Vol. 2, Issue 1, August 2025 Subject-Law ISSN 3049-3099 (Print)

Peer Reviewed

VIPS JOURNAL OF LAW & DEVELOPMENT

VIVEKANANDA INSTITUTE OF PROFESSIONAL STUDIES-TC (VIPS-TC)
Affiliated to GGSIP University, Delhi & Approved by Bar Council of India & AICTE
Grade 'A++' Accredited Institution by NAAC &
Recognized by UGC under Section 2 (f) & NBA Accredited for MCA Programme
ISO 9001:2015 Certified Institution

About Vivekananda Institute of Professional Studies – TC (VIPS-TC)

Vivekananda Institute of Professional Studies - TC (VIPS-TC) was established in the year 2000. Even as a sapling, its roots were firm, for they were energized by Swamiji's teachings. Today, VIPS – TC has progressed and is nestling sixteen courses under seven different Schools. It continues to stand with determination, moral sight and strength of mind to create capable and ethical human beings with infinite power, infinite knowledge and indomitable positive energy. Under the aegis of VIPS – TC, Vivekananda School of Law and Legal Studies (VSLLS) is committed to realizing the words of Swami Vivekananda: "Man Making, Character Building and Nation Building" and is well known for its robust efforts in legal education. Research is integral to academics as it forms the foundation for knowledge creation and intellectual growth. It enables students, scholars, and professionals to explore new concepts, test theories, and contribute to the existing body of knowledge in their respective fields. VSLLS works towards development oriented research in the Legal domain.

About the VIPS Journal of Law & Development

VIPS Journal of Law & Development is an annual double blinded peer reviewed journal accepting submissions in English language. The inception year of the Journal is 2024 and it is further envisioned to promote global development of Law as it provides a platform for scholarly research dedicated to exploring the intersection of legal frameworks and socio-legal development with an inter disciplinary approach. The Journal follows transparent review policy, ensuring that all submissions undergo rigorous scrutiny through a double- blind peer review process by subject experts, maintaining academic integrity. As a policy of the Journal the contributing authors are communicated the comments and suggestions from the reviewers and are also regularly updated about the status of their submission. The mode of citation for the journal is VIPS VSLLS VOL 2 VJLD (2025).

TABLE OF CONTENTS

Title of the Paper / Author	Page No.
An Appraisal of Arbitration Laws in India *Dr. Chandrakanthi L*	**1**
From Crisis To Circularity: A Legal Perspective on E-Waste Management in India *Dr. Gunjan Ahuja & Dr. Ankita Kumar Gupta*	**23**
Green Economy: Catalysing Sustainable Development in India *Dr. Sadaf Moosa*	**37**
Judicial Discretion and Sentencing: Balancing Justice, Proportionality, and Reform in Indian Criminal Law *Shashank Raghav*	**56**
Reforming Juvenile Justice In India: The Role of Victim-Offender Mediation in Diversion and Rehabilitation *Chinki Verma*	**81**
Advancing Circular Economy through Extended Producer Responsibility in India *Vagisha Nandini*	**100**
Mental Health Laws in India: Unveiling the Legal Landscape *Srishti*	**124**
Reforming the Indian Matrimonial Law: The Case for Recognizing Pre-Nuptial Agreements in India's Pluralistic Society *Rupal Gupta*	**142**
Judiciary's Role In Tackling Non-Performing Assets in The Indian Banking Sector *Dikshant Gupta*	**156**

Beyond Consent: The New Frontier of Children's Privacy Rights in India's DPDP Act **176**
Ananya Tiwari

Navigating gig work in India's New Labour Codes: Legal Challenges, Global Insights, and the Path to Social Security **192**
Pallavi Kumari

Digital Dystopias: Legal Quandaries of Innovation, Accountability, And Rights in the Metaverse **210**
Shambhawi Tiwari & Akanksha Aditi

Patent Illegality in Arbitration: Aligning Indian Jurisprudence with Global Standards **223**
Disha Bhatia

Weaponized Code: The Use of Automated Systems to Sort, Control and Exclude Refugees **234**
Manshwi Anand

Submission Guidelines **256**

ADVANCING CIRCULAR ECONOMY THROUGH EXTENDED PRODUCER RESPONSIBILITY IN INDIA

Vagisha Nandini*

VIPS Journal of Law & Development
Subject - Law
August 2025, Vol. 2, Issue 1, 100-123
ISSN 3049-3099 (Print)
©Vivekananda Institute of Professional Studies-TC
(VIPS-TC)
https://vslls.vips.edu/vslr/

ABSTRACT

As nations transition to a circular economy, their association with waste must be rectified. The obligation for waste collection, segregation, and disposal has traditionally been regarded as the duty of municipalities and public authorities. In a linear economy, the accountability of producers and manufacturers was confined to the duration of the product's utilisation. A circular economy mandates circularity in product design and disposal. Extended producer responsibility (EPR) underscores the significant role of producers in the ecologically responsible management of waste from their products. It compels them to develop their products with eco-efficiency in mind. An EPR policy can significantly alter how waste is managed. As India prepares to transition into a circular economy, it becomes crucial to analyse the EPR rules. The research article performs a documentary examination of all statutory regulations in India that embody the notion of EPR. The research article aims to examine the implementation of mandatory EPR within the Indian legal framework to date, to pinpoint the principal sectors where mandatory EPR has been established in India, and to juxtapose the EPR framework in India with the guidance manual on EPR from the Organisation for Economic Cooperation and Development (OECD). The research indicated that EPR was first implemented in India in 2011 for plastics and electronic trash. India has an EPR framework for eight specific waste categories: plastic packaging, electronic trash, waste tires, battery waste, spent oil, end-of-life vehicles, building and demolition debris, and non-ferrous metals. When matched with the checklist for EPR policy

* PhD. Research Scholar, Department of Law, Central University of Punjab, Bathinda.

contained in the OECD guidance manual, it was found that EPR rules presently in force in India substantially comply with the same. The research article thus concludes with the thought that the effectiveness of the EPR framework would greatly depend on the proper implementation of these rules.

Keywords: *Circular economy, extended producer responsibility, waste management, sustainability, SDGs*

1. INTRODUCTION

The concept of circular economy is a relatively recent phenomenon that has gained prominence due to the necessity for sustainability.[1] The circular economy represents a transition from the linear economy, characterized by the make, use, and dispose model that has existed since the onset of industrialization.[2] Linear economy promoted consumption at the cost of the depletion of finite resources where consumers preferred convenience over environmental concerns and producers could go on producing recklessly without any qualms about the waste generated and its whereabouts. The burgeoning global population, the exhaustion of non-renewable resources, and the apprehensions regarding pollution and climate change underscore the necessity to reevaluate the linear economic model. Ever-rising landfills, choking seas, and smog-filled skies brought home the realisation that the world needed to rethink its relationship with waste. Industrialisation had brought many benefits; it made way for the mass production of goods, which were cheaper and durable. However, the production cost of these goods failed to account for the hidden costs to the environment. The circular economy considers all these pitfalls of the linear economy and tries to initiate a conversation around waste so that it is reintegrated into the economy.[3]

Circular economy is based on certain key principles.[4] The first and foremost is

1 Martin Geissdoerfer et al., *The Circular Economy – A New Sustainability Paradigm?*, 143 J. CLEAN. PROD. 757, 757-758 (2017).

2 Furkan Sariatli, *Linear Economy Versus Circular Economy: A Comparative and Analyzer Study for Optimization of Economy for Sustainability*, 6 VISEGR. J. BIOECON. SUSTAIN. DEV. 31, 32 (2017).

3 Tihomir Tomić & Daniel Rolph Schneider, *Circular Economy in Waste Management – Socio-Economic Effect of Changes in Waste Management System Structure*, 267 J. ENVIRON. MANAGE. 110564, 110564-110565 (2020).

