



# URBAN EP

## Tyre Stewardship Research Fund and market development activities – Evaluation Report

### Executive Summary

Prepared for

**Tyre Stewardship Australia**

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## Introduction

Urban EP was engaged by Tyre Stewardship Australia (TSA) to evaluate the Tyre Stewardship Research Fund ('the Fund') according to the following objectives:

- To investigate, measure and understand the impacts that TSA funded activities have had on market development for tyres in Australia
- To ascertain whether TSA has delivered against the desired market development objectives and outcomes of the Scheme
- To improve organisational quantification of the effectiveness of market development programs
- To provide TSA with templates and process for more effective monitoring and reporting in future.

In doing so, this evaluation will present key findings, recommendations and lessons learned for TSA's Fund delivery and related activities.

## Background to the Fund and market development

In April 2013, The Australian Competition and Consumer Commission (ACCC) authorised the Tyre Product Stewardship Scheme (the Scheme) as a framework designed to achieve the following goals over the subsequent five years:

1. Increase resource recovery and recycling and to minimise the environmental, health and safety impacts of all end-of-life tyres generated in Australia
2. Develop Australia's tyre recycling industry and markets for tyre derived products.

The key performance target for the Scheme is to increase the proportion of end-of-life tyres (EOLTs) going to an environmentally sound use, relative to baseline levels at the time of the ACCC ruling. It is funded by tyre importers in proportion to the number of tyres imported and sold in Australia.

The Scheme is underpinned through implementation arrangements including:

1. Administration and initiatives led by TSA
2. Commitments from participant organisations to act in accordance with the Scheme
3. Interparty agreements and contracts between participant organisations
4. The use of the Fund to support research projects.

As such, the Fund has an important role as one of the TSA functions stated in ACCC's determination, and in its contribution as the primary mechanism through which greater EOLT diversion for environmentally sound use would be achieved.

## The Fund and other market development priorities

TSA's efforts to locally stimulate demand for EOLTs include two main branches of activity:

- The management and use of the Tyre Stewardship Research Fund to support technological and commercial innovations that will lead to higher sales of locally processed tyre derived product
- Other market development activities designed to address barriers that are not addressed through the Fund.

The Fund uses a competitive process to financially support research projects that further the development of markets for Australian tyre derived products such as road construction, playground surfacing, railway applications, explosives, and other applications.

The Fund as defined in the Scheme Guidelines has objectives<sup>1</sup> to:

1. Advance innovative technologies in Australia by supporting focused, collaborative research in high priority technologies
2. Retain local expertise in, and attract international expertise to, Australia in technologies related to EOLTs
3. Support the growth of skills and capacity in Australia in technologies related to end-of-life tyres for the domestic and international markets
4. Share the results of that research with the wider industry as appropriate whilst respecting intellectual property rights.

The Fund is dedicated to **early stage through to proof of concept** research and development for the utilisation of EOLTs. To date, funds have not been made available to support commercialisation activities. This policy had not been reviewed during the timeframe relevant to this evaluation, although the evaluation team understands that this restriction is now being revisited.

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<sup>1</sup> Refer to Tyre Stewardship Scheme Guidelines, Section 4.4, p. 17.

## Evaluation method

Urban EP was requested to evaluate the Fund and market development program according to three areas that drive program performance (see the table below, with relevant Key Evaluation Questions, KEQs, to guide the evaluation process).

