Perspectives on End-of-Life Tire (ELT) Management

Challenges and Potential Solutions in India

World Business Council for Sustainable Development

Tire Industry Project

ATMA

Contents

Executive Summary

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01. Executive Summary

The concept of viewing waste as a valuable resource rather than something to discard is transforming the recycling industry. This shift is particularly relevant for end-of-life tires (ELTs), which have diverse applications and are increasingly seen as key components of a circular economy.

The global urgency for improved management of end-of-life tires (ELTs) is clear, with approximately 1 billion tires reaching the end of their useful life each year.[1] While poor management of ELTs poses significant risks, including environmental and health hazards from unregulated dumping and illegal reuse, effective ELT management offers numerous sustainability benefits, such as economic gains from recycled outputs, job creation in collection and recycling, and environmental advantages from using recycled materials instead of virgin resources.[2]

To tackle the challenges of ELT management and identify effective solutions, the Tire Industry Project (TIP)—a CEO-led initiative under the World Business Council for Sustainable Development (WBCSD)—is working on global best practices research in ELT management since 2008. Recognizing the importance of fostering multistakeholder collaboration within key markets, TIP has organized workshops across the United States, Europe, and China. On September 21, 2023, in partnership with the Automotive Tire Manufacturers' Association (ATMA) of India, TIP hosted a workshop in New Delhi to address ELT management issues within the context of India's recently introduced Extended Producer Responsibility (EPR) regulation for waste tires.

The event brought together over 80 participants, spanning diverse categories of stakeholders, to align global sustainability initiatives with local challenges and opportunities. The one-day workshop featured technical sessions, breakout discussions, and knowledge-sharing activities aimed at raising awareness, improving the implementation of EPR regulation, and fostering collaboration within India's tire industry. Insights were gathered from stakeholder interviews, a pre-workshop questionnaire, and discussions during the workshop.

Key recommendations for ELT management and EPR regulation in India emerging from workshop discussions:

- Investment in R&D and training: Promote research, information dissemination, and training programs, drawing on successful EPR schemes in Europe, such as Ecopneus (Italy), RecyBEM (Netherlands), and Aliapur (France).
- Establishment of ELT collection centers: Develop large-scale authorized ELT collection centers and clarify the roles of tire consumers, dealers, and distributors in the recycling ecosystem.
- Addressing EPR portal issues: Resolve technical challenges with the Central Pollution Control Board's EPR portal, including IT registration issues, EPR certificate cost discovery, and lack of EPR certificates' trading transparency.

The workshop discussions resulted in the identification of impactful solutions including:

- Government initiatives to regulate EPR certificate pricing, promote retreading and reuse, and incentivize environmentally responsible recyclers.
- Advancement of ELT recycling technologies to improve sustainability outcomes.
- Awareness programs to engage stakeholders and facilitate a smooth transition to EPR regulation.

The workshop also emphasized the need for coordinated efforts among tire manufacturers, recyclers, and government agencies to ensure the successful implementation of EPR regulation and the creation of a circular tire industry in India.

Introduction

02.

02. Introduction

The Tire Industry Project (TIP), operating under the World Business Council for Sustainable Development (WBCSD), serves as the leading global platform for addressing sustainability challenges in the tire industry. Established in 2005, this CEO-led initiative brings together 10 major tire companies, collectively representing over 65% of global tire manufacturing capacity.

TIP primarily consists of leading global tire manufacturers as core members; however, it also collaborates with affiliate members—organizations and stakeholders that contribute to TIP's sustainability initiatives but do not contribute to the governance of TIP. The affiliate members of TIP are regional tire trade associations and Automotive Tire Manufacturers' Association (ATMA) of India is an affiliate member of TIP.

As one of the most advanced sectors in end-of-life product management, the tire industry has made significant progress in collecting and recovering ELTs worldwide.[3] This aligns with circular economy principles, recognizing the potential of ELTs and their materials as valuable resources beyond their initial use. However, further progress requires enhanced collaboration, supportive policies, innovative business models, and better information sharing across the value chain.

To foster such collaboration, TIP organized stakeholder dialogues in key regions, including the United States, Europe, and China, partnering with regional tire and recycling associations. These dialogues focused on identifying critical challenges in the ELT value chain and exploring research opportunities and solutions to improve ELT management. Reports from these dialogues outlined key recommendations and actions for TIP and industry associations to drive progress.

With its growing automotive sector and increasing tire consumption, India holds immense potential for advancing ELT management, while facing both challenges and opportunities in managing ELTs.

Inadequate ELT management poses serious risks, including environmental degradation and public health hazards. However, adopting responsible practices can unlock significant benefits, such as driving industrial growth, creating employment opportunities, and reducing dependence on virgin raw materials. By prioritizing robust ELT management system, India can accelerate its transition to a circular economy and pave the way for a more sustainable future.

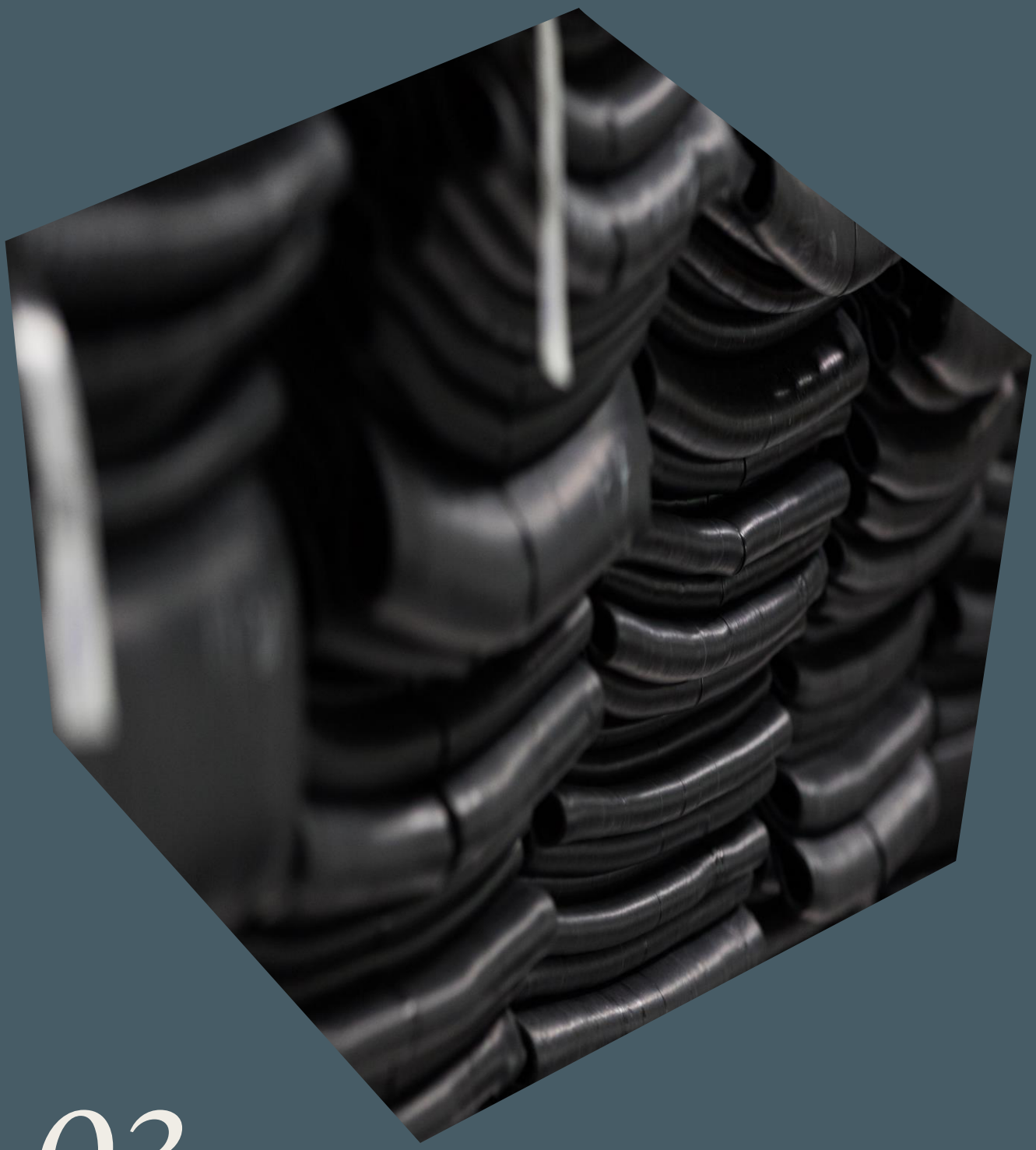
In response to these opportunities and challenges, TIP collaborated with ATMA to host a workshop in India, bringing together diverse stakeholders to address local challenges and align global sustainability initiatives with India's unique needs.