4 ELLEN MACARTHUR FOUNDATION, *TOWARDS A CIRCULAR ECONOMY: BUSINESS RATIONALE FOR AN ACCELERATED TRANSITION* (2015). ELLEN MACARTHUR FOUNDATION https://www.ellenmacarthurfoundation.org/towards-a-circular-economy-business-rationale-for-an-accelerated-transition

its insistence on preserving finite natural resources. The second principle insists on maintaining the highest utility of materials by designing the products to be remanufactured, refurbished or recycled conveniently. The third principle ensures that all this is done so that there is little to no harm to other systems in this process, thus aiming that no land use patterns are affected, pollution is checked, and air, soil and water remain uncontaminated. The circular economy model ensures that waste does not exist in the system. One of the key policies on which the circular economy relies is the principle of extended producer responsibility (EPR). The Organization for Economic Cooperation and Development (OECD) *defines* EPR *"as an environmental policy approach in which a producer's responsibility, physical and/or financial, for a product is extended to the post-consumer stage of a product's life cycle."*[5] In the linear model, a producer was responsible for the quality of the goods while they were being used. The producer had no reason to concern himself with what became of the product after the consumer discarded it. EPR mandates that a producer's accountability persists beyond the product's point of sale. The purpose of an EPR policy is twofold- firstly, it shifts the responsibility of collection of waste and its disposal from the public authorities to the producers themselves. Secondly, it incentivises the producers to design their products considering environmental considerations. EPR thus ensures a circularity in designing the products and their disposal, making way for the circular economy.[6]

2. Materials and Methods

This research article analyses the implementation of circular economy principles in India through a documentary examination of all statutory regulations that incorporate the principle of extended producer responsibility, comparing them with the OECD guidance manual. These documents have been retrieved from egazette.gov.in by searching available gazettes using the keyword extended producer responsibility. The publishing date was chosen from 1 January 1950 to 30 November 2024. The search result led us to 33 documents, with the oldest published on 31 March 2016 and the newest published on 1 October 2024. Finally, nine rules were chosen. Eight of nine rules were identified for the final study since they contained the EPR guidelines for distinct items. The items include plastic packaging, electronic waste, used tires, battery waste, spent oil, end-of-life cars, building and demolition

5 OECD, Extended Producer Responsibility: A Guidance Manual for Governments. (2001).

6 Stéphanie H. Leclerc & Madhav G. Badami, *Informal E-Waste Flows in Montréal: Implications for Extended Producer Responsibility and Circularity*, 72 Environ. Manage. 1032, 1033 (2023).

debris, and non-ferrous metals. The other rule is the Ecomark rules, 2024, which also recognises extended producer responsibility compliance by the product as a criterion for the grant of Ecomark.

The focus of this analysis is three-fold: to trace the adoption of mandatory EPR in the Indian legal framework to date, to identify the key areas in which mandatory EPR has been introduced in India and to compare the EPR framework in India with the OECD guidance manual on EPR.

3. DISCUSSION

The OECD guidance manual, published in 2001, provides a checklist for the points to be considered while preparing EPR legislation by the governments. The manual proposes that an ideal EPR legislation should contain the following: guiding principles, goals and objectives, key definitions, scope, products to which it applies, legal approach (whether mandatory or voluntary), targets or quotas and an information dissemination plan.[7] Further, it also states that the EPR policy should be framed to complement national priorities and support sustainable consumption and production. The policy design process must be transparent and include a wide consultation of stakeholders. As per the OECD guidance manual, 2001, the proposed EPR policy should follow the guiding principles, i.e., it must be designed so as to provide producers with incentives, encourage innovation, be centred around a life cycle approach, clearly defined responsibilities, and cater to the unique characteristics and properties of the products. It is also necessary that the policy is flexible and all stakeholders are consulted and duly informed about the same. The guiding principles also require that while framing the policy, both voluntary and mandatory approaches must be considered, the policy must be transparent and should provide for periodic evaluations. Secondly, the proposed policy must have a clear goal and objective. The manual also requires that important terms be clearly defined in the instrument. The aspect of the scope of the EPR policy requires that it should be in consonance with the stated goals and objectives. Further, the policy must clearly identify the products or waste streams to which it applies. The legal and administrative approach of the policy requires that the policy must clearly specify whether it is voluntary, mandatory, or a mixture of both for the stakeholders involved. The OECD guidance manual cites targets and quotas commonly found in the EPR programmes, and the same must find a place in the proposed EPR

7 OECD, *supra* note 5, at 37.

policy. The EPR policy must support national and sub-regional priorities, should be transparent and provide for an information dissemination plan.

The principle of extended producer responsibility is inherently linked to the Sustainable Development Goals. Switching to an EPR framework for waste streams ensures responsible consumption and production (SDG 12) as businesses try to create products that have high recycling value while also ensuring proper disposal at the post-consumer stage.[8] Further, it forms a step towards climate action (SDG 13) as sustainable management of waste would reduce greenhouse gas emissions, which are produced during resource extraction and filling up of landfills, as the virgin materials would be replaced by recycled materials as per the EPR mandates.[9] EPR is also linked to the creation of sustainable cities and communities (SDG 11) as it supports a cleaner environment by promoting environmentally sound disposal of waste. It is also linked to clean water and sanitation (SDG 6), life below water (SDG 14) and life on land (SDG 15) as its implementation would reduce pollution of the environment.[10] EPR, if properly implemented can also support decent work and economic growth (SDG 8) and foster growth of industry, innovation and infrastructure (SDG 9) as it strives to create green jobs for waste collection, segregation, recycling and product redesign and at the same time, it intends to promote investments in recycling infrastructure and reverse logistic systems.

In India, EPR guidelines were introduced for certain items such as plastics and e-waste in 2011.[11] At present, the EPR framework is in force for six types of waste products in India: plastic & plastic packaging, e-waste, waste tyres, battery waste,

8 Darius Corbier et al., *Shaping Sustainable Consumption Practices: Changing Consumers' Habits through Lifestyle Changes and Extended Producer Responsibility Schemes*, 217 Resour. Conserv. Recycl. 108214 (2025).

9 Oksana Nikishyna et al., *A Circular Ecosystem for the Implementation of Sustainable Development Goals Based on Extended Producer Responsibility*, 7 Multidiscip. Sci. J. 2025071 (2024).

10 Daniel Faibil et al., *Extended Producer Responsibility in Developing Economies: Assessment of Promoting Factors through Retail Electronic Firms for Sustainable e-Waste Management*, 41 Waste. Manag. Res. 117 (2023).

11 R.M. Turaga & K. Bhaskar, *EPR and Policy Instruments for E-Waste Management: A Review and Lessons for India's New e-Waste Regulations* (2017).

used oils and end-of-life vehicles.[12][13][14] EPR has already been enacted for two other types of waste: construction and demolition waste[15] and non-ferrous metals[16] but is yet to come in force.

3.1 EPR for plastic and plastic packaging in India

EPR for plastics was initially established in India in 2011 with the issuance of the Plastic Waste (Management and Handling) Rules, 2011.[17] These rules were notified in supersession of the Recycled Plastics Manufacture and Usage Rules, 1999. The 2011 rules defined extended producer responsibility for the producers or manufacturers of plastic carry bags and multilayered plastic pouches or packages. The EPR introduced through the 2011 rules was very lenient. Even though it defined EPR, it did not define the producer. It also did not provide the responsibilities of the stakeholders engaged in producing and collecting plastic waste.

