and Mark - there is no commercially operating, high volume pyrolysis plant operating in the region (Arizona/California)

As an interesting side note, Mark Belshe informed me that a few years ago, the local market in Arizona was inundated with demand for tyres at a low cost for international markets. This was mainly to Asia to meet TDF demand (which is where much of Australia’s tyres go). It was of great concern in the USA as it was beginning to undercut the ‘gate fee’ for local processors (the fee the recyclers get to process tyres). A study was commissioned to ascertain the factors which were leading to this increased demand in Asian markets. The study found that the biggest determinant for the demand for US tyres to Asia was the price of coal in Australia! We truly live in a global market.

Mark and I spent a great day with Bill Malaby from HollyFrontiers, an independent oil refiner and asphalt binder provider. The product Bill and his team provide is pre-mixed in the facility pictured below. You can see the black bags of rubber on the truck that are then added to the hopper (above Mark’s red helmet), then mixed at a high temperature with the bitumen to create a crumb rubber binder.

![Mark Belshe of the Rubber Pavement Association (red hat) with Bill Malaby from HollyFrontiers - an asphalt binder supplier](image)

Once Bills’ product leaves his site, it’s taken to another facility where the binder is mixed with aggregate to be utilised on Arizona roads. Bill and his team have an exceptional product created in a controlled environment with a high degree of monitoring and management. The implementation of techniques such as these provide a valuable insight into possible applications in the Australian market.
'How do they make it work in California?'

It's a question I've heard and asked a lot. To begin to understand the factors that are in place to support such the extensive and successful program they have in place, I visited the following Californian destinations:

- Sacramento: CalTrans, CalRecycle
- Davis: University of California Davis
- Napa Valley: National Blending Company, Syar Industries & The Franciscan Estate, Prison Wine Company!!!
- San Francisco: My port of call in and out. And what an awesome port it is too

When I first envisioned my Fellowship journey, California was top of the list for destinations I’d like to visit. After spending a few days with Calvin Young (my most excellent host & sommelier), Nate and the rest of the Calrecycle team (some of which are pictured below), I was thoroughly enlivened and inspired by the team and approach they have in California. The learnings from here are already proving to be a great resource upon my return to Australia. I look forward to further interactions and collaborations with our Californian colleagues.

Left to right: Some of the CalRecycle team: Chris, Jim, Calvin, Me (honorary for the day!), Nate, Melissa & Noel

California generates around 42 million waste tyres a year with approximately 35.8 million of those tyres (80.9 percent) diverted through various alternatives, including reuse, retreading, and combustion⁴.

Nate informed me that the California program started with a 25 cents per passenger tyre unit fee when it commenced in 1997 before they graduated to $1 a tyre in 2001 after a few big tyre fires broke out (media and political pressure is a powerful thing isn’t it?).

Just by chance, 25 cents is the exact same levy per passenger tyre for the Tyre Stewardship Australia (TSA) scheme! It's a simple thing, but coming from such a small team and working in the TSA 'start-up' environment, it was heartening to gain an insight into how a program of such scale and success came about. One of the biggest insights from this visit is: We've all got to start somewhere!

We've a long way to go in Australia and the extent of the challenge can be rather daunting at times (when you consider there's 56 million equivalent passenger tyres generated annually in Australia). Therefore, seeing CalRecycle in action made me more willing to accept the Australian challenge with a larger perspective in mind.

⁴ [http://www.calrecycle.ca.gov/tires/overview.htm](http://www.calrecycle.ca.gov/tires/overview.htm)
Calvin Young, the CalRecycle tyres team leader, is a man of many ideas who has been at the helm of a number innovative market initiatives. Although based in a government organisation, Calvin has used his extensive back ground in financial systems and accounting to create some innovative funding models and systems.

Aside from financial systems, one of Calvin’s other great ideas was to meet in the Napa Valley for lunch. More meetings at wineries I say! The food was outstanding. Calvin’s son Brett is the executive Chef of the Franciscan Estate, The Prisoner Wine Company. Man, did we get looked after!

It was back to business the next day in Stockton. No wineries in Stockton - that is for sure! It was a real pleasure to have Ricardo Soto (General Manager) show us around the tire disposal and recycling facility called Tire Disposal & Recycling (believe it or not).

It was great to see because you can sometimes get the impression that in places like California, it’s all high end, refined product for roads and crumb markets. But even the Californian market needs players like Ricardo and his team to keep the high, continual flow of waste tyres generated daily moving through the system. We have similarly oriented businesses in Australia and these companies do a great job in managing tyres safely too.

CalTrans

One of the most insightful meetings I had was with a road engineer (who’d of thought?) Chuck Suzcko of Caltrans - the Californian transport authority. Chuck has been in the game for 33 years and was
formerly the Office Chief of Construction Engineering. He’s seen it all… on numerous occasions and then some!

Action shot! Chuck with the Caltrans spec’s for rubber in roads. We’d love to get these in place in Australia. Since this visit, momentum is gaining to achieve that goal too.

According to Chuck, the crumb rubber in roads initiative started in California in the 70’s, but he became involved in a few projects in the 90’s. For Chuck and Caltrans, the desired outcome they were seeking was in utilising rubber in the pavement wearing course (asphalt top layer) to stop cracking ‘reflecting’ up from the lower, concrete base – a common issue with roads in the region. The work they did (and many studies subsequent to that) quantified the benefit crumb rubber provides in such applications (more on that a bit later).

Meanwhile, tyre stockpiles had become a problem in California with two significant fires in Tracy (1998) and Westley (1999). Additionally, tyres were accumulating from a lack of demand for product generated from local recyclers due to cheap imports (some of which was from Canada... my next destination).

This created a situation where there was a resource and environmental problem related to accumulated tyres, the use of which are a by-product of the roads industry. Added to this was the fact that the road network can benefit from the productive use of this ‘problematic’ material to make better roads. There was therefore an impetus to create a ‘closed loop’ scenario where the industry that contributed to the resource issue could also contribute to the solution to the betterment of their own assets.

Given the political and performance drivers, Chuck informed me that in 2004, Assembly member Lloyd Lavine brought Bill 338 to the California State Assembly. This formed the basis of the Public Resource Code 42703 which provided a directive to CalTrans to specify crumb rubber in roads in particular circumstances.

