Framework for Circular Economy Vision 2036

State Pollution Control Board, Odisha
Forest, Environment & Climate Change Department,
Government of Odisha

March 2025

pwc

Contents

Acronyms

CAGR	Compound Annual Growth Rate
CE	Circular Economy
C&D	Construction and Demolition
ELT	End-of-Life Tyres
ELV	End of Life Vehicles
EPR	Extended Producer Responsibility
GDP	Gross Domestic Product
GPP	Green Procurement Policy
INR	Indian Rupee
LiFE	Mission Lifestyle for Environment
MSW	Municipal Solid Waste
MSME	Micro, Small, and Medium Enterprises
MW	MegaWatt
NDC	Nationally Determined Contributions
NITI	National Institution for Transforming India
NREP	National Resource Efficiency Policy
PPP	Public-Private Partnerships
R&D	Research and Development
SDG	Sustainable Development Goals
SPCB	State Pollution Control Board
UNEP	United Nations Environment Programme
USD	United States Dollar

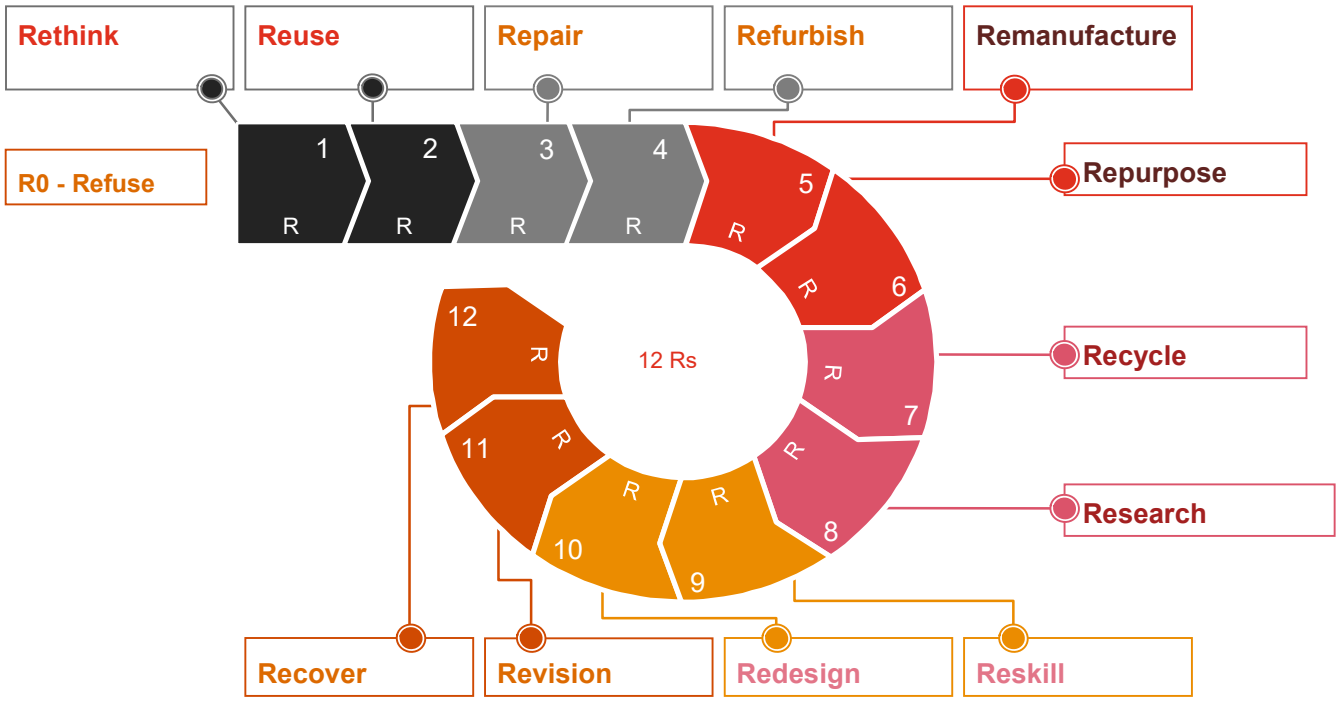
1. Introduction

Global Trends in Circular Economy

In the face of pressing global challenges such as resource depletion, environmental degradation, and climate change, Circular Economy stands out as a transformative model for sustainable development. Unlike the traditional linear economic model, which follows a "take-make-waste" approach, the Circular Economy model seeks to create a regenerative system that optimizes resource use and minimizes waste. Circularity aims to design out waste, extend product life spans and recover useful resources from waste.

Global movements like the Ellen McArthur Foundation, the Circular Economy 100, World Economic Forum and the United Nations Environment Programme (UNEP) and regional initiatives across the world like the EU Circular Economy Action Plan and Circular Economy Movement in Latin America are working towards the transition to Circular Economy. Further, the Industry 5.0 revolution, involving a network of connected devices and systems across the supply chain to facilitate intelligent manufacturing as per customer-specific requirements, would be a key enabling tool for Circularity.