Area	Key Evaluation Questions (KEQs)
<b>Effectiveness</b>	<p>To what extent was the Fund conceived, planned and delivered to ensure its intended contribution to the Tyre Product Stewardship Scheme?</p> <p>To what extent did funded projects contribute to the primary objective of the Scheme?</p> <p>What evidence grants confidence in the competitive performance of end applications?</p> <p>To what extent did the Fund achieve its stated objectives?</p> <p>To what extent did other market development activities support research fund outcomes?</p>
<b>Efficiency</b>	<p>How successful was TSA in leveraging additional resources to support its research program?</p> <p>How do research fund and market development overheads compare to project outlays?</p> <p>How has the Fund contributed to the program per dollar invested?</p> <p>What evidence is there that projects were delivered efficiently?</p>
<b>Appropriateness</b>	<p>How critical was TSA's funding to research project?</p> <p>Would project partners seek further funding from TSA if they had an eligible project idea?</p> <p>Were TSA's application, funding agreement, project management and follow up suitable to funding recipients' needs?</p> <p>Were project risks adequately managed during delivery?</p>

The method was applied across the Fund and market development activities, spanning its general intent, internal delivery processes and decisions, project delivery and project outcomes.

Information was gathered from multiple sources to provide a solid evidence base for the evaluation:

- Research fund planning and reporting documents
- Documents specific to funded projects
- Interviews conducted with Research Advisory Committee (RAC) personnel
- Interviews with representatives of a subset of funding recipient organisations
- Information on changes in relevant procedures, practices and business operations that have been adopted by TSA since the commencement of the Fund
- Other relevant sources, including strategy, market analysis and corporate documents and recollections provided on request from TSA's Market Development Manager.

Findings in response to these KEQs (including key lessons and recommendations in Section 5 and 6 of the report respectively), supporting discussions (Section 4), and a more detailed description of the evaluation process (Section 3) are set out in the final evaluation report. Abridged findings and recommendations are summarised below.

## Evaluation findings

### Effectiveness

#### Achieving diversion in support of the Scheme

Putting aside some less reliable figures provided by some project teams, the projects examined during evaluation could account for up to 106,500 tonnes of annual demand for TDP through commercial scale activities in the near term, mainly as demand for crumb rubber. This aggregated figure is based on projections nominated by research project representatives in early 2018.

Assuming that EOLTs are 70 % recoverable as crumb, this equates to 152,000 tonnes EOLT or 19 million EPU's per year. Given these volumes, TSA may need to review whether existing local production capacity can meet this anticipated volume.

There was substantial uncertainty in arriving at this estimate, based on:

- How reliable some of the project team's diversion estimates are, and how well they reconcile with other market intelligence. Two University of Melbourne estimates were not based on realistic market scenarios (and were not used in the total figure used above). The figures used by University of Wollongong need to be revised or qualified in the event that rail projects are cancelled, delayed or deemed a poor fit with the tested technology.
- The remaining steps to realise commercial diversion, and the consequent risks and timeframes that should be attached to their expected contributions to the Scheme's target.

Across the projects funded and evaluated here, their technologies were seen to introduce lower material costs, enhanced durability, better performances, and greater versatility compared with standard products used in the end markets today. This finding suggests that TSA has not unduly funded research projects of questionable value. The majority of projects yielded results that support commercial viability while bringing large scale diversion of EOLTs a step closer.

One of the reasons for why the projected diversion volumes supported by the Fund are uncertain rests on the decision to restrict support to early stage research projects. There are well-founded reasons for this, relating to the Fund's early years of operation. But this decision impacts the certainty and lead time ahead of commercial scale EOLT diversion, and may skew Fund participation to organisations that are less informed and less positioned to perceive and pursue commercial opportunities. It may be timely to review this restriction and support later stage projects, with appropriate revisions to project application, selection and risk management arrangements.

Diversion volumes that occurred during the delivery of research projects came to 56,180 kilograms across seven projects, as one-off uses. The evaluation team suggests that this volume is minimal compared to the amount of EOLT generated each year, and compared to ongoing diversion opportunities should the technologies being tested reach commercial maturity.

#### Performance against Fund objectives

In its authorisation of the Scheme, the ACCC ruled that the Fund is to meet the following four objectives (abridged here):

1. Advance innovative technologies by supporting focused, collaborative research

2. Retain local expertise in and attract international expertise to Australia
3. Support the growth of skills and capacity in technologies related to end-of-life tyres
4. Share research results with the wider industry while respecting intellectual property rights.