Headquartered in New Delhi, ATMA represents over 90% of India's tire production through its six prominent member companies and plays a vital role in bridging the gap between the government and the tire industry, contributing to policymaking and addressing industry challenges in a dynamic economic environment.

Beyond advocacy, ATMA engages with media, NGOs, and international associations to promote the Indian tire industry's perspective on key issues.[4]

Additionally, ATMA's Indian Tire Technical Advisory Committee (ITTAC) has driven advancements in technical and manufacturing capabilities over its 60-year history. By collaborating with national and international standards organizations, ITTAC has helped position India's tire manufacturing sector among the global leaders in technology, quality, and sustainability. Today, India's greenfield tire manufacturing facilities are recognized for their cutting-edge practices and adherence to global standards, marking a significant achievement in the industry's journey.[5]

Approach



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03. Approach

The ELT workshop in India was designed to identify critical challenges and opportunities in the management, recycling, and disposal of ELTs. With a focus on India's Extended Producer Responsibility (EPR) regulation, the workshop aimed to share knowledge, foster collaboration, and develop actionable recommendations for improving ELT management. EPR is a policy framework that holds manufacturers, importers, and brand owners responsible for the entire lifecycle of their products, including collection, recycling, and environmentally sound disposal. In the context of ELTs, EPR can mandate that tire producers ensure proper waste management, promote circular economy practices, and reduce the environmental impact of used tires.

3.1 Objectives of the workshop

The primary objectives of the workshop included:

- Sharing insights on recycling and recovery practices within the framework of India's EPR regulation for ELTs.
- Presenting the Ecopneus (Italy) EPR system and other global best practices in ELT management.
- Developing sustainable solutions for ELT recovery tailored to the Indian context.
- Formulating recommendations and identifying next steps for effective EPR implementation and ELT management.
- Providing participants with opportunities to network, exchange experiences, and explore potential collaborations to promote tire circularity and recycling practices.

3.2 Workshop structure

The workshop followed a structured approach to ensure comprehensive coverage of relevant issues and the identification of potential solutions. Key components included:

- Inaugural contributions: Opening remarks by representatives from the TIP, an Indian government official, and the Chairman of the ATMA.
- Technical sessions: Presentations and discussions led by national and international experts (Table 1).
- Breakout sessions: Thematic group discussions on specific aspects of ELT management and EPR implementation (Table 2).

3.3 Preparatory work

To ensure a meaningful and impactful event, the workshop's planning process included interviews with 15 stakeholders (Figure 1). These interviews provided valuable insights into the challenges and opportunities within the ELT sector, helping to shape the workshop's agenda and breakout session topics.

Content and discussions

The workshop provided updates on India's EPR regulatory framework, highlighted key challenges in EPR implementation, and shared insights from global case study Ecopneus. This approach ensured that the workshop addressed the unique challenges of ELT management in India while fostering collaboration and knowledge sharing among stakeholders.

Figure 1: Stakeholders interviewed before organizing workshop

Table 1: Overview of the workshop's technical sessions

Session 1: Global best practices in ELT management and successful EPR implementation
• The Ecopneus scheme (a producer responsibility organization in Italy) and its ELT recovery achievements over the last 11 years. • ELT scenario in Italy when it was a free market before 2011. • Operations of the Ecopneus scheme in Italy, including collectors, recycling and energy recovery facilities. • Activities of the Ecopneus scheme from 2011 to 2021 and market trends in material recycling, energy recovery and crumb rubber applications. • Example of joint industry recovered carbon black (rCB) call-to-action focusing on increasing the use of rCB in tires.
Session 2: Overview and challenges in EPR for India's waste tire regulatory framework
• Global and regional dimension of the ELT market, including market size. • Global ELT management regimes (tax system, EPR and free market system). • ELT collection and recovery routes in India. • Uses of ELT and recycling processes/products in India, including pyrolysis, crumb, reclaim, recovered carbon black (rCB), etc. • Overview of the EPR regulation in India.
Session 3: Material and energy recovery and latest innovations in ELT recycling technologies
• Economic perspectives of various tire recycling technologies. • Tire pyrolysis process and its benefits. • Tire pyrolysis oil (TPO) demand and its applications. • Rising global demand for rCB due to tire manufacturer initiatives. • Devulcanization processes, trends, applications, and examples of involvement of various stakeholders. • Recycled rubber molded goods and their applications. • Niche applications such as ELTs in concrete and rubberized asphalt.

Table 2: Breakout discussion themes and topics selected for in-depth coverage

Theme 1: Global best practices in ELT management and successful EPR implementation
• Hearing from the global perspectives and based on experiences with ELT management in India, what are the key suggestions and recommendations for EPR regulation for waste tires in India? • Learning from proactive sustainability initiatives across the tire industry, what are the potential suggestions and opportunities to leverage recycled materials for tire circularity? How can tire companies, governments and other stakeholders accelerate these efforts?
Theme 2: EPR implementation for ELT in India: status, challenges, and way forward
• Challenges and potential solutions for the registration of producers, importers, recyclers and retreaders on the centralized EPR portal. • Concerns and potential solutions for the sufficient supply of EPR certificates on the portal for the fulfillment of EPR obligations of producers. • Suggestions for EPR certificate transactions (e.g., bilateral trade between tire producers and recyclers/retreaders). What role could the government have in setting EPR certificate trade mechanism?
Theme 3: ELT recycling pathways in India, challenges and potential solutions
• How can informal ELT supply chain in India (generation, collection and final recycled end-products) evolve towards more organized collection and collaboration? • How can stakeholders address the lack of availability and accessibility of ELT collection and recycling data in India? What are the suggestions to improve ELT traceability? • What are the challenges in scaling the use of ELT derived materials like crumb rubber-modified bitumen (CRMB) in road application and recovered carbon black (rCB) in new tire manufacturing? What are the suggestions for the improved use of ELTs in sustainable and other applications?

Perspectives on ELT Management for India

04.

04. Perspectives on ELT Management for India

India's ELT management landscape presents both opportunities and challenges, as highlighted during the workshop discussions. With an annual generation of approximately 2.8 million metric tons of ELTs and a recovery rate of 98%, the country has a strong foundation for tire recycling.[6] However, the dominance of the informal sector in ELT collection and recycling poses environmental and operational challenges, necessitating a shift toward a more organized and regulated system.

4.1 Current status and challenges

India's ELT recycling ecosystem is heavily reliant on informal ELT collectors and treatment facilities, which often operate outside the formal regulatory framework. This leads to issues such as a lack of ELT traceability, non-compliance with environmental standards, and unsafe practices, particularly in the pyrolysis sector. The unregulated use of pyrolysis technology has raised concerns about environmental emissions, which can adversely impact the environment and public health.

Additionally, the fragmented ELT collection infrastructure and limited involvement of tire manufacturers in reverse logistics increases inefficiencies in the system. Despite the introduction of EPR regulation for waste tires in India under the Hazardous and Other Wastes Amendment Rules 2022, challenges such as technical difficulties in the EPR registration process, lack of organized ELT collection mechanism, and transparency issues in EPR certificate trading persist.

4.2 Recent developments

Significant efforts have been made to address these challenges:

- The National Green Tribunal (NGT) has intervened to regulate pyrolysis units, resulting in the closure of non-compliant facilities and the introduction of revised Standard Operating Procedures (SOPs) by the Central Pollution Control Board (CPCB).[7 & 8]
- EPR regulation now mandates producers, recyclers, and retreaders to conduct EPR certificate transactions through a centralized online platform. This step aims to streamline compliance and encourage formalization within the sector.[9]

Several key stakeholders, including government bodies like the Ministry of Environment, Forest, and Climate Change (MoEFCC), Central Pollution Control Board (CPCB), and industry associations such as All India Rubber and Tire Recyclers Association (AIRTRA), Tire & Rubber Recycling Association of India (TRRAI), Material Recycling Association of India (MRAI) and Tire Retreading Education Association (TREA), are actively contributing to policy formulation, capacity building, and the promotion of sustainable recycling practices.

