

# **INDUSTRY WASTE MANAGEMENT PLAN**

## **TYRES**

**Developed by the CSIR in terms of Section 29 of the  
National Environmental Management: Waste Act, 2008**

**DRAFT 1 FOR STAKEHOLDER CONSULTATION**

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**The statements made and recommendations included in this report are based on available documented data and research findings. No primary data collection was undertaken and sources of information is listed in the Bibliography.**

## **PURPOSE OF THIS DOCUMENT**

**The intended purpose of this document is to serve as a “straw-dog” for the plan, i.e. the document present current thoughts and structure of the plan which will be used as the point of departure for stakeholder dialogue for the development of an Industry waste management plan for tyres.**

Draft for Consultation

## Executive Summary

(To be added)

*Draft for Consultation*

## Glossary

The following terms are defined in the Waste Tyre Regulations, 2017 as follows:

Collection points	Means areas of business from which waste tyres derived, or a commercial area where waste tyres may be collected including but not limited to, mines, farms and tyre dealers;
Load index	Means the international code imprinted on the side of a tyre that indicated the load, or weight that the tyre can carry at its maximum design pressure;
Micro-collector	Means an individual from the informal sector that collects waste tyres;
Part worn tyre	Means a used tyre, which can be safely returned to its original intended use and which, after being retreaded, is not of such a nature and condition that is not suitable to be fitted on a vehicle that operates on a public road in accordance with the National Road Traffic Act, 1996 (Act No 93 of 1996) or the regulations made in terms of that Act;
Pre-processing	Means pre-treatment of waste tyres to make the waste tyres suitable for transportation or for a specified treatment or processing option. Pre-processing includes sorting, baling, cutting (downsizing), shredding or debanding;
Treadable casing	Means the structural part of a used tyre that may or may not have residual tread depth for further road use and when subjected to inspection of the structural soundness of the casing, can be reprocessed by vulcanising new tread to the casing and can then be safely returned to its original intended use
Tyre	means a continuous covering made of natural rubber or synthetic rubber or a combination of natural and synthetic rubber encircling a wheel, whether new, used or retreaded, excluding tyres from motorcycles, bicycles and tricycles;
Tyre dealer	Means any person or entity that distributes, or otherwise deals commercially, in tyres;
Tyre producer	Means any person or institution engaged in the commercial manufacture or import of tyres and retreadable casing, and the import of vehicles fitted with tyres for distribution in South Africa
Vehicle	Means any motorised or towed mode of transport or implement fitted with tyres
Waste Tyre	means a new, used, retreaded or unroadworthy tyre not suitable to be retreaded, repaired, or sold as a part worn tyre and not fit for its original use;
Waste tyre management plan	means an industry waste management plan for the waste stream of waste tyres as contemplated in Section 28 or 29 of the Act, which has been approved by the Minister and published in the Gazette;
Waste tyre storage site or depot	Means a facility that is used for temporary storage of waste tyres
Waste tyre stockpile abatement plan	means a plan, submitted by a person or entity who had a waste tyre stockpile prior to 30 November 2012, indicating the manner and timeframe in which the stockpile will be removed.
Waste tyre stockpile	means a site on which predominantly waste tyres of any form are stored and have been stored continuously for a period greater than two years, and which cover an area greater than 500m <sup>2</sup> , but excludes a waste disposal facility.
Waste tyre stockpile owner	Means the owner, processor or person in control of the waste tyre stockpile or the waste tyres therein
Waste tyre processor	Means a person or facility that is engaged in the commercial re-use, recycling or recovery of waste tyres;

Waste tyre transporter	Means any person who conveys or transfers waste tyres between any of the following facilities: a producer, a tyre dealer, a waste tyre storage site, a depot or collection points where waste tyres may be collected or waste tyre processors
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Tyres categories based on the European Tyre and Rim Technical organisation (ETRTO) manuals<sup>1</sup>:

1. Passenger car tyres
2. Commercial vehicle tyres
3. Agricultural tyres
4. Motorcycle tyres
5. Industrial tyres and lift truck tyres
6. Aircraft tyres
7. Any other pneumatic tyres

Draft for Consultation

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<sup>1</sup> <https://www.etrto.org>

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## 1 Introduction

On 29 November 2019, the Minister of Environment, Forestry and Fisheries, Ms BD Creecy, MP, issued a Notice in terms of Section 29(1) of the National Environmental Management: Waste Act, 2008 (NEMWA) for the Council of Scientific and Industrial Research (CSIR) to develop an industry waste management plan (IndWMP) for tyres. This notice followed the rejection of the IndWMPs submitted by the Tyre industry as stated in the Notice of closing off the section 28 process that was published on 11 September 2019.