Plastic Waste Management Rules, 2016, which replaced the Plastic Waste (Management and Handling) Rules, 2011, aimed to improve the EPR concept introduced in 2011.[18] Rule 2(h) of the Rules, 2016 defined EPR as "*the responsibility of a producer for the environmentally sound management of the product until the end of its life*".[19] The Rules also defined producer, which included not only the manufacturer and the importer of carry bags, multilayered packaging, and plastic sheets, but also individuals and industries who used plastic sheets for packing or wrapping.[20]

12 Kajalben Patel, Understanding the Current E-Waste Management System in India A Study on Strengthening the Integration of E-Waste Management Sectors in India under EPR Rule. (Mar. 2021) (Master's thesis dissertation, Uppsala University).

13 Ram Boojh, *Waste Management and the Agenda 2030 in the Indian Context*, *in* ENVIRONMENTAL MANAGEMENT IN INDIA: WASTE TO WEALTH 3 (Shalini Yadav, Abdelazim M. Negm, & Ram Narayan Yadava eds., 2022), https://link.springer.com/10.1007/978-3-030-93897-0_1.

14 Nitish Arora, Shilpi Kapur Bakshi & Souvik Bhattacharjya, *Framework for Sustainable Management of End-of-Life Vehicles Management in India*, 21 J. MATER. CYCLES. WASTE. MANAG. 79, 94 (2019).

15 Namya Sharma, Pradip P. Kalbar & Muhammad Salman, *Global Review of Circular Economy and Life Cycle Thinking in Building Demolition Waste Management: A Way Ahead for India*, 222 BUILD.ENVIRON. 109413, 109424 (2022).

16 Hema Jha, Upakrishnam S.V. Sanskrit & Brajesh Kumar Dubey, *Recovery of Precious Metals and Rare Earth Elements from E-Waste*, *in* WASTE-TO-WEALTH 282 (1st ed. 2024), https://www.taylorfrancis.com/books/9781003327646/chapters/10.1201/9781003327646-19.

17 Dipti Gupta & Satya Dash, *Challenges of Implementing Extended Producer Responsibility for Plastic-Waste Management: Lessons from India*, 19 SRJ 1595 (2023).

18 Surya Singh & Mrinal Kanti Biswas, *Management Strategies for Single-Use Plastics: Lessons to Learn from Indian Approach of Minimizing Microplastic Waste*, 2 ENVIRON. SCI.: ADV. 1680 (2023).

19 Plastic Waste Management Rules, 2016. Rule 2(h).

20 *supra* note 19, Rule 2(s).

Rule 9 established the obligation of producers, importers, and brand owners to devise the mechanisms for waste collection by EPR.[21] The Rules specify that the primary obligation for the collection of multi-layered plastic sachets, pouches, or packaging is with the producers, importers, or brand owners who market the products.[22] It additionally mandated the registration of producers, recyclers, and manufacturers with the Pollution Control Board.[23] The rules were amended in 2018 to include provisions related to energy recovery.[2425] Significant modifications on EPR obligations for plastic occurred in 2022, when the 2016 rules were revised to incorporate Schedule II, which outlined the Guidelines on Extended Producer Responsibility for Plastic Packaging.[26] The Schedule identifies plastic packaging as "*material made using plastics for protecting, preserving, storing and transporting products in various ways*".[27]

Schedule II made four entities liable under the EPR obligations for plastic packaging: Producer, Importer, Brand Owners and Plastic Waste Processors.[28] It also laid down four categories of plastic packaging, which are covered under the EPR guidelines. The guidelines lay down detailed targets for recycling obligations, reuse mandates, use of recycled content and end-of-life disposal quotas for plastic packaging. The guidelines provided for a centralized portal developed by CPCB on which the abovementioned entities were required to compulsorily register. The guidelines further laid down the EPR targets for producers, importers and brand-owners.[29] The guidelines also provided for the generation of extended producer responsibility certificates[30] and environmental compensation[31]. If the entities failed to achieve their targets, the Pollution Control Boards could levy environmental compensation, but

21 *supra* note 19, Rule 9.

22 *supra* note 19, Rule 9(2).

23 *supra* note 19, Rule 13.

24 *supra* note 19, Rule 2(ga).

25 Simran Talwar et al., A Review of the Policy Framework for a Circular Economy for Plastics in India (2021). https://research.csiro.au/rpwi/wp-content/uploads/sites/412/2022/02/Policy-Framework-for-a-CE-for-Plastics-in-India-Final-2021-2.pdf

26 Anurodh Sachdeva & Arpit Srivastava, *Extended Producer Responsibility: Lessons for Realizing and Implementing a Circular Economy for Plastics in Asia*, *in* PROSPECTS FOR TRANSITIONING FROM A LINEAR TO CIRCULAR ECONOMY IN DEVELOPING ASIA 93 (2022).

27 *supra* note 19, Schedule II, Clause 3(h).

28 *supra* note 19, Schedule II, Clause 4.

29 *supra* note 19, Schedule II, Clause 7.

30 *supra* note 19, Schedule II, Clause 8.

31 *supra* note 19, Schedule II, Clause 9.

payment of compensation would not absolve them from their obligations.[32] The centralized portal is active and can be accessed on https://eprplastic.cpcb.gov.in/.

Research shows that even though the principle of EPR for plastics has existed for more than a decade in India, there is a lack of knowledge about the same among the stakeholders.[33] The rules have gradually evolved considering the challenges in the implementation of the same. The challenges included non-compliant companies and passive State Pollution Control Boards, a lack of adequate infrastructure, suboptimal drafting and a lack of national-level coordination.[34] The amendments in the 2016 rules are a bid to address these challenges. However, even after frequent amendments in the plastic waste management rules, certain practical challenges continue to hinder the EPR implementation for plastic and plastic packaging in India, such as weak compliance and monitoring by the authorities.[3536] The rules rely on self-declared data submitted by producers, importers and brand owners (PIBOs) with minimal third-party verification.[37] Even though a centralized portal has been launched, the registration process is still cited as complex by the stakeholders, with frequent amendments in the rules adding to their woes. The recycling infrastructure for plastic and plastic packaging in India is insufficient, with most of it functioning in the urban areas, leaving rural areas susceptible to illegal dumping, and burning of plastics.[38] The demand for recycled plastics remains low in the market. Even though there is a proliferation of PROs, there is a lack of accountability and a third-party verification mechanism for PRO claims. The EPR framework for plastic and plastic packaging effectively excludes the informal sector, which is undoubtedly the biggest player in the recycling of plastics. Lack of consumer awareness also greatly affects the implementation.

32 *supra* note 19, Schedule II, Clause 9.5.

33 M.Z.M. Nomani et al., *Extended Producer Responsibility and Enforcement of Single-Use Plastic Ban in Pune City of India*, 22 Nat. Env. Poll. Tech 1519 (2023).

34 Saroj Kumar Pani & Atul Arun Pathak, *Managing Plastic Packaging Waste in Emerging Economies: The Case of EPR in India*, 288 J. Environ. Manage. 112405 (2021).

35 Dipti Gupta & Satya Dash, *Challenges of Implementing Extended Producer Responsibility for Plastic-Waste Management: Lessons from India*, 19 SRJ 1595 (2023).

36 Amrita Dey & Denis Ashok S, *Policy Pathways Utilizing Extended Producer Responsibility and Eco-Modulation Frameworks for Sustainable Food Packaging Waste Management in India: A Review*, 26 Results Eng. 104885 (2025).

37 Surya Singh & Mrinal Kanti Biswas, *Management Strategies for Single-Use Plastics: Lessons to Learn from Indian Approach of Minimizing Microplastic Waste*, 2 Environ. Sci:. Adv. 1680 (2023).

38 Nishith Jardosh & Vinish Kathuria, *Impact of Regulatory Policy Instruments on Plastic Waste Generation in India: A System Dynamics Approach*, Waste Manag. Res. 0734242X241304342 (2024).