Figure 1 : 12 Rs of Circular Economy

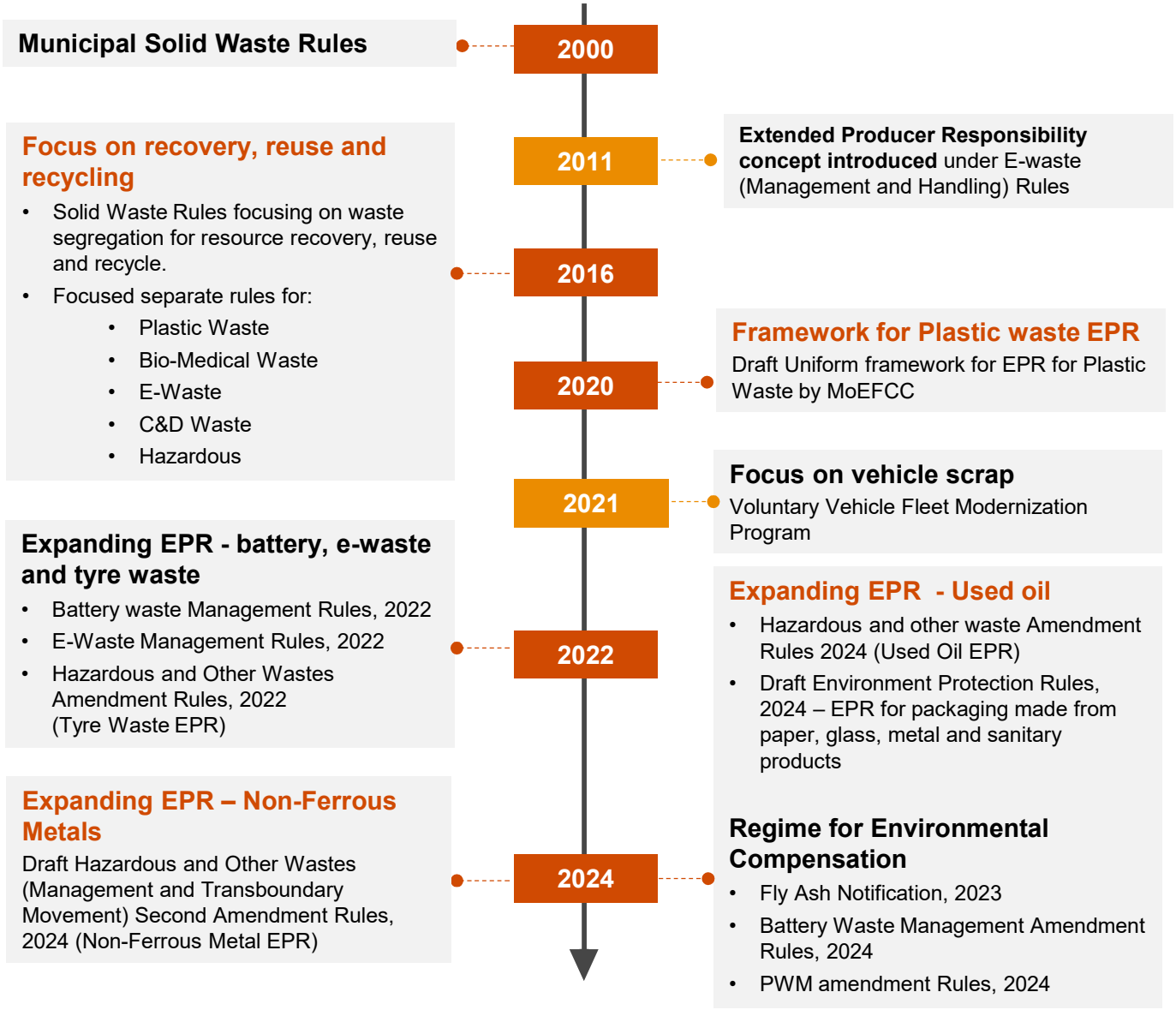


Importance of Circular Economy in India

Circular Economy holds particular significance for India, a nation marked by its resource-intensive economy and rapidly expanding population. By 2030, India is expected to be the third largest economy, with a forecasted annual growth rate of 6.7%. India is expected to generate an annual value of USD 218 billion (INR 14 lakh crores) by 2030 and USD 624 billion (INR 40 lakh crores) by 2050 through Circular Economy transition.

The growing necessity for sustainable waste management in India has catalyzed the evolution and adoption of various policies over time, which have focused on the transition to circularity