Workshop insights

The workshop provided a platform for over 80 stakeholders to identify barriers and propose solutions for effective ELT management and EPR implementation. Key takeaways included:

- Improving ELT collection infrastructure: Participants emphasized the need for large-scale, authorized ELT collection centers to streamline raw material supply for formal recyclers.
- Addressing EPR framework gaps:
    - Expanding responsibilities under EPR to include tire consumers, tire dealers, and ELT collectors.
    - Proposing eco-fees for ELT management, akin to practices in the EU.
    - Enhancing transparency in EPR certificate pricing and trading.
    - Addressing the limited market for retreading certificates and streamlining registration processes.
- Promoting sustainable practices and innovation:
    - Encouraging joint R&D between tire manufacturers and recyclers to scale rCB usage in new tire production.
    - Standardizing pyrolysis by-products and incentivizing environmentally compliant pyrolysis units by increasing their weightage factor in the EPR regulation.
    - Supporting innovative recycling methods through government-backed incentive schemes aligned with sustainability goals.
- Capacity building and awareness: Industry associations and recyclers committed to raising awareness and encouraging broader registration of recyclers on the EPR portal.

For India to achieve sustainable ELT management, a cohesive approach is needed that balances environmental concerns with economic opportunities. Strengthening regulatory frameworks, fostering collaboration among stakeholders, and incentivizing environmentally sound technologies will be crucial.

The insights from the workshop underscore the importance of formalizing the sector, promoting circular economy principles, and ensuring compliance with global best practices, to position India as a leader in sustainable ELT management.

For a more detailed account of the ELT management, EPR implementation challenges, and potential solutions discussed during the workshop, see the Appendix.

Recommendations and Next Steps

05.

05. Recommendations and Next Steps

General recommendations for stakeholders

During the workshop in India, it became evident that effective ELT management necessitates strong leadership to coordinate with and engage stakeholders to establish new, efficient, and scalable ELT management systems.

TIP recommends that stakeholders:

- Learn from global efforts by exploring the tools and literature available in the tire industry. TIP has done global research on ELT management practices. See the TIP pages on WBCSD's website to learn more about the work TIP has carried out on ELTs.[10]
- Secure market development and standardization by facilitating the development of standards and a robust market for ELT-derived products, encompassing innovative applications for recycled rubber such as rCB, and create new economic opportunities for recyclers.
- Incentivize recyclers by finding ways to promote environmentally responsible recyclers in the sector. This may involve incentive schemes for advanced recycling technology or production-linked incentives to advance the move towards circularity.
- Ensure collaboration between stakeholders to develop and implement effective ELT management systems. This includes working with government authorities, tire recycling industry, individual manufacturers, research institutions and other stakeholders to improve ELT management practices.
- Encourage the adoption of sustainable practices by raising awareness and implementing initiatives centered on sustainability and circular economy. This is vital for both government entities and businesses. Sharing success stories can play a key role in increasing awareness and inspiring action to achieve these goals.

Stakeholders at the workshop committed to take collaborative effort to improve the ELT market, recognizing the critical role of continuous engagement in addressing challenges and scaling sustainable solutions.

TIP encourages ELT stakeholders to leverage knowledge exchange opportunities to propel advancements in ELT management.

5.1 Next steps

TIP, ATMA and Indian recycling associations will consider updating their ELT management workplans, informed by the challenges and solutions raised during the workshop.

TIP published reports that integrate relevant lessons learned and insights from the earlier discussions as highlighted below:

- Global ELT management – Global state of knowledge on collection rates, recovery routes and management methods.
- ELT management toolkit – Lays out key steps in establishing and enhancing ELT management systems, with examples from various regions and countries.
- Sustainability driven: Accelerating impact with the tire sector SDG roadmap – Identifies key Sustainable Development Goals (SDGs) where the tire sector can have the most impact and key actions to scale and accelerate contributions to the SDGs. The roadmap comprises seven impact pathways, one of which focuses on circularity and ELT management and details a series of proposed actions aimed at solving challenges, including those raised during the workshops.
- Perspectives on ELT management – Key takeaways and outcomes from stakeholder dialogues in the United States, Europe and China.

TIP will continue to raise awareness of the importance of good ELT management practices and their contribution to the SDGs as described in the roadmap and the ELT management toolkit. Furthermore, building on the success of the other workshops, TIP will continue to engage with stakeholders from the ELT value chain in other regions to exchange ideas on ELT management needs and solutions.

During the workshop in India, it became evident that effective ELT management necessitates strong leadership to coordinate and engage stakeholders to establish new, efficient and scalable ELT management systems.

In response to the valuable insights and recommendations provided by workshop participants, ATMA and recycling associations are motivated to take proactive measures to address the challenges in the tire recycling industry.

The proposed guidance to the industry towards tire sustainability and circularity in India are outlined as follows:

- **Integration of ELT collectors into the EPR framework:** ATMA and recycling associations to discuss the inclusion of ELT collectors as an integral part of the EPR framework with the government.

- **Increase recyclers' participation:** Industry stakeholders to actively promote the engagement of additional recyclers in the industry. The goal is to encourage more recycling companies to join the portal for EPR to ensure more EPR certificates are available for the fulfillment of producers' ELT obligation.

- **Conduct research and development (R&D):** Building on initiatives in the European Union, ATMA to conduct R&D in collaboration with recyclers and the government. This effort will focus on enhancing the use of recycled materials, especially rCB, to create more consistent materials designed for tire circularity. The objective is to increase the percentage of material reuse without compromising tire product performance.

- **Develop specifications for rCB:** ATMA member companies to work with recyclers and the government to develop specifications for rCB for use in tire and tube manufacturing.

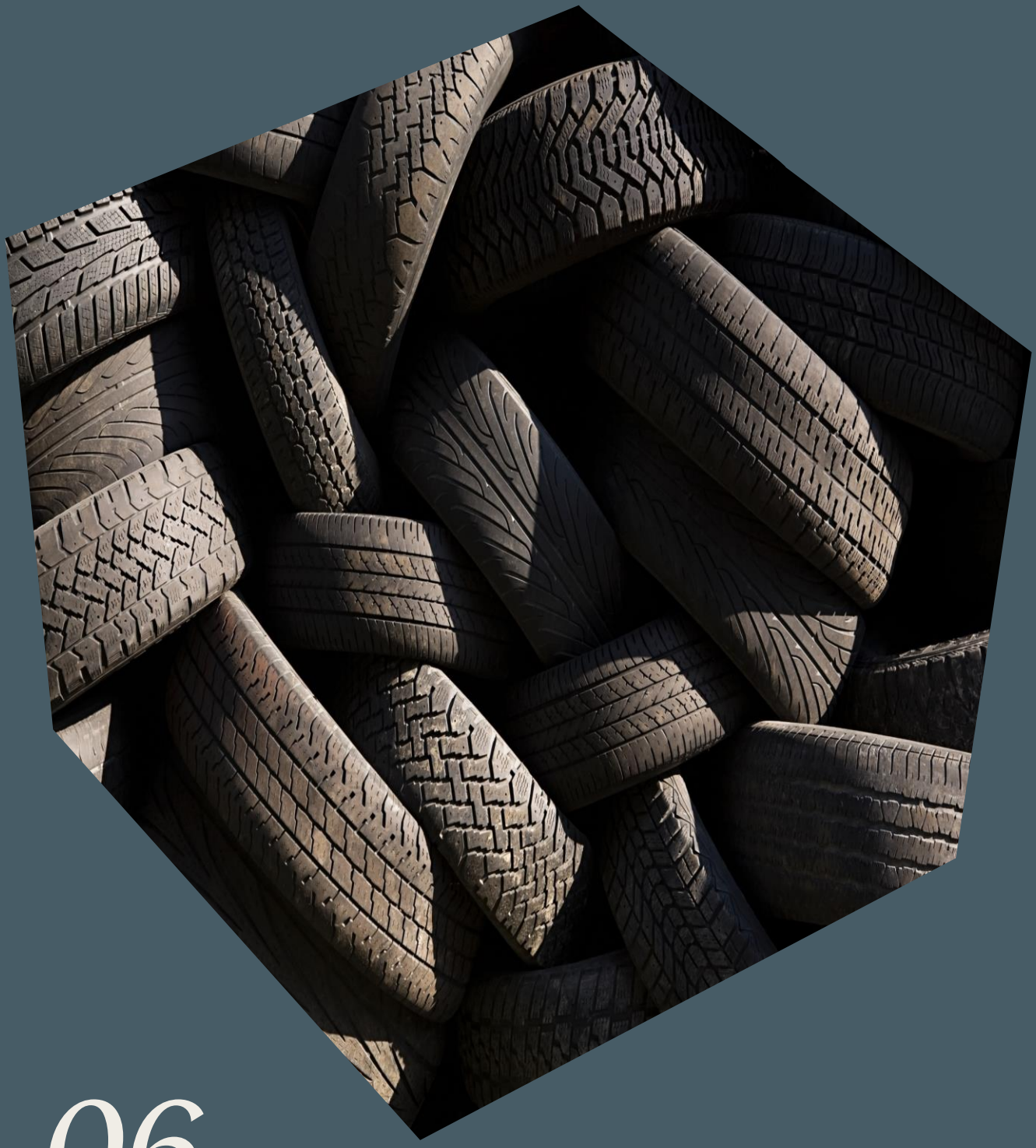
- **Emulate European EPR schemes:** ATMA and recycling associations, with the support of the government, to explore the feasibility of implementing a scheme similar to the European EPR. This initiative proposes the introduction of a green tax on consumers at the point of new tire distribution, following EU best practices. This approach would support the financial sustainability of the tire industry and help fund reverse logistics for collecting used tires and distributing them to authorized recyclers.

