सत्यमेव जयते

16th CIVIL SERVICES DAY

21st APRIL, 2023

PROMOTING CIRCULAR ECONOMY

For Sustainable Development

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"World is witnessing depletion of all types of natural resources. In such a scenario, circular economy is the demand of the hour and we have to make it a mandatory part of our lives"

- **Hon'ble Prime Minister Narendra Modi**

COMPOSITION OF SESSION

Plenary Session	Promoting Circular Economy For Sustainable Development
Chair	**Shri Bhupendra Yadav** Hon'ble Minister for Environment and Forest
Panelists	**Smt. Leena Nandan,** Secretary, Ministry of Environment Forest & Climate Change Government of India **Smt. Alka Upadhyay,** Secretary, Ministry of Road, Transport & Highways Government of India **Shri Pankaj Jain,** Secretary, Ministry of Petroleum & Natural Gas Government of India **Smt. Supriya Sahu,** Additional Chief Secretary, Department of Environment, Climate Change and Forests, Government of Tamil Nadu
Rapporteur	**Shri Naresh Gangwar** Additional Secretary Ministry of Environment Forest & Climate Change Government of India

BACKGROUND

Mission Circular Economy is a focus of the Government. Hon'ble Prime Minister in his address to the nation on the occasion of 75th Independence Day on 15th August 2021 highlighted focus on 'Mission Circular Economy'. The call of Lifestyle For Environment (LiFE) given by the Hon'ble Prime Minister envisions replacing the prevalent 'use-and dispose' economy with a circular economy, which would be defined by mindful and deliberate utilization. Development of circularity in different waste streams will not only have environmental benefits in terms of recovery of precious materials, reduced use of virgin material, environmentally sound management of wastes but also socio-economic benefits. Policies and programmes for unlocking the potential of Circular Economy will lead to creation of new job and business opportunities.

India has been one of the fastest growing economies in the world. This robust economic growth coupled with rising household incomes have resulted in increased consumer spending, which is expected to reach USD 4 trillion by 2025. With a population of 1.3 billion people, accounting for 18% of the global population, living on only 2.4% of the world's surface, India is poised to face significant resource constraints. In order to sustain this growing population, achieve the desired economic growth rate and tackle the issue of resource scarcity, the country must embark on a positive, inclusive and environmentally sustainable model of development. Unlocking circular economy opportunities holds the key to lead this transformation towards building a low carbon resource efficient economy.

A circular economy path adopted by India could bring in substantial annual benefits, along with significant reduction in congestion and pollution which in turn will maximize the resource efficiency, minimize the consumption of finite resources and will provide an impetus to the emergence of new business models and entrepreneurial ventures. The circular economy is being increasingly recognised as a design-led approach in unlocking systemic solutions that address multi-dimensional global challenges of climate change, biodiversity loss, and pollution.