3.2 EPR for E-Waste

EPR for electronic waste in India was initiated in 2011 by notification of E-waste (Management and Handling) Rules, 2011.[39] These rules applied to producers, collection centres, bulk consumers, dismantlers and recyclers.[40] The rules mandated that every producer of electrical or electronic equipment, collection centre, dismantler, and recycler of e-waste secure authorisation from the State Pollution Control Board or the Pollution Control Committee, as applicable.[41] The 2011 rules listed the responsibilities of the entities above so that they took all the steps to ensure environmentally sound e-waste management.[42] The rules mandated that manufacturers of electrical or electronic devices minimize the utilization of hazardous substances, including lead, mercury, cadmium, and hexavalent chromium, with specific exceptions delineated in Schedule II of the Rules, 2011.[43] Schedule I of the rules listed the categories of electrical and electronic equipment to which the rules applied.

The 2011 rules were replaced by the E-Waste (Management) Rules, 2016, which became effective on October 1, 2016.[44] The 2016 rules expanded the number of stakeholders within their ambit, and they went on to include manufacturers, consumers, dealers, e-retailers, and refurbishers as well. The 2016 rules, in addition to EPR, defined EPR Authorization, EPR Plan, Producer Responsibility Organization, etc. The 2011 rules applied only to electronic or electrical equipment (EEE). However, the 2016 rules also covered components, consumables, spares, and parts of EEE, providing a comprehensive EPR framework.[45] The 2016 rules brought fluorescent and other mercury-containing lamps within their ambit.[46] Under the 2011 rules, the producer or any other person or agency could set up collection centres. The 2016 rules marked a shift from this approach and made collection solely the producer's responsibility to check the leakage of e-waste to unauthorized players. Under the

39 Vijay Kumar Garlapati, *E-Waste in India and Developed Countries: Management, Recycling, Business and Biotechnological Initiatives*, 54 Renew. Sustain. Energy Rev. 874 (2016).

40 E-waste (Management and Handling) Rules, 2011. Rule 2.

41 *supra* note 40, Chapter III.

42 *supra* note 40, Chapter II.

43 *supra* note 40, Chapter V.

44 Atin Biswas & Siddharth Ghanshyam Singh, E-Waste Management in India: Challenges and Agenda (2020). https://www.cseindia.org/content/downloadreports/10593.

45 Haribansh Singh & S.K. Chaturvedi, *Environment Protection and E-Waste Management in India*, 12 IJLJ (2021).

46 Madhu Rana, *E-Waste Management: Challenges and Solutions*, 2, IJLLR 1, 14 (2021).

2011 rules, producers were required to obtain authorization from SPCBs or PCCs; however, the 2016 rules paved the way for a single authorization from the CPCB directly.[47] The 2016 rules also provided options for the ease of implementation of EPR, such as setting up a producer responsibility organization[48], e-waste exchange[49], e-retailer[50], deposit refund scheme[51], etc. The 2016 rules also introduced targets for EPR, which were prescribed in Schedule III of the rules. The 2016 rules were also superseded by the E-waste (Management) Rules, 2022.[52] These rules came into force from 1st April 2023. The 2022 rules broadened the EPR framework for e-waste in India considerably. These rules paved the way for solar photovoltaic modules, solar panels, and cells to be included under the definition of e-waste.[53] Also, both the 2011 and 2016 rules applied to only a small number of electric or electronic equipment; the 2022 Rules, however, extended the applicability to over 100 types of items.[54]

The 2016 rules were applicable solely to two types of electrical and electronic equipment: information technology and communications devices, and consumer electrical and electronic products. The 2022 rules additionally included five additional categories of electrical and electronic equipment (EEE): large EEE, small EEE, electrical and electronic tools, toys, leisure and sports equipment, as well as medical devices and laboratory instruments. Rule 4 of the 2022 rules mandates that manufacturers, producers, refurbishers, and recyclers register on the centralized portal. The 2016 rules did not include EPR targets for producers; instead, Schedule IV of the 2022 regulations specifies these targets.[55] 2022 rules also provide for the levying of environmental compensation upon non-compliant entities.[56] Further, the 2022 rules also provide for the generation of certificates by recyclers and refurbishers, which the producers can purchase to adjust their EPR liabilities under the rules.[57] The EPR portal for e-waste management can be accessed by visiting https://

47 E-Waste (Management) Rules, 2016. Rule 13.

48 *supra* note 47, Rule 2(dd).

49 *supra* note 47, Rule 2(s).

50 *supra* note 47, Rule 2(q).

51 *supra* note 47, Rule 2(k).

52 Deepak Kumar Adhana & Rashmi, *E-Waste Generation, Management and Impacts: A Review in Present Indian Scenario*, 9 INT. J. RES. ENG. APPL. & MANAG. 88 (2023).

53 Ninaad Desai & Minal Pathak, *End of Life Solar Panels: Assessment for Gujarat, India*, SSRN (2024), https://www.ssrn.com/abstract=4693717.

54 E-waste (Management) Rules, 2022. Schedule I.

55 *supra* note 54, Schedule IV.

56 *supra* note 54, Rule 22.

57 *supra* note 54, Rule 14

eprewastecpcb.in/#/.

The effective implementation of EPR for e-waste is crucial as India is currently the fifth-largest manufacturer of waste electrical and electronic equipment.[58] Further developed countries also export large volumes of end-of-life electronic items to India. There is a lack of proper e-waste drop-off facilities in India, which often contributes to inadequate e-waste disposal, with e-waste making its way to the landfills.[59] Research has shown that there is a lack of awareness among consumers regarding proper methods of e-waste disposal.[60] Further, the rules seem to bypass the role of the unorganized sector in e-waste collection and disposal in India.[61] The producers often fail to meet their annual collection targets. There is a lack of voluntary take-back programs for end-of-life electronic equipment, which continues to lie in households unattended.[62] Further, lack of coordination among organizations involved in managing and disposing of e-waste also seems to hinder the implementation of EPR for e-waste management in India.[63] Effective implementation of the e-waste management rules is the key to ensuring sustainable practices for e-waste management in India.[64] Lack of accurate data on the e-waste generated also affects the proper management of the e-waste.[65] Research has identified a lack of awareness, infrastructure[66], attitudinal barriers, prominence of the informal waste sector[67] and a complex authorization process for treating e-waste as certain barriers

58 Ashwani Kumar et al., *Sustainable Waste Electrical and Electronic Equipment Management Guide in Emerging Economies Context: A Structural Model Approach*, 336 J. Clean. Prod. 130391 (2022).

59 Boopathy Nisha et al., *Consumer Awareness and Perceptions about E-Waste Management in Semi-Urban Area of Northern Tamil Nadu: A Mixed-Method Approach*, 29 J. Fam. Community Med. 132 (2022).

60 Kartik Adhikari & Amit Saha Roy, *E-Waste by Mobile Phones: A Case Study on the Consumption, Disposal Behavior, and Awareness of Consumers in Kolkata, India*, 43 Bull. Sci. Technol. Soc. 55 (2023).

61 Rama Mohana R. Turaga et al., *E-Waste Management in India: Issues and Strategies*, 44 Vikalpa 127 (2019).

62 Daniel Mmereki, Baizhan Li & Wang Li'ao, *Waste Electrical and Electronic Equipment Management in Botswana: Prospects and Challenges*, 65 JA&WMA 11 (2015).

63 Pankaj Kumar et al., *A Review on E-Waste Contamination, Toxicity, and Sustainable Clean-up Approaches for Its Management*, 508 Toxicol. 153904 (2024).

64 Tetiana Shevchenko et al., *Towards a Smart E-Waste System Utilizing Supply Chain Participants and Interactive Online Maps*, 6 Recycling 8 (2021).

65 Shashi Arya & Sunil Kumar, *E-Waste in India at a Glance: Current Trends, Regulations, Challenges and Management Strategies*, 271 J. Clean. Prod. 122707 (2020).