- **Establish authorized ELT collection centers:** ATMA and recycling associations, with the support of the government, to lead efforts to create a widespread network of ELT collection centers across the country. This network will facilitate the efficient collection and channelize the used tires to authorized recycling facilities.

- **Introduce an incentive scheme for recyclers:** ATMA and recycling associations to propose incentive schemes, such as a production linked incentive (PLI) scheme to the government, with the aim of promoting advanced ELT recycling technologies. This initiative will encourage innovation and investment in sustainable tire recycling practices across the country.

As a final note, TIP encourages all ELT value chain actors to contribute to the opportunities outlined in this report and looks forward to working to achieve a circular economy for ELTs.

Appendix



06.

06. Appendix

6.1. An explanation of the focal topics of the workshop

End-of-life tire (ELT) management in India

ELT management in India, despite being unorganized, is highly efficient, as there are no waste tire landfills in the country. The supply chain of ELT in the country involves stakeholders including vehicle sources, tire distribution centers, informal ELT collectors, ELT scrap dealers and recycling/retreading companies. Waste tires have a high economic value, resulting in no tire dumps.

Distributors and dealers collect used tires and often trade them through informal channels, and scrap dealers sell these waste tires. Recycling companies assess the potential of waste tires for retreading purposes or converting them into valuable end-products by recycling. This complex chain highlights the economic and environmental importance for effectively managing ELTs in India. Based on stakeholders' interviews and secondary research, Figure 2 explains the indicative supply chain structure of ELT flow in India.

Figure 2: Indicative supply chain structure of ELT flow in India

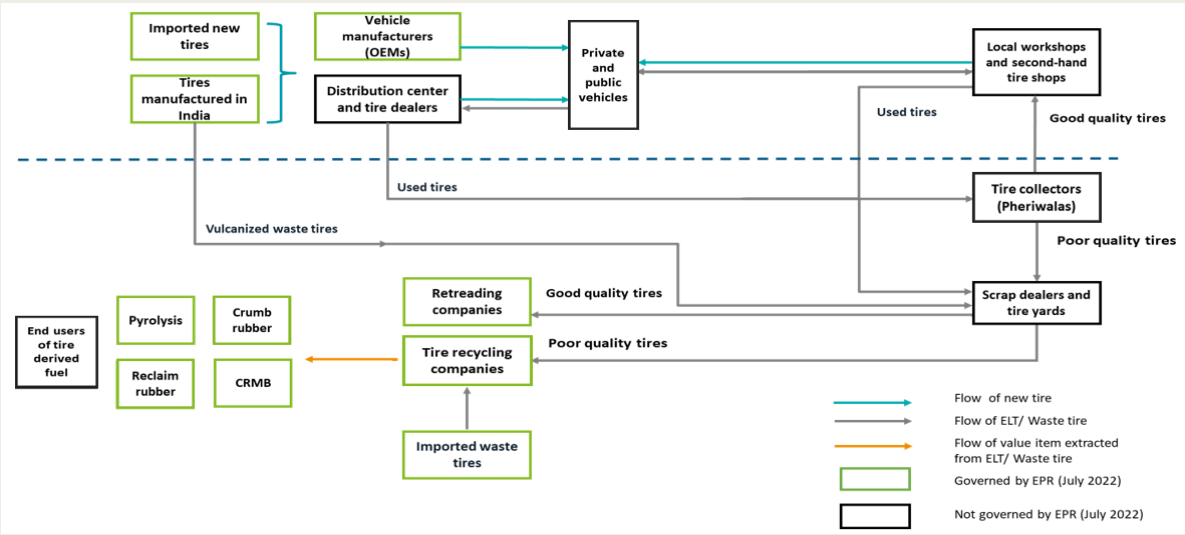


Table 3: Brief explanation of supply chain structure

Stakeholder	Description of role
Consumers	Public and private vehicles are the primary source of waste tires in India.
Distribution centers and tire dealers	The distributors and tire dealers who are responsible for collecting used tires that fall outside the scope of the EPR serve as the starting point in the recycling chain.
Informal ELT collectors (pheriwalas)	Informal collectors like hawkers (pheriwalas) play a role in ELT collection by purchasing used tires from tire dealers. These pheriwalas trade waste tires with aggregators like yard owners or scrap dealers.
Scrap dealers and yard owners	Scrap dealers and yard owners store larger quantities of waste tires, sometimes separating good tires for resale in the second-hand market for a better price. They are responsible for collecting and sorting waste tires for retreading and recycling purposes.
Recycling and retreading companies	These companies represent the final link in the chain of ELT recovery. They purchase all types of waste tires, both good and poor quality, from scrap dealers and yard owners. Formal recycling companies require scrap dealers to have Goods & Services Tax (GST) registration and conduct payments through bank transactions/cheques.

Major recycling pathways

Pyrolysis, crumb rubber, reclaimed rubber and retreading are the four primary reuse and recovery paths for used tires in India. The existence of many recycling and retreading facilities in India reflects promising prospects for fostering a circular economy for ELTs. However, this also presents a challenge for the government in ensuring consistent policy implementation across the entire market.

The pyrolysis process is a dominant choice for ELT recovery in India. Most pyrolysis operations in India use batch-type technology, while continuous technology is utilized by only a few recycling facilities. The pyrolysis process yields valuable by-products like high calorific value pyrolysis oil, steel, char and pyro-gas.

The batch-type pyrolysis technology plants entered the Indian recycling sector in 2005, primarily imported from China. While these plants proved to be profitable, they faced challenges related to stability, environmental compliance and safety standards. Due to growing environmental concerns of batch-type pyrolysis units, government interventions and ELT import restrictions were implemented. As a result, several non-compliant tire pyrolysis units were shut down, which has affected the reputation of the industry.[11]

The batch and continuous type pyrolysis technologies are discussed in brief below.[12]

- **Batch process –** Most of the tire pyrolysis units in the country are batch type technology because of less capital cost requirements. In these plants, the process starts with the manual feeding of whole waste tires or tire pieces into the reactor and ends with the removal of steel wire and char.
- **Continuous process –** India has very few examples of continuous type technology due to its high cost. In this process, it is necessary to mechanically cut waste tires into small chips to liberate steel before feeding into the reactor. The entire technology system is a closed circuit where the reactors run continuously and do not require opening.

Crumb rubber and reclaimed rubber are also crucial elements of the tire recycling industry in India. Various applications use crumb rubber, made by reducing waste tires into uniform granules that are free from fiber and steel. Crumb rubber is utilized in building and construction activities, and in a wide range of recycled rubber products, such as rubber flooring, athletic tracks, playgrounds and sports courts. Crumb rubber can also be used as an additive in asphalt for construction of roads and driveways as crumb rubber modified bitumen (CRMB).

Crumb rubber is also used as a feedstock for reclaimed rubber which is used as a substitute for virgin rubber in many applications, including tires, hoses, belts, etc. Incorporating reclaimed rubber into rubber product manufacturing reduces the dependency on virgin rubber and helps conserve natural resource.