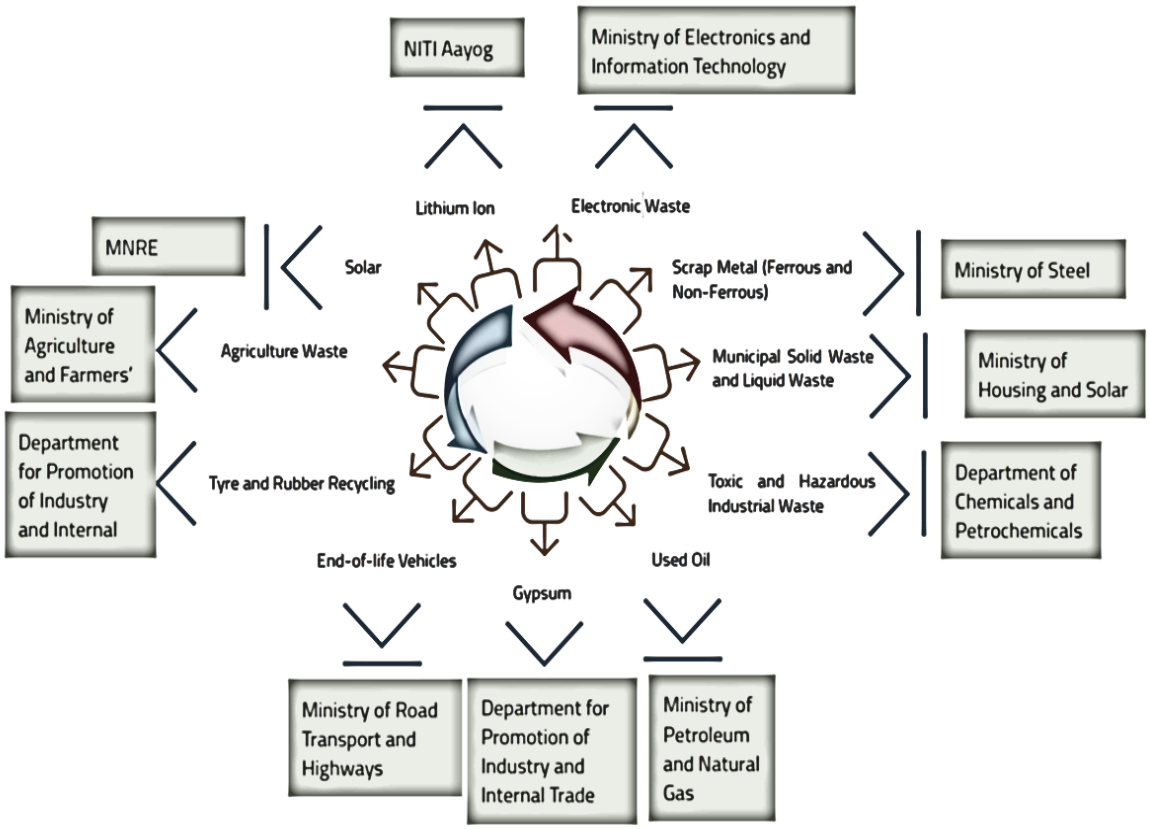
INTRODUCTION

The Circular Economy refers to an economic model whose objective is to produce goods and services in a sustainable way, by limiting the consumption and waste of resources (raw materials, water, energy) as well as the production of waste. It includes 6 R's - Reduce, Reuse, Recycle, Refurbishment, Recover, and Repairing of materials.

To expedite the transition of the country from a linear to a circular economy, 11 Committees were formed to be led by the concerned Line Ministries and comprising officials from Ministry of Environment and Forest Climate Change (MoEFCC) and NITI (National Institution for Transforming India) Aayog, domain experts, academics and industry representatives for 11 focus areas (Figure 3). The Committees gave detailed action plans for their specific target areas for transition from a linear to a circular economy.

Figure 3: 11 Expert Committees with their Focused Area

Circular Economy Action Plans for 10 waste categories (Lithium ion batteries; E-waste; Toxic and hazardous industrial waste; Scrap metal (ferrous and non-ferrous); Tyre and



Rubber; End of Life Vehicles; Gypsum, Used Oil, Solar Panels and Municipal Solid Waste

have been finalized, and are under implementation. Respective Nodal Ministries are coordinating on progress of implementation of these action plans. (Li-ion batteries - NITI Aayog; E-waste - MEITY; Toxic and hazardous industrial waste - D/o Chemicals and Petrochemicals; Scrap metal (ferrous and non-ferrous) - M/o Steel; Tyre and Rubber - MoEFCC; End of Life Vehicles - MoRTH; Gypsum - DPIIT; Used Oil - MoPNG; Solar Panels - MNRE; and Municipal Solid Waste - MoHUA.)

Regulations mandating market based Extended Producer Responsibility (EPR) on producers, importers and brand owners following the principle of circular economy have been notified by the Ministry of Environment Forest and Climate Change Government of India in the following four categories of wastes i.e. plastic packaging waste, battery waste, e-waste and waste tyre.

- ‘‘Extended Producer Responsibility (EPR) for Waste Tyre, 2022’’ on 21.07.2022.
- Guidelines on EPR for Plastic Packaging on 16.02.2022.
- ‘’Battery Waste Management Rules, 2022’’ on 22.08.2022.
- ‘’E-Waste (Management) Rules, 2022’’ on 02.11.2022.