The first IndWMP for tyres under NEMWA is the Integrated Industry Waste Tyre Management Plan (IIWTMP) of the Recycling and Economic Development Initiative of South Africa (REDISA) which was implemented from 1 December 2011. Minister Edna Molewa, the then Minister of Environmental Affairs withdrew the plan with effect from 1 October 2017, following the change in the regulatory framework with the approval of the Pricing Strategy and the repeal of regulation 149 with the Waste Tyre Regulation, 2017. In the interim, the waste tyre stream has been managed by the Waste Management Bureau (WMB) as provided in the transitional arrangements of the Waste Tyre Regulations, 2017.

### 1.1 The context

#### *1.1.1 How many waste tyres in South Africa?*

There is currently no accurate figure on the number of waste tyres been generated on an annual basis in South Africa. We know that an estimated 16 million tyres are sold in South Africa on an annual basis, (11 million tyres are manufactured locally and 5 million tyres are imported (SATMC, 2015). Assuming that 95% of tyres are passenger tyres with an average weight of 9.1 kg, and the remaining 5% of tyres are truck tyres with an average weight of 45.4 kg, South Africa an estimated 174 640 tonnes of tyres is sold annually (DEA, 2018). This figure includes tyres for new vehicles. The typical tyre last for more than a year which implies that the number of tyres been sold per year cannot be used as a direct proxy for the amount of waste tyres per year. Some reconciliation will be required. One will also need to account for an estimated 3% year on year growth rate for the demand of new vehicles (i.e. over and above the replacement of old vehicles) and subsequent tyre sales. This will not automatically result in an 3% growth rate in waste tyres (various reasons could be put forward here, one of which include improvements in tyre technology to make tyres last longer, another potential reason could relate to improved road conditions resulting in slower wear of tyres and fewer pot-hole related write-offs).

The WMB have indicated that 170 266 tonnes of waste tyres are generated per year (2019 estimate) of which 77% is collected and 24% of the collected tyres are processed.

Between 2013 and 2015, the net tonnage of off the road (OTR) tyres manufactured and imported into South Africa amounted to approximately 25 000 tons per annum, after accounting for exports and rejects. It is anticipated that approximately 20% of this mass will be lost to normal wear and tear during the productive life of the tyre. It is therefore estimated that new arising OTR tyre waste will approximate 20 000 tons per annum.

#### *1.1.2 Waste tyre backlogs*

OTRs collected but not yet processed, as well as OTRs not yet collected are estimated at approximately 120 000 tons (TWAMISA, 2018).

#### *1.1.3 New tyre technology*

Recent advances in tyre technology include Goodyear's futuristic Oxygene photosynthesis tyre, which integrates living moss in its sidewall and generates its own light and Michelin's puncture-proof airless

concept tyre which will be virtually maintenance-free and will not have irregular wear from over- or under-inflation.

The impact of these new tyre technologies may have an impact on the management waste tyres in the future, but not in the short term.

#### *1.1.4 Business case for tyre recycling*

A study undertaken in 2013, as part of the Waste RDI Roadmap (DST, 2014a) found that waste tyres can be recycled to produce rubber crumb, which can be sold for approximately R3,000 per tonne to road builders. However, collection and transport of waste tyres from tyre dealers costs between R700 and R1,900 per tonne, while processing to produce rubber crumb costs another R2,000 per tonne, excluding overhead costs. It is therefore clear that recycling of tyres to produce rubber crumb in this scenario is not economically viable **given the current technology**. The tyre levy of R2.30/kg could partially address this, provided that the levy can be accessed. In the meantime, a more viable option may simply be to recover energy by using tyres in cement kilns or brick making plants, where waste tyres can replace part of the coal currently being used to produce energy. The WtE potential of tyres is relatively high, and has been valued at R367 per tonne (DST, 2014a). Pyrolysis was not evaluated in the 2013 study.

## **1.2 Legal framework for the tyre sector**

Waste tyres are regulated under the National Environmental Management: Waste Act, 2008 (Act 59 of 2008), the National Norms and Standards for Disposal of Waste to Landfill, 2013 (R636) and the Waste Tyre Regulations, 2017 (R1064 of 29 Sept 2017).

The National Norms and Standards for Disposal of Waste to Landfill, 2013 (R636) introduced waste disposal restrictions on waste tyres as follows:

- Waste Tyres: whole as of 23 August 2013
- Waste tyres: quartered as of 23 August 2018

The Waste Tyre Regulation, 2017 placed a landfill ban on waste tyres as of 29 September 2017.

The regulations outline a number of prohibitions as far as waste tyre management is concerned as follows:

No person may -

- a) manage waste tyres in a manner which does not comply to these regulations;
- b) recover or dispose of a waste tyre in a manner that is likely to cause pollution of the environment or harm to health and well-being;
- c) dispose of a waste tyre at a waste disposal facility;
- d) recover any financial contribution in terms of a waste tyre management plan from a subscriber to the plan, unless authorised by law; or
- e) export waste tyres in whatever form unless the exportation of such waste tyres is authorised by the Minister in writing.

According to the regulations the Waste Bureau is responsible to facilitate, supervise and control the management of waste tyres for the interim until a new industry waste management plan is approved in terms of Section 28 or 29 of the Act.

