CIRCULAR ECONOMY & RESOURCE EFFICIENCY IN INDIA

Policy and Standardization

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Contents

1. Executive Summary

The Government has been actively formulating policies and promoting projects to drive the country towards a circular economy. It has already notified various rules, such as the Plastic Waste Management Rules, e-Waste Management Rules, Construction and Demolition Waste Management Rules, Metals Recycling Policy, etc., in this regard.

Since its constitution, NITI Aayog too has undertaken several initiatives to ensure sustainable economic growth. Direct initiatives were taken to address the challenges in the utilization of waste as resource and to evolve a perspective on the recycling industry in India. NITI also prepared a strategy paper, along with the EU delegation to India, on 'Resource Efficiency', and four more on resource efficiency in the sectors of steel (with the Ministry of Steel), aluminium (with the Ministry of Mines), construction and demolition (with the Ministry of Housing and Urban Affairs) and e-waste (with the Ministry of Electronics and Information Technology).

To expedite the transition of the country from a linear to a circular economy, 11 committees have been formed—to be led by the concerned line ministries and comprising officials from MoEFCC and NITI Aayog, domain experts, academics, and industry representatives—for 11 focus areas (table 1). The committees will prepare comprehensive action plans for transitioning from a linear to a circular economy in their respective focus areas. They will also carry out the necessary modalities to ensure the effective implementation of their findings and recommendations.

The focus areas include 11 end-of-life products/recyclable materials/wastes that either continue to pose considerable challenges or are emerging as new challenge areas that must be addressed in a holistic manner.

While increased manufacturing and changing consumption patterns will generate more employment and increase per capita income, the effects of such higher production on the environment must also be efficiently managed and mitigated. With only 2% of the world's landmass and 4% of freshwater resources, a linear economy model of 'Take-Make-Dispose' would constrain India's manufacturing sector and, consequently, the overall economy. Therefore, it is essential to recognize and revolutionize the material flow in the manufacturing process and shift towards a circular economy, which provides multipronged economic and ecological benefits.

Table:1

S. No.	Focus Area	Concerned Line Ministry
1	Municipal Solid Waste and Liquid Waste	Ministry of Housing and Urban Affairs
2	Scrap Metal (Ferrous and Non-Ferrous)	Ministry of Steel
3	Electronic Waste	Ministry of Electronics and Information Technology
4	Lithium Ion (Li-ion) Batteries	NITI Aayog
5	Solar Panels	MNRE

6	Gypsum	Department for Promotion of Industry and Internal Trade
7	Toxic and Hazardous Industrial Waste	Department of Chemicals and Petrochemicals
8	Used Oil Waste	Ministry of Petroleum and Natural Gas
9	Agriculture Waste	Ministry of Agriculture and Farmers' Welfare
10	Tyre and Rubber Recycling	Department for Promotion of Industry and Internal Trade
11	End-of-life Vehicles (ELVs)	Ministry of Road Transport and Highways

2. Government Policy initiative

2.1 Plastic Waste Management Rules

The Government has notified the Plastic Waste Management Rules, 2016, in suppression of the earlier Plastic Waste (Management and Handling) Rules, 2011.

The Plastic Waste Management Rules, 2016 aim to:

- Increase minimum thickness of plastic carry bags from 40 to 50 microns and stipulate minimum thickness of 50 micron for plastic sheets also to facilitate collection and recycle of plastic waste,
- Expand the jurisdiction of applicability from the municipal area to rural areas because plastic has reached rural areas also.
- To bring in the responsibilities of producers and generators, both in plastic waste management system and to introduce collect back system of plastic waste by the producers/brand owners, as per extended producers' responsibility.
- To introduce collection of plastic waste management fee through pre-registration of the producers, importers of plastic carry bags/multilayered packaging and vendors selling the same for establishing the waste management system.
- To promote use of plastic waste for road construction as per Indian Road Congress guidelines or energy recovery, or waste to oil etc. for gainful utilization of waste and address the waste disposal issue; to entrust more responsibility on waste generators, namely payment of user charge as prescribed by local authority, collection and handing over of waste by the institutional generator, event organizers.

The Union Ministry of Environment, Forests and Climate Change (MoEFCC) has notified the Plastic Waste Management Amendment Rules, 2021, which prohibits identified single use plastic items which have low utility and high littering potential by 2022.