These rules set out EPR targets for manufacturers, producers, importers, and brand owners, along with enabling transactions among stakeholders for Extended Producer Responsibility (EPR) certificates.

The Government of India has come up with policies as a part of its focus on building circular economy:

National Vehicle Scrappage Policy - The Vehicle Scrappage Policy launched by the Hon’ble Prime Minister on August 13, 2021, is an important policy that promotes circular economy. The Policy envisages the creation of scrapping infrastructure throughout the country. The government plans to establish 450–500 automated vehicle fitness testing facilities across India as part of public–private collaboration through the voluntary vehicle fleet modernization programme. In addition to reducing pollution, the government's fleet modernisation programme aims to improve road and vehicle safety, fuel efficiency, and the availability of low-cost raw materials for the auto, steel, and electronics industries. Private automobiles will be de-registered after 20 years if declared unfit or if not renewed. Although

private automobiles will be eligible for renewal of registration after the 15th year based on fitness-test (valid up to five years), they will be encouraged to de-register their vehicles after 15th year.

The Vehicle Scrappage Policy may significantly reduce carbon emissions and air pollution while promoting employment and economic growth. As older vehicles are phased off the road, the service and manufacturing sectors will benefit from increased demand for new vehicles or electric vehicles. The Government of India has been focused on promoting the sale of electric vehicles through the National Electric Mobility Mission Plan 2020 and the Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME) Scheme.

Wet waste management - Scientific management of wet and dry waste is a prerequisite for developing sustainable cities and rural areas enabling them to reduce carbon footprints, become resources efficient and resilient. Scientific management of wet and dry is key for operationalizing waste to wealth. The Solid Waste Management Rules, 2016, provide the statutory framework for solid waste management in the country including mandating separate processing of wet and dry waste by local authorities following the principle of circular economy. Swachh Bharat Mission envisions complete scientific management of wet and dry waste in the country.

Management of wet waste through generation of compost needs to be linked with the PM Programme for Restoration, Awareness, Nourishment and Amelioration of Mother Earth (PM PRANAM) which incentivizes States and Union Territories to promote alternative fertilizers and balanced use of chemical fertilizers. Further, Bio-methanation plants for wet waste management can be linked with the GOBARdhan (Galvanizing Organic Bio- Agro Resources Dhan) scheme. Under the budget announcement 2023, 500 new 'waste to wealth' plants will be up under GOBARdhan scheme. These will include 200 compressed biogas (CBG) plants, including 75 plants in urban areas.

Dry waste management including plastic packaging: Dry waste is most valued stream of solid waste due to high economic value of recyclables. Municipal dry waste is nowadays sorted in MRFs to recover recyclables which go back to same manufacturing stream. The Ministry of Environment, Forest and Climate Change has notified guidelines for extended producer responsibility based upon market mechanism in order to drive growth of waste management sector in plastic packaging, waste tyre, e-waste and waste battery. Circularity in dry waste can decouple economic growth from consumption of primary resources. Other

recyclable components of dry waste could also be included under EPR regime to push circular economy.

Extended Producer Responsibility for plastic packaging

The Guidelines on Extended Producer Responsibility (EPR) for plastic packaging vide Plastic Waste Management (Amendment) Rules, 2022, were notified on 16th February 2022. The Guidelines stipulate mandatory targets on Producers, Importers and Brand Owners for recycling of plastic packaging waste, reuse of rigid plastic packaging and use of recycled plastic content in manufacture of plastic packaging.

The year-wise target for recycling of plastic waste across different categories of plastic packaging is given below:

Year	Target * (% of Extended Producer Responsibility)
2024-25	30-50
2025-26	40-60
2026-27	50-70
2027-28 onwards	60-80

* based upon plastic packaging category – rigid plastic packaging, flexible plastic packaging, multi-layered plastic packaging, compostable plastic

Special Category waste (E-waste, battery waste, tyre waste): Recycling and processing of special category waste such as E-waste, battery waste, end of life vehicles are linked with recovery of valuable raw materials, which can be further used as inputs for further manufacturing. Recycling of E-waste and battery waste leads to recovery of precious metals. Therefore, circularity in special category waste will lead to reduction in use of virgin raw materials and also reduction in imports of virgin raw materials not available in the country or not available as per requirement.