The tyre producers must submit declarations on the quantities of tyres produced and imported to the Waste Bureau on a quarterly basis and the Bureau must establish a waste tyre forum with all affected industry to deal with the governance and operational matters pertaining to the management of waste tyres during the interim until the new industry waste tyre plan is approved.

### 1.3 Composition of the sector

The waste tyre sector comprise a number of stakeholders including:

- Manufacturers and importers of tyres
- Generators of waste tyres:
  - Fitment centres
  - Mines
  - Agriculture
  - Industry
- Waste Tyre Depot managers
- Waste tyre collectors
- Waste tyre transporters
- Waste tyre processors including, but not limited to
  - Pyrolysis
  - Shredding
  - Crumbing
  - Tyre Derived fuel
  - Cement Kilns
- Research institutions including
  - Universities
  - Science Councils
  - Chemical industry

There are four tyre manufacturers in South Africa namely Goodyear, Bridgestone, Continental and Sumitomo (Dunlop). All of these companies are owned by international tyre companies with extensive global footprints. The South African tyre producers supply tyres to the vehicle manufacturing industry and also to the tyre replacement market in South Africa and Africa. In addition to the locally manufactured tyres, there are also an estimated 200 importers of tyres of various brands, mostly imported from China and Japan.

Continental tyres is shutting down its mining and agricultural tyres production unit in Port Elizabeth and moving production out of South Africa.

The breakdown of the waste tyre network by province is provided in Table 1.

**Table 1: Provincial breakdown of the network (WMB, 2020)**

Province	Collection points	Transporters: Primary & secondary	Micro collectors	Micro depots	Operating depots: Pre-processing & holding	Depot under development	Processors: Contracted & registered	Processors: still setting up
Eastern Cape	187	3	5	1	3	2	1	1
Free State	93	2			2	1		
Gauteng	696	17	132	14	8	2	5	2
KwaZulu Natal	319	15			4	0	3	
Limpopo	154	7			1	2		
Mpumalanga	231	4			3	1		
North West	112	5	4	1	1	3		
Northern Cape	49	1			1	0		
Western Cape	512	13	6	5	2	0	2	
<b>Total</b>	<b>2353</b>	<b>67</b>	<b>147</b>	<b>21</b>	<b>25</b>	<b>11</b>	<b>11</b>	<b>3</b>

## 1.4 Employment and SMMEs

Data on job creation and SMME's were obtained from the Waste Management Bureau and is provided in Table 2 and 3.

**Table 2: Jobs created and maintained in the waste tyre value chain**

Category	2018/19			2019/20		
	Created	Maintained	Total	Created	Maintained	Total
Transporters	102	395	497	65	442	507
Depots	163	192	355	50	345	355
Processors	69	156	225	33	176	225
<b>Total</b>	<b>334</b>	<b>743</b>	<b>1077</b>	<b>148</b>	<b>963</b>	<b>1087</b>

**Table 3: SMME's created in the waste tyre value chain**

	2018/19	2019/20
Processors	12	3
Transporters	80	0
Secondary Industries	54	16
Micro Depots/cooperatives	18	0
Depots	24	0
<b>Total</b>	<b>188</b>	<b>19</b>

## 2 Vision and mission for the sector

### 2.1 The proposed Vision:

Waste tyres are recognised as valuable resources contributing to the circular economy in South Africa.

The Waste RDI Roadmap (DST, 2014, a) set a target:

*“100% end-of-life tyres collected and recycled, and 50% decrease in stockpiles is achieved by 2024”*

### 2.2 Proposed Mission

To grow the contribution of the waste tyre sector in the circular economy through:

- Reduced environmental impacts associated with waste tyre management towards sustainable development;
- Realising the resource value of waste tyres in a circular economy;
- Development of sustainable SMMEs and creating decent jobs towards social upliftment; and
- Equitable benefit sharing across the value chain.

### 3 Objectives and Priorities for the Waste Tyre Sector

#### 3.1 Strategic objectives

The objectives of this Tyre Industry Management Plan are to:

1. Establish sustainable off-take markets for recycled tyre products to create demand for processed waste tyres;
2. Develop waste tyre processing capacity and infrastructure to support local waste tyre arisings (i.e. generation of waste tyres) in an environmentally sustainable way, with the potential to grow processing capacity to support the Southern African region in the future;
3. Establish smart logistics and transport systems to optimise the collections and distribution of waste tyres from point of generation to processor;
4. Create sustainable jobs and SMME opportunities in line with national government imperatives; and
5. Foster transparent, equitable, and fair distribution of cost and benefits across the waste tyre value chain.

#### 3.2 Performance Indicators and Targets

It is important to track progress against the objective of the plan and therefore it is important to set measurable targets as performance indicators.

##### 3.2.1 Objective 1: Creating off-take markets

Available data indicate that markets exist from the products from:

- Pyrolysis;
- Shredding;
- Crumbing; and
- Tyre Derived fuel

Targets for market development should therefore consider the following interventions:

- Creating local demand for high value end-products;
- Creating local demand for end-products of tyres not currently recycled; and
- Government intervention through policy changes to stimulate demand for tyres as alternative fuel source where appropriate.