Figure 2 : Evolution of regulatory environment around Circular Economy in India

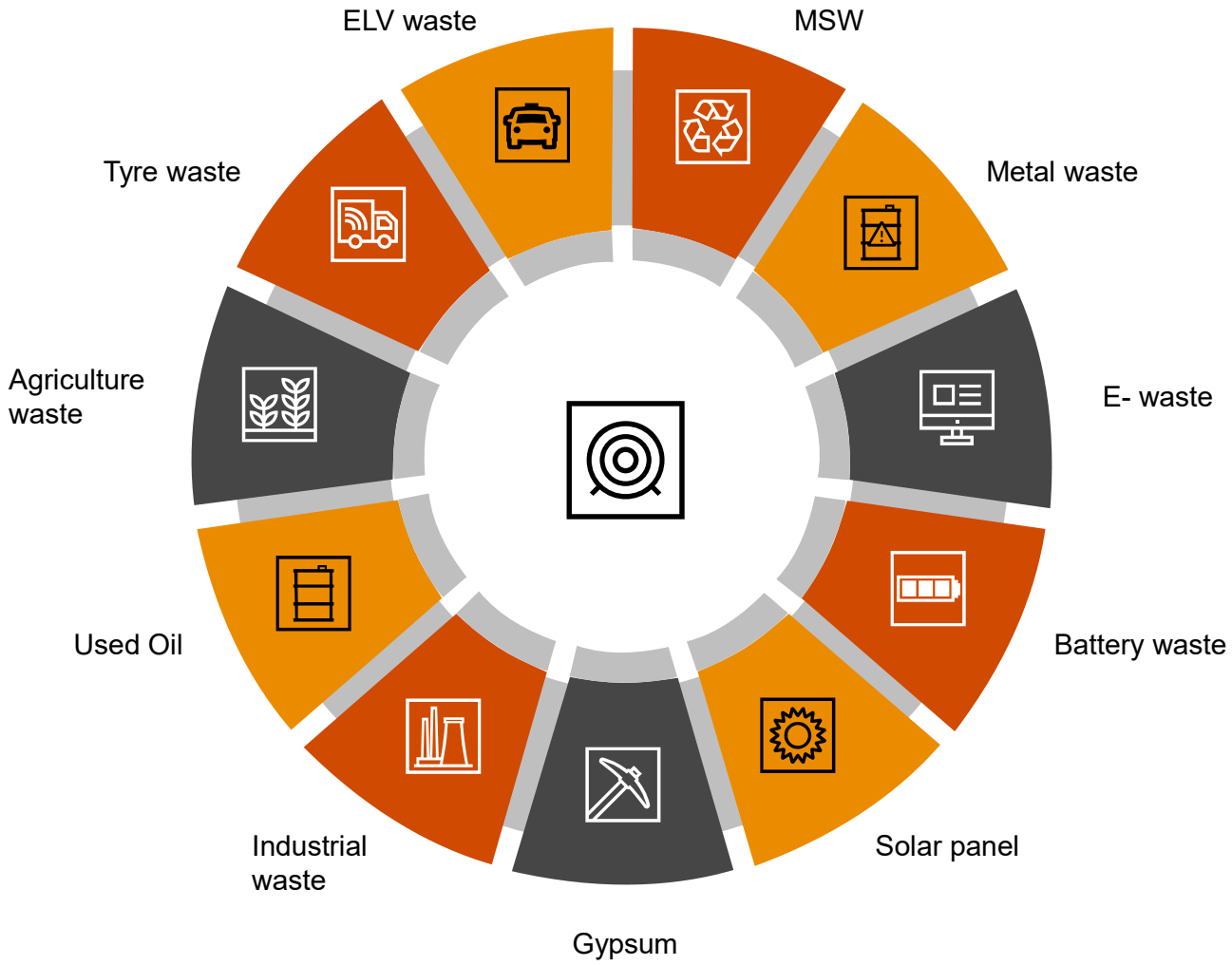


India is implementing policies that align national targets with global sustainability goals, a commitment further evidenced by India's Nationally Determined Contributions (NDCs), which aim to reduce greenhouse gas emissions in support of the United Nations Sustainable Development Goals (UNSDGs). Additionally, the Mission Lifestyle for Environment (LiFE) promotes sustainable living practices, drawing inspiration from traditional Indian lifestyles. Other key initiatives include the draft National Resource Efficiency Policy (NREP) of 2019 and Extended Producer Responsibility (EPR) frameworks which focus on enhancing resource efficiency and improving waste management practices respectively.

Focus Areas in Circular Economy

The Government of India took proactive steps to establish a Circular Economy Cell in NITI Ayog in 2022 with dedicated sectoral committees formed for preparation of action plans for Circular Economy in 11 sectors. **Ever since, seven out of the eleven sectors have come up with Action plans or EPR frameworks to facilitate Circular Economy.**

Figure 3 : Focus Areas for Circular Economy in India



India's material consumption is anticipated to increase significantly, approximately doubling from 7 billion tonnes in 2015, to 14.2 billion tonnes by 2030 . This anticipated rise is driven by factors such as population growth, urbanization, economic mobility, improved standard of living, consumerism and the subsequent rise in per-capita resource consumption.

.

Table 1: Opportunities for various waste sectors

Waste Sector	Opportunities
Municipal Solid Waste	**1.6 Lakh TPD** Waste generated by Urban India in 2021 **5-25% of C&D Waste in MSW,** which provides revenue generation opportunity of **USD 48 Million** (INR 416 crores) annually
Metal Waste	Metal scrap recycling industry valued at around **USD 11 billion in 2023**
E-Waste	E-waste is projected to increase substantially due to the expansion of Information technology, solar energy and wind energy infrastructure
Battery Waste	**~500,000 tons** of waste **batteries expected to be recycled from 2022 to 2030**
Solar Waste	India's solar waste could reach **600 kilotonnes (kt) by 2030**. This includes **~10 kt of silicon, 12-18 tonnes of silver, and 16 tonnes of cadmium and tellurium**
Gypsum	Recycling of gypsum from industrial and construction sources has applications in cement production and agriculture as a soil amendment.
Industrial Waste	Potential generation of **5,690 MW of electricity from MSW and Industrial Waste as of 2023. Hazardous waste accounts for 10-15% of industrial waste,** which includes materials such as fly ash, gypsum and glass objects.
Used Oil	Recycling of used oil, a form of hazardous waste, presents substantial opportunities for processing and re-refining, thereby decreasing dependence on virgin petroleum products.
Agriculture Waste	**~350 million tonnes** of agricultural waste generation annually as of 2020, this waste has potential to generate over 18,000 MW of power.
Tyre Waste	**275,000 tyres** discarded daily by the tyre industry in 2021
End-of-Life Vehicle Waste	**22.5 million End of Life Vehicles (ELVs) expected by 2025.** Potential yield of 5 million tonnes of steel scrap, 1.2 million tonnes of aluminum, and about 0.2 million tonnes of copper from ELVs.