EPR regulation in India

The Indian government has established an online portal for waste tire management where all industry stakeholders, such as producers, recyclers and retreaders, must register before commencing or continuing their business activities. The government has divided the EPR obligation based on the entity registering on the portal.[13]

EPR obligations for producers (manufacturers and importers) of new tires: The EPR obligation for producers is discussed in the table below.

For units established after 1st April 2022, the EPR obligation will start after two years (Y) and be 100% of the new tires manufactured or imported in the year (Y-2).

EPR obligations for importers of waste tires: The EPR obligation in year (Y) will be 100% of the tires imported in year (Y-1) and will prohibit the import of waste tires for the purpose of producing pyrolysis oil or char.

EPR obligations for retreading of waste tires: Producers of retreaded tires will be exempt from the EPR obligation for one year.

Table 4: EPR target for producers

Year	Quantity of new tires manufactured or imported in a year (in percentage)
FY23 (2022-23)	35% of new tires manufactured or imported in FY21
FY24 (2023-24)	70% of new tires manufactured or imported in FY22
FY25 (2024-25)	100% of new tires manufactured or imported in FY23
After FY25 (year Y)	100% of year (Y-2)

The weightage and conversion factor assigned to the recycled products under the EPR regime is highlighted in the table below.[14] These metrics help in the calculation of the final quantity eligible for the generation of EPR credits/certificates for recyclers.

CPCB has determined the conversion factor (C_F) for each end-product while the steering committee will review the weightage (W_P) from time to time, in view of the technological advancements, availability of material and other factors.

Transaction of EPR certificates: Producer can purchase the certificates through the portal at a price mutually agreed between producer and recycler/retreader. The producers and recyclers have to submit all such transactions on the online portal along with the timely filing of quarterly returns. The producer and recycler jointly determine the price of the certificate, with limited government involvement. The guidance document is published by the CPCB which provides the details of the transaction.[15]

Video tutorial for recycler registration: The CPCB has released a tutorial to assist recyclers in the registration process.[16]

Standard operating procedure (SOP) for the registration of stakeholders on the EPR portal for waste tires: The SOP provides the information required for the registration of producers, recyclers and retreaders. Registration adheres to the checklist outlined in the SOP as the applications undergo review based on this checklist.[17]

Table 5: Metrics used to calculate quantities of EPR credits/certificates generated for recyclers

Recycled product	Weightage (W_P)	Conversion factor (C_F)
Reclaimed rubber	1.30	1.298
Recovered carbon black (rCB)	1.25	3.676
Crumb rubber modified bitumen (CRMB)	1.10	0.2
Crumb rubber	1.0	1.333
Pyrolysis oil and char	0.80 (continuous process) 0.50 (batch process)	1.49 (continuous process) 1.49 (batch process)

6.2. Glossary of terms

Crumb rubber modified bitumen (CRMB): Rubberized asphalt or CRMB is made by breaking used tires into rubber crumbs that are added with bitumen, which is typically used to make regular asphalt for road surfaces.

Devulcanized rubber: Derived from a chemical process called devulcanization that breaks the bonds of vulcanized rubber without shortening the carbon chains. Devulcanization is a method for material recovery.

End-of-life tire (ELT): A tire that can no longer serve its original purpose on a vehicle. This excludes retreaded/reused tires or those exported on used cars.

Extended producer responsibility (EPR): In the case of EPR, the responsibility for organizing ELT management falls on the producer of the tires (manufacturer or importer). The targeted volumes are typically determined based on the quantities of tires introduced into the market.

Energy recovery: A recovery route that uses recovered ELTs for tire-derived fuel (TDF).

Material recovery: A recovery route that uses recovered ELTs for the production of new material, for example, ELT used to produce tire-derived material (TDM).

Producer: As specified in the Indian EPR regulation, producer is defined as any person or entity who: (i) manufactures and sells new tires domestically; or (ii) sells domestically under its own brand, new tires manufactured by other manufacturers or suppliers; or (iii) sells imported new tires; or (iv) imports vehicles fitted with new tires; or (v) automobile manufacturers importing new tires for use in new vehicles sold domestically; or (vi) imports waste tires.[18]

Producer responsibility organization (PRO): Not-for-profit organizations set up jointly by tire producers to take responsibility of managing ELTs. The mandate of PRO is to collect and manage the treatment of an equivalent volume of tires sold collectively by tire companies (according to the principle of "one new tire sold; one worn tire recovered").

The financing of the process comes from an environmental fee generally applied to the product price. PROs manage the entire ELT value chain from collection to recovery or recycling, with the support of a reliable and transparent traceability system.

Pyrolysis: The decomposition of ELT into pyrolysis oil, gas, steel and char in different proportions is called pyrolysis. The process includes the application of high pressure and temperature, and usually the absence of oxygen.

Recycling: As specified in the Indian EPR regulation, recycling is defined as any process or action of converting waste tires into the following end-products in an environmentally sound manner: (i) reclaimed rubber; (ii) crumb rubber; (iii) crumb rubber modified bitumen (CRMB); (iv) recovered carbon black (rCB), which is usable as raw material for manufacture of new tires; and (v) pyrolysis oil or char, which is used only as a fuel and not as raw material for manufacture of new tires.[19]

Reclaimed rubber: The conversion of vulcanized rubber waste into a state in which it can be mixed, processed and vulcanized again. Reclamation usually involves a chemical process and is a method of material recovery as reclaimed rubber is designed to replace new rubber in the manufacturing of rubber products.

Retreading: Also known as recapping or remolding, it is the process of tire renewal for reuse by replacing worn-out rubber belts and treads with new ones.

Recovered carbon black (rCB): During pyrolysis, the organic materials in the tires break down into gases and liquids, leaving behind solid carbon black particles. This byproduct is then further processed to remove impurities and optimize its properties for various industrial applications to act as a substitute for virgin carbon black.

Tire-derived material (TDM): A product made from the recycled ELT material.

Tire-derived fuel (TDF): ELT which is used as an alternative fuel to produce energy through combustion (energy recovery) is called tire derived fuel. TDF also refers to the fuel produced by a specific treatment of ELT (such as pyrolysis, which can produce oil and gas products along with a TDM portion).

Tire pyrolysis oil (TPO) units: Industrial facilities that employ the pyrolysis process to convert ELTs or used tires into various valuable products, such as pyrolysis oil, char (possible to upgrade to recovered carbon black) and pyro-gas.

6.3. ELT Management Challenges & Industry Perspectives

This section summarizes the ELT management challenges, and possible solutions shared by participants during the workshop and pre-workshop discussions. The insights below reflect the personal experiences and opinions of participants, not necessarily those of TIP or its members. During the workshop, participants identified key challenges, explored ways to address them, and prioritized the most promising solutions.

Topic 1: Drawing from global perspectives in ELT management and EPR regulations, what are the major concerns and recommendations for improving the ELT management and EPR regulation for waste tires in India?

Challenges and solutions in the market and economic aspects of ELT management in India

Challenge 1: Lack of eco-fees for ELT management

The collection and recycling of ELTs involve significant logistic and financial challenges. ELTs must first be consolidated at collection centers and then distributed across various channels for recycling and reuse, all of which require substantial funding. In many developed economies, including the EU, this funding is supported by eco-fees — environmental contributions collected at the point of sale for new tires. Tire manufacturers, distributors, or dealers charge this fee to consumers and pass it on to support tire collection and recycling efforts, ensuring environmentally responsible disposal.

However, in India, the absence of an eco-fee system means that ELT management is largely driven by external market forces. This reliance on market dynamics often leads to inefficiencies and challenges in establishing a sustainable and organized tire recycling system.

Potential way to overcome this challenge

Indian stakeholders can draw valuable insights from successful European models to enhance the efficiency and sustainability of the ELT management supply chain.

A key step in this direction would be the establishment of a sustainable funding mechanism through the adoption of an eco-fees. This system would involve levying a green fees at the point of sale for new tires. The collected fees could then be used to provide financial incentives to authorized tire collectors and recyclers, supporting environmentally responsible collection, recycling, and disposal practices. Implementing a structured eco-fee mechanism could significantly enhance India's capacity to manage ELTs in an environmentally sound manner.