Plastic Waste Management (Amendment) Rules, 2021

2.2 E-Waste Management Rules

The Ministry of Environment, Forests, and Climate Change (MoEFCC) is primarily responsible for regulations regarding electronic waste. Additionally, the Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB) produce implementation procedures to ensure proper management of rules set forth by the MoEFCC.

E-Waste Management and Handling Rules, 2011

The E-Waste (Management and Handling) Rules of 2011 came into effect in May 2012. The rules stated that all manufacturers and importers of electronic goods were required to come up with a plan to manage their electronic waste. Producers or importers had to establish e-waste collection centers or employ take back systems. These rules also mandated that sellers of electronic goods must provide consumers with information on how to properly dispose of the electronics to prevent people from dumping their electronics with domestic waste. Further, companies that produce electronics which have the potential to become e-waste must make the consumer aware of the hazardous materials in their product. These rules established and placed specific responsibilities for each party involved in the production, disposal, and management of electronic waste. Specific responsibilities were given to the producer, collection centers, consumer or bulk consumer, dismantlers, and recyclers. These rules also mandated that commercial consumers and government departments must keep records of their electronic waste and make them available to state and federal Pollution Control Boards.

E-Waste (Management) Rules, 2016

In October 2016, the **E-Waste (Management) Rules, 2016** replaced the E-Waste (Management and Handling) Rules, 2011. This set of rules clarifies duties of responsible parties, enacts more stringent regulations on e-waste production, as well as clarifies the general definition of e-waste. In these rules, e-waste is defined as "electrical and electronic equipment, whole or in part discarded as waste by the consumer or bulk consumer as well as rejects from manufacturing, refurbishment and repair processes. 'Electrical and electronic equipment' in turn has been defined to mean equipment which are dependent on electric current or electro-magnetic field to become functional." A major concept presented in these rules is the idea of Extended Producer Responsibility (EPR). Producers of electronic products must implement EPR to ensure that their electronic waste is delivered to authorized recyclers or dismantlers. These rules establish and place specific responsibilities for each party involved in the production, disposal, and management of electronic waste. Specific responsibilities were given to the manufacturer, producer, collection centers, dealers, refurbisher, consumer or bulk consumer, recycler, and the state government. These rules also stated target goals for certain industries to drastically reduce their collection of electronic waste.]

Amendment to the E-Waste Management Rules, 2018

This amendment relaxes certain aspects of the strict E- Waste (Management Rules of 2016). Specifically, the amendment focusses on the e-waste collection targets by 10% during 2017–2018, 20% during 2018–2019, 30% during 2019–2020, and so on. This amendment also gives the Central Pollution Control Board power to randomly select electronic equipment on the market to test for compliance of rules. The financial cost associated with this testing shall be the responsibility of the government, whereas previously, this responsibility was of the producer.

2.3 Construction and Demolition Waste Management Rules

The Ministry of Environment, Forest and Climate Change notified the Construction & Demolition Waste Management Rules, 2016 on 29 March 2016. The rules are an initiative to effectively tackle the issues of pollution and waste management.

The rules shall apply to every waste resulting from construction, re-modelling, repair and demolition of any civil structure of individual or organisation or authority who generates construction and demolition waste such as building materials, debris, rubble.

https://cpcb.nic.in/displaypdf.php?id=d2FzdGUvQyZEX3J1bGVzXzIwMTYucGRm

2.4 Strategy paper on Resource Efficiency: NITI Aayog

In November, 2017, NITI Aayog along with EU Delegation to India had prepared a Strategy paper on Resource Efficiency. The objective of the RE Strategy is to make recommendations for enhancing the resource-use efficiency in the Indian economy and industry, develop indicators for monitoring progress, and create an ecosystem for improving the resource security and minimising environmental impacts.

Following up on this strategy paper, in January 2019, a status paper titled "Resource Efficiency & Circular Economy – Current status and Way forward" has also been prepared with four focus areas namely steel, aluminium, E-waste and Construction and Demolition waste. This status paper is based on findings from sectoral strategy papers on steel, aluminium, E-waste and Construction and Demolition waste prepared by concerned ministries/departments in association with NITI Aayog and other key stakeholders including EU delegation to India.