Extended Producer Responsibility on E-waste

Under the E-Waste (Management) Rules, 2016, twenty-one (21) types of electrical and electronic equipment (EEE) have been notified. The E-Waste (Management) Rules, 2022 is a transformative step towards implementation of the announcement made by Hon'ble Prime Minister to promote Circular Economy in full earnest. Number of e-waste items covered under extended producer responsibility increases from 21 to 106. Further, in new rules the collection target has now been changed to recycling target and start from 60% of the quantity of waste generation as indicated in Extended Producer Responsibility Plan for FY 2023-24 to

80% for FY 2027-28 and remains 80% from FY 2028-29 onwards. The schedule for recycling target for E-waste is given below

Year	Target
2023-24	60
2024-25	60
2025-26	70
2026-27	70
2027-28 onwards	80

Extended Producer Responsibility on Battery waste

Ministry of Environment, Forest and Climate Change, Government of India published the Battery Waste Management Rules, 2022 on 24th August, 2022 to ensure environmentally sound management of waste batteries. New rules replace Batteries (Management and Handling) Rules, 2001. The rules cover all types of batteries, viz. Electric Vehicle batteries, portable batteries, automotive batteries and industrial batteries. The rules mandate Extended Producer Responsibility (EPR) on the producers (including importers) of batteries who are responsible for collection and recycling/refurbishment of waste batteries and use of recovered materials from wastes into new batteries. Producers (including importers) are mandated targets for collection and recycling/refurbishment of waste batteries in the range of 30-90% depending on the type of batteries. However, the remaining batteries are also to be collected in 7-14 years compliance cycle. The schedule for recycling target is given below

Year	Target *
2024-25	55-70
2025-26	60-80
2026-27	60-90

* depending on battery type – portable automobile, industrial, E-vehicles

Extended Producer Responsibility on Tyre waste

Ministry of Environment, Forest and Climate Change, Government of India published the notification on 'Extended Producer Responsibility (EPR) for Waste Tyre' on 21st July, 2022 through amendment in Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 to ensure environmentally sound management of waste tyres. These rules cover all types of waste tyre including tubes and flaps that is no longer mounted on a vehicle and is no longer used for its intended purpose. Extended Producer Responsibility (EPR) has been mandated on the producers (including importers) of tyres who are responsible

for recycling/ retreading of waste tyre and use of recovered materials from wastes into reclaim rubber, crumb rubber, crumb rubber modified bitumen, recovered carbon black and pyrolysis oil & char. The schedule for recycling target is given below

Year	Target
2022-23	35
2023-24	70
2024-25	100

C&D Waste Rules, 2016 – The Construction and Demolition (C&D) Waste Rules 2016 outlined the duties and responsibilities of multiple parties including waste generators, Urban Local Bodies (ULBs), State & Central government Ministries and organisations. In order to make implementation easier, it also provided templates for the documentation required for each management phase. The goal, of the (C&D) Waste Rules, 2016 implementation plan, is to make it easier for ULBs across the India to adopt good C&D waste management practices and ensure that recycled products find adequate and sustainable utilisation.

Smart Cities Mission - The Smart Cities Mission was launched by the Hon' Prime Minister on 25 June, 2015. The Mission's major aim is to promote cities that offer essential infrastructure, a clean and sustainable environment, and quality of life for their inhabitants by focusing on the social, economic, physical, and institutional foundations of the city. The Mission strives to spur economic growth and improve quality of life. To improve overall well-being and reduce the vulnerability of residents, the Smart Cities Mission highlights some characteristics of a Smart City, such as diversified land use, reduced resource depletion and pollution, and digitization.