##### 3.2.2 Objective 2: Increase processing capacity to match market demand

Available information suggest that on average about 40% of the total collected tyres are processed per year. In addition, many of the processing plants pilot scale plants.

Targets for increasing processing capacity should therefore consider:

- Upscaling of pilot plants to industrial scale as and where appropriate;
- Creating additional processing capacity in close proximity to areas with high volumes of waste tyre generation i.e. mining, and industrial areas to reduce transport distances to processing facilities;
- Increasing processing capacity to supply established markets; and

- Maximizing value extraction/addition to support business sustainability.

### 3.2.3 *Objective 3: Optimised collection and distribution systems*

The current logistics system for waste tyres collections and distribution is cumbersome and require improvement. An effective logistics system is therefore required to ensure timely waste tyre collections from generators and effective sorting, pre-processing and distribution to processors.

Therefore, targets should, amongst others, relate to:

- Number of collection points (% reduction in backlog over time);
- Tonnage of waste tyres collected;
- Tonnage of waste tyres processed (% of collected and in relation to available processing capacity); and
- Distribution efficiency (movement of tyres from depots to processors)

### 3.2.4 *Objective 4: Sustainable job creation and SMME opportunities*

There are potential for job creation and SMME development throughout the waste tyre value chain, but specifically in transport, collections and processing of waste tyres. It is important to track the sustainability of these opportunities and not simply the number of jobs or SMME created.

Targets should therefore be set to track additional new jobs and SMME entering the waste tyre value chain including:

- Number of additional jobs created per category i.e. transport, depots and processors;
- Number of jobs maintained per category;
- Number of additional SMMEs created per category i.e. processors, transporters, secondary industries, micro depots, depots; and
- Financial sustainability of SMMEs in the sector

### 3.2.5 *Objective 5: Equitable, and fair distribution of cost and benefits across the waste tyre value chain.*

The heavy lifting in waste tyre management is in the early stages (collection and transport) of the value chain while the money is made at the processing stage of the value chain. At present the cost associated with the collection and transport is largely carried by the state (subsidized through the tyre levy) while the benefits are not shared across all stakeholders.

Inputs are required on how this can be achieved for the benefit of the environment and sustainability of the value chain.

## **3.3 Priority areas for activity**

### 3.3.1 *Reducing the quantities of waste tyres leaking into the environment*

Interventions to reduce waste tyres leaking into the environment will have to focus on creating uptake markets for products created from waste tyres, as well as processing capacity for, re-use, recycling, recovery and beneficiation of waste tyres.

Specific interventions should focus on:

- Optimised logistics for effective waste tyre management;

- Developing processing capacity to deal with the supply;
- Developing markets to stimulate demand for processed; and
- Improved waste tyre treatment technologies, for example and finding appropriate alternative waste treatment technologies to reduce the need for stockpiling.

Although alternative treatment technologies are listed as a potential intervention to reduce waste tyre quantities leakage into the environment efforts should be focussed on high value products as well as high volume processing with off-take markets.

### *3.3.2 Financing and charges for waste tyres management*

The current remuneration model for micro collectors is R6.00 per tyre with a monthly threshold of 1000 tyres per micro collector while micro depots are paid R6 000 per month and incentives. Primary transporters rates are set based on the average monthly distance travelled and the size of the vehicle. Payment is then made based on tonnage transported multiplied by the rate. Secondary transporters are compensated based on the distance of travel between depots and processors.

Interventions required for addressing financing and charging issues include the following:

- To embark on a full cost accounting exercise for waste tyre management options in different geographic regions. Given the varied local conditions in different geographic areas, it is recommended that a full cost accounting exercise should be undertaken at provincial level and must include aspects of collection, transportation, storage, treatment capacity, debt payment and depreciation.
- The collection and transport costs should then become part of the input-cost structure of the recycling industry once up and running to ensure long-term sustainability.

### *3.3.3 Improved data and information*

Accurate data is required to proactively determine the need for additional infrastructure and equipment.

Accurate data can be collected through:

- Active participation in the National Waste Information System (WIS) to ensure that all generators, treatment and processing facilities are registered, and report waste quantities

### *3.3.4 Suitable land for Infrastructure*

Depots are required to store and sort waste tyres for distribution to processors. There is thus a requirement to find suitable land for depots and processors to be established

Interventions relating to land for establishing infrastructure will relate to the following:

- Proximity to generators of waste tyres and processors;
- Appropriate zoning of land for these activities;
- Associate road infrastructure for access to the sites;
- Etc.

### *3.3.5 Optimising logistics around waste tyres management*

A number of interventions are required to address ineffective collection systems. These interventions should address:

- Awareness creation about suitable vehicles;
- Capacity building about route planning; and
- logistics optimization.