The status paper brings out 30 recommendations out of which following 14 recommendations have identified as priority actions.

S. No.	Category	Recommendations	Implementing Agencies	Timelines
1	Policies	Formulate a national policy on RE/CE for biotic and abiotic resources addressing various lifecycle stages and key stakeholders.	MoEFCC	6 months - 1 year
2		Formulate a national policy on Sustainable Public Procurement (SPP) with an action plan emphasizing procurement of RE & CE products.	MoF	6 months - 1 year
3	Programmes and Mainstreaming	Mainstream RE/CE initiatives by leveraging existing flagship programmes and schemes like Swachh Bharat Abhiyan, Smart Cities Make in India, Start-up India, Digital India and others.	MoEFCC, MoHUA, MDWS, MCI-DIPP, MeitY	6 months - 1 year

4		Create a fund on similar lines as the National Clean Energy and Environment fund to finance infrastructure, innovative technologies and related RE/CE initiatives.	MoF	6 months - 1 year
5	Regulation	Establish a national coordinating body- Bureau of Resource Efficiency (BRE) to implement and achieve national RE/CE goals.	NITI Aayog, MoEFCC, MoCA	1-2 years
6		Establish and mandate a 'Consent to Close' requirement for medium and large-scale industries in the 'RED' category to ensure that waste streams are responsibly managed and recycled after closure.	MoEFCC/CPCB	6 months – 1 year
7		Rationalise tax regime on critical virgin raw materials to make secondary raw materials price competitive	MoF	6 months – 1 year
8	Setting up a dynamic recycling industry	Promote the establishment of Material Recovery Facilities (MRFs) with the allocation of land in urban areas and industrial estates.	MoEFCC, MoHUA, MeitY	1-2 years
9		Establish a remanufacturing council or an association to spur growth of remanufacturing industry	Industry, industrial associations	1-2 years
10	R&D and Technology Development	Support R&D to develop scalable technologies for RE/CE and promote usage of Artificial Intelligence (AI) for higher efficiencies	DST, MoEFCC, MoHUA, MoA, MoS, MoM	1-2 years
11		Create and manage knowledge platforms that facilitate open innovation, provide access to experts, and engage academia to support the transition towards RE/CE.	MHRD, MoEFCC	1-2 years
12	Capacity Development, Outreach & Monitoring	Provide capacity development support on RE/CE for ministries/departments at the National and State levels.	NITI Aayog/ MHRD/ EU-REI3	6 months - 1 year
13		Develop and promote programmes and certifications for skill development of the informal sector N	NSDC, SCGJ	1-2 years
14		Develop monitoring and outcome indicators for tracking progress on RE/CE.	NITI Aayog/ MoEFCC/ State Governments	1-2 years

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2.5 Draft National Resource Efficiency Policy, 2019

The Ministry of Environment, Forests and Climate Change has proposed a draft **National Resource Efficiency Policy 2019**. It **aims** to streamline the efficient use of these resources with minimum negative impact on environment.

Key features of the policy:

1. It seeks to set up ***a National Resource Efficiency Authority (NREA)*** with a core working group housed in the Ministry of Environment, Forest and Climate Change and a members group with representations from different ministries, state/union territory, and other stakeholders.
2. The authority would be supported by an ***Inter-Ministerial National Resource Efficiency Board*** to guide on the aspects critical to its implementation.
3. It also plans to ***offer tax benefits*** on recycled materials, green loans to small and medium Enterprises (SMEs) and soft loans to construct waste disposal facilities, apart from setting up ***Material Recovery Facilities (MRF)***.
4. Manufacturers and service providers would also be required to use more recycled or renewable materials and awareness would be created among consumers to indicate the shift.
5. Idea of the national policy is to drive the country towards ***circular economy*** through efficient use of available material resources, based on principle of 6R and 'green public procurement'.
6. ***The 6R stands for reduce, reuse, recycle, redesign, re-manufacture and refurbish*** while the very premise of 'green public procurement' is to procure products with lower environmental footprints such as secondary raw materials and locally sourced materials.
7. It also pitches for moving towards '***zero landfill' approach*** in the country, hinting at possibility of imposing 'landfill taxes' and 'high tipping fees' for bulk generators of waste so that they can move towards optimal use of materials and better waste management.