Politics meets engineering meets environment. The ultimate win/win/win!

However, while we can have all the best political, engineering and environmental intentions in mind - you really need to be able to quantify benefit and measure performance to create prolonged and effective change. This is where Dr. David Jones of University of California Davis (UC Davis) Pavement Research Centre comes into the equation.
University of California: Pavement Research Centre: Davis
The UC Davis team, led by David, have been commissioned by several authorities, including CalRecycle & Caltrans, to undertake an incredible amount of research at their facility just outside of Davis. Starting as a farm field in 2009, the team has over 17 staff and some of the best equipment of its kind in the world (including gear made in Melbourne).

David and his team have thoroughly investigated crumb rubber use for the last 8 years and continue to do so. Many of the questions we ask as an industry in Australia have been addressed by the research of his team. This includes assessing the performance benefits of crumb rubber roads, perceptions of fuming and smell, mix designs, sound benefits and the use of recycled rubber roads when they’re recycled.

Subsequent to my visit, TSA hosted David in August at the 2017 Australian Asphalt Pavement Association conference, in August in Melbourne. David presented to road engineers in Australia on the Californian experience, met with representatives from the Victorian road authority (VicRoads) and has created extensive networks that we hope to build upon to further learnings in the Australian rubber in roads sector moving forward.

'David Jones (right) with Brian (National Blending Company) & Mike (Syar Industries)

'How does it work in California?'
So, going back to my initial question: 'How does it work in California?'.

These things are rarely clear cut - and I’m loathe to make it sound simple as such things are nuanced and complex. But given I asked the question up front, I should at the very least provide some sort of proposition. My initial take is:

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. This framework is 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.

Canada
With waste tyre management, the potential benefits a program can deliver is predicated on what the government, industry and stakeholders of a given region are willing to accept.
The Canadian schemes I visited only accept a comprehensive system that collects all tyres and deliver high value processing outcomes.

Such programs don’t come cheap, but they Canadian schemes of British Columbia and Ontario have been willing to pay what’s required to deliver on community and stakeholder expectations.

However, expectations can change in complex management environments and change is afoot in the Canadian market – particularly Ontario. As such, I was privileged to visit at a critical juncture in the evolution of the Canadian waste tyre market which provided a great perspective on end of life tyre management systems.

On my Canadian tyres odyssey I had the pleasure of visiting 2 prominent schemes:

- The Tyre Stewardship British Columbia (TSBC), based in Vancouver & Vancouver Island where Rosemary Sutton showed me the TSBC ropes
- The Ontario Tyre Stewardship Scheme (OTS) where Andrew Horsman and the team showed me how tyre management works in Toronto and the surrounding territory

**Tyre Stewardship British Columbia**

To begin with, I met with Rosemary Sutton of Tyre Stewardship British Columbia (TSBC). Rosemary was a great support for me in planning my journey and went out of her way to provide a valuable insight into the unique local tyres scene in BC.

TSBC started as a government Scheme in 1991 and remained so until 2006. They then became an Extended Producer Responsibility set-up (EPR - where the original equipment manufacturers take responsibility for the management of the waste stream - a type of model that is prevalent in Europe) in 2007. TSBC is the not for profit company set up to administer the management of the 4.5 million waste tyres generated across BC annually.

Key characteristics of this program are that there are no (direct) disposal fees to consumers. For every new tyre sold, the retailer remits to TSBC an Advance Disposal Fee (ADF), commonly referred to as an eco-fee. This is a fee of $5 per passenger tyre and $9 for medium truck tyres increasing as the tyres increase in size. The eco-fee is then used to pay for tyre collection and to incentivise processing and the consumption of recycled tyre product.

I can hear the recyclers in Australia crying as they read those numbers - what they wouldn't give for gate fees equivalent to this!!! Coming from Australia where the disposal cost is a ‘market arrangement’ between businesses that can be as little as less than $2 per tyre (which is the same arrangement as in the UK) - the Canadian eco-fee is quite a substantial amount relatively speaking. However, this amount must be viewed in terms of the total waste tyre supply chain support it gives for collection as well as processing and consumption of recycled tyre product.

To learn more about the collection system and the logistics associated with this, Rosemary and I met with Bob Pitre of Western Rubber Products (owned by Liberty Tire Company - a large recycling company who own many sites across the US and Canada).
Bob informed me of the challenges they have with tyre collection in BC. BC is 5 times the size of Texas (which is big apparently) with 3,300 registered ‘generator’ sites. Bob has set up an ingenious ‘reverse logistics’ system where they deliver 15 ton branded trailers regionally. They are then filled over time to be brought back for processing once they’re full. Simple really. And something we should consider for the Australian market given the challenges we face with dispersed tyres and the lack of aggregation in regional areas.

Once returned to the processing site, Bob and the team process tyres into crumb and mulch for products such as matting, safety equipment and sports fields. They process around 45,000 tons annually (which is around 10% of what Australia produces in a year).

In addition to the substantial amount contributed to subsidise the ‘universal’ collection and transportation system, interestingly, TSBC also pay to incentivise both ‘Processing’ of tyres and the consumption of recycled tyre product via ‘End User’ incentives. These can be as much as $370 per tonne for highly refined ‘powder’ and as low as $69 per tonne for tyre derived aggregate (cue Australian recycler gasps here).

The current TSBC system allows for commercial arrangements for all tyre management to be solely administered by TSBC. TSBC then create contractual arrangements with processor(s) to collect, process and reuse the tyre products the scheme collects. Given that there is a limited feedstock in BC, there are currently a small number of service providers. However, with increasing globalisation in markets, players from other regions may look to expand their businesses into the BC region. Such an eventuation will call for an adjustment in the way in which the system is currently managed in BC. But that’s nothing new. If there’s one thing I’ve learned from my visits to date it is; the one constant is change.

Incentives & Subsidies
In terms of the incentives TSBC and other Canadian schemes pay, they are a marked philosophical change from the Australian approach. They are also a mechanism which provokes debate in and between some tyre management schemes.
Incentives and subsidies are no doubt effective in paying for collection, processing and delivering the immediate objective of high recycled tyre product consumption. However, some hold that subsidies can be a mechanism that can create ‘false markets’. That is, the value of a product or material can be artificially altered to make it more competitive relative to other competing products through the systematic altering of its value via the imposition of a levy or subsidy on particular transaction points.