### 3.3.5.1 Benchmarking

Benchmarking provides a useful means of raising awareness between collectors, transporters and processors of good practices with regards to effective and efficient processes and systems. It is recommended that benchmarking must be undertaken at national level taking all good practices into consideration.

### 3.3.5.2 Capacity building

Capacity building programmes should include aspects of training, mentoring and practical experience at all stages of the value chain.

### 3.3.5.3 Maintenance

System, equipment and infrastructure failure is often the symptom of poor maintenance. There are two aspects to maintenance to ensure sustainability, namely:

- Routine maintenance and
- Repair maintenance

A schedule for routine equipment and infrastructure maintenance is required for any system to be sustainable. Regular maintenance also has the advantage that it could inform budget planning by timeously identifying the need for replacement of capital equipment and infrastructure. Planned down time of equipment for maintenance purposes, provides for contingency plans to be put in place in order to continue important service delivery. Timeous repairs to, or replacement of broken parts further avoids unintended secondary damage and total failure of equipment and infrastructure. Good maintenance has the additional advantage of limiting the pollution impacts resulting from waste tyre management.

### 3.3.5.4 Holistic planning

Efficient waste tyre management systems can only be achieved through holistic planning. Holistic planning requires the incorporation of integrated environmental management considerations into the development of policies, strategies and programmes, all spatial and economic development planning processes and all economic activities. All elements of the environment are interlinked and management and planning must take account of connections between them.

It is therefore important that the Industry Waste Management Plan for tyres, must be implemented as a dynamic document, continuously utilised in the short-, medium- and long-term management of waste tyres. The plan must further be updated regularly to ensure that it remains relevant in line with changes in the sector. It is also imperative to align this plan with the automotive masterplan to ensure that growth in the sector is adequately addressed.

## 4 Infrastructure

### 4.1 Depots

#### 4.1.1 Pre-processing depots

Pre-processing depots engage in baling or shredding activities. Baling is primarily done to preserve storage space and increase transport capacity.

The purpose of a depot is to create temporary storage for waste tyres and pre-process tyres by shredding for supply to processors (tyre derived fuel (TDF) and Pyrolysis).

A number of factors need to be taken into account when planning the establishment of a pre-processing depot. These include:

- Location;
- Routes and suitability of access roads;
- Quantities of waste tyres to be handled at the facility; and
- Possibility to sort waste tyres.

Specialised bulk haulage vehicles are used to haul baled tyres from depots to processors. These require suitable access roads. The possibility of bottlenecks in the route related to waste tyre quantities to be handled at the facility must be considered. The number and size of pre-processing depots to be established will be determined by the specific conditions in the region.

#### *4.1.2 Standard depots*

Standards depot serve primary transporters on a daily basis. Sorting and temporary storage of waste tyres is the only activities at these depots. The same factors as indicated in 4.1.1 are applicable.

#### *4.1.3 Holding depots*

These depots serve as storage for waste tyres while awaiting dispatch to processors. The same factors as indicated in 4.1.1 are applicable.

## **4.2 Processing facilities**

Processing facilities will include but not be limited to:

- Crumbing – Shredding and grinding of waste tyres to be used in product moulding (tiles, bricks), asphalt for road surfacing, sport turfs, etc.
- Pyrolysis – Thermal decomposition of waste tyres to produce oil, carbon char, steel and gas.
- TDF – waste tyres used to replace coal in heating applications (cement kilns, brick manufacturing)

A number of factors need to be taken into account when planning the establishment of a processing facilities. These include:

- Proximity to markets
- Proximity to feedstock supplies
- Location in terms of zoning
- Routes and suitability of access roads; and
- Quantities of waste tyres to be processed at the facility.

## **5 Human resource requirements**

It is important to ensure that job opportunities created during construction and operation of infrastructure should be geared at local job creation and be labour intensive while ensuring decent jobs. Technologies may require scarce skills or skills levels that are not locally available. The waste tyres industry should therefore engage with higher education institutions to create the required training material and courses to develop local skills for uptake into the waste tyre industry.

## **6 Research Development and Innovation**

The Waste RDI Roadmap have identified waste tyres as a priority waste stream requiring intervention. The following goal statement was put forward by stakeholders with an indication of the likelihood of realisation in South Africa.

Stakeholder Goal statement 10+ years (beyond 2024)		Likelihood of SA Realisation
Tyres	100% end-of-life tyres collected and recycled, and significant decrease in backlog (stockpiles)	High

The evolution, evaluation and enablers are provided in Annexure 1.

The Waste RDI roadmap specifically mention that choice in technology solution targeted must be guided by what makes local economic sense, based on amongst others, the quantities and types of waste generated, the local cost of technology solutions, the value of waste streams to local markets, available skills, the local policy environment, and the local climate for business and investment (DST, 2014).

## 7 Action plan

The required interventions necessary to address the waste tyre management issues in South Africa will vary depending on site specific circumstances. An action plan with time periods varying between short, medium and long terms needs to be developed.