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2.6 Draft policy paper on Circular Economy in Electronics and Electrical Sector: Meity

In May ,2021, the Ministry of Electronics and Information Technology has floated a policy paper that intends to replace the current linear system of 'take-make-dispose' in the electrical and electronics manufacturing sector with a circular economy one. The paper titled "Circular Economy in Electronics and Electrical Sector," focuses on the life cycle of electronics – including stages of raw material acquisition, design, manufacturing/production stage, consumption to end of life (e-waste) management, and secondary raw materials utilization, among other issues.

The paper covers the entire lifecycle of the products used in EEE manufacturing, and makes short-, medium- and long-term suggestions about CE.

For example, in raw material procurement, it recommends mandatory use of a certain percentage of critical materials sources from secondary materials, the medium to long term, and promotion of technology for extraction of maximum number of materials through technology development/transfer, innovative finance mechanisms and schemes.

In the consumption stage, the policy recommendations include resource efficiency or circular economy labeling, eco-labelling on the products in the percentage use of recycled materials in the product to create consumer awareness in recycling aspects of products.

It further recommends regulation to increase EEE warranty from 2 to 6 years, measures against planned obsolescence, legal warranty of second-hand products and promoting green public procurement (GPP) by government agencies.

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2.7 Environment Ministry and TERI signed MoU for setting up Resource Efficiency cell

Ministry of Environment, Forest and Climate Change and The Energy and Resources Institute (TERI) has signed a MoU on 3rd June 2018 to set up a Resource Efficiency Cell at the Ministry. The main objectives of the Cell are to provide a platform to mainstream resource efficiency in public policy. It aims to achieve this through coordinated thinking among the various relevant Ministries and agencies for promoting resource efficiency in the use of materials in the country. It also aims to ensure a 'system' thinking based on materials, products and processes, apart from enabling the preparation of an overarching resource efficiency policy for India and coordinated sectoral policies and regulatory mechanisms.

TERI has also released a paper on "Circular Economy for Plastics in India: A Roadmap" which identifies the key demand and supply side potential across the entire value chain for fostering circularity in plastics and includes a specific focus on the downstream issues on reducing, reusing, and recycling plastics. It aims to decouple plastics production from virgin fossil feedstock, incentivize use of recycled plastics to substitute virgin plastics, encourage responsible design, and strengthen and expand plastic recycling and reutilization.

3. EU-INDIA Co-operation around Circular Economy

3.1 EU-India Summit on 15th July 2020

The 15th summit between India and the EU was held via video conference. The EU was represented by Charles Michel, President of the European Council, and Ursula von der Leyen, President of the European Commission. India was represented by Prime Minister Shri Narendra Modi.

Leaders adopted a joint statement, reaffirming their commitment to strengthen the EU-India strategic partnership. This should be based on shared principles and values of democracy, freedom, rule of law, and respect for human rights, aiming at delivering concrete benefits for the people in the EU and India.

They endorsed "**EU-India Strategic Partnership: A Roadmap to 2025**" as a common roadmap to guide joint action and further strengthen the EU-India Strategic Partnership over the next five years. Through this roadmap, both sides have agreed on many provisions to support and strengthen cooperation between India and EU and on CE/RE provisions are:

Environment:

- Strengthen cooperation on environmental matters through the Joint Working Group on Environment as well as the Environmental Forum to support India's transition to a resource efficient and circular economy, to address air and water pollution, and to find innovative solutions to tackling plastic and marine litter, as well as to promote the integration of environmental concerns and solutions into economic growth policies.

- Strengthen the dialogue and establish an **EU-India Partnership on resource efficiency and circular economy** including through engagement and partnership between green businesses, particularly SMEs. Continue to contribute to the resource efficiency and circular economy strategies, formulating guidelines on aspects related to collection, handling, processing, and recycling of waste. **Enhance cooperation on standardisation and sharing of best practices** in fostering an efficient and sustainable use of natural resources, notably by promoting more recycling and resource recovery, in both the formal and informal economy

Urban development:

- Further implement the Partnership for Smart and Sustainable Urbanisation, namely supporting smart and sustainable cities, promoting investments in sustainable urbanization, promoting climate action and disaster risk reduction in cities, developing effective solid waste management & treatment and promotion of circular economy, developing effective water supply & sewage system and innovation in housing.