66 Ramachandran Rajesh, Dharmaraj Kanakadhurga & Natarajan Prabaharan, *Electronic Waste: A Critical Assessment on the Unimaginable Growing Pollutant, Legislations and Environmental Impacts*, 7 Environ. Challenges 100507 (2022).

67 Deblina Dutta & Sudha Goel, *Understanding the Gap between Formal and Informal E-Waste Recycling Facilities in India*, 125 Waste Manag. 163 (2021).

in the management of e-waste in India.[68] The facilitators identified include educating consumers, providing e-waste collection service, adherence to government rules, incentivizing formal disposal and educating oneself as an organization.[69] It has been suggested that the government must integrate financial incentives with EPR initiatives, organize training programs, create proper collection systems, procure investment in safe recycling technologies and enforce strict implementation of laws for sustainable management of e-waste.[70]

Inclusion of solar photovoltaic modules, panels and cells as e-waste under the rules by India is a welcome change, as developed countries like the US and Europe had already initiated efforts to manage the same.[71] Further, the recyclability of metals used in solar waste is high, and there is enormous potential for achieving circularity in this sector.[72] With the International Solar Alliance in picture, India is in the process of harnessing solar power across the country, highlighting a need for developing recycling infrastructure for solar PV e-waste.[73] As solar waste is distinct from other types of e-waste, being more organized waste than the others, it can be managed optimally.[74] Research has, however, shown that several barriers to the management of solar PV waste are common to e-waste.[75]

3.3 EPR for Waste Tyre

The EPR obligation for waste tyres was introduced in India in 2022 through an amendment in the Hazardous and Other Wastes (Management and Transboundary

68 Sarita Kumari Sandwal, Rakshit Jakhar & Katarzyna Styszko, *E-Waste Challenges in India: Environmental and Human Health Impacts*, 15 APPL. SCI. 4350 (2025).

69 Sonal Thukral & Meenakshi Singh, *An Exploratory Study on Producer's Perspective towards E-Waste Management: A Case of Emerging Markets*, 5 CLEAN. WASTE SYST. 100090 (2023).

70 Paromita Chakraborty et al., *Electronic Waste Recycling in South Asia: Overview of Associated Risks from a Cocktail of Micro-Pollutants and Recommendations for Sustainable E-Waste Management*, 18 J. HAZARD. MATER. ADV. 100715 (2025).

71 Navin K. Dev, Ravi Shankar & Fahham Hasan Qaiser, *Industry 4.0 and Circular Economy: Operational Excellence for Sustainable Reverse Supply Chain Performance*, 153 RCR 104583 (2020).

72 Rubén Contreras-Lisperguer et al., *Cradle-to-Cradle Approach in the Life Cycle of Silicon Solar Photovoltaic Panels*, 168 J. CLEAN. PROD. 51 (2017).

73 Karishma Chaudhary & Prem Vrat, *Circular Economy Model of Gold Recovery from Cell Phones Using System Dynamics Approach: A Case Study of India*, 22 ENVIRON. DEV. SUSTAIN. 173 (2020).

74 Ayush Gautam, Ravi Shankar & Prem Vrat, *Managing End-of-Life Solar Photovoltaic E-Waste in India: A Circular Economy Approach*, 142 J. BUS. RES. 287 (2022).

75 Ayush Gautam, Ravi Shankar & Prem Vrat, *Circular Economy-based Operational Strategies in the Management of Solar Photovoltaics E-waste: A Multi-stakeholder Perspective*, 33 BUS. STRAT. ENV. 9040 (2024).

Movement) Rules, 2016.[76] The amendment inserted Schedule IX in the rules, which laid down the extended producer responsibility for waste tyres. The Schedule defines producer as any person or entity who manufactures and sells new tyres, sells tyres manufactured by others, or sells imported tyres.[77] The definition of producer also includes importers importing new tyres, vehicles fitted with new tyres or waste tyres. The entities covered by the Schedule are producers, recyclers and retreaders, who are required to compulsorily register on the centralised portal.[78] The Schedule then lays down EPR targets for producers[79] and for the generation of EPR certificates in favour of recyclers, which producers can purchase to adjust their liability under the EPR targets[80]. The Schedule also lays down the responsibilities of the producer and the recycler.[81] The Schedule also lays down provisions for imposing environmental compensation on the producers who do not meet their obligations and on the recyclers who issue false certificates.[82] The EPR portal for management of waste tyres can be accessed by visiting https://www.eprtyrescpcb.in/.

With a burgeoning automobile market comes the problem of managing end-of-life tyres. Research shows that at least one million metric tons of waste tyres are discarded every year in India.[83] Since tyres are non-biodegradable and highly combustible, their disposal is a serious issue.[84] While traditional methods of tyre waste management included landfilling, incineration and co-combustion, the advanced techniques include retreading, gasification, and pyrolysis. Research shows that the recovery rate of waste tyres in India is quite high at 98% and only 2% of tyres end up in landfills. However, a significant portion of recovery is done through ways that cannot be considered environmentally conscious.[85] The EPR framework for the

76 Wajiha Khan, Dhananjay Singh Shyamal & Absar Ahmad Kazmi, *Management of End-of-Life Tyres in India: Current Practices, Regulatory Framework, Challenges, and Opportunities*, 26 J. Mater. Cycles Waste Manag. 1310 (2024).

77 Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. Schedule IX, Clause 1(e).

78 *Supra* note 77, Schedule IX, Clause 2.

79 *Supra* note 77, Schedule IX, Clause 4.

80 *Supra* note 77, Schedule IX, Clause 5.

81 *Supra* note 77, Schedule IX, Clauses 7-8.

82 *Supra* note 77, Schedule IX, Clause 10.

83 P. Anbazhagan, D. R. Manohar & Divyesh Rohit, *Influence of Size of Granulated Rubber and Tyre Chips on the Shear Strength Characteristics of Sand–Rubber Mix*, 12 Geomech. Geoeng. 266 (2017).

84 Dina Czajczyńska et al., *Waste Tyre Pyrolysis – Impact of the Process and Its Products on the Environment*, 20 TSEP 100690 (2020).

85 Wajiha Khan, Dhananjay Singh Shyamal & Absar Ahmad Kazmi, *Management of End-of-Life Tyres in India: Current Practices, Regulatory Framework, Challenges, and Opportunities*, 26 J. Mater. Cycles

management of waste tyres in India intends to ensure that waste tyres in India are managed in an environmentally sound manner, requiring all the stakeholders in the tyre business to take responsibility for the discarded tyres by ensuring their proper disposal and recycling. The major challenge in waste tyre management in India is the lack of infrastructure for the proper disposal of waste tyres. Research also supports a dynamic pricing strategy to be incorporated to influence the customer's willingness to return end-of-life tyres to ensure circularity.[86]

3.4 EPR for Battery Waste

The EPR for battery waste has been introduced through the Battery Waste Management Rules, 2022.[87] The 2022 rules superseded the Batteries (Management and Handling) Rules, 2001. The 2001 rules only applied to lead-acid batteries.[88] Although these rules did lay down responsibilities of manufacturer, importer, assembler, reconditioner and dealer of these batteries and set collection back targets for them, it did not explicitly make any reference to the concept of extended producer responsibility.[89] The EPR framework for waste battery was introduced explicitly for the first time in India through the 2022 rules. While the 2001 rules applied only to lead acid batteries, the 2022 rules apply to *"all types of batteries regardless of chemistry, shape, volume, weight, material composition and use"*[90]. The rules define extended producer responsibility[91] and extended producer responsibility registration[92]. The 2022 rules also provide a comprehensive definition of waste battery.[93] The rules lay down the functions of the producer, consumer, refurbisher and recycler. Schedule I of the 2022 rules list the prohibitions on heavy metal content in the battery and labelling requirements, respectively. Schedule II lays down the EPR targets for different types of batteries. The rules also provide for generating EPR certificates by

WASTE MANAG. 1310 (2024).