### 7.1 Monitoring and reporting

It is important to monitor progress with the implementation of the plan. Issue to be monitored and reported on relate to amongst others finances, state of the environment reporting and waste tyre management reporting.

The Waste Act, 2008 prescribes the establishment of a national waste information system (SAWIS) for the recording, collection, management and analysis of data and information that must include data on the quantity and type or classification of waste generated, stored, transported, treated, transformed, reduced, re-used, recycled recovered and disposed of. The waste tyre industry is therefore required to report in terms of the requirements of the SAWIS and provincial waste information systems.

Monitoring and reporting mechanisms must be put in place to monitor the progress being made towards implementing the Industry Waste Management Plan for Tyres. The key performance indicators and targets must be used for reporting purposes.

The indicator process should recognise that meeting of targets will in reality become an iterative process. It may thus be necessary to propose interim targets such that, over time, the final target is reached.

## 8 Bibliography

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Waste Research Development and Innovation Roadmap, 2014. Key points of leverage and RDI Opportunities

## **Appendix 1      Opportunities and trends**

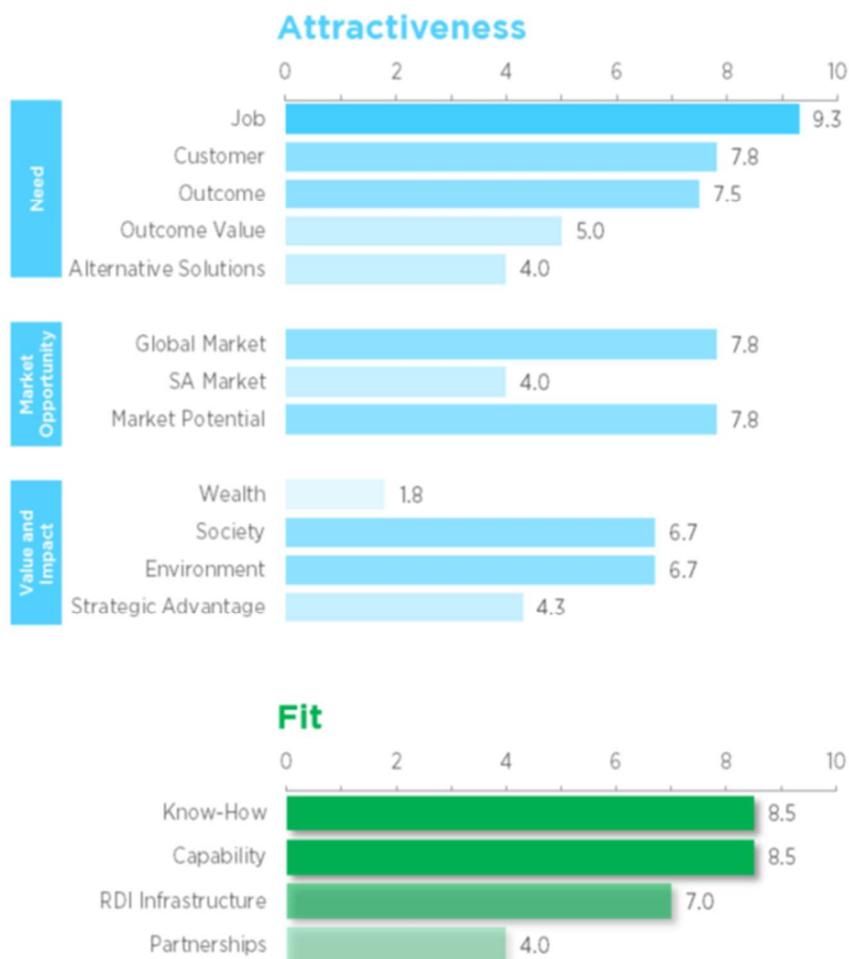
The opportunities evaluation provides an overview of the Market Opportunities for waste tyres, how attractive they are and what is required to realise them.

The Trends analysis describes the local and global trends in waste tyre management

Draft for Consultation

# Opportunity Evaluation

## Tyre Waste



## Interpretation

*“100% end-of-life tyres collected and recycled, and a 50% decrease in stockpiles is achieved by 2024”*

- ▶ A very sound understanding of the objective, customers and end-use applications. However, the value of pursuing the opportunity in materials recycling is inhibited by the incumbent solution – combustion or other low value production
  - ▶ Whilst global markets could benefit from the development and application of South Africa’s technology, local conditions seem to place constraints on growth
  - ▶ Realising the opportunity does not hold high potential for job creation yet the perception is high of other societal and environmental benefit
  - ▶ A strategic approach to processing waste tyres which provides maximum value to the SA Market (and not only disposal solutions), is required
- 
- ▶ Universities and Science Councils are building RDI capabilities in tyre waste, with a focus on alternative technologies, particularly pyrolysis
  - ▶ Investment is being made by industry, e.g. REDISA, to selected Universities for R&D in waste tyre technologies