The argument then goes that once you create altered market conditions, industry will then orient to these conditions and invest accordingly. That works well if the subsidies are maintained or altered slowly over a time. However, issues can arise should the political or structural orientation of the market or scheme that underpins that market change (or worse still, the Scheme be closed all together as is case at my next stop in Ontario - described below) and thereby the associated subsidies. In such instances, there can be dramatic, unforeseen impacts that create uncertainty and undermine investment and business continuity. Not to mention unwanted negative environmental impacts in the case of waste management schemes.

Additionally, subsidies are focused on a territory or region. With increased globalisation and movement of materials, there is a perception that the benefits that subsidies have in one market can create distortions on those that are neighbouring or somewhat related. A case in point is that one Canadian recycler told me around 80% of what they produce is sold into the US market. Similarly, Australia receives crumb from Portugal cheaper than what it can be produced in Australia. To counter, it can be argued (quite successfully) that a pure market approach to tyre management doesn’t work. Detrimental impacts occur environmentally if market support mechanisms are not implemented, hence the need for schemes such as TSBC.

It’s a complex discussion without a definitive right or wrong answer. Whatever course is chosen, the implications of each instrument need to be considered strongly to minimise potential detrimental impacts when wielded.

Ontario Tyre Stewardship:
I had an incredibly enlightening time in Ontario, predominantly with Andrew Horsman (Executive Director), Claudia Hawkins (Director of Promotion and Education) & Steve Gluckowski (Operations Manager). They are a key part of the 30-strong staff at OTS who implement one of the most comprehensive and high performance schemes in the world... for now (more on the impending closure of OTS a little later).

Currently, OTS operate as a ‘sole purchaser’ of waste tyre services in the province. As such:
- OTS collect 140,000 tonnes per year (12 million passenger tyre equivalent).
- 100% of what they collect (including the large mining and off the road tyres) goes to Ontario recyclers.
- 98% of the rubber product they produce goes to crumb.

Yes. That’s right - 98% of the rubber they collect goes to crumb! That is a remarkably high number.

One of the most notable aspects of OTS is that they implement their program to ensure that no tyres will go to landfill or be burned as a tyre derived fuel. That is quite a significant statement and ambition for any tyres scheme as most (probably all aside from OTS as far as I know) send a large portion of material to be used as a tyre derived fuel. As such, it achieves the highest value recycling outcomes of any scheme I have visited or am aware of.

The policy directive for the 'no tyres to tyre derived fuel' relates to the Ontario province Waste Diversion Act upon which the Scheme is predicated. As such, the 'Program Request Letter’ from the
then Minister initiating the Scheme provides directives of this nature to ensure alignment of the Scheme with government policy.

No. Steve, Claudia, Gord (CRM Plant Manager) & I are not at a night club or on a stage performing. That’s the chill from the minus 190 degree celsius cryogenic tyre recycling plant creating the dry ice look.

The Scheme is funded via OTS receiving $3.30 per passenger and per $12.95 per truck tyre paid via the importer (essentially the last ‘person’ to touch it before it enters Ontario... the old, ‘you touched it last' rule!). This creates a significant income of around over $50-60 million that pays for collection and subsidies for processing and consumption in a similar fashion to TSBC.

A great example of where some incentives go to increase consumption of tyre product is in these pictures below taken at a 'Home Depot' store (similar to Bunnings in Australia). These pictures illustrate how some of the products become consumer goods once they have been collected, processed into a reusable form (crumb, powder, granule) and then used as an input to produce another product. Here, the support of OTS has seem companies replace the use of non-recycled materials with tyre derived materials to create products for use in the home.

*Pictures from Home Depot showing consumers the products that are made with tyres.*
Treadmarks
I was also privileged to get an insight into the most excellent and comprehensive electronic tyre management and tracking system Zach Dryman (Chief Computer Nerd) and the OTS team have created called Treadmarks.

Every driver in the OTS program employed by a ‘Hauler’ is provided with an iPad Mini by OTS with the TreadMarks Mobile application pre-installed. Every Collector, Hauler, and Processor is identified by a unique QR Code. The QR code is encrypted and cannot be read by any other device or program. The paperless tire collection documentation process consists of the following steps:

- The Hauler arrives at the Collector location
- The Hauler logs into TreadMarks Mobile using their unique participant badge with encrypted QR code, and begins a new transaction
- The Hauler scans the Collectors QR code, and the Collector’s information is populated in the application
- The Hauler enters the quantity of each tyre type they are receiving from the Collector
- The Hauler verifies the tyre count entry, and signs the transaction
- The Collector verifies the Hauler’s tyre count entry and signs the transaction
- The Hauler completes the transaction confirmation in the app and confirmation is sent to OTS

Treadmarks is exemplary in its scope, detail and execution. Coming from a new organisation that can struggle with efficient reporting, the benefit of such a comprehensive system was not lost on me. As such, I think more schemes from around the world would derive benefit from looking at the system Zach and the team have implemented, it’s world class.

The beginning of the end...
Since the inception of OTS in 2009, they have developed an admirable program in terms of the impressive tyre recovery and recycling numbers. However, regardless of these positive outcomes, no scheme operates in isolation and a clear demonstration of this is the fact that OTS are in the process of being closed.

On February 17, 2017, the Minister asked OTS to submit a plan for closure by the end of October 2017 (this is a transition plan OTS must write, but they haven’t been told exactly what they’re transitioning to... That's a hard plan to write). The Minister then has until March 2018 to approve this plan. All going as expected, OTS will cease to operate as of December 31 2018.

Given the impressive systems, team and outcomes they have achieved, many are asking why this is the case (not the least many of the recyclers and alike I visited who have created business models and invested on the current market conditions predicated via the OTS scheme).
Despite the stories some may have heard (namely media from a couple of years ago regarding a rogue Chief Financial Officer and a colleague who took ‘liberties’), the primary reason for the closure of OTS is because it is part of an overhaul of the management of all waste streams in Ontario. Despite the fact that OTS has achieved a 100% recycling rate, many other waste streams (organics, construction & demolition and other commercial waste streams) suffer with low recovery rates of around 25-30%.