According to this evaluation, the Fund has been successful in fulfilling its stated objectives, separate to its contribution to the Scheme's primary objective to divert used tyres from landfill via domestic activities. The advancement of new technology (objective 1) is a hallmark of each project, applied in different ways relevant to market development. Some projects advanced innovation by transferring technologies used elsewhere, whereas others invested in entirely new technologies.

While the Fund fulfilled this objective, the evaluation team notes the potential trade-off between innovation and the main objective of securing greater volumes of diversion. To some extent, the more innovative a discovery is, the greater the uncertainty that the technology can ultimately be applied as a commercially scalable, near term, environmentally sound end use for EOLTs. While this uncertainty is inherent to early stage research, the desire for innovation ought not to lose sight of the main intent to increase EOLT diversion from landfill through credible technologies and end uses.

More generally, the Fund's stated objectives as set out in the ACCC determination (and numbered above) are not as strongly connected to the purpose of the Scheme as they could be, such that a focus on the stated objectives will not necessarily support the Scheme efficiently and effectively. A set of objectives that are more aligned to the core mission of the Scheme will avoid potential conflicts and trade-offs as explained above.

## Capability improvements and network effects

In operating the Fund over several years, benefits additional to delivering on its main objectives and its direct contribution to the Scheme have emerged. These include:

- The creation of cross sectoral networks and specialists that have a role in supporting or pursuing commercial innovation relevant to different end markets, including: researchers, recyclers, regulators, commercial leaders, business consultants, co-investors (such as grants delivery agencies) and other stakeholders
- The accumulation of end market and research sector knowledge across TSA staff, records and business systems, and able to be shared with partners and stakeholders.

Given the recent approval of the draft Market Development Strategy, it may be timely to review and consider how these assets may be leveraged to support the strategy's implementation and other components of TSA's responsibilities. In particular, there may be market development priorities in regulatory reform, market analysis, infrastructure funding, training and engagement, and other areas that lend themselves to working closely with particular organisations.

## Fund delivery processes and systems

In most areas, processes used in managing the Fund and its projects have been effective, and TSA has demonstrated an ongoing willingness to test and improve processes that have been seen as sub-optimal, or that need adjustment in the face of new knowledge and changes to its operating

landscape. This openness to improvement is in itself a major positive, separate to the particular systems in place to operate the Fund.

However, there are isolated areas where the Fund’s management could be more effective, as set out in the table below.

<b>Application stage</b>	In some applications, the basis for projecting diversion volumes at a commercial scale lacked credibility. This may point to a lack of commercial capability in the project team and/or a limited ability to perceive the technology through the lens of market opportunity and/or commercial partners having an insufficient role in application development.
<b>Selection stage</b>	While the Selection stage seems to be working effectively, there may be a basis for the RAC to provide commentary on the quality of diversion potential estimates used by project teams in the Application stage, and what measures should be undertaken to improve these estimates by project completion.
<b>Project planning</b>	<p>Project planning arrangements appear to have been effective in satisfying the needs of stakeholders, including TSA and the research teams. However, in some instances, project plans were still in the draft stage and lacked detail regarding how project risks would be managed.</p> <p>This could cause problems for projects at risk of delivery failure, as it is not clear that the most recent plan represents an agreed view of the project, its expectations, and the division of responsibilities.</p>
<b>Delivery and reporting</b>	<p>Project reporting largely followed a milestone reporting format. While suitable for reporting progress, it does not address wider needs related to market development goals, and does not treat the project as sitting within a wider ecosystem of activities centred on market development and local diversion outcomes.</p> <p>Equally, if the team cannot demonstrate a capacity to improve its appreciation of the commercial opportunity in line with TSA’s expectations, this may carry a risk for later stages of commercialisation.</p>
<b>Project close out</b>	<p>TSA does not evidently employ formal close out processes as a matter of course when projects come to completion.</p> <p>There is an opportunity to capture project-level and commercial insights through a range of close out methods while streamlining reporting on the Fund’s performance. The close out process could additionally note options for TSA to work with project teams again, either through research projects or other means to develop markets.</p>

## Other market development activities

Historically, TSA has been somewhat effective in undertaking activities to address market barriers that may be poorly addressed by narrowly focusing on funding early stage research. But it is not clear that these historic initiatives responded to areas of greatest need and urgency, or that they encapsulated a systematic approach to ensuring diversion outcomes for EOLTs.