2. Odisha – a Harbinger in Circular Economy

Context

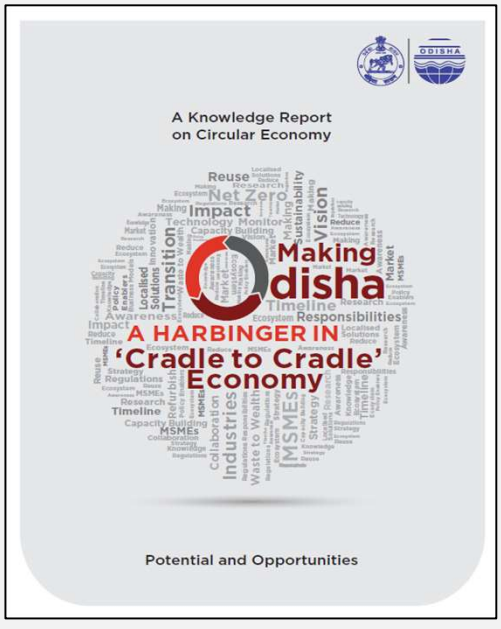
Odisha is the third fastest growing state in the country after Madhya Pradesh and Andhra Pradesh. With the lowest industrial power tariffs and moderate cost for skilled labor, Odisha is at a current growth rate of over 8%. The industries sector makes the highest contribution to the state's GDP at 43%. Odisha has become a leading state in India's mineral and metal industry, being the largest mineral-producing State in the country with 44.9% of the national minerals output by value in 2023-24. It also leads in manufacturing steel, stainless steel, and aluminum, highlighting its crucial role in India's industrial sector.

Odisha generates about 100 million tonnes of waste comprising industrial waste such as fly ash, slag, and gypsum and urban waste like plastic, electronic waste, municipal waste, battery and waste tyres. The increasing quantities of waste lays thrust on Circular Economy for the state to not only handle the waste effectively and safely, but also to generate value from the waste. This focus includes co-processing and enhancing the recyclability, reuse, and repurposing of materials, which could drive the state's growth.

Odisha has been making significant strides in adopting and promoting a circular economy (CE) model, aiming to transform the state into a hub of economic and environmental innovation

Also, during the Make in Odisha Conclave 2022, the state demonstrated its commitment to sustainable industrialization by promoting the Circular Economy (CE) as sectoral area. A key element of this effort was the release of a knowledge report outlining the opportunities and stakeholders' suggestions to be included in the circular economy principles, with a particular focus on "Waste to Wealth" initiatives. The "Make in Odisha 2022" emphasised the importance of the "Reduce, Reuse, and Recycle" principles, successfully securing commitments for 38 Circular Economy-related projects. These initiatives attracted investments amounting to ₹2,357.32 crore, with the potential to generate direct employment for 1,043 individuals and indirect employment for 2,162 individuals, thereby reinforcing Odisha's resolve towards sustainable growth.

Figure 4 : Knowledge Report released during MIO 2022



The knowledge report emphasized the need for collaboration among the government, industries, and stakeholders to foster a supportive ecosystem towards circular transition. It highlighted the critical role of **Industrial Symbiosis**, where waste generated by major industries in Odisha can be repurposed as secondary raw materials through symbiotic partnerships. This approach aims to create a thriving "waste-to-wealth" ecosystem within the state, enhancing resource efficiency and driving sustainability across sectors.

Current Policy Landscape in Odisha

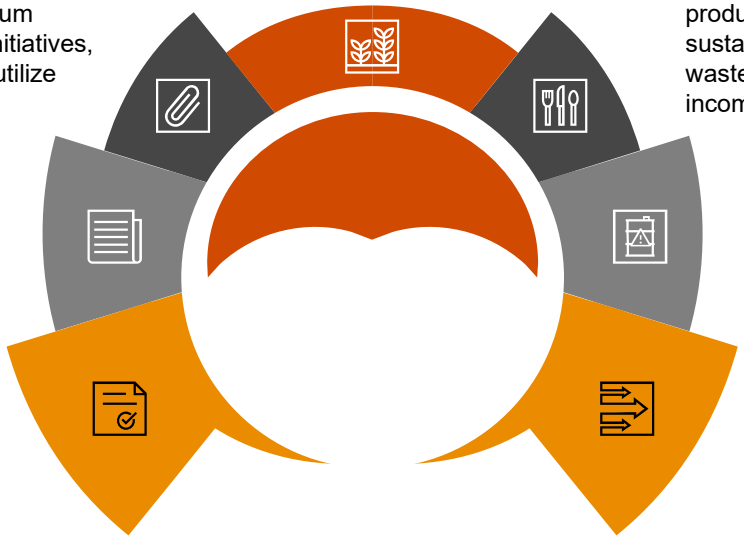
Odisha is actively promoting a circular economy by implementing both central-level waste management regulations and state-specific initiatives.

Figure 5 : Policy Landscape in Odisha

SAMRUDHI – Agricultural Policy 2020 focuses on sustainable agriculture by increasing farmers' incomes, ensuring nutritional security, and adapting to climate change.

The **Odisha MSME Development Policy, 2022** and **Industrial Policy Resolution 2022** furthers efforts by encouraging small and medium enterprises to adopt green initiatives, focus on sustainability, and utilize industrial by-products.

Odisha Export Policy 2022 and **Odisha Food Processing Policy 2022** aims to improve product quality, promote sustainable packaging, reduce waste, and enhance farmers' incomes through value addition.



Vehicle Scrappage Policy of Odisha, 2022 was formulated with the objective of scientifically promoting recycling of vehicle scrap.

Policy for the utilization of fly ash includes provision of subsidies to manufacturers of ash products and mandating the use of fly ash in construction

Industrial Policy Resolution 2022, Promotes sustainable industrial growth through innovation and efficient resource utilization.

Odisha SDG Indicator Framework is a state-specific initiative that emphasizes expanding international cooperation and capacity-building in water and sanitation activities, waste reduction, and recycling technologies.

The Future - Vikshit Odisha 2036

As Odisha strives towards becoming a developed state under the "Vikshit Odisha" vision, its key sectors—manufacturing, mining, agriculture, fisheries, and tourism—are poised for a leap forward. This development, while promising economic prosperity, brings with it an inevitable increase in waste generation, necessitating robust waste management strategies to ensure sustainable growth.