Under the current delivery framework, stewardship organisations like OTS are created to manage waste streams - other programs relate to e-waste, paint and other hazardous municipal materials. 'Blue Box' is one such prominent program which is set up for packaging and printed materials. The current legislation for Blue Box requires a 50-50 cost sharing arrangement between local government and industry, with government operating the program. This has led to many years of disagreement with industry pushing to get more say in how the program is delivered if it is having to share the cost (reportedly around $200 million annually). These annual battles over the management of the Scheme have been public and acrimonious and do not reflect positively on the programs themselves. Therefore, under the new legislation, industry will have to carry 100% of the cost, but, will also get control over the operations of the diversion programs so they can make changes they feel are necessary to improve efficiency.

To this end, on June 9, 2016, Bill 151 – the Waste Free Ontario Act (WFOA) was enacted. This Act means the days of the current legislation (the Waste Diversion Act, 2002) and the Industry Funding Organization’s - such as OTS - are numbered.

Where to from here for OTS?
And so, it begins. Again. The closure of one program means the creation of (an)other(s). The premise of the impending legislation is that the importers will organise their own Schemes, similar to what is prevalent in Europe with an Extended Producer Responsibility (EPR) model. The prevailing view is that the tyre companies will 'self organise' and create their own scheme(s).

To discuss this process from the governments perspective, Andrew Horsman and I visited Carmelina Macario, Program Lead, WEEE (Waste Electrical & Electronic Equipment) & Used Tyres with Resource Productivity & Recovery Association (RPRA). The RPRA is a not for profit, non government organisation, set up to ensure producers and associated organisations are meeting their performance and regulatory requirements.

Andrew Horsman (OTS Executive Director) and Carmelina Macario - Program Lead, WEEE & Used Tyres

Carmelina and her team oversee, upon direction from the Minister, the winding up of the old regime and the creation of the new one. It’s a massive undertaking. Her team currently manage 4 programs with 6 staff - soon they will have 30 staff and many more programs. Each program will need to develop plans, boards, administrative structures and delivery frameworks in business areas they may have had
little previous experience in. Having come from government previously, my head hurts with the immensity of the challenge that lays before them. Particularly as I left government to work setting up a new stewardship scheme with 'producers'. It's a massive challenge.

Regardless of what some may think of the decision by the Ontario government to wind up OTS and other schemes, credit should be given for their willingness to do what they feel is necessary to deliver the best system for stakeholders and the community. The breadth of the current systems they have as well as the desire to achieve the best possible outcomes in future iterations of their programs demonstrates a desire to not accept anything less than full and effective environmental outcomes from waste.

Acceptance: The Canadian Quandary
When discussing tyres product stewardship in Canada, I proposed that with waste tyre management, the potential outcomes a program can achieve is predicated on what the government, industry and stakeholders of a given region are willing to accept. The Canadian schemes I visited only accept a comprehensive system that collects all tyres and supports high value recycling applications.

The danger of holding such high standards is that when you dismantle the system that underpins it, the coherency of the market structure that has been created and acclimatized to over time is undermined. Such heavy shifts in such a short space of time can devastate business continuity and viability - particularly when investments returns are predicated on factors based on the former framework.

This poses a quandary. The problem with tyres can be viewed as a market failure. If there's a failure, we need to intervene. Schemes are created to do so to deliver better environmental outcomes. Then the question becomes, how do we intervene and to what extent?

Canada has demonstrated the great things that can be achieved through a strong directive and a system to back that up. However, it also evidences the risks that can occur when this direction changes.

England & Scotland

Maybe it's my inner Aussie back packer coming to the fore after repeated jaunts though London over the past couple of decades. Or perhaps it was the unseasonably hot UK summer with the hottest June day since 1976 at 34 degrees (the Brits were melting!). Whatever it was, after being on the road in the US and Canada, it was a bit of an unexpected relief to be back on familiar shores in the UK.

The familiarity with London also extended to the discussion to be had around tyre management with the UK approach sharing many similarities to Australia (or vice-versa perhaps?).

In the UK, I had the pleasure of meeting with:

- Peter Taylor: Director of the UK Tyre Recovery Association
- Paul Hallett from the Department of Environment Food & Rural Affairs (DEFRA)
- Mike Berry from Zero Waste Scotland

Peter Taylor & the UK Tyre Recovery Association

Peter Taylor is a tyre industry veteran with experience in new tyre and recyclates markets around the world. He is Director of the Imported Tyre Manufacturers’ Association (ITMA Europe), Secretary General of the UK Tyre Recovery Association (TRA) and is a prolific writer on industry matters. The TRA operates a unique market-based best practice program for scrap tyres in the UK which is the largest of its kind in Europe.
Peter and I have gotten to know each other over the last few years. We originally met on a panel of the European Tyre Recyclers Association conference in Brussels in 2015. Since then, TSA & Sustainability Victoria have hosted Peter for a very popular ‘Industry Conversation’ event at the MCG in late 2015. Therefore, it was great to catch up with Peter again in the UK to learn more about the UK Tyre Recovery Association and the role they play in tyre management in the UK.

The UKTRA was formed in July 2004 and acts as the primary implementing agency of the Tyre Industry Federation’s ‘Responsible Recycler Scheme’ (RRS). All TRA members are fully accredited by the scheme, which guarantees that all tyres collected, recycled or reprocessed by them are disposed of or reused in an environmentally friendly or acceptable methods.

Members are guaranteed that the tyres collected by members of the RRS are disposed of in an environmentally friendly and acceptable method, whether recycled or used as a fuel in cement kilns, helping them comply with their Duty of Care obligations as well as protecting the environment. As a guarantee, those who subscribe to the scheme are subject to a stringent annual audit process conducted regularly by independent environmental audit specialists. This acts in a very similar way to the audit and accreditation process implemented by Tyre Stewardship Australia.

In conversations with Peter, he explained that the nature of the tyre management system in the UK does share many similarities to that of Australia. Key similarities are:

- There isn’t a government mandated scheme or program where participation is required (such as there is in the US, Canada and most of Europe)
- The UK system is predicated on a market based approach where there is a market ‘pull’ for tyres. That is, there is a market based fee for tyre disposal (as opposed to a regulated eco-fee) that goes to the collector and recycler. This creates a more ‘flexible’ and ‘dynamic’ system where the end use of tyres changes depending on where the demand lies, as opposed to being centrally determined by the scheme or organisation that collects the eco-fee.
- The market based approach is underpinned by regulation by the EPA (Environment Protection Authority) of relevant processing and storage sites
- There is an audit and compliance system in place to create transparency and accountability across the supply chain.