**Table 5: Waste tyres**



Evolution: Waste tyres

What?	Where?	Now 0-3 Years	Next 3-10 years	Later > 10 years	Drivers (PESTEL)
<ul style="list-style-type: none"> <li>• End-of life tyres                             <ul style="list-style-type: none"> <li>○ Passenger</li> <li>○ Commercial</li> <li>○ Mining</li> <li>○ Agricultural</li> <li>○ Other</li> </ul> </li> <li>• Stockpiles (backlog)</li> </ul>	Throughout South Africa <ul style="list-style-type: none"> <li>• Urban areas</li> <li>• Mines</li> <li>• Rural, agricultural areas</li> </ul>	<ul style="list-style-type: none"> <li>• Approval of IndWMPs</li> <li>• Develop collection infrastructure (national) including storage</li> <li>• Downstream value-add markets</li> <li>• Research and development</li> <li>• Initial WtE</li> <li>• Piloting technology and processing plants</li> <li>• End-use markets investigation</li> </ul>	<ul style="list-style-type: none"> <li>• Detailed business model</li> <li>• Economic analysis to identify opportunities</li> <li>• Revisit IndWMPs</li> <li>• Investment in recycling plants</li> <li>• Component recovery and/or energy recovery</li> <li>• Markets for recyclate (mainly rubber crumb)</li> <li>• Processes to recycle</li> <li>• Phased development to more sophisticated processes</li> </ul>	<p><b>Goal statement:</b></p> <ul style="list-style-type: none"> <li>• <i>100% end-of-life tyres collected and recycled, and significant decrease in backlog (stockpiles)</i></li> </ul> <ul style="list-style-type: none"> <li>• Markets for recyclate</li> <li>• Network of processing sites</li> <li>• Developed secondary markets</li> <li>• Industry and government support</li> <li>• Zero illegal dumping</li> <li>• Technology/solutions specific to context of the region</li> <li>• Plants in place that can process/part process, linked to end-use markets</li> </ul>	<p>What will drive the growth of this waste stream?</p> <ul style="list-style-type: none"> <li>• Economic development</li> </ul> <p>What will drive changes in practice?</p> <ul style="list-style-type: none"> <li>• DEA approve IndWMPs, EIAs</li> <li>• Effective IndWMP</li> <li>• Industry participation</li> <li>• Enforcement of legislation</li> <li>• Secondary markets</li> <li>• ARF subsidy</li> <li>• Education/awareness</li> <li>• Mass transport systems</li> <li>• Incentives</li> <li>• Government green procurement</li> </ul>

Evaluation: *Waste tyres*

Benefit	Obstacles	Key Enabling Institutions	Likelihood of SA Realisation
<ul style="list-style-type: none"> <li>• <b>To the Economy</b> <ul style="list-style-type: none"> <li>○ Foreign direct investment</li> <li>○ Local resources (reprocessing) (carbon black and oil)</li> <li>○ Investment</li> <li>○ New markets</li> <li>○ Potential energy benefit</li> <li>○ Municipality budget relief</li> </ul> </li> <li>• <b>Wealth</b> <ul style="list-style-type: none"> <li>○ New businesses, including small businesses</li> <li>○ New value chains</li> <li>○ New revenue streams</li> <li>○ Probability of additional income for industry</li> </ul> </li> <li>• <b>Society</b> <ul style="list-style-type: none"> <li>○ Burning stops</li> <li>○ Dumping stops</li> <li>○ Participate in economy</li> <li>○ Job creation</li> </ul> </li> <li>• <b>Health</b> <ul style="list-style-type: none"> <li>○ Reduced emissions/pollution (burning)</li> <li>○ Reduced vermin</li> <li>○ Safety (re-grooving of tyres)</li> <li>○ Degradation toxins (heavy metals)</li> </ul> </li> <li>• <b>Environment</b> <ul style="list-style-type: none"> <li>○ Stop illegal dumping</li> <li>○ Reduced atmospheric emissions and toxins (burning)</li> <li>○ Prevent flooding (tyres blocking stormwater)</li> <li>○ Improvement of disposal practices</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Market</b> <ul style="list-style-type: none"> <li>○ Low demand currently</li> <li>○ Low economic value (end-use market)</li> <li>○ Needs to be developed</li> </ul> </li> <li>• <b>Policy, legislation &amp; regulation</b> <ul style="list-style-type: none"> <li>○ DEA approve IndWMPs</li> <li>○ EIA turnaround – obstacle to development</li> <li>○ Waste licenses – bureaucratic</li> <li>○ Enforcement</li> <li>○ Tax on oils from tyres</li> <li>○ All needs to be revisited</li> <li>○ Conflicting legislation</li> <li>○ Lack of communication</li> </ul> </li> <li>• <b>Infrastructure</b> <ul style="list-style-type: none"> <li>○ Tyre sellers in place but logistics and processes to be put in place</li> <li>○ Economics of it</li> <li>○ Viability of space/place</li> </ul> </li> <li>• <b>Investment</b> <ul style="list-style-type: none"> <li>○ High capital cost – needs long-term plan</li> <li>○ No collection points</li> <li>○ High transport costs</li> <li>○ Industry needs to be involved</li> </ul> </li> <li>• <b>Relationship</b> <ul style="list-style-type: none"> <li>○ Industry-DEA-Redisa</li> <li>○ Questions around Redisa</li> <li>○ Industry needs to be involved</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Government</b> <ul style="list-style-type: none"> <li>○ National government (DEA, DST, DOE, EDD)</li> <li>○ IDC, the dti, NEF</li> </ul> </li> <li>• <b>Industry</b> <ul style="list-style-type: none"> <li>○ User industries (e.g. construction/roads and cement)</li> <li>○ Industry associations (manufacturers, importers, dealers)</li> <li>○ Chamber of mines</li> </ul> </li> <li>• <b>Research</b> <ul style="list-style-type: none"> <li>○ Science Councils (CSIR)</li> <li>○ All academic institutions</li> </ul> </li> <li>• <b>Partnerships</b> <ul style="list-style-type: none"> <li>○ Well established in developed countries</li> <li>○ Industry-DEA</li> </ul> </li> <li>• <b>Other</b> <ul style="list-style-type: none"> <li>○ Industry communication to consumer</li> <li>○ SATRP</li> </ul> </li> </ul>	<p><b>High</b></p>