In manufacturing, especially in steel and power plants, managing fly ash, slag and dolochar is crucial for minimizing environmental harm and exploring recycling opportunities. Mining expansions require effective waste management to handle tailings and overburden sustainably. Tourism requires sustainable practices to reduce plastic waste. Effective waste management is critical to ensure that Odisha's economic growth remains sustainable and environmentally friendly**.**

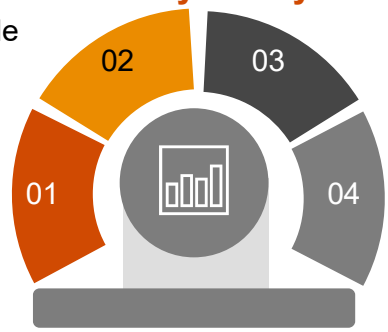
3. Cases: Circularity in Action

Odisha's natural resources and transport infrastructure have helped it tap into its manufacturing and mining capabilities. The proximity of these industries presents a unique opportunity to maximize resource utilization. By identifying symbiotic partnerships among these players, an efficient resource management plan can be drawn.

Circular Economy in Aluminium Dross by Runaya

It recovers about 90% of the available aluminium metal through dross processing.

Runaya is promoting circularity through in Aluminium industry through its Dross Processing and Aluminium recovery process



The remaining residue is converted to value-added products used as slag conditioners at steel plants.

Aluminium recovery through their current process is one of the most carbon efficient Aluminium produced in the world

01 Neutralized phospho-gypsum is used in road construction.

02 Zypmite is being manufactured by granulation of gypsum with micronutrient. It is used as a soil conditioner which helps in improving the soil fertility.

03 Gypsum is sold to cement industries as a retarding agent which is mainly used for regulating the setting time of cement.

Compaction of Neutralised phospho-gypsum layers

4. Priority Sectors

The state intends to strategically prioritise sectors for implementing a circular economy model, aligning with the central government's policy on sustainable development and NITI Aayog's frameworks. The prioritization shall be into three categories, i.e. critical sectors, growing sectors and opportunity sectors, based on the state's industrial strengths and future growth prospects.

Critical Sectors

Key waste sectors resulting from current economic activities

Growing Sectors

Emerging waste sectors resulting from state's development focus

Opportunity Sectors

Other waste sectors with notable resource recovery potential

Recognizing the need to address the sectors where substantial waste is generated, especially from mining and manufacturing activities, the state is prioritizing these critical areas. Additionally, with the growing presence of renewable energy industries, there is a concerted effort to manage the waste produced by these sectors, supporting the state's renewable energy goals and mitigating environmental impacts. The circular economy model emphasizes the recovery of materials, identifying sectors where recovered materials can be utilized to meet increasing demand in other areas of the state. By doing so, Odisha can maximize resource utilization, reduce dependency on raw material imports, reduced environmental cost of waste management and stimulate economic growth within the state.

Table 3: Potential for Critical, Growing and Opportunity waste sectors*

Sectors		Economic Potential
Critical sectors	**Industrial waste** - **Fly Ash** - **Red Mud** - **Dolochar** - **BF/SMS/ FAP Slag**	Odisha is expected to generated approx. 1834 Million Tonnes per Annum (MTPA) of Industrial waste, which would amount to approx. INR 84,369 Crores over the FY 2025 to FY 2036. This includes materials generated as by-products of the Iron & Steel, Alumina and Power production industries.
	Gypsum	Over FY2025 to FY2036, gypsum waste is expected to accumulate to 130 MTPA, with a recoverable waste amount of 57.4 MTPA and an economic potential of approximately INR 6,900 Crores.
	Used Oil	Over FY2025 to FY2036, used oil waste is projected to accumulate to 123,000 TPA, with a market potential of INR 442 Crores.
	Municipal Solid Waste	Generation of MSW is projected to reach over 20.65 MTPA during FY2025-2036, generating a business value of INR 6,663 Crores.
Growing Sectors	**E-Waste**	E-waste is anticipated to accumulate to 16,000 TPA from FY2025-2036, offering a market value of over INR 1,360 Crores.
	Battery Waste	Battery waste is expected to reach a cumulative of 846,000 TPA from FY2025-2036, with a corresponding business potential of over INR 49,000 Crore.
	Solar Panel Waste	Solar panel waste is projected to accumulate to 3,000 TPA from FY2025-2036, with an economic capacity of approximately INR 11 Crores.
Opportunity Sectors	**Tyre Waste**	Over FY2025-26, approximately 1.58 MTPA of tyre waste is expected to be generated in Odisha, with a promising business potential of INR 4,427 Crore.
	ELV Waste	Number of ELV Vehicles in Odisha are projected to reach 6,861 Million Tonnes from FY2025-36, which could provide an economic value of INR 18,294 Crores.
	Agriculture Waste	Agricultural waste is anticipated to total 5.73 MTPA from FY2025-2036, and has the potential be used to make by-products including biofuels, building materials, packaging materials, and can used in power generation. Agriculture production contributed to 21% of Odisha's GSDP in 2023-24.
	Scrap Metal Waste	Odisha has huge potential for Scrap Metal Waste. Currently, the State is importing scrap metal from other States for using in manufacturing and construction activities within the State.