Research and Innovation:

- Building upon the good cooperation, both parties agreed to further widen the scale and impact of it under the next EU research and innovation programme, 'Horizon Europe' (2021-2027), and in India's equivalent research and innovation programmes and missions, based on co-investment and co-funding. Cooperation will take place in areas of mutual interest and in support of notably the EU-India dialogues on climate change & energy, in line with Mission Innovation and on resources efficiency & circular economy

EU-India leaders met again in May'2021 and committed to accelerate the implementation of new CE & RE Partnership to intensify bilateral exchanges on relevant regulatory approaches, market-based instruments and business models. EU also invited India to join the Global Alliance on Circular Economy and Resource Efficiency.

- EU-India Strategic Partnership: A Roadmap to 2025
- EU-India joint declaration on resource efficiency and circular economy

3.2 EU Resource Efficiency Initiatives (EU-REI)

European Union's Resource Efficiency Initiative (EU-REI) for India aims to support India in the implementation of the United Nations global Sustainable Consumption and Production (SCP) agenda by way of adapting international standards and best practices in business on resource efficiency and fostering the efficient and sustainable use of natural resources.

The project works towards creating a dialogue on the need for resource efficient approaches in India among key government and non-governmental organisations, businesses, students, media, and the public. It also underscores the link between recovering raw materials from different material streams and creating an enabling ecosystem for the management of secondary raw materials. Adoption of RE standards and benchmarks and business best practices on resource efficiency will remain key in this transition. The primary sectors of interest are mobility, buildings and construction, renewable energy (photovoltaics), and resource recovery from waste (e-waste and plastics and packaging).

EU-REI has undertaken a study to explore the adaptation of European/international standards for e-waste management to the Indian context to further the objective of better management of e-waste through responsible collection, transportation & storage, depolluting and recycling. The overall objective of this assignment is to develop recommendations for the adaptation of European standard "EN 50625-1:2014 - Collection, logistics & Treatment requirements for WEEE - Part 1: General

treatment requirements" as well as the corresponding Technical Specifications "Collection, logistics & Treatment requirements for WEEE Part 4: Specification for the collection and logistics associated with WEEE'' to the Indian context. Focus on IT equipment in line with the Indian "Strategy on Resource Efficiency in the Electrical and Electronic Equipment Sector".

EU REI activities on WEEE:

- RE strategy (Nov. 2017)
- EPR Sectoral Study on E-waste and Plastics (Sept. 2018)
- EEE Strategy (MeitY and Niti Aayog, Jan. 2019)
- Circular Economy Mission (Sept. 2018)
- MeitY E-waste Awareness Scheme – Monitoring and Evaluation support

For more information about EU-REI, please click here

4. Standardization work

In India, the Bureau of Indian Standards (BIS) has been the universally recognised professional standard setting organisation created by the Government of India with a wide range of standards for quality and performance of manufactured products. In recent years, BIS standards have been developed for recycled products that can be used to promote resource efficiency in the economy, such as the use of fly ash in concrete (IS 3812) and bricks (IS 12894).

- **PCD 12: Plastics**: To formulate Indian Standards for specifications for thermosetting and thermoplastic resins-bonded and moulding materials; natural and synthetic polymers, synthetic resin bonded laminates thermoplastic films and sheets, plasticizers cellular plastics, finished plastic articles, composites and reinforced plastics (excluding sanitary wares and plastic pipes for water supply and plastic packaging containers) safety of toys, and natural and synthetic adhesives (excluding for plywood industry and electrical tapes). https://www.services.bis.gov.in:8071/php/BIS_2.0/bisconnect/pow/pow_details

    - **IS 14534: 1998**: Guidelines for the recovery and recycling of plastic waste. This standard prescribes guidelines for the selection, segregation, and processing of plastics waste/ scrap. This standard also prescribes guidelines to the manufacturers of plastic products regarding the marking to be used on the finished product to facilitate identification of the basic raw material. It will also help in identifying whether the material used on the product is virgin, re-cyclate or a blend of virgin and recyclate. In the Annex A of this guideline, the products allowed to be manufactured from recycled PET is listed (as follows): Non-food containers for detergents, shampoos, petroleum products, pallets, including reusable packaging containers, film, sheet for non-food applications, Carpets and floor mats, playground equipment's, jacket, T-shirts, sportswear, geotextiles, tool handles, footwear, luggage, etc. The plastic waste management rules, 2016 refer to IS 14534 on how to recycle plastics.