86 Arup Ratan Paramanik & Biswajit Mahanty, *A Circular System for End-of-Life Tires under Extended Producer Responsibility*, 38 MATER. MANUF. PROCESS. 1964 (2023).

87 Abhijeet Kumar & Firdaus F. Rizvi, *Hazardous Effects of Battery Waste and Role of the Battery Waste Management Rule 2022 in Enhancing Energy Efficiency*, 07 IJCSRR 8261 (2024), https://ijcsrr.org/single-view/?id=19872&pid=19799.

88 Rajkumar Joshi & Sirajuddin Ahmed, *Status and Challenges of Municipal Solid Waste Management in India: A Review*, 2 COGENT ENVIRON. SCI. 1139434 (2016).

89 Yamini Gupt & Samraj Sahay, *Waste Management and Extended Producer Responsibility*, 54 EPW 35 (2019).

90 Battery Waste Management Rules, 2022. Rule 2.

91 *Supra* note 91, Rule 3(m).

92 *Supra* note 91, Rule 3(n).

93 *Supra* note 91, Rule 3(ze).

recyclers and refurbishers in favour of the producers.[94] The rules also provide for the levying of environmental compensation against errant producers and other entities who act in violation of the rules.[95] The rules also obligate the producers to ensure compulsory usage of a certain percentage of domestically recycled materials in the new battery.[96] Minimum recovery targets for each type of battery have also been laid down.[97] The EPR Portal for Battery Waste Management can be accessed by visiting https://www.eprbatterycpcb.in/.

India has an ambitious EV policy in place, and it requires a requisite infrastructure in place for the end-of-life batteries used in such EVs. While lead-acid batteries were the norm in their heyday, new batteries such as lithium-ion batteries are used in EVs by manufacturers.[98] The global collection and recycling of batteries is poor, with India accounting for less than 1% of the same. In India, lead acid batteries were recycled both formally and informally, but the informal sector often involves no concern for the safety of workers involved or the environmental costs of unsafe recycling practices.[99] A challenge with the recycling of lithium-ion batteries is that the scrap value of such batteries is lower than the recycling costs involved.[100] Even though the new rules are comprehensive and include all kinds of batteries in its wake and lays down the aspect of EPR for producer, it is a concern that if the cost of recycling and disposing of waste battery is high for the producers without a way to recoup their costs, it would incentivize informal recycling.[101] The Indian government also needs to check and curb the illegal international dumping of battery waste in India and ensure strict enforcement of the waste management rules.

3.5 EPR for Used Oil

EPR was initially implemented in 2023 through an amendment to the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. The

94 *Supra* note 91, Rule 10.

95 *Supra* note 91, Rule 13.

96 *Supra* note 91, Schedule II.

97 *Supra* note 91, Rule 9.

98 Gang Zhao, Xiaolin Wang & Michael Negnevitsky, *Connecting Battery Technologies for Electric Vehicles from Battery Materials to Management*, 25 iScience 103744 (2022).

99 Yamini Gupt & Samraj Sahay, *Managing Used Lead Acid Batteries in India: Evaluation of EPR-DRS Approaches*, 5 J. Health Pollut. 52 (2015).

100 Wojciech Mrozik et al., *Environmental Impacts, Pollution Sources and Pathways of Spent Lithium-Ion Batteries*, 14 Energy Environ. Sci. 6099 (2021).

101 Vivek Anand Asokan et al., *Ambitious EV Policy Expedites the E-Waste and Socio-Environmental Impacts in India*, 190 Resour. Conserv. Recycl. 106829 (2023).

amendment became operative from 1st April 2024. The 2023 amendment inserted Chapter VII titled *"Extended Producer Responsibility for Used Oil" in the 2016 rules. The rules define extended producer responsibility about used oil as "the responsibility of the producer of base oil or lubrication oil or importer of used oil under this chapter for meeting recycling targets only through registered recyclers to ensure environmentally sound management of used oil"*.[102] The rules apply to producers, collection agents, recyclers and used oil importers who must register with the Central Pollution Control Board.[103] The Rules state that for EPR, the used oil can be managed in two ways- through the production of refined base oil or lubrication oil from the used oil or through energy recovery.[104] The rules laid down EPR targets for both producers and used oil importers.[105] The rules also provide for generating EPR certificates in favour of recyclers, which the producers and the used oil importers may purchase.[106] The rules also lay down the responsibilities of all the stakeholders involved in the waste management framework of used oil: producers, used oil importers, collection agents, recyclers and bulk generators.[107] These rules also provide for the levying of environmental compensation.[108] The EPR Portal for Used Oil Management can be accessed by visiting https://eprusedoil.cpcb.gov.in.

There are several challenges that hinder the transition of the petroleum sector into a circular economy, including significant expenditure for research and development, subsidies, and substantial investments. Further, there is a lack of incentives for the producers and recyclers. Other challenges include the lack of requisite skills and inherent limitations in the recyclability of the used oil. While the EPR framework for used oil in India fills the policy gaps and creates a regulatory oversight over waste oil recycling and collection, the other challenges still loom large.[109]

3.6 EPR for End-of-Life Vehicles

The EPR for end-of-life vehicles had been proposed in the Draft End-of-Life Vehicles

102 Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. Rule 25(h).

103 *Supra* note 102, Rule 26.

104 *Supra* note 102, Rule 27.

105 *Supra* note 102, Rule 27, Table.

106 *Supra* note 102, Rule 28.

107 *Supra* note 102, Rules 31-35.

108 *Supra* note 102, Rule 39.

109 *Circular Economy Model for Petroleum Waste and Its Implementation in India*, *in* ENVIRON. SCI. ENG. 253 (2023), https://link.springer.com/10.1007/978-3-031-48220-5_12.

(Management) Rules, 2024**.** These rules have been notified as the Environment Protection (End-of-Life Vehicles) Rules, 2025 vide S.O. 98(E) dated 06th January 2025, and have come into force on April 1, 2025. The rules apply to the producers, registered owners, bulk consumers, registered vehicle scrapping facilities and entities involved in testing vehicles and handling, processing, and scrapping of End-of-Life vehicles.[110] The Rules adopt the definition of end-of-life vehicle as provided in S.3(1)(f) of Motor Vehicles (Registration and Functions of Vehicles Scrapping Facility) Rules, 2021. End-of-life vehicle thus includes a vehicle that is no longer registered, has been declared unfit, or has been cancelled or declared so by order of court or declared as a waste vehicle by the legitimate registered owner.[111] The rules list the responsibilities of the producer, registered owner, bulk consumer, collection centre, automated testing stations and registered vehicle scrapping facility.[112] Schedule of the rules lays down EPR targets for the end-of-life vehicles. The rules also provide for generating EPR certificates in favour of registered vehicle purchasing facilities, which the producer can purchase.[113] The rules also incorporate the provision for levying of environmental compensation against the producers in case they fail to comply with the proposed EPR targets.[114]

Although the principle of extended producer responsibility has recently become a part of the management of end-of-life vehicles in India, automakers operating in India have launched voluntary initiatives to ensure sound waste management. Maruti Suzuki has a "*Take Back*" program in place to collect and recycle old cars, whereas TATA Motors also has circular economy initiatives like TATVA, Re.Wi.Re and Prolife to ensure the sustainable management of vehicles.[115] In India, vehicles are registered for five years after which the owners either run it illegally, sell it to another user, keep it parked or sell it to a dismantler. They may also exchange the same through buy-back schemes. Although there are registered vehicle scrapping facilities, a major portion of dismantling takes place in the informal sector.[116] Informal

110 Environment Protection (End-of-Life Vehicles) Rules, 2025. Rule 2.

111 *Supra* note 110, Rule 3(i).

112 *Supra* note 110, Rules 4-8.

113 *Supra* note 110, Rule 9.