**The data are based on secondary research and internal analysis*

5. Vision for Circular Economy

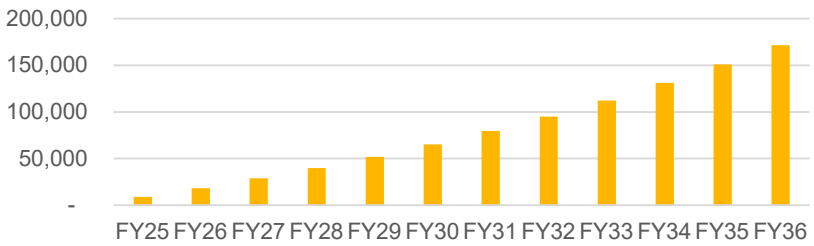
The State's economic landscape was primarily driven by linear models of production and consumption, leading to resource depletion, environmental challenges, and economic inefficiencies. The reliance on traditional methods resulted in high levels of waste generation and limited value recovery, posing sustainability concerns for the future. Recognizing these challenges, the state has progressively embraced the principles of a Circular Economy, which offers a transformative approach to sustainable development. By prioritizing resource efficiency, waste minimization, and innovative business models, Odisha aims to unlock new economic opportunities, drive industrial competitiveness, and build long-term resilience in the face of environmental and economic challenges.

Circular Economy – the key enabler for economic growth

As a result of efforts to promote investments, the state is on the track of rapid industrialization. While this would accelerate economic growth, resource depletion and environmental degradation are increasing cause of concern. In this context, Odisha recognizes Circular Economy as the key enabler for the same. The state upholds the following Vision for Circular Economy. By creating infrastructure to facilitate Circular Economy, Odisha could potentially recover resources ctors.

By creating infrastructure to facilitate Circular Economy, Odisha could potentially recover resources worth 1.71 Lakhs Cr cumulatively up to 2036, from the waste generation in the priority sectors.

*Figure 7: Cumulative Economic Potential of Waste (in INR Cr)**



Vision

To leverage Circular Economy to drive sustainable economic growth in Odisha through resource efficiency and innovation, generating employment and ensuring a more resilient Odisha by 2036

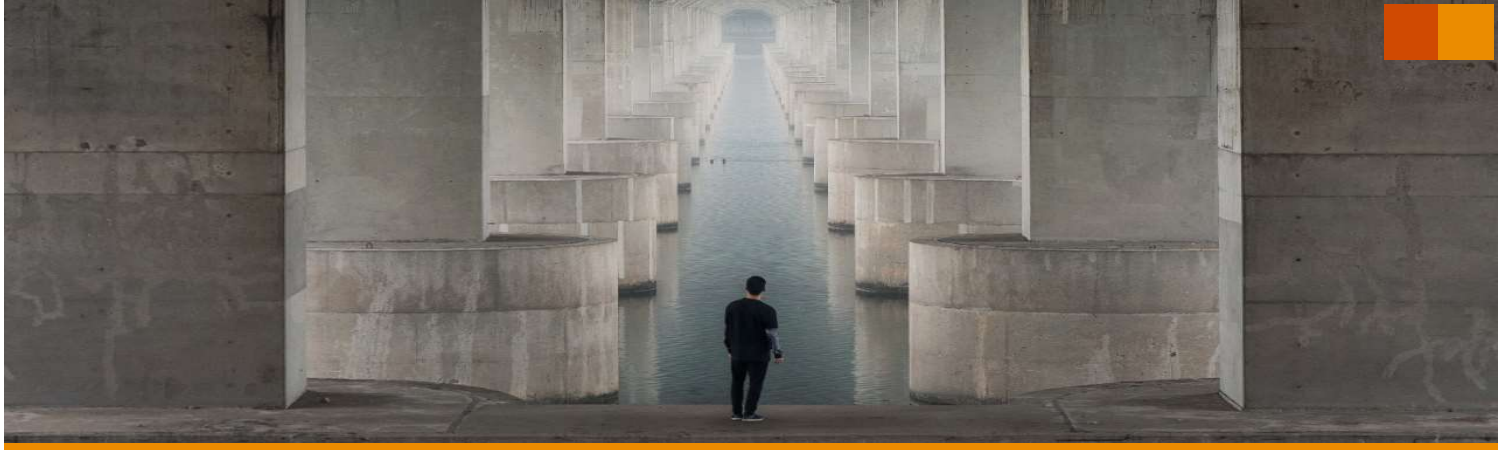
Achieve sustainable resource management by reduced dependency on virgin resources

Developing green enterprises to promote sustainable practices.

Diverting waste from going into landfill

Create green jobs, focusing on recycling, renewable energy, and sustainable production.

*This does not include agriculture waste.
The data are based on secondary research and internal analysis



6. Strategic Pillars and Key Interventions for Circular Economy

Odisha has already embarked on its journey towards a circular economy with several policies and initiatives. This journey involves various cross-sectoral and sector-specific challenges as well as opportunities. Overcoming these challenges to reap the opportunities in this journey requires concerted strategic interventions over time. While some challenges are addressed by policies at a national level such as standardization, many others could be addressed through specific focus at the state level. A comprehensive understanding of these challenges across various stages of waste management and resource utilization is crucial for identifying the right strategic interventions needed to craft an effective roadmap towards a circular economy

Figure 8: Key challenges at each stage

01 Demand

- Limited restrictions on materials to 'refuse' and/or limited enforcement
- Limited use of recycled/refurbished goods: Inadequate quality standards and lack of awareness
- Consumer Reluctance: Habitual resistance and lack of incentives
- Higher prices for recycled goods
- Inadequate incentives to promote recycled goods

02 Waste generation

- Limited segregation: Lack of initial sorting complicates recycling efforts, making recycling inefficient and expensive.

03 Collection

- Inadequate collection points
- Increased cost of transportation or inter-state movement of waste
- Dominance of unorganized sector reduces traceability and transparency
- Lack of information or awareness on proper waste management

04 Pre-processing

- Increased Pre-Processing Effort owing to inadequate segregation
- Inconsistent quality of collected waste poses challenges in recycling processes.