Challenge 2: Limited involvement of tire industry in the ELT collection process

In India, tire companies do not actively engage in ELT collection and management. Unlike in some European countries, where tire manufacturers are responsible for organizing and funding the collection, recycling, and disposal of used tires, Indian tire companies generally do not have formal systems in place to handle ELT collection and management.

Potential way to overcome this challenge

Tire companies in India could play a more active role in ELT collection and management with the help of ELT or EPR management organization, such as producer responsibility organizations (PROs). India could benefit from learning and adopting best practices from European tire companies which manage ELTs through dedicated ELT management organizations (like Ecopneus, Aliapur or RecyBEM).

Ecopneus Example: Ecopneus scpa is the non-profit company for the tracking, collection, processing and final destination of ELTs created by the major tyre manufacturers operating in Italy (Bridgestone, Continental, Goodyear-Dunlop, Marangoni, Michelin and Pirelli). In the course of time, many other companies have joined Ecopneus. Under Art. 228 of Legislative Decree 152/2006, tyre manufacturers and importers are obliged to ensure the management of a quantity of ELTs equal in weight to that which is placed on the replacement market in the preceding calendar year, based on the EPR.

As provided for by Ministerial Decree 82/2011, which implements Art. 228, in addition to providing for all the operations necessary to ensure the correct recovery of all the ELTs under their responsibility, on behalf of its business partners, Ecopneus is also entrusted with the duty of reporting to the Authorities. This task is carried out by Ecopneus with an appropriate IT system, in order to certify the quantitative flows of ELTs from the source to collection and use, as well as to provide for the economic reporting and the reporting of the quantities placed on the market annually.

Challenge 3: Absence of reverse logistics of ELTs

India has an extensive market with hundreds of tire dealers, distributors, etc. One of the primary challenges faced is the absence of a robust reverse logistics distribution network that ensures the movement of used tires to the authorized collectors or recyclers.

Potential way to overcome this challenge

Stakeholders in India may propose a scheme like Ecopneus to fund the reverse logistics of used tires and incentivize authorized collectors and recyclers in India.

Challenge 4: Limited focus on large-scale ELT collection

Aligning hundreds of waste tire collectors in India may be a challenge. Italy's model, which involves fewer entities handling collection and recycling, similar to the approach in the United States, demonstrates the efficiency of supporting large scale ELT collectors in the process.

Potential way to overcome this challenge

There is a need to have large-scale authorized ELT collection centers across India to ensure a stable supply of ELTs to authorized recyclers and retreaters to strengthen the recycling industry. This approach will help recyclers meet their raw material needs and support them in upgrading their technology. India currently has around 38 large ELT collection hubs across the country which are directing ELTs to authorized recyclers.

Developing 40-50 large scale authorized ELT collection centers across the country, either by government or private enterprises, would further strengthen the flow of ELTs towards authorized recyclers. These centers should follow SOPs to ensure the responsible and compliant handling of ELTs. A transition plan may support smaller ELT collection centers during this shift. This approach aims to enhance ELT collection and traceability and incentivize formal recyclers.

Additionally, it is also easier to manage a few large ELT collection centers than overseeing many small ELT collection centers.

Challenge 5: Recycling business challenges

In India, stakeholders are not effectively channeling large quantities of ELTs, and recyclers (unauthorized or authorized) buy ELTs based on free market mechanisms. This practice hampers the ability of authorized recyclers to source ELTs, primarily because ELT dealers often prefer to operate in cash or off the books.

Potential way to overcome this challenge

As discussed in the above point, developing large scale authorized ELT collection centers across India would enable the flow of ELTs towards authorized recyclers. This would enable authorized recyclers to easily source ELTs from large ELT collection centers.

Challenges and solutions in ELT management policies and regulations in India

Challenge 1: Limited consumer and dealer/distributor responsibility

Key stakeholders, including tire consumers, dealers, distributors, and scrap dealers, currently have minimal responsibility for ELT disposal due to their exclusion from the EPR regulation. This limited involvement contributes to a lack of organized and regulated ELT collection mechanisms across the country, hindering effective waste management efforts.

Potential way to overcome this challenge

To enhance ELT management in India, the industry could adopt a shared responsibility model, involving all stakeholders - consumers, collectors, tire dealers, producers, and recyclers - rather than limiting the responsibility to select groups. Key recommendations include:

- **Expanding the EPR framework:** The Indian EPR regulation could take inspiration from European models by formally recognizing collectors such as tire dealers, scrap dealers, and tire yards. This recognition would address the reverse logistics of used tires. Additionally, the government could establish a clear definition of a "collector" to ensure consistent practices.
- **Tire take-back policy:** Tire manufacturers, in collaboration with the government, could require tire dealers to accept one used tire from customers when selling a new one. This would promote responsible disposal and collection, creating a streamlined flow for ELT handling.
- **Reward-based return system:** Introducing incentive-based programs could encourage consumers to participate actively in proper tire disposal. For instance, customers could receive discounts on new tires when returning old ones, similar to schemes used for end-of-life vehicle management.

Challenge 2: Limited specific government support for the tire recycling industry

Without specific policies, incentives or funding, the tire recycling industry would struggle to expand and develop more sustainable and efficient technologies.

Potential way to overcome this challenge

Support tire recycling efforts in the country by developing an incentive scheme like the production linked incentive (PLI) scheme to promote advanced tire recycling. This would align with the government's sustainability goals, encourage the adoption of innovative recycling methods, and support the growth of the recycling industry.

Challenge 3: Insufficient oversight for Imported ELTs

In India, recyclers can be given license to import ELTs in shredded or cut form. However, there is a limited system to ensure that these imported ELTs are directed to the appropriate recycler allowed to use imported ELT, or to pyrolysis units (pyrolysis units are not allowed to import ELTs).

Potential way to overcome this challenge

While the government has made efforts to address non-compliant tire pyrolysis units in the country, it could further enhance EPR enforcement, including overseeing the end-use of imported ELTs. Additionally, steps could be taken to curb unlicensed and illegal recycling activities in India. One suggestion to the government could be to implement a rule or additional amendment in the EPR to address this oversight of imported ELTs.

Challenge 4: Lack of reporting obligations of ELT data in India

In the EU, each member state is required to report the volume of ELTs generated and how stakeholders are recycling ELTs. This reporting helps to provide visibility and track progress on meeting ELT collection, material and energy recovery targets. In contrast, India's ELT system does not currently include such provisions.

Potential way to overcome this challenge

Establishing a reporting obligation for the national authorities and aligning the Indian reporting system with international best practices, such as those in the EU.

This would help ensure accurate data on the volume of ELTs generated in India. This would also enable the authorities to monitor compliance and track progress on ELT collection, material recovery and energy recovery targets.

Challenge 5: Lack of availability of official ELT recycling data in India

Although production data for reclaimed rubber is publicly available through the Rubber Board of India, no official figures are available with regard to other recycling pathways, such as pyrolysis and crumb rubber.

Potential way to overcome this challenge

Establishing a comprehensive data collection system for all recycling pathways, including pyrolysis and crumb rubber, would offer increased transparency in the recycling industry with accessible official data on recycling.

Challenges and solutions in education and awareness for ELT management in India

Challenge 1: Opportunity to have tire stewardship programs

In tire stewardship programs globally, dealers, retailers or consumers dispose their ELTs at a designated collection point, access point, or drop-off point, from where the ELTs are sent to authorized recycling facilities.

Potential way to overcome this challenge

The government and the tire industry could set up a tire stewardship program in or near metro cities in India, where most ELTs are generated. This program would collect used tires and encourage authorized dealers or retailers to avoid selling them to the informal sector. Instead, they would keep records of the tires they collect and ensure tires are directed to authorized recyclers.

Challenge 2: Limited focus on retreading

The focus has primarily been on recycling, but this overlooks the important aspects of reuse and retreading, which are key methods in enhancing tire sustainability.

Potential way to overcome this challenge

The government could launch awareness campaigns to educate tire consumers and businesses about the environmental and economic benefits of tire reuse and retreading.

Topic 2: What are the challenges and potential solutions for the registration of producers, importers, recyclers and retreaders on the EPR portal for waste tires? Additionally, what are the concerns and potential solutions for ensuring an adequate supply of EPR certificates on the portal and what role might the government play in establishing a certificate trade mechanism?