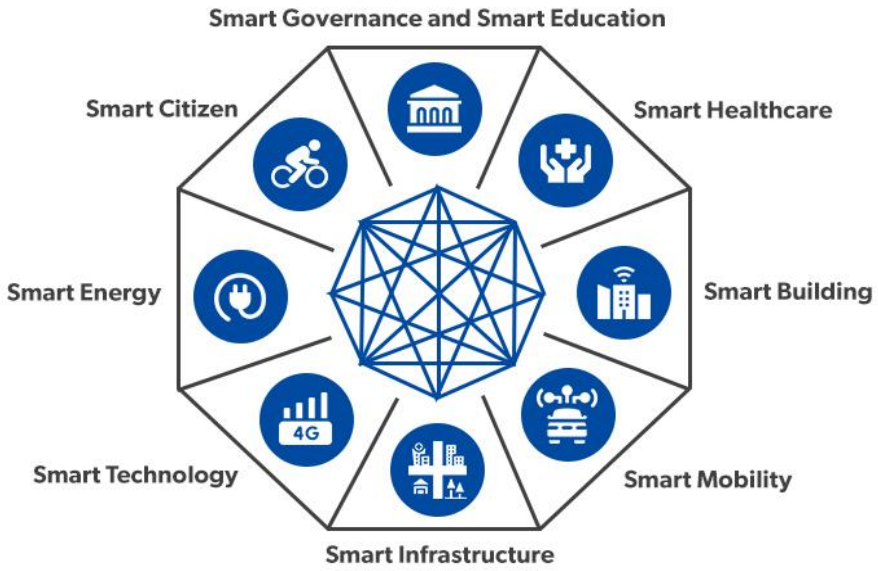


Figure 4: Features of Smart Cities

States and Urban Local Bodies (ULBs) play a key supportive role in the development of Smart Cities. Smart leadership and vision at this level and ability to act decisively are important factors determining the success of the Smart Cities Mission. Making cities circular and competitive can be accomplished in a number of ways, including efficient resource allocation, waste management, e-governance, and electric mobility.

India's Smart Cities Mission, Digital India, Make in India and Swachh Bharat Mission, have much potential for integrating socio-cultural contexts at the grassroots in the shift to circularity.

The mandate for waste processing through Extended Producer Responsibility in plastic packaging, E-waste, battery waste, tyre waste and the vehicle scrapping policy will lead to an immense demand of the recycling infrastructure in respect of these streams. The scientific processing of wet and dry waste will allow development of circular economy in solid waste.

SUCCESS STORIES

The transition towards a circular economy is underway in both public and private sectors. In the last five years, growing numbers of businesses across sectors are turning to circular economy approaches. Many noteworthy initiatives have been taken by corporates and government bodies towards sustainable development.

CIRCULAR ECONOMY MODEL – SURAT, GUJARAT

In the last four decades, Surat has seen unparalleled growth, reporting one of the peak growth rates in the nation. The city's strength story divulges the impressive advancement the town has made in acknowledging its challenges and promoting the all-inclusive philosophy and planning that actual resilience needs. Surat has addressed many of its crucial challenges, specifically its water security and flooding challenges.

After growing to be a prototypical in the nation for its circular economy, generating revenue through the reuse of wastewater, Surat Municipal Corporation (SMC) endeavours to become a net-zero liquid discharge city. The city attempts to create INR 500 Cr. through the treated water for non-potable uses. The city is an example of how a circular economy model can operate in a town where revenue is generated by selling water. Surat city is generating 1000 MLD wastewater currently, and it tries to treat and reuse it.

INDIA'S FIRST NET ZERO ENERGY BUILDING

The Indira Paryavaran Bhavan office (MOEFCC) building in New Delhi is the first net zero building in India. It is designed to have reduced energy demand and to meet the demand with renewable energy. Building design elements reduce energy and water use, resulting in overall savings of 40% and 55% energy consumption. With an installed capacity of 930 kW peak solar power, the building boasts the largest rooftop solar system among multi-story structures in India, providing all of the energy required by the structure. By splitting blocks and arranging them around a sizable central courtyard, the building's design and orientation maximise ventilation. When compared to a typical system, chilled beam air conditioning uses 40% less energy by cooling the air through water pipes installed throughout the ceiling. Even the passenger elevators produce electricity while in use, significantly reducing energy use, thanks to energy-efficient lighting. Water demand is decreased by using fixtures that use less water, collecting rainwater, and reusing treated water for cooling and irrigation systems in plants. No water escapes from the property since sewage is treated on-site and the pure water that results is used to irrigate plants close to the building.