05 Recycling

- Limited funds for scale of activities
- Limited technology adoptions due to inadequate funds
- Limited standards for recycled output
- Increased costs for environmental and social compliance
- Presence of notable informal recyclers
- Unregulated pricing for certain sectors

Challenges are multifaceted spanning **behavioral, financial, operational, and institutional aspects,** affecting diverse stakeholders like **producers, recyclers, waste collectors, regulators and officials.**

Many of these challenges are resulting from varied range of root causes. For example, promotion of secondary resources market is driven by demand and demand in most cases is a result of policies, incentives, market prices, material properties and so on. Addressing each of these challenges would require interventions that collectively create an enabling environment. These interventions have been strategically categorized under several key pillars, ensuring a comprehensive and cohesive approach to fostering a circular economy.

Strategic Pillars

The strategic pillars of a circular economy provide a comprehensive framework for transitioning towards sustainable practices, fostering innovation, and driving economic growth by emphasizing resource efficiency, waste reduction, and systemic change across industries.

Figure 9: Strategic Pillars for circular economy transition in Odisha

1. Policy, Governance and Incentives

Table 4 Measures under policy, Governance and Incentives

State-level Extended Producer Responsibility (EPR) Cell	Tailor EPR schemes to Odisha's industrial business ecosystm, ensuring compliance and aiding local industries in product lifecycle management.
Public Procurement Policy	Develop policy that prioritizes procurement of goods with a specified percentage of recycled or refurbished content, using platforms like GeM, guided by clear state-defined procurement guidelines.
Industrial Symbiosis Initiatives	Encourage resource sharing and waste exchange among industries by linking these activities with operational consents, potential for co-locating, and online marketplaces
Circular Ratings and Certifications	Introduce a circular standard rating system or certificates to reward businesses to recognize and reward businesses excelling in circularity
Financial Incentives	Offer tax benefits, State Goods and Services Tax (SGST) rebates, and subsidies for businesses investing in technologies and practices that enhance circularity
Standards and quality assurance	Evaluate existing standards for use of recycled or recovered materials from waste and coordinate with relevant ministries to address the gaps

Case Study:

GreenCo, a rating framework initiative by the Confederation of Indian Industry (CII), has partnered with Karnataka State Pollution Control Board (KSPCB), to promote green business practices and implement 'Green Rating of industries in Karnataka' in March 2023. An exclusive incentive scheme starting from INR 50,000 to INR 10,00,000 is offered for industries registered under KSPCB CII Green rating scheme in Karnataka State.

Case Study:

Naroda Industrial Estate in Ahmedabad, Gujarat, has been recognized for its efforts in industrial symbiosis, such as use of Chemical Gypsum, a by-product from various industries, in cement manufacturing or utilizing iron sludge, which comes from dye manufacturing processes, in making bricks.

2. Financing Infrastructure

Table 5 : Measures under financing infrastructure

Circular Economy Funds	Green Bonds	Risk-sharing and Mitigation	Grants and loans	Public-Private Partnerships
Establish dedicated CE investment funds(with support of International Development Agencies, Central Institutes) to support startups and projects	Promote the issuance of bonds to finance infrastructure projects that align with CE principles	Partner with insurers and banks to underwrite risks associated with new circular ventures, encouraging investment by mitigating financial risks	Offer low-interest loans and grants to businesses engaged in circular practices such as remanufacturing, refurbishing	Leverage PPPs to pool resources, expertise, and innovation, enabling the development of CE infrastructure at scale

Case Study:

The Government of Tamil Nadu has planned to set up 'Tamil Nadu Green Climate Fund' of Rs.1000 Crores to support various Climate Change initiatives, mitigation and greening projects. The fund will be created through various financial instruments viz., Equity, equity-linked instruments, debentures, convertible instruments etc. with a tenure of 10-years, extendable by up to 2 years. This fund is to be set up as a Category I (Social Venture Fund) under the SEBI Alternative Investment Fund Regulations, 2012.

3. International and Regional Cooperation

Table 6: Measures under international and regional cooperation

Knowledge Network	A platform for sharing knowledge, best practices, and facilitating collaboration and innovation. It hosts events, maintains a knowledge base, forms working groups and partnerships, coordinates industry activities.
Industry Alliances	Form coalitions to address shared challenges like waste management or standardizing materials. These alliances can operate through a common platform to foster collective action.
Collaboration with Academic Institutions	Partner with academic institutions both regionally and internationally to facilitate research and innovation in circular economy practices. These collaborations can support the development of new technologies, provide training and education programs for skill development.
Global Collaborations	Engage in collaborations with international partners to exchange best practices and technologies that can be adapted to Odisha's context.

Case Study:

The Indian Plastic Pact, launched by the CII and WWF-India, is a collaborative platform aimed at creating a circular economy for plastics by bringing together stakeholders across the value chain.

4. Research, Innovation and Technology

Investments in research and development can help Odisha spearhead innovation within the circular economy. Exploring new circular business models and innovating recycling technologies for improving resource efficiency by fostering research in this new field will accelerate its transition to circular practices.

Table 4: Measure under research, innovation and technology

Innovation Challenges	Conduct annual hackathons to address specific circular economy issues, and engage with national and international networks for knowledge sharing and access to new technologies
Establishment Research Center	Establish a Centre of Excellence to act as an apex institution for knowledge collation and transfer, R&D for localised solutions, capacity building of stakeholders, development of business models for MSMEs, provision of support to investors to participate in circularity related opportunities , etc.
Innovation Hubs and Funding	Set up incubators to support startups with mentorship and funding, and offer grants for projects focusing on circular innovations, encouraging academic and industry collaboration
Leveraging Technology	Adapt successful global technologies for local needs and leverage digital tools like blockchain for transparency and IoT for efficient waste management

Case Study:

T-Hub, a business incubator by the Government of Telangana, partners with academic institutions and the private sector to support innovation. The AIC T-Hub Foundation, in collaboration with the Atal Innovation Mission, offers mentorship, funding, and industry connections to entrepreneurs. Its third program cohort emphasizes on circular economy.

The New Plastics Economy Innovation Prize, launched by the Ellen MacArthur Foundation, encourages innovators to design circular solutions for plastic packaging. The winners work with experts to make their innovations marketable at scale.

5. Education and Public Awareness

Market demand for recycled materials and awareness about proper disposal are essential for advancing circular products in Odisha. Enhancing public understanding through education, campaigns, and community engagement can emphasize the benefits of circularity, leading to more sustainable resource use:

Table 8: Measures under education and public awareness

Educational Workshops and Curriculum Integration	• Conduct workshops and integrate circular economy principles into school curricula, establishing a foundation of sustainable practices. • Impart knowledge on Circular Economy through Eco-Clubs. • Develop facilities to demonstrate products through CE.
Digital Resource Dissemination	Develop educational materials in local languages and leverage social media platforms like Instagram and Facebook to disseminate this content
Public Education Campaigns	Launch campaigns across various media to raise awareness about the circular economy, for example, "Swachh Bharat" initiative.
Community Events	Utilize local events and public spaces to showcase circular economy initiatives and sustainable businesses

6. Skill Development and Capacity Building

Adequate skills and capacities to adapt to the advancing technology is vital for supporting the circular economy. Training programs and workshops will equip individuals with the expertise needed to implement and maintain circular practices across various industries.

Table 9: Measures under skill development and capacity building

Training Programs	Develop targeted training sessions designed for diverse groups, such as SPCB officials, municipal heads, local industry associations, to deepen their understanding of circular economy principles
Workshops for Policymakers	Conduct specialized workshops for policymakers to formulate supportive policies for the circular economy
Industry-Specific Training	Tailor modules for manufacturing, agriculture, and construction sectors focusing on resource optimization
Online Learning	Develop online courses and webinars to provide flexible learning opportunities on circular economy topics

Case Study:

The United Nations Industrial Development Organization (UNIDO) offers training programs for circular economy practices targeting developing countries.

7. Monitoring & Evaluation

Table 7: Measures under monitoring & evaluation

Performance Metrics	Develop clear metrics to assess the progress through measurable indices and impact of circular economy initiatives, ensuring alignment with Odisha's goals and Vikshit Odisha
Regular Audits and Reviews	Implement a system of regular audits and reviews to track the effectiveness of policies and initiatives, conducting impact assessment, evaluating needs and gaps, facilitating continuous improvement.
Centralised Monitoring System	Develop a platform for Odisha that assesses implementation by collecting and analyzing data, tracking policy utilization, facilitating industrial symbiosis, and providing a dashboard for real-time insights to support government and industry collaboration.
Feedback Mechanisms	Establish feedback loops with stakeholders to gather insights and make informed adjustments to strategies and policies.

7. Stakeholder Views

Following the release of the Vision Framework at the Utkarsh Odisha: Make in Odisha Conclave 2025, **a Stakeholder Consultation Workshop was conducted on March 1, 2025**, to strengthen Odisha's transition to a Circular Economy. This workshop was designed to gather insights and feedback from a diverse array of stakeholders crucial to the state's economic and environmental landscape. By understanding these perspectives, Odisha aims to ensure its path forward is comprehensive, realistic, and effectively addresses both challenges and opportunities unique to the region.

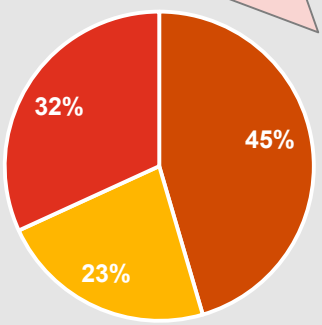
The workshop brought together participants from various sectors, including government officials, industry leaders, recyclers, and representatives from NGOs. The session began with an overview of Utkarsh Odisha, and the Intents Received. A detailed presentation on the key aspects of the Vision Framework followed, highlighting the strategic goals and implementation strategies envisioned for Odisha's Circular Economy transition.

Stakeholder	Representation
Government	43%
Industry (Metals & Mining, Chemicals, Fertilizers, Oil & Gas)	40%
Recyclers	11%
Non-profit Organizations	6%

The workshop focused on gathering feedback from stakeholders through discussions and online forms. Representatives from key sectors in Odisha shared their challenges and requirements, providing a thorough understanding of the landscape.

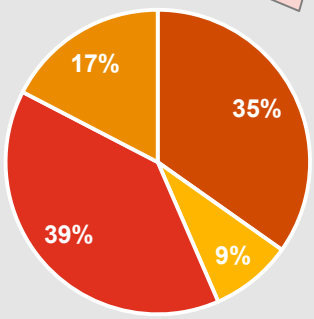
Government - Response from Stakeholders

Which financial assistance tool is the easiest to implement to promote investments in recycling infrastructure?



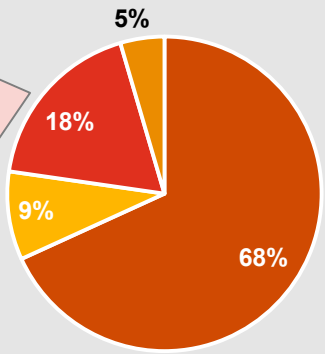
- Establishing circular economy funds
- Offering tax incentives and financial grants
- Providing low-interest loans and financing options

What capacity-building measures are most critical for government officials to better support circular economy initiatives?



- Exchange programs with other regions well-versed with circular economy initiatives
- Self-paced online courses for officials
- Specialized on-the-job training programs
- Workshops and seminars for officials