The UK vs Australia

As my discussions with Paul Hallett from the Department of Environment, Food & Rural Affairs (DEFRA) evidenced, Australia shares many of the judicial and political systems of that of the UK ‘motherland’. Therefore, in terms of the government regulatory, legislative and political philosophy, we share many similarities. With such things as legal and political processes, the application to an Australian context from the UK can be transferable. However, where you have geographical and landscape difference to the extent that we do in Australia relative to the UK there are implications. These implications relate to the consolidation of the supply of feedstock to underpin efficient business models to effectively manage the disposed tyre resources. In Australia, the tyranny of distance and costs associated with doing business in the vast expanse (30 times the size and 2/5 the population!) creates inefficiencies in the collection system which leads to stockpiles and risk of fire and environmental harm.

The more overt and extensive Canadian schemes are engineered to overcome these barriers to create a financial levy that addresses the geographical and landscape challenges that lead to the market inefficiencies that create stockpiling as an end point.

This system works well for the UK (well mostly, I’ll discuss some of the challenges with Scotland in the next section) where there is a consolidate market of 40 million tyres in a space one thirtieth (1/30) the
size of Australia. However, the applicability of such a model to an Australian context with the challenges of large distances and population sparsity are more open to discussion.

Paul Hallett from DEFRA

Scotland:

I also had the great pleasure of meeting Mike Berry of Zero Waste Scotland in Edinburgh. Scotland are in a unique position in that they fall under the jurisdiction of EU and UK in terms of the legislative underpinnings of their waste policies. Also unique to Scotland is the fact that they can, if they choose, initiate an alternative, independent, Scottish waste management system. This is something that is currently under consideration for tyres, with Mike leading the charge.

Mike Berry and I Outside the Scottish Government building. Obviously.

As noted above via the conversations with Peter Taylor of the UK TRA, the UK system is predicated on a market based approach underpinned by a regulatory framework. This operates with a good degree of effectiveness in England where there is limited tyre production (meaning an Extended Producer Responsibility scheme could be viewed as being somewhat redundant) and there is a high volume of waste material supply in a concentrated area (meaning less space for remote tyre stockpiles).

Scotland currently works within the UK approach. However, the Scottish geography and associated market (smaller, more dispersed population meaning smaller volumes of disaggregated tyres – a similar problem to that experience by Australia) means that the market approach that works satisfactorily for England doesn't provide the economies of scale to ensure all Scottish tyres are collected. Therefore, Scotland is looking at alternative approaches.

Mike also informed me that Scotland would also like to support higher value applications from the tyres they collect based upon the Proximity Principle and the EU Circular Economy Package which is currently
being developed. This is particularly so given the market oriented approach of the UK can lead to ‘lowest common denominator’ outcomes where ‘the path of least resistance (and price!)’ flows on to lower value outcomes such as tyre derived fuel (as opposed to the highly engineered Canadian approach in Ontario which has the edict of no tyres to fuel).

Given the fact that the current UK recovery system isn’t accommodating the particularities of the Scottish market, vagueries around Brexit and the fact that EU is providing strategic direction towards the delivery of higher value outcomes, the Scottish government is looking to reassess waste tyre management policy.

Initial options for Scotland relate to the possibility of strengthening the current regulatory regime because aspects of the current framework are being exploited to aggregate tyres, derive income from the gate fee, but then stockpile the tyres with no real intention to move them on (common to Australia too). In some instances, the land owner is left with the responsibility to clean up the tyres. In others, government is expected to step in and clean them up. Such arrangements are untenable in the longer term.

Other avenues being explored include levy’s or charges for tyre clean up and management. As part of the UK, Scotland can’t have non-specific charges to the population being aggregated and used for unrelated programs - otherwise known as a tax. They must have levies that are directly related to the delivery of services associated with the nature of the levy. In this sense, the creation of an independent Scheme or organisation such as the European EPR schemes, or the Australian TSA approach are all options that are ‘on the table’.

UK Conclusions

Australia and the UK share extensive ties through many aspect of history and current popular culture including via politics, legal systems, foreign policy, literature, comedy, sport and excessive drinking of alcoholic beverages. It therefore makes sense that we maintain a close watch on our Anglo-spheric friends. However, as Scotland has demonstrated, there’s also value in looking to do things differently too.

Therefore, from an Australian perspective, we’ll watch the progress in Scotland closely as the model they implement could provide insight into possible initiatives in Australia. The Scottish example again demonstrates that there isn’t a ‘right’ way to manage tyres. Any Scheme needs to be accommodating the nuances of the context in which it is set.

Europe

No tyres world tour would be complete without visiting the substantial & well regarded European tyre stewardship schemes.

Europe is renowned as having multiple extensive Extended Producer Responsibility (EPR) schemes. This typical ‘European’ approach has been the basis for replication for many models throughout the world. In Australia, it is often proposed that ‘we should have a scheme like they have in Europe’.

From an Australian perspective, this begs the questions:

- What is a typical European tyre product stewardship scheme?
- Is the European model applicable to an Australian context?

To answer these questions, I visited the following destinations and key stakeholders:

- Aliupur: The French EPR Scheme which is often cited as one of the biggest and best in the world. Jean Phillipe Faure & Richard Durbiano were fine hosts for my visit to beautiful Lyon.
• The European Tyre & Rubber Manufacturers Association (ETRMA) in Brussels where Jean Pierre Tavern was a most accommodating host
• While in Brussels, I also had the pleasure of meeting with Chris Lorquet, CEO of the Recytyre, the Belgian Scheme
• In Lisbon, Portugal, I had an enlightening visit with Paolo Sliva from Valorpneau – the Portuguese Scheme
• Finally, I met with Dr. Jorge B. Souza of Consulpav. A great proponent of rubber in roads around the world, particularly in California & Portugal. Jorge also organises the pre-eminent rubber in roads conference held every few years and manages an associated publication.

A ‘typical European Scheme’
Jean Pierre of ETRMA gave me an insightful overview of tyre Schemes in Europe. As his infographic below illustrates, there are 3 major types of Schemes in Europe. However, it is the extended Producer Responsibility Schemes in ‘green’, that are considered ‘typical European Schemes’.