    - **IS 14535: 1998:** Indian Standard for Recycled plastics for the manufacturing of products – Designation. This layout the guidelines for identification and classification of recycled

plastics materials (that is ready for normal use without any further modifications) based on its basic properties and applications.

- **LITD 31:Cloud Computing, IT & Data Centres**: To establish Indian standards in the field of a) Cloud Computing and Distributed Platforms including Foundational concepts and technologies, Operational issues, and Interactions among Cloud Computing systems and with other distributed systems b) Assessment methods, design practices, operation and management aspects to support **resource efficiency**, resilience and environmental sustainability for and by information, data centres and other facilities and infrastructure necessary for service provisioning. https://www.services.bis.gov.in:8071/php/BIS_2.0/bisconnect/pow/pow_details

- **CHD 33: Solid Waste Management Sectional Committee**: To formulate Indian Standards on i) Specifications, Terminology, methods of sampling and characterization of solid waste (Excluding Bio- Medical & Nuclear Waste), ii) Codes of Practices on reduction, recycling, reuse and treatment of Solid wastes (Excluding Bio-Medical & Nuclear Waste), iii) Guidelines and codes of practice for Solid waste disposal (Excluding Bio-Medical & Nuclear Waste) https://www.services.bis.gov.in:8071/php/BIS_2.0/bisconnect/pow/pow_details

- **ETD 43: Standardization of Environmental Aspects for Electrical and Electronic Products**: To prepare the necessary guidelines, basic standards, in the environmental area, in close cooperation with product committees, which remain autonomous in dealing with the environmental aspects relevant to their products; To liaise with product committees in the elaboration of environmental requirements of product standards in order to foster common technical approaches and solutions for similar problems and thus assure consistency in standards. https://www.services.bis.gov.in:8071/php/BIS_2.0/bisconnect/pow/pow_details
    - IS 16584: 2017 IEC/TR 62635 : 2012 Guidelines for End-of-Life Information Provided by Manufacturers and Recyclers and for Recyclable and for Recyclability Rate Calculation of Electrical and Electronic Equipment

BIS and the Indian Roads Congress have also come up with standards prescribing limits up to which recycled aggregates can be safely used in different applications. In 2016, BIS amended the IS 383 standard to allow for the use of recycled aggregates from construction and demolition waste in concrete production (BIS, 2016). Steps are being taken by BIS to formulate standards for using C&D waste as coarse aggregates in concrete. The Indian Roads Congress (IRC) has issued 'IRC-121:2017 Guidelines for Use of C&D Waste in Road Sector' outlining what kind of materials from recycled C&D waste and in what proportion, may be safely used for specific road construction/repair applications.

5. Resources

- **Bureau of Indian Standards**
  https://bis.gov.in/
- **NITI Aayog**

https://www.niti.gov.in/

- **Ministry of Electronics and Information Technology**
  https://www.meity.gov.in/
- **Ministry of Environment, Forests and Climate Change**
  http://moef.gov.in/
- **Govt Driving Transition from Linear to Circular Economy**
  https://pib.gov.in/PressReleasePage.aspx?PRID=1705772
- **Environment Ministry and TERI signed MoU for setting up Resource Efficiency cell**
  https://www.latestgkgs.com/ministry-of-environment-forests-and-climate-change-moefcc-2929-a
- **Steel Scrap Recycling Policy**
  https://steel.gov.in/sites/default/files/Steel%20Scrap%20Recycling%20Policy%2006.11.2019.pdf
- **Government notifies the Plastic Waste Management Amendment Rules, 2021, prohibiting identified single use plastic items by 2022**
  https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1745433
- **E- Waste (Management) Amendment Rules, 2018**
  http://www.indiaenvironmentportal.org.in/content/453310/e-waste-management-amendment-rules-2018/
- **Construction and Demolition Waste Management Rules, 2016**
  https://cpcb.nic.in/rules-7/#:~:text=(5)%20Every%20waste%20generator%20shall,processing%20and%20disposal%20of%20construction