114 *Supra* note 110, Rule 15

115 Atul Sharma & Ajai Prakash, *Driving Sustainability: Exploring the Implementation, Opportunities, and Challenges of Circular Economy Practices in India's Automobile Industry*, 15 ADHYAYAN J. MANAG. SCI. 70 (2025).

116 Solange Ayuni Numfor et al., *A Review of Challenges and Opportunities for End-of-Life Vehicle Recycling in Developing Countries and Emerging Economies: A SWOT Analysis*, 13 SUSTAINABILITY 4918 (2021).

dismantling does not perform all depolluting operations on the end-of-life vehicle, with severe repercussions for the environment.[117] Sustainable ELV management in India suffers from major challenges such as a weak regulatory framework, a poor collection network, and low salvage prices for the ELVs.[118] Since the EPR framework in the context of End-of-life vehicles has just been launched, it is yet to see how it fares and what challenges it faces, yet it forms a crucial step towards bringing circularity in the ELV management in India.

3.7 EPR for Construction and Demolition Waste

The EPR for construction and demolition waste had been proposed through the Draft Construction and Demolition Waste Rules, 2024.[119] The central government had invited suggestions and objections for these proposed rules, which were published on 29th July 2024. The Environment (Construction and Demolition) Waste Management Rules, 2025 were notified by the MoEFCC on April 4, 2025, and shall come into effect on April 1, 2026. The rules apply to all construction, demolition, remodelling, renovation and repair of any structure.[120] The rules define construction and demolition waste as *"he waste generated due to construction, demolition, remodelling, renovation, repair, and maintenance activities, and comprises of soil, sand and gravel, bricks and masonry, concrete, metal, wood, plastic, ceramic and such other items"*.[121] The rules also define a waste generator as the occupier of the project who has full control of the same.[122] Thus, a producer for the 2025 rules is a waste generator for a building or building complex project with a built-up area of 20,000 square metres and above.[123] The rules provide for registration of producers, operators of intermediate waste storage facilities and recyclers of construction and demolition waste. The rules also lay down a waste utilisation framework. The rules further

117 Zambri Harun et al., *Development, Critical Evaluation, and Proposed Framework: End-of-Life Vehicle Recycling in India*, 14 SUSTAINABILITY 15441 (2022).

118 Nitish Arora, Shilpi Kapur Bakshi & Souvik Bhattacharjya, *Framework for Sustainable Management of End-of-Life Vehicles Management in India*, 21 J. MATER. CYCLES WASTE MANAG. 79 (2019).

119 Kandasamy Palanivelu & Sathyanarayanan Sri Shalini, *4 Sustainable Circular Economy in the Indian Context: Policies and Best Practices*, *in* CYCLIC ECONOMY 63 (Michele Aresta, Angela Dibenedetto, & Franck Dumeignil eds., 2024), https://www.degruyter.com/document/doi/10.1515/9783110767179-004/html.

120 Karambir Singh et al., *Recent Trends and Strategies in Waste Management: A Comprehensive Analysis of India's Waste Scenario*, *in* INTEGRATED WASTE MANAGEMENT 13 (Akanksha Gupta, Ravinder Kumar, & Vinod Kumar eds., 2024), https://link.springer.com/10.1007/978-981-97-0823-9_2.

121 The Environment (Construction and Demolition) Waste Management Rules, 2025. Rule 3(g).

122 *Supra* note 121, Rule 3(aa).

123 *Supra* note 121, Rule 3(q).

lay down the responsibilities of the waste generator, producers, contractors, service providers, authorised agencies, operators of intermediate waste storage facilities and recyclers.[124] The EPR targets for recycling construction and demolition waste per the EPR framework are in Schedule I of the Rules. The Rules also provide for the levy of environmental compensation against non-compliant entities.[125]

India is a major contributor of concrete debris generated from construction and demolition waste.[126] Research has shown that 90% of the construction and demolition debris in India ends up in landfills.[127] Management of construction and demolition waste is crucial as this sector is resource-intensive, and the debris generated, if managed effectively, can enhance the overall resource efficiency of the sector. Studies have identified several challenges in the Indian scenario of construction and demolition waste management: lack of adaptable building designs, lack of a mechanism for urban mining, improper waste quantification, need for standardization of building components, limited application of recycled construction materials, lack of material recovery targets, lack of recognition of informal sector, lack of interface between construction contractors, lack of support to companies adopting sustainable construction practices and lack of successful examples of reuse of buildings.[128] The Environment (Construction and Demolition) Waste Management Rules, 2025 addresses some of these challenges as it lays down a mechanism for urban mining, sets EPR targets for waste generators and provides an interface for waste generators, recyclers, and waste storage facilities to work together.

3.8 EPR for Scrap of Non-Ferrous Metals

The Draft Hazardous and Other Wastes (Management and Transboundary Movement) Second Amendment Rules, 2024, proposed to insert Chapter VIII in the Hazardous and Other Wastes (Management and Transboundary Movement) Rules,

124 *Supra* note 121, Chapter IV.

125 *Supra* note 121, Chapter VI.

126 Ning Zhang et al., *Mitigation of Carbon Dioxide by Accelerated Sequestration in Concrete Debris*, 117 Renewable and Sustainable Energy Reviews 109495 (2020).

127 S. Nair, India manages to Recover and Recycle only about 1 per cent of its construction and demolition (C&D) waste, says new CSE analysis, (2021), CSE Media Resource Center, https://www.cseindia.org/india-manages-to-recover-and-recycle-only-about-1-per-cent-of-its-construction-and-demolition-10326.

128 Namya Sharma, Pradip P. Kalbar & Muhammad Salman, *Global Review of Circular Economy and Life Cycle Thinking in Building Demolition Waste Management: A Way Ahead for India*, 222 Building and Environment 109413 (2022).

2016, titled Extended Producer Responsibility for Scrap of Non-Ferrous metals. As the name suggests, the chapter applies only to certain non-ferrous metals: Aluminium, Copper, Zinc, and their alloys.[129] These rules were notified as the Hazardous and Other Wastes (Management and Transboundary Movement) Amendment Rules, 2025 on July 1st, 2025.[130] The rules shall come into effect from April 1, 2026. Rule 45 provides that the products' manufacturer, producer, collection agent, refurbisher and recycler *"shall get registered by the Central Pollution Control Board"*. The rules further provide that the above entities can neither carry out business without registration nor deal with any unregistered entity.[131] The producers are required to fulfil their EPR obligations specified in Schedule II. The extended producer responsibility certificates may be generated for registered recyclers and refurbishers, which producers can buy to offset their EPR obligation.[132] Rule 51 lists the responsibilities of manufacturers, which include a collection of scrap and waste generated during manufacture, using recycled materials in new products and filing quarterly and annual returns. The producers are required to fulfil EPR targets, provide their contact details to facilitate communication with the consumers, and make suitable arrangements for collecting and transporting scrap metals.[133] The collection agents are required to collect scraps from the manufacturers, producers and bulk consumers and supply them to the registered recycler.[134] Refurbisher is required to collect scraps generated during manufacture and ensure their recycling or disposal.[135] Recyclers must ensure that the scrap of non-ferrous metals is procured from manufacturers, producers and collection agents, that no damage is caused to the environment during recycling, and that residue is disposed of properly.[136] The rules also provide for the responsibilities of bulk consumers[137] i.e., consumers using a minimum of one thousand tons of non-ferrous metal products listed in the Schedule I in any particular financial year. The rules also propose environmental compensation to be collected from the producers

129 Draft Hazardous and Other Wastes (Management and Transboundary Movement) Second Amendment Rules, 2024, Rule 44(k).

130 The Hazardous and Other Wastes (Management and Transboundary Movement) Amendment Rules, 2025.

131 *Supra* note 130, Rule 45.

132 *Supra* note 130, Rule 47.