![ELT Management Schemes in Europe](http://www.etrma.org/tyres/ELTs/ELT-management/ELT-management-schemes)

The EPR model differs from the more market oriented approach of Austria, Croatia, Germany, Ireland and Switzerland. Although operating under a free-market system, United Kingdom features a hybrid system as collectors and treatment operators have to report to national authorities via the UKTRA.

As the European Tyre and Rubber Manufacturers Association (ETRMA) defines it, an EPR Scheme is predicated on law that ‘defines a legal framework that assigns the responsibility to the producers (tyre manufacturers and importers) to organise the management chain of end of life tyres’[^5]. Countries with a Producer Responsibility regime include Belgium, Bulgaria, Czech Republic, Estonia, Finland, France, Greece, Hungary, Italy, the Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain, Sweden and Turkey.

According to ETRMA and operators of this type of model, they consider it to be ‘the most suitable and robust for addressing and resolving end of life tyre arisings, in a sustainable manner for the long term, and to achieve a 100% recovery rate, in the most economical way’6.

In many ways, this assertion can be justified. The Schemes that I visited are well resourced, manage extensive collections systems (via subcontracting services), have good data management, are undertaking R&D (to varying degrees) and can verify the destination of large volumes of tyres. They have and do pay for the clean-up of stockpiles, although in most cases, this is not explicitly required in the terms of their operational framework.

The most common form of organisational and administrative structure for EPR organisations is via the creation of a not-for-profit company financed by tyre producers. Additionally, reporting obligations are required to relevant national authorities and governments to support transparency and reliable traceability for the movement of funds and tyres.

The diagram below (Producer Responsibility Scheme) illustrates where the intervention of EPR schemes occurs within the supply chain, where they have contracts, how money is distributed and the role of the State.

![Producer responsibility scheme](http://www.etrma.org/tyres/ELTs/ELT-management/producer-responsibility)

**Aliupur**

In France, I had the great pleasure visiting Jean Phillipe Faure & Richard Durbiano of Aliupur. Jean Phillipe was very forthcoming with his time and expertise. This was of great value as he acts in a similar role to me insofar as he is looking to develop markets for tyre derived product in France.

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Jean Phillipe was kind enough to take me out for dinner with his wife Stephanie and daughter Tiffany. Tiffany practiced her English on me and we established what the Australian word for Kangaroo is. Dinners such as these and the hospitality of those I visited were a huge pleasure and some of the great highlights of my trip.

As Jean-Phillippe informed me, the Aliupur model is predicated on a €1.25 ‘eco-fee’. This funds Aliupur to manage ‘everything’ in terms of the collection, sorting, transport and processing. In France, there is a population of 60 million people, who dispose of around 44 million tyres per annum which equates to approximately 480,000 tons annually of end of life tyres disposed annually (2015 numbers). Such a figure is interesting when compared to Australia which generates a similar tonnage – but from a population of only 24 million people (roughly 60% of the French population. This differential can largely be attributed to the high proportion of mining tyres (which have a high equivalent passenger unit ratio) in Australia relative to the population.

From theft to right: 2 Staff from Eurec Environment on the left, Jean Phillipe Faure & Richard Durbiano of Aliupur and Samuel Vaz, Eurec Environment Plant Manager

As Jean-Phillipe communicated to me, EPR schemes such as Aliupur are setup to manage an equivalent amount of tyres waste to what they sell into the market. They essentially ‘offset’ the amount they sell by managing the same volume of tyres at the ‘back end’ of the tyre life cycle.

This means they process an equivalent amount to what they sell into the market and as such, don’t have to process the exact same tyres (i.e. their actual branded tyres) they sell. In the case of Aliupur, this equates to the number of tyres sold by Bridgestone, Continental, Dunlop, Goodyear, Kleber,
Michelen & Pirelli\(^7\). The aggregated sales of these companies account for approximately 80% of the French market.

**Stockpile Management in France**

In terms of stockpile management, Aliupur devised an interesting approach that should be considered for an Australian context. They created a multi-industry agreement which was signed on 20 February 2008 which gave rise to Recyvalor. According to Bénédicte Barbry, President of Recyvalor, this entity was set up to “eliminate all historic inventories of used tires on French territory in less than eight years.”

Recyvalor committed to evacuate and valorise the 61 historic inventories listed, representing about 80,000 tons of used tires over a period of between 6 and 8 years. This commitment represented a total financial commitment of nearly €7 million from the members of the association and the State\(^8\). It is now 10 years later and all the historic stockpiles have been dealt with. Recyvalor will now close as the issue has been some been resolved and they don’t want to encourage further stockpiling.

**Is EPR the perfect model?**

There is no doubt that Aliupur and other ‘European’ style EPR schemes represent a progressive and effective mechanism to better manage outcomes associated with end of life tyres. However, external to these Schemes, there are some industry players that raise concerns regarding the implications of having such a centralized and influential player ‘imposed’ upon the market. As such, given the free market approach prevalent in Australia, there are questions around whether transferring such an approach to an Australian context would be accepted and viable.

Other concerns raised by contacts I met in Europe and beyond highlight the fact that the creation of EPR organisations can be a major market factor that significantly alter market structures and conditions. A case in point is the example of Ontario discussed earlier this report. The Ontario example demonstrated the positive impacts that can be achieved by altering market structures to overcome a clear market failure (which is often the case with the management of waste tyres). However, it also highlighted the disruption that can occur when the new structure is altered significantly or removed.

I have asked several stakeholders external to the European market, but who deal with these Schemes, for opinions on European Schemes. The response can be surmised as ‘they great if you’re in them but not so when you’re out’. Responses of this nature imply that EPR structures become the decisive factor in the shape and orientation of the market. Centralised control of this nature can limit access to the market to new players. In some instances, this has the potential to stifle innovation and competition.

The organisational structure of EPR entities can become very bureaucratic in nature and self-perpetuating. Once they are set up, they are required to promote their own use and benefit. As such, some have called into question the effectiveness and accuracy of report. Additionally, bureaucracies can sometimes be impervious to the immediacy of market signals and lack the agility to service accordingly. When the destination of all tyres is determined by a centralised authority, such organisations can wield a substantial influence on where tyres go and how they are used. Obviously, this is the point of EPR organisations – to handle these large volumes in an environmentally sound manner. However, some question the ability of one organisation to do so in a flexible manner that is attuned to the subtle movements of a fluctuating global market.