During the workshop, the representative from the Government of India provided an update to the audience on the EPR regulation, mentioning that MoEFCC launched a portal in August 2023 for the generation and transfer of EPR credits. This was followed by a technical session that provided an in-depth look at the EPR regulatory framework in India, offering the audience a clearer understanding of the topic and setting the stage for further discussions.

While the new system represents a positive first step in improving transparency regarding the quantity of ELTs managed in India—an aspect highlighted by stakeholders during the workshop—it also presents challenges and areas for improvement. One such challenge is that the current portal mainly focuses on registration, lacking effective functionality to support organized ELT collection efforts.

Challenges and solutions related to market and economic aspects of the EPR portal and EPR certificates in India

Challenge 1: Limited government role in certificate pricing

Tire producers, recyclers, and retreaders determine the price of the EPR certificate, with minimal government involvement in this process. The government does not play a role in setting price bands for the certificates.

Potential way to overcome this challenge

The government or the EPR steering committee could play a role in setting a maximum and minimum cap on EPR certificate price. The maximum price could be the conversion/ processing cost of ELT into recycled end products, while the minimum price could be the legal cost a formal recycler bears if operating

within formal economy (with GST invoices) and not in a cash economy (price to legalize from cash to formal economy). For example, a formal recycler is buying ELT at INR 20 per kg (INR 17 + INR 3 as 18% GST) and if another informal recycler is buying ELT at INR 18 per kg (in cash without GST), then the minimum price of the EPR certificate could be INR 2 per kg.

Challenge 2: Unclear marketability of retreading certificates

Retreaders face difficulties in selling retreading certificates because these certificates only delay the tire producers' ELT obligation, rather than fulfilling it. As a result, tire producers are more likely to buy recycling certificates, which directly fulfill their ELT obligations, making retreading certificates less appealing. This confusion and imbalance reduces the use of retreading certificates in the system.

Potential way to overcome this challenge

Retreaders proposed the provision of clear guidelines and trade mechanism of retreading certificates by the government. There is also a need to better incentivize retreading certificates for producers than just deferring their obligations by one year. The inclusion of the purchase of mandatory percentage of retreading certificates by the producers would enhance marketability of retreading certificates and could help promote retreading practices. Furthermore, the steering committee could try to include leading retreading organizations in its group.

Challenge 3: Limited transparency in transactions

The portal currently offers limited visibility into EPR credit prices and trading activity.

Potential way to overcome this challenge

The government could enhance transparency in the portal, clearly indicating EPR certificate prices and trades, and ensuring that producers and all stakeholders can easily access and view this information.

Challenge 4: Delayed process due to post-registration audit

After recyclers/retreaders complete the registration process, they are required to undergo an audit by the CPCB before they can receive EPR certificates. Producers typically wait for the completion of this audit before purchasing the certificates, as the audit helps verify whether the recycler is adhering to all the required standards. This audit, being a prerequisite for certification, introduces a delay in the process.

Potential way to overcome this challenge

CPCB could expedite the audit process and accelerate the issuance of EPR certificates to recyclers on the portal.

Challenge 5: Factors Impacting cost efficiency of ELT management

There is a need to consider other factors such as transportation costs, geography and end-market to achieve efficient ELT management. Importing ELTs from a foreign country is more cost-effective than transporting ELTs from remote areas to the recycling facility. Addressing this requires consideration of ELT collection costs between states.

Potential way to overcome this challenge

The EPR regulation could consider additional factors, such as transportation costs, location of end-market and other factors that play a vital role in its economics.

Challenges and solutions related to policies, regulations, and EPR certificates on the EPR portal in India

Challenge 1: EPR Registration

Diverse issues with the registration process on the portal were reported by stakeholders, including:

- **Registration of multiple units:** The system does not allow the registration of multiple units under the same GST or Importer Exporter Code (IEC) number across different locations. This limits businesses with multiple operations from registering each unit separately on the EPR portal.
- **Single email ID and phone number:** The portal restricts registration to one email id and phone number, preventing stakeholders with multiple business entities from registering separately for each unit. For example, recyclers with distinct operations for crumb rubber, reclaim rubber, and pyrolysis oil under a group name are unable to register each unit due to these constraints.
- **Single category registration:** The portal does not allow an entity to be registered under both the producer/importer and recycler categories simultaneously. If an entity is registered as a producer or importer, it cannot also register as a recycler, limiting flexibility for businesses involved in both roles.
- **Lack of editing options:** Once data is entered during registration, the portal does not provide the option to edit or undo the information. This creates difficulties for stakeholders who may need to correct or update their details

Potential way to overcome this challenge

The government could prioritize the resolution of technical and IT-related issues affecting the EPR portal to ease recyclers' registrations. The government expects to deploy a seamless portal soon.

Challenge 2: Issues faced by retreaders

Although the SOP for stakeholder registration on the EPR portal includes guidelines for retreaders, they have reported being unable to register or participate in transactions involving retreading certificates.

Potential way to overcome this challenge

Creation of retreader specific guidelines for EPR transactions on the portal.

Challenge 3: Retrospective effect of EPR policy

The EPR policy applies retrospectively, without prior awareness of the upcoming EPR regulation.

Potential way to overcome this challenge

To ease the burden on recyclers, ELT obligations for imported tires could be phased. This would allow them to gradually fulfill obligations for tires imported before the EPR regulation. Instead of fulfilling the entire obligation at once, recyclers could meet it over time.

Challenge 4: Need to incentivize pollution free pyrolysis

While many organized recyclers have become well-educated and operate their plants in compliance with government norms and SOPs, it appears that the EPR Regulation on ELT has assigned lower weightage to batch-type pyrolysis. This reduced weightage may not fully support responsible recyclers who are meeting compliance conditions.

Potential way to overcome this challenge

The government could make efforts to incentivize environmentally responsible and authorized pyrolysis units by improving their weightage factor in the EPR.

Challenge 5: Insufficient EPR certificates for producers

Under the current weightage system in EPR regulation, it appears that even if 100% of formal recyclers register on the EPR portal, there would not be sufficient certificates for producers to fulfill their obligations. This is because around a majority of recyclers are pyrolysis units, which have the lowest weightage (0.5 for batch-type). Additionally, the issuance of EPR certificates will not account for recyclers importing ELTs, as the EPR is only applicable to tires produced in India.

Potential way to overcome this challenge

The government could make efforts to incentivize environmentally responsible and authorized pyrolysis units by improving their weightage factor in the EPR (from 0.5 to 1 for batch-type pyrolysis). This would improve pyrolysis unit participation in the EPR, increase overall EPR certificate generation, and enable an increase in the weightage for other recycling pathways (e.g., crumb and reclaim), thereby generating more certificates.

Challenge 6: Need for regulations for batch-type pyrolysis units

In India, majority of ELTs are recycled by pyrolysis, significantly using batch-type technology. The previous observations in the published CPCB report followed by NGT order found that many pyrolysis recycling units are not operated in environment-friendly manner.

Potential way to overcome this challenge

The implementation of the revised SOP for tire pyrolysis released by CPCB at the recycler level is crucial and would help to regulate batch-type pyrolysis units.

Challenge 7: Impact of ELT import restrictions for the recycling industry

Imposing import restrictions hampers the growth of the recycling industry. Despite importing around 1 million metric ton of ELTs annually, raw material shortage persists in India.

Potential way to overcome this challenge

The ban on import of ELTs for pyrolysis could be targeted primarily at non-compliant pyrolysis unit operators within the industry, rather than being applied universally to all pyrolysis units in the sector.

Challenges and solutions related to education and awareness issues on EPR portal registration in India

Challenge 1: Most recyclers operate in a cash economy

Most recyclers operate in a cash-based economy, which results in limited activity on the EPR certificate transaction system. Currently, only formal recyclers with GST-based invoices can register on the portal. Many recyclers, however, trade raw materials and recycled products through cash transactions and informal channels, which discourages them from registering on the portal.

Potential way to overcome this challenge

The government could establish a cut-off date for EPR registrations to accelerate efforts among recyclers and penalize those who fail to comply. Increasing recycler registration on the EPR portal requires greater awareness and encouragement. Producers and recycling industry associations could actively promote the importance of registering more recyclers, which is likely to lead to higher EPR certificate generation. Additionally, once transactions begin, it will further motivate more recyclers to participate in the EPR regime.