133 *Supra* note 130, Rule 52.

134 *Supra* note 130, Rule 53.

135 *Supra* note 130, Rule 54.

136 *Supra* note 130, Rule 55.

137 *Supra* note 130, Rule 56.

in case of non-fulfilment of their EPR obligations.[138] The compensation can also be levied against recyclers who issue false certificates and unregistered producers, recyclers, or entities violating the provisions of the rules. The rules specifically provide that environmental compensation does absolve the producer from their EPR obligation for that particular year and that the same is carried forward.

3.9 Ecomark Rules, 2024

The Eco-mark scheme was introduced in India vide a resolution G.S.R. 85(E) dated 20th February 1991. It was a voluntary eco-labelling scheme aimed at providing accreditation and labelling to products that met certain environmental criteria. The scheme's objectives were to incentivise manufacturers and importers towards reducing the adverse environmental impacts of their products, rewarding genuine initiatives by companies, and assisting consumers in making environmentally responsible purchase decisions, thereby improving the environment. The scheme, however, failed to materialise owing to the Ministry of Environment and Forests being unable to maintain the momentum due to the lack of political will, aggressive lobbying by the businesses against the scheme and weak management of the scheme due to the lack of cooperation between the different ministries of government.[139] It was felt that for the scheme to kick off, the responsibility of granting the "*eco-mark*" should be transferred to an efficient agency and effectively promote the scheme amongst the consumers. [140] The 1991 scheme has now been notified as Ecomark Rules, 2024 under the Environmental (Protection) Act, 1986, which have come into force from 1st October, 2024. The criteria for granting an Ecomark may include the product's ability to reduce pollution, the product being recyclable or made from recycled materials, and the product reducing the use of non-renewable resources or materials that harm the environment. The criteria may be developed by keeping certain environmental considerations in mind, such as the production process, environmental impact, emissions arising from the production, compliance with EPR guidelines, utilisation of waste materials, recycling potential of the product and the use of non-hazardous substances. The First Schedule of the Rules, 2024 provides for different types of products and the criteria for the grant of the ecomark scheme. The Schedule lists 17 products for which an application for grant of ecomark may be made which are- architectural paints and powder coating, cosmetics, batteries,

138 *Supra* note 130, Rule 60.

139 P.S. Mehta, Why Was India's Ecomark Scheme Unsuccessful? (2007) https://www.cuts-citee.org/pdf/RREPORT07-01.pdf.

140 J.K. Das, *Responding to Green Concerns: The Roles for Government and Business*, 27 Vikalpa 3 (2002).

lubrication oils, soaps and detergents, paper, food items, packaging materials, electric and electronic goods, food additives, wood substitutes, aerosol propellants, plastic products, textiles, fire extinguishers, finished leather and coir products.

Table 1: Analysis of EPR Rules Presently in Force in India

Checklist items as per OECD Guidance Manual	**Plastic Waste Management Rules, 2016.**	**E-Waste (Management) Rules, 2022**	**Hazardous and Other Wastes (Management and Transboundary Movement) Amendment Rules, 2022.**	**Battery Waste Management Rules, 2022.**	**Hazardous and Other Wastes (Management and Transboundary Movement) Second Amendment Rules, 2023.**	**(End-of-Life Vehicles) Rules, 2025**
Goals and objectives	environmentally sound management of the product	environmentally sound management of e-waste	environmentally sound management of waste tyre	environmentally sound management of Waste Battery;	environmentally sound management of used oil;	Environmentally sound management of end-of-life vehicles
Key definitions	Yes (Clause 3 of Schedule II)	Yes (Rule 3 of Chapter I)	Yes (Clause 1 of Schedule IX)	Yes (Rule 3)	Yes (Rule 25 of Chapter VII)	Yes (Rule 3)
Scope	Producer, Importer, Brand Owners, Plastic Waste Processor	Manufacturer, Producer, Refurbisher, Recycler	Producer, Recycler of waste tyre, Retreader	Producer, Consumer, Public Waste Management Authorities, Entities involved in collection, Segregation treatment, Refurbisher, Recycler	Producer, Collection agents, Recycler, Used Oil importers	Producer, Registered owner of vehicles, Bulk consumers, Registered Vehicle Scrapping Facility, Collection centres, Automated testing stations and Entities involved in testing of vehicles, handling,

						processing and scrapping of End-of-Life vehicles
Product	Plastic packaging	E-waste	Waste tyre	Waste battery	Used oil	End-of-Life vehicles
Legal approach	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
Targets	Yes (For Producer, Importer, Brand Owners)	Yes (For Producer)	Yes (For Producer)	Yes (For Producer)	Yes (For Producer and Used Oil Importer)	Yes (For Producer)
Information dissemination plan	Yes	Yes	Yes	Yes	Yes	Yes

The above table reflects that the EPR rules in India substantially comply with the checklist items for EPR policies as laid down in the guidance manual. Although the EPR framework introduced in India way back in 2011 for plastics and e-waste was rudimentary and voluntary, the same cannot be said about the EPR rules in force at present. Even the newly enacted rules for construction and demolition waste, non-ferrous metals and end-of-life vehicles are a step in the right direction and contain all the relevant particulars. To transition into a circular economy from a linear economy, India had identified eleven focus areas, which were municipal waste, scrap metals, e-waste, lithium-ion batteries, solar panels, gypsum, toxic, and hazardous industrial waste, used oil waste, tyre and rubber recycling and end-of-life vehicles. EPR rules for most focus areas are already in force, while some await enforcement. It can be said that India has taken the first step towards a circular economy by framing the EPR policies. However, the framing and enforcement of rules must be complemented by effective implementation. The concept of EPR in India has been around since 2011, yet the challenges remain.

The implementation of the Extended Producer Responsibility (EPR) policy in India encounters numerous challenges across various waste streams. The issues associated with plastic waste encompass non-compliant enterprises, inactive State Pollution Control Boards, insufficient infrastructure and a deficiency in national coordination. The e-waste sector has challenges due to insufficient drop-off sites,

inadequate consumer knowledge, and poor coordination among entities engaged in e-waste management. The waste tyre management market is impeded by inadequate disposal infrastructure and the necessity for a flexible pricing approach to incentivize the return of end-of-life tyres. The construction and demolition waste sector encounters issues including inflexible building designs, inaccurate trash quantification, and restricted utilization of recycled resources. The elevated expenses associated with recycling and disposing of battery waste, coupled with the absence of cost recovery mechanisms, promote informal recycling practices. The used oil sector has considerable costs for research and development, insufficient incentives, and intrinsic recyclability constraints. Ultimately, the end-of-life vehicles management is hindered by an inadequate regulatory framework, an insufficient collecting infrastructure and diminished salvage values. Confronting these obstacles is essential for the successful execution of the EPR policy and the shift to a circular economy in India.

4. CONCLUSION

The transition to a circular economy is not just a necessity but an imperative for sustainable development. The implementation of Extended Producer Responsibility (EPR) in India has shown promising strides, particularly with the introduction of comprehensive frameworks for various waste categories such as plastics, e-waste, waste tyres, battery waste, and used oil. The recent inclusion of solar photovoltaic modules and the enacted rules for end-of-life vehicles and construction and demolition waste further underscore India's commitment to this transition. However, the success of these frameworks hinges on effective implementation and overcoming existing challenges such as inadequate infrastructure, lack of awareness, and the dominance of the informal sector in waste management. The alignment of India's EPR policies with the OECD guidelines is a positive step, but continuous evaluation and adaptation are crucial. In conclusion, while India has laid a robust foundation for a circular economy through its EPR policies, the journey ahead requires concerted efforts from all stakeholders. By addressing the gaps and ensuring stringent enforcement, India can pave the way for a sustainable future where waste is not just managed but reintegrated into the economy, thereby reducing environmental impact and promoting eco-efficiency.