GIFT Smart City Waste Management

India is planning to develop 100 smart cities and one of the basic principles of the smart cities is to have sustainable Waste Management. A Swiss technology was recently implemented in GIFT city (Gujarat International Finance Tech City) Ahmedabad, for garbage disposal with minimum human intervention. In the process solid waste will be collected in a tower and through vacuum suction pipes transferred to the waste collection centre for waste segregation

and then the organic waste is decomposed using vermicomposting and inorganic waste is disposed of by plasma technology incineration. Energy generated from incineration is consumed for multi purposes. GIFT city is an appropriate experimentation and understanding opportunity for efficient urban waste management.

WAY FORWARD

Transition to a circular economy is a very big opportunity for India and government has been proactive in formulating targeted strategies and policies to ensure proper waste and resource management and leverage circularity principles not only to meet India's global environmental sustainability commitments but also to ensure that India has resources available to meet its growth aspirations. There are also concerted efforts to bring multiple stakeholders on the same page for policy implementation.

Moving forward, it is essential to create an enabling environment for businesses to make circular practices profitable and businesses viable. Finally, it is essential to emphasize on the importance of data driven decision making and the need for more research and development in the area of circular economy. Governments at all levels, from National to State to District, must work together to overcome the challenges of a circular economy. The government can introduce cheap financing channel and schemes like Production Link Incentive (PLI) targeting circular practices adoption with clear objectives. Currently, most of the circular economy activities happen at the very end of value chains, resulting in sub-optimal economic and environmental outcomes. The authorities can help push the initiatives up the value chain through focused actions such as mandatory procurement of recycled content product in government tenders and clear targets and accountability for Extended Producer Responsibility (EPR) sector wise. State Governments and local authorities need to take steps for operationalization of waste to wealth through scientific management of wet and dry waste processing including plastic packaging, C&D waste, special category waste including E-waste and scrapping of end of life vehicles.

DISCUSSION POINTS

- Despite the Government's policy efforts and regulatory measures, there is a need to build momentum and determine how policies and regulations can be implemented effectively on the ground.

- Industries play a crucial role and therefore collectively need to determine how industries can promote and adopt circular economy.
- India's infrastructure is to be further enhanced to fully support a circular economy so what may constitute as measures to enhance the recycling infrastructure in the country?
- There is a cultural resistance to the idea of reusing and recycling products in India, especially to replace higher-value products, making it difficult to change consumer behaviour and shift towards a circular economy. Consumer behaviour is crucial for success of implementation of circular economy so what are some measures to build a mass movement for circular economy?

LIST OF ABBREVIATIONS

S.No.	Abbreviations	Details
1.	GHG	Greenhouse Gas
2.	USD	United States Dollar
3.	GDP	Gross Domestic Product
4.	MSW	Municipal Solid Waste
5.	MT	Metric Tones
6.	SBM	Swachh Bharat Mission
7.	EPR	National Resource Efficiency Policy
8.	MoEFCC	Ministry of Environment and Forest Climate Change
9.	NITI	National Institution for Transforming India
10.	MNRE	Ministry of New and Renewable Energy
11.	FAME	Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles
12.	RE	Resource Efficiency
13.	PET	Polyethylene Terephthalate
14.	ULB	Urban Local Body
15.	EPR	Extended Producers Responsibility
16.	PRO	Producers Responsibility Organization
17.	SPCB	State Pollution Control Board
18.	PCC	Pollution Control Committee
19.	C&D	Construction and Demolition
20.	ULBs	Urban Local Bodies

21.	INORA	INSTITUTE OF NATURAL ORGANIC AGRICULTURE
22.	kWh	Kilowatt Hour
23.	GIFT	Gujarat International Finance Tech City
24	CPWD	Central Public Works Department
25.	BMTPC	Building Materials & Construction Technologies
26.	MoHUA	Ministry of Housing and Urban Affairs
27.	PLI	Production Link Incentive