Challenge 2: Lack of initiative among stakeholders to start filing returns

Initiatives for filing returns to meet EPR obligations are currently lacking, prompting the need to begin this process.[20]

Potential way to overcome this challenge

Producers and recyclers could start filing their returns using the interim portal arrangements in place. The CPCB has released a notice in this regard, urging the producers to start the process. The government could consistently distribute the minutes of meetings and provide regular updates on progress. This approach will help ensure that all producers and recyclers remain well-informed and compliant with the specified requirements.

Topic 3: What are the potential suggestions and opportunities to leverage recycled materials for tire circularity? How can tire companies, the government, and other stakeholders accelerate these efforts?

The breakout sessions highlighted that Indian tire producers are quite keen to use rCB and promote a circular economy. They have emphasized the need to maintain the balance between the formulation of standards to use rCB in virgin tire production while maintaining safety standards and product performance needs.

During the pre-workshop stakeholder consultations, we discussed the challenges and potential solutions related to the use of CRMB in road applications and the use of rCB in tire manufacturing. The challenges and potential solutions related to the use of ELT recycled materials in different applications are outlined below.

Challenges and solutions related to market and economic aspects of recycled material use in the tire industry in India

Challenge 1: Limited adoption of recycled materials due to performance and safety standards

In India, the use of recycled materials such as reclaimed rubber, crumb rubber, devulcanized rubber and rCB remains significantly low. This is primarily due to stringent performance and safety standards that govern the production of new tires.

These standards are designed to ensure that tires meet specific durability, performance, and safety criteria, such as high tensile strength, wear resistance, and safety in extreme conditions. As a result, tire manufacturers are often cautious about incorporating higher levels of recycled content, as it can impact the performance characteristics of the tire.

Potential way to overcome this challenge

Encouraging the effective use of recycled end-products in the tire industry, such as rCB will require the development of more consistent materials designed for circularity. This may involve adjusting processes to achieve a higher percentage of reusable material without compromising product performance standards.

Challenge 2: Inadequate supply of ELTs

Recyclers face challenges in accessing a sufficient supply of ELTs and the necessary support to achieve economies of scale, which in turn limits their ability to explore technology upgrades and development opportunities.

Potential way to overcome this challenge

As recyclers face the push to upgrade their technology due to the additional revenue opportunities from EPR credit transactions, it will be crucial for both the industry and the government to collaborate and provide support in these efforts.

Challenge 3: Inadequate support to recyclers

The challenge of inadequate support to recyclers stems from a combination of financial constraints, lack of technical knowledge and support in utilizing EPR credits, inconsistent material supply, and market competition. These factors limit the ability of recyclers to adopt modern technologies, improve efficiency, and meet the growing demand for recycled materials.

Potential way to overcome this challenge

The government and tire industry could offer support to recyclers by ensuring a steady supply of ELTs to bolster their industry. This will allow effective capacity use, ensure competitiveness, and allow the fulfilment of demand of rCB.

Challenge 4: Limited market for rCB

In India, EPR credits for rCB are only granted when the material is sold to tire manufacturers. Yet, the market for rCB in the Indian tire industry is currently very limited, as rCB is not widely adopted by tire producers for manufacturing. This creates a disconnect between the availability of rCB and its potential use in the tire industry, hindering both the growth of the rCB market and the effective utilization of EPR credits designed to incentivize recycling efforts.

Potential way to overcome this challenge

The industry could promote joint research between tire producers, recyclers or recyclers' association, research institutions and the government for the use of pyrolysis end-products in circular applications, like rCB for the development of circular tires. For example, the joint industry rCB call-to-action, which focuses on increasing the use of rCB in tires.[21] The European Tire and Rubber Manufacturer's Association (ETRMA) is building on the call to action with its pyrolysis task force in Europe. The tire industry is working with ASTM on the classification for rCB qualities. The BlackCycle project aims to enable a circular economy of tires by creating, developing and improving a full value chain that will recycle ELT to produce highly technical second-hand raw materials without any waste of resources.[22 & 23]

Challenge 5: Competition from the plastic industry for modified bitumen

Bitumen suppliers prefer to use polymer-modified binders over rubberized or crumb rubber-modified bitumen, as there are chances of phase separation of crumb rubber from bitumen during the mixing process, which deteriorates its properties. The stringent quality control requirements for CRMB limits its widespread adoption.

Potential way to overcome this challenge

Government efforts are required to mandate a minimum percentage of CRMB usage in road construction that would aim to encourage CRMB adoption and promote sustainable practices in the industry.

Challenges and solutions related to policies and regulations on recycled material use in the tire industry in India

Challenge 1: Lack of standardization of by-products of pyrolysis

There is a need for the standardization for pyrolysis oil, char or carbon black, in contrast to retreated and reclaimed rubber which are BIS standards covered. There is a lack of guidelines or specifications that differentiate rCB and carbon char.

Potential way to overcome this challenge

There is a need to develop specifications regarding the use of rCB in relevant applications such as tire and tube manufacturing. Guidance could be taken from the ASTM standards at the international level for rCB.

Challenge 2: Limited government standards to promote tire circularity

Until recently, no policy promoted the use of recycled material like rCB in place of virgin carbon black, except under EPR regulation, where the government supports rCB by giving it the highest combined weightage.

Potential way to overcome this challenge

The mandated use of recycled materials in tire production can support an effective circular economy approach, while encouraging producers to use recycled materials. The industry needs more such regulations to promote recycled materials in tire production, with the regulators yet to define a required percentage of recycled content for the use in tire manufacturing.

Challenge 3: Limited policy push for crumb rubber-modified bitumen (CRMB)

While the government has mandated the use of plastic waste in road construction and repair through a notification by the Ministry of Road, Transport, and Highways, there is no similar policy encouraging the use of CRMB.[24]

Potential way to overcome this challenge

There is a need to promote regulations or directives that encourage the use of CRMB in road construction, maintenance or other important applications.

Challenges and solutions regarding education and awareness on recycled material use in the tire industry in India

Challenge 1: Lack of awareness of the benefits of using recycled end-products such as CRMB or rCB

There is a lack of awareness among road contractors and engineers about the benefits of using CRMB which leads to its low adoption in road construction projects. Similarly, there is limited awareness of future opportunities for the tire industry regarding rCB.

Potential way to overcome this challenge

- Industry stakeholders could elevate success stories related to road construction projects using CRMB and to new tires' manufacturing using rCB.
- Stakeholders could create a learning and communications platform, resulting in enhanced communication across regions to share both success stories and challenges.
- The industry could conduct research to address phase-separation issues with CRMB to get improved properties for road construction and repair.
- The Department of Science and Technology, Government of India could support research projects exploring effective ELT management strategies through appropriate funding.

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Disclaimer

This publication has been developed in the name of the World Business Council for Sustainable Development (WBCSD) Tire Industry Project (TIP). Like other TIP publications, it is the result of collaborative efforts by representatives from TIP member companies and external experts. TIP member companies reviewed drafts, thereby ensuring that the document broadly represents the perspective of WBCSD TIP membership. Input and feedback from stakeholders were incorporated in a balanced way. This does not mean, however, that every member company or stakeholder agrees with every word. The report has been prepared for general informational purposes only and is not intended to be relied upon as accounting, tax, legal or other professional advice.

Contributors

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TIP remains committed to sustainable ELT management and looks forward to continuing to engage with stakeholders whose collective actions can drive circularity in the global management of ELTs.

About WBCSD

The World Business Council for Sustainable Development (WBCSD) is a global community of over 225 of the world's leading businesses driving systems transformation for a better world in which 9+ billion people can live well, within planetary boundaries, by mid-century. Together, we transform the systems we work in to limit the impact of the climate crisis, restore nature and tackle inequality.

We accelerate value chain transformation across key sectors and reshape the financial system to reward sustainable leadership and action through a lower cost of capital. Through the exchange of best practices, improving performance, accessing education, forming partnerships, and shaping the policy agenda, we drive progress in businesses and sharpen the accountability of their performance.

About Tire Industry Project

Formed in 2005, the Tire Industry Project (TIP) is a voluntary CEO-driven initiative with a mission to anticipate, understand and address global environmental, social and governance issues relevant to the tire industry and its value chain. TIP acts by commissioning independent research of the highest standards, collaborating on sectoral solutions and engaging with external stakeholders. TIP currently brings together 10 leading tire companies that represent more than 65% of the world's tire manufacturing capacity.

TIP operates under the umbrella of the World Business Council for Sustainable Development (WBCSD).

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