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\(^7\) https://www.aliapur.fr/en/company/what-aliapur

\(^8\) http://www.recyvalor.fr/-Recyvalor-.html
One final issue that can be a concern with EPR models is the fact that there can be multiple EPR schemes within a given territory. With delineations of responsibility through multiple market players and a lack of a definitive responsible agent, gaps in service provision can occur as well as a lack of clarity in terms of responsibility for outcomes. This eventuation was communicated to me in an interview through the example of the substantial tyre fire in Sesena, south of Madrid. Spain uses an EPR model and has multiple schemes in the territory. Apparently, each Scheme in Spain felt the extensive stockpile that had accumulated was the responsibility of the other – or at the very least, they could not agree on terms to cooperatively deal with the issue. Therefore, the risk was never managed appropriately until the worst-case scenario eventuated and 10 hectares of tyres went up and 9,000 people had to be evacuated from the area.

Aliupur and other ‘European’ style EPR schemes represent a progressive and effective mechanism to better manage outcomes associated with end of life tyres. Is any system perfect? No. However, the fact that Aliupur and associated organisations have managed to clean up stockpiles and continue to manage end of life tyre arising’s effectively and with minimal risk to the community demonstrates that Australia has a lot to learn from the ‘European Approach’.

India: Mumbai & Pune

India Context
The latest end of life tyre data shows that around 28% of Australia’s end of life arising’s are sent to countries such as India to be used as a tyre derived fuel (TDF). Yet the workings of the waste tyre industry in India are a mystery to many in the Australian sector.

The TDF market is a mainstay for consumption of the large volumes of waste tyres we generate around the world. Given the excess of supply that is characteristic of all waste markets, high volume-low processing destinations are required to accommodate this excess of supply. As Australia has no substantial domestic TDF consuming plants to accommodate such high generation volumes, international TDF constitutes a high percentage of the consumption profile for the accessible Australian feedstock.

We live in a global market where the movement of materials across the world is common place. However, when such movement occurs, the ability of the material generator to influence supply chain outcomes is diminished. This is particularly so when processing and utilisation of the material is done in another territory where the laws and practices may not align with regulations and expectations with that of the territory of origin of the waste stream.

As part of stewardship schemes, there is a requisite to deliver acceptable environmental outcomes in the waste disposal of a given material. In the case of Tyre Stewardship Australia, there is an imperative to ensure that the tyres we dispose of in Australia are disposed of in a manner that delivers an ‘environmentally sound end use’.

To monitor end of life outcomes, at the commencement of TSA, categories were created that require reporting and adherence to standards for particular participants within the end of life supply chain. Key participant categories are retailers, collectors (haulers) & recyclers. Such categories are satisfactory for a national product stewardship Scheme should the extent of its coverage be within Australia. However, with the extensive international flow of material oversees, the supply chain now interacts with international territories and organisations. Therefore, if we’re to successfully verify the sustainable end use of Australian end of life tyre arising’s, verification needs to interact with overseas markets and players.

Given this, one of the key things I was keen to understand in India was how Australian organisations such as TSA can better engage with the Indian market to enable verification of the sustainable end use of end of life tyres generated in Australia. The key challenge with this is understanding how to engage with such a vast and substantial market and identify the key interaction points to create a consistent monitoring and reporting framework.

Indian demand for Australian tyres
The big question I had in relation to Australian waste tyres in India was: ‘why does a country like India need access to Australian tyres when they generate over 3 million tons of tyres themselves’? To answer this, it was essential to learn of the ‘dynamics’ of the Indian waste tyre market.

Upon arriving in India, I had the privilege of visiting many sites with Gemini Company representative Vishal Bhandari. He informed me that the Indian demand for tyres comes down to the following key elements:

- **Lack of aggregation:** India has an economy of ‘micro’ operators. People work cheaply on a small scale given the low cost of living. This smaller network of operators creates distributed feedstock making it difficult to access consistent, aggregated feedstock volumes
- **Informal economies:** There are many ‘informal’ uses for tyres in India. Key amongst these are as ‘weights’ on ‘slum’ roof tops and being burned for brick making
- **Quality:** Apparently Indian tyres have less natural rubber meaning lower calorific value. As a result, they’re less desirable to TDF markets
- **Transport:** Traffic and roads in India can be difficult to negotiate. Therefore, logistics associated with transport across distances is costly and takes time.

Given these factors prevalent in Indian market, tyres from international markets such as Australia are attractive to India because they are:

- high quality
- aggregated easily (due to the streamlined collection and transport systems in more developed countries)
- easily accessible
- consistently available
- cheap to access (in some developed countries, TDF is perceived by some as a ‘low cost disposal avoidance’ mechanism).
When you consider that developed countries are looking for destinations for the oversupply of feedstock and Indian markets are looking for a large feedstock supply that has the many qualities outlined above, it’s a mutually beneficial relationship.

**Down Stream Vendors**

Upon establishing the reasons for Indian demand for Australian tyres, questions remained regarding how Australian organisations can interact with India to verify the environmentally sound end use of Australian generated end of life tyres.

Dealings with the Indian market to date have indicated that the creation of and adherence to standards in relation to end of life disposal is less stringent in India than in countries such as Australia. Therefore, the query for organisations such as TSA that have a requirement to maintain environmentally sound end use standards for end of life arising’s generated in Australia, is regarding whether adequate verification processes can be created for ‘remote’ markets such as India.

Mr. Sudershan S Gusain is the Technical Service Manager for Standard and Regulations at Bridgestone India, based in Pune. He participates in the Automotive Tyre Manufacturers Association (ATMA) and the associated Indian tyre technical advisory committee called the Indian Tyre Technical Advisory Committee (ITTAC) (funnily enough). Bridgestone Australia were kind enough to put me in contact with Mr. Gusain and I was grateful for his expertise on the sector in India and beyond.

Mr. Gusain informed me that there have been discussions within ATMA and ITTAC with the Department of Industrial Policy and Promotion (DIPP): Ministry of Commerce, the Quality Council of India and the Indian Rubber Manufacturers Research Association which have looked at the applicability of EPR models in India amongst other proposed models.
However, as has been noted in other territories, there is no right or wrong tyres product stewardship system that is applicable to all. Any system needs to be aligned with the geographical, political, economic and cultural realities of a given territory. In this sense, India is no different. Or perhaps a better way to put it is; India is very different, so therefore a very Indian approach needs to be created.