Enablers: *Waste tyres*

Enabler	Now 0-3 years	Next 3-10 years	Later > 10 years
<b>Technology</b>  (Imported, Local) Product, Process, Business Model	<ul style="list-style-type: none"> <li>• Map technologies currently available (locally and internationally)</li> <li>• Available – once IndWMPs approved invest in plants to ‘crumb’ and start-up idle plants</li> <li>• Look at business model and end-use possibilities</li> <li>• Innovation alternatives</li> </ul>	<ul style="list-style-type: none"> <li>• Development of end-use markets – widen usage of recyclates</li> <li>• More plants built</li> <li>• Implementation of pilot projects (technology and infrastructure)</li> <li>• Local manufacture</li> </ul>	<ul style="list-style-type: none"> <li>• Plants and end-use established</li> <li>• Provincial plants based on the needs of the province (post-processing)</li> <li>• Full value chain of end-use market</li> <li>• Range of alternative processes in place (e.g. de-beading, de-sulphurization, de-vulcanization, clean carbon black for uplevel production)</li> </ul>
<b>Capability</b>  Knowledge, Skills, Competence, Human Capital	<ul style="list-style-type: none"> <li>• Current expertise available</li> <li>• Status quo – backlog and rate of generation</li> <li>• Build corporate governance</li> </ul>	<ul style="list-style-type: none"> <li>• Development of relevant indicators and targets</li> <li>• Continuous evaluation and objectives (timeframes)</li> <li>• Development of skills and training programmes based on processes and end-use, e.g. resource economists</li> <li>• Innovation</li> </ul>	<ul style="list-style-type: none"> <li>• Ventures are sustainable</li> <li>• Ongoing</li> <li>• Export technology</li> </ul>
<b>Relationships</b>  Industry, Government, Research	<ul style="list-style-type: none"> <li>• SATRP-REDISA-DEA-DTI-IDC</li> <li>• Tyre manufacturing industry to work with government structures for research, etc.</li> <li>• Industry and government must action roadmap</li> <li>• Industry and mining standards</li> <li>• Academia, Science Councils</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain relationships</li> <li>• Ongoing for efficiency improvements and fostering of relationships in understanding processes, markets and industry (transparency)</li> <li>• Academia, Science Councils</li> </ul>	<ul style="list-style-type: none"> <li>• Local equipment industry grows</li> <li>• Development of independent governing body</li> </ul>
<b>Infrastructure</b>  Support Systems Services	<ul style="list-style-type: none"> <li>• Logistics infrastructure</li> <li>• ‘Collection point’ determination (i.e. industry and retail), as well as provincial/municipal collection points</li> <li>• Effective collection, storage, processing</li> </ul>	<ul style="list-style-type: none"> <li>• Perfect/refine logistics</li> <li>• Growth of SMMEs involved in value chain</li> <li>• Production plants</li> </ul>	<ul style="list-style-type: none"> <li>• Further role out of new plants</li> <li>• Inclusive tyre component fractioning</li> </ul>
<b>Government Action</b>  Policy, Legislation, Regulations	<ul style="list-style-type: none"> <li>• Legislate plans (IndWMPs) and enforce</li> <li>• Review of current legislation – enabling legislation</li> <li>• Allow commercial competition</li> <li>• Ring-fence recycling fee – not to national coffers</li> </ul>	<ul style="list-style-type: none"> <li>• Enforcement</li> <li>• Improvement in policy</li> <li>• Incentives</li> <li>• Norms &amp; standards (to replace EIA)</li> </ul>	<ul style="list-style-type: none"> <li>• Enforcement</li> <li>• Measurement of monitoring for continuous improvement</li> <li>• Accountability</li> <li>• Incentives</li> </ul>