The draft Market Development Strategy demonstrates a more systematic and deliberative approach to market development and barrier removal, which should also grant greater certainty of diversion

outcomes supported by positive research results. TSA may consider the final Market Development Strategy as a means to implement some of the recommendations contained in this report.

## Efficiency

### Co-funding from project teams

In reviewing funding arrangements used for each project, all projects were found to comply with funding rules relevant at the time and enabled TSA to leverage substantial external resources. While there were some departures from the preferred amounts and ratios expected of partners, the guidelines made allowances for this where value for money could be substantiated.

TSA improved the funding leveraged over time, rising from \$1.40 leveraged during negotiated rounds for every research fund dollar, to \$2.30 thereafter. The mean funding leveraged was \$1.91 per dollar across all projects, close to TSA's stated preference of \$2 for every dollar from the Fund.

Some projects signify a greater EOLT diversion outcome per dollar allocated than others, although this comparison is partly limited by the poorer or less certain estimates provided by some project teams. Putting those projects aside, the industry led projects were notable as being efficient research expenditures, when weighing project costs and expected diversion impacts together. In this sense, they represented substantially better value for money than those that were led by academic and other research-focused bodies.

### Project delivery efficiencies

With regard to project delays and cost over-runs, the evaluation finds that projects performed well:

- No project documents or representative interviews revealed any cost over-runs or other indications that project resources were used inefficiently
- Most projects were able to deliver expected milestones within allotted timeframes, with some isolated instances of interim delays that did not warrant contract variation.

## Appropriateness

### Risk management arrangements

Project stakeholders felt that risks were adequately managed during project delivery, and this may be consistent with the low incidence of project delivery delay and cost over-runs. But in reviewing project planning documents, it is clear that processes to manage risks could be improved. Project plans exhibited considerable variation in the level of risk management detail that they provided.

Most of the duties to manage risks were carried by project teams. While this has its advantages, the understanding of risks that TSA has accrued while managing the Fund could perhaps be more adequately utilised. Moreover, the approach of leaving risks to project teams misses the opportunity for TSA to connect project delivery to commercialisation risks that reside between project completion and full commercial applications of the technology. Both project delivery risks and commercialisation risks need to be accounted for in ensuring that research projects ultimately contribute to the Scheme's diversion focus, yet current arrangements provide no visibility of risks



outside the project that could nonetheless be partially influenced or mitigated during the project.

### **Project team experiences of working with TSA**

During the evaluation, representatives were interviewed on the basis of whether the Fund was essential to undertaking the project, and how supportive TSA's processes were in project application and delivery phases. According to responses:

- The Fund was important to all projects reviewed. Seven of nine projects would not have taken place in its absence; the remaining two would have been deferred some months.
- All representatives stated an interest in seeking funding via TSA in future, should they be in the process of exploring technologies that were deemed eligible for support via the Fund.
- TSA's engagement, relationship management and standard of practice in running the Fund was seen an area of strength for the organisation.

However, this feedback needs to acknowledge a level of partiality given that interviewees were Fund recipients and may have a stake in maintaining strong positive relationships with TSA.

## Lessons Learned

Taking a broader and more systemic perspective on these findings, general lessons concerning the Fund and its role in the Scheme can be made. These serve as insights and principles to consider and potentially apply in future planning, decision making and operations regarding the Fund and related market development activities.

### **1. A pragmatic approach to managing the Fund**

TSA exhibits a willingness and capacity to adapt how the Fund works as its situational awareness grows and as circumstances shift, without being unduly beholden to past decisions. This ability to optimise the Fund over time, while respecting boundaries emplaced by the ACCC and the Product Stewardship Framework, is seen as an advantage that TSA should preserve over time.

### **2. Support for the Scheme's objective as having primacy to the Fund**

The objectives of the Fund centre on driving innovation, building and retaining expertise, and sharing knowledge. They do not innately orient the Fund to support the role of the Scheme to increase diversion of EOLTs to environmentally sound uses. This mismatch between the Fund's intent and the Scheme's purpose introduces a systemic risk to performance. This risk is resolved by aligning the Fund's objectives to the Scheme, and then perpetuating that alignment to lower level procedures, decision rules and principles relating to the Fund's operations.

### **3. Confidence in the numbers**

Applications supported from the Project stream of the Fund fundamentally need to present a well-founded projection of diversion outcomes that can be achieved from commercialising their technology. This should be informed by a credible appraisal of technical and market features, and include an indication of timeframes, risk factors, and related actions needed to realise commercialisation. Where TSA deems that the project is worthy of funding despite inadequate projection methods, project delivery milestones and/or activities outside the project could be used to bring estimates up to an acceptable level of confidence.

### **4. Project management embedded in a commercialisation framework**

TSA's stake in each project goes beyond project delivery, and includes achieving commercial scale diversion outcomes that relies upon positive research results. Given this interest and the broader guidance informed by the Market Development Strategy, it makes sense for wider commercialisation factors and risks to be accounted for in the project management used by TSA and research teams, designating roles according to who is best placed to play them.

## **5. Feedback cycles between market development and research**

Point 4 above flags the opportunity to better instil the Scheme's needs and market intelligence into project expectations and delivery arrangements. But the feedback cycle also runs in the other direction. Interim project results and commercial projections may uncover new markets to explore and help prioritise commercialisation pressures to investigate. The Scheme may benefit from periodically examining project results and what this means for updating the Market Development Strategy and its priorities. TSA may want to devise a set of methods and workflows to more deeply assess market potential in response to research discoveries.

## **6. Diagnostic methods to review Fund performance and inform future projects**

A number of tools used in this evaluation grant strategic insights into how well the Fund has worked, and which projects represent good value for money and are likely contributors to reaching the Scheme's objective. This suggests the opportunity to apply project, end-market, and Fund level appraisal methods on a periodic basis to understand patterns behind the Fund's performance and to direct future investments and market development activities accordingly.

## **7. Research projects as an entry point for partners in innovation and commercial adoption**

While the focus of the Fund has been to complete projects with research outputs that help prove tyre derived products as a commercial resource, it can more generally benefit from working with project organisations coming together in response to the Fund. If TSA is interested in exploiting these relationships beyond the Fund, it makes sense to use project outputs as a call to further collaboration. TSA may seek to ask the following questions:

- Can the Fund better attract the types of organisations that have, or could be encouraged to have, an ongoing stake in the Scheme? Is it explaining how the Fund and the Scheme work together, and what this means for parties open to outcomes-driven collaboration?
- Is TSA driving the best outcomes from each project – from both technical and commercial perspectives – not only to test new technologies, but to then call on co-investments and non-financial contributions from research partners and others at later points of market barrier removal, supply chain development, and commercial adoption?
- Is TSA adequately selling the achievements of the Fund and the commercial advantages of EOLT material evidenced by project results, to bring new applicants to the Fund and engender interest in working on other market development needs?

The results of this evaluation suggest that while TSA has taken some steps to leverage the Fund in this way, there is the opportunity to more assertively use the Fund as a tool to persuade greater investment in the Scheme beyond individual research projects.

## Recommendations

- 1:** Revise the Fund objectives to inherently service the Scheme's mission as its first priority. (It is understood that TSA recognises this priority, as set out in the draft MD Strategy.)
- 2:** Expand the scope of projects eligible for support through the Fund to include later stage projects. (It is understood that TSA is currently progressing this revision, as set out in the draft MD Strategy).
- 3:** To address concerns of undue market distortion arising from the inclusion of these larger and later stage projects, TSA is recommended to review, engage with stakeholders on, and communicate to stakeholders the impartiality of the application and selection processes used for these projects.
- 4:** If TSA moves towards supporting later stage projects entailing larger outlays and risks, TSA may require more detailed information from project leads during the application phase, commensurate with the capital outlays and risks at hand.
- 5:** It is recommended that diversion achieved during project delivery is not the most suitable metric for evaluating the Fund's contribution to the Scheme. Rather, the volume projected as achievable once the technology in question realises commercial maturity is more relevant and useful. But this reporting should duly note the timeframes and contingent factors influencing these outcomes.
- 6:** TSA is recommended to review and develop strategies in response to any identified supply chain constraints, that may impair the full use of local feedstocks in end products derived using technologies supported through the Fund. For example, TSA may seek to review whether local crumb rubber productive capacity can meet the demand expected from new applications explored by the Fund.
- 7:** The beneficial properties from the use of tyre derived product were proven to include cost reduction, improved durability and performance, and greater versatility. TSA is recommended to use this knowledge to sell the advantages of TDP as a constituent in select applications. It can use these results to attract more innovative applications beyond sectors that have already been a research focus.
- 8:** TSA is recommended to consider the potential trade-offs that may come between the role of the Fund to support the Scheme's diversion objectives, and its current objectives' focus on innovation, expertise development and information sharing. Should these objectives be retained, TSA may wish to develop guidance on their interpretation to avoid conflicts with the Scheme's core mission.
- 9:** TSA is recommended to review its internal knowledge base developed in managing the Fund, and the various networks of Fund stakeholders relevant to different end markets, for how they could be invited to help implement the Market Development Strategy.
- 10:** TSA is recommended to provide guidelines and/or standards to Fund applicants, to bring attention to the level of rigour expected regarding diversion volume calculations used in their applications.
- 11:** TSA is recommended to request the RAC to formally note the robustness of the projection method used in each shortlisted Project Stream application, and recommend to the Board what steps the project team ought to take to improve these projections either within or parallel to project delivery.
- 12:** TSA is recommended to ensure project plans are complete and adequate as tools to keep projects on track and minimise delivery risks.
- 13:** Where suitable, TSA is recommended to formally ask project leads (with their commercial partners) to re-evaluate the technology's commercial prospects, based on agreed activities at select points over the project's lifespan, and include in project reports. Alternatively, TSA could invite project partners to partake in a wider workshop with other end market stakeholders as the project

approaches close out, centring on a discussion of what significance the results have for commercialisation, and how the remaining market barriers and knowledge gaps need to be tackled.

**14:** TSA is recommended to consider formal close out processes (meetings, interviews, closure reports) to set out achievements, key lessons, and updated market intelligence relevant to the technology. These processes should help streamline measures used to report on the Fund's performance as a whole, and support its coordination with other market development activities.

**15:** Should TSA seek to revise IP arrangements, it is suggested that this take place within a more focused examination of what parts of the Scheme it needs to improve, and what are the pros and cons of the options available to improve it (which may or may not involve IP settings).

**16:** TSA is recommended to consider whether project recruitment processes need to more strongly favour industry leadership. Further, where a funded project is led by research specialists, TSA is recommended to check whether commercial parties are adequately prepared to take a leading role in subsequent stages in the innovation cycle.

**17:** TSA is recommended to keep a register of risks that have materialised across projects (or came close to materialising), and prompt management responses from future project teams where those risks are relevant to their projects. These risks (with others self-nominated by project teams) are recommended to be fully accounted for in project planning and management procedures.

**18:** TSA is recommended to take a wider view of risks relating to projects, to encompass commercialisation risks on the assumption of positive project results and the plan to progress the technology forward. These risks may be drawn from market scanning activities undertaken when implementing the market development strategy, then reframed as priorities to attend to either within or parallel to project delivery.