Regardless of the model, what these conversations demonstrate is the fact that similar types of organisations to those in Australia (government, tyre companies, environment organisations) are engaged around mechanisms to improve tyre outcomes in India. The implication is that rather than trying to create a verification system from Australia, the most efficient and effective means of Australian companies engaging with the Indian sector is via engagement with existing Indian regulators and producers.

Currently, Australian and Indian markets are well connected through trade. However, engagement between respective regulatory and stewardship agencies is practically non-existent. Subsequently, our alignment and integration of standards and expectations is incongruous. India already has existing processes in place as well as some regulatory frameworks and instruments. The challenges for TSA (and the rest of the world) is to engage, listen and understand these mechanisms better. Once we have a better understanding of our respective requirements, we need then align management systems to be better integrated and deliver mutually beneficial outcomes.
## 10. Recommendations

Based upon my visitation of the many destinations above, the following recommendations are made for activities to be considered to assist in the development of the Australian end of life tyre sector.

<table>
<thead>
<tr>
<th>Number</th>
<th>Action</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>National Waste Tyre Management Strategy</td>
<td>A process that engages with government, community and industry stakeholders in Australia and associated territories that creates a shared vision for standards in relation to waste tyre management. The creation of shared expectations can then underpin the formulation of performance measures and strategies to achieve these expectations. The Australian Scheme can then be oriented to implement activities to achieve these objectives.</td>
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<tr>
<td>2</td>
<td>Industry Capability Analysis</td>
<td>The TSA model is predicated on a market based approach. The expectations of TSA in terms of the performance measures it is expected to achieve are very high. However, there has been little analysis of the capability and capacity of current service providers to collect and process Australian tyres in a cost effective manner. Additionally, there has been no analysis of the extent to which current TSA mechanisms can realistically achieve the objectives of the organisation (which are reflective of stakeholder expectations). Therefore, an analysis of current industry capability relative to the implementation mechanisms TSA has available is required to ascertain the capability of the Scheme and market to deliver the expectations required of it.</td>
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<tr>
<td>3</td>
<td>Market Development Strategy</td>
<td>This has already been created via a cofunded collaboration between TSA and the governments of Victoria, Queensland, NSW and WA. More work needs to be done in the implementation of this initiative.</td>
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<tr>
<td>4</td>
<td>National Regulations Working Group</td>
<td>There is a lack of coordination and synergy between State regulatory frameworks. A closer alignment would assist in administration and implementation of more consistent practice across the country. Further integration of reporting protocols and data reconciliation could also be considered. Longer term goals around harmonisation of regulations can also be considered.</td>
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<td>5</td>
<td>National Stockpile Analysis</td>
<td>Currently there is no data or analysis that quantifies and categorises legacy stockpiles. Work is required to understand where stockpiles are located and create a map of these locations (confidentially). Each stockpile should then be categorised. The costs associated with clean-up can then be undertaken (individually and regionally). The regulatory basis for intervention on each can be assessed. The intersection of roles and responsibilities and coordinating methods to address associated issues also analysed. Finally, a national business case for action is proposed using a cost benefit analysis.</td>
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<td>6</td>
<td>Creation of a separate organisation for stockpile management</td>
<td>As per the Recycler example in France, Australia could consider the creation of an organisation specifically set-up to clean up stockpiles. In doing so, the responsibility for historical stockpile remediation can be 'externalised' to a separate non-industry/government organisation. Once the task has been addressed, the organisation can be folded, thereby not encouraging further stockpile creation.</td>
</tr>
<tr>
<td>7</td>
<td>Regional service provision analysis</td>
<td>There is obviously a lack of extensive service collection in regional and remote areas. Analysis is required to map the current distribution of the services, identify the failures in service provision and identify mechanisms to support regional collection efficiency.</td>
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<td>8</td>
<td>Recycling Efficiency Options</td>
<td>Australia being a large and sparsely populated landmass has challenges effectively collecting and transporting waste tyres efficiently. Therefore, an analysis of current logistics routes and collection hubs that identifies current service provision as well as gaps would be beneficial. From this, business models and infrastructure that supports greater efficiency and service provision could be proliferated through funding and other support mechanisms.</td>
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<tr>
<td>9</td>
<td>Industry assessments in key tyre derived product consuming areas</td>
<td>Individual market assessments are required to identify potential market uptake in key sectors. The National Market Development Strategy for Used Tyres focuses on Roads &amp; Rail. More work needs to be done in the concrete, polymers, carbon, infrastructure and moulded product sectors.</td>
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<tr>
<td>10</td>
<td>Mining Sector Analysis</td>
<td>TSA currently works in the passenger and truck tyre sectors. No headway has been made into the mining sector. More work needs to be undertaken in this sector to ascertain the current market, barriers to entry and the scope for leveraging outcomes.</td>
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<tr>
<td>11</td>
<td>Greater Regional Leadership</td>
<td>TSA has become a focal point for the development of the industry in Australia. However, TSA could do more to become a hub for activities in the Asia Pacific. This is particularly so with NZ and large end of life destination markets such as Singapore, Malaysia and India.</td>
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<td>12</td>
<td>Down Stream Vendor Analysis</td>
<td>TSA needs to undertake substantial work to align Australian reporting and verification methods with international organisations and processes. The example in India demonstrated that there are existing industry and government bodies aligned to TSA objectives for enhanced environmental outcomes for waste tyre utilisation. Therefore, an analysis of all major destinations for Australian waste tyres needs to be undertaken to identify key stakeholders, regulations and processors to ensure Australian verification systems are aligned with the 'down stream' markets.</td>
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</tbody>
</table>
11. **Final Word**

If my Churchill journey has taught me one thing, it’s to ensure a greater gap between connecting flights when booking round the world tickets.

But in addition to that, it’s showed me that you have to start somewhere... and we’ve started in Australia. Once good people get together and start working on a positive solution, examples around the world demonstrate that great progress can be made.

I look forward to using my Churchill experience to work collectively with the committed community of government, recyclers, tyre brands and tyre product users we have in Australia to build a stronger waste tyre sector for many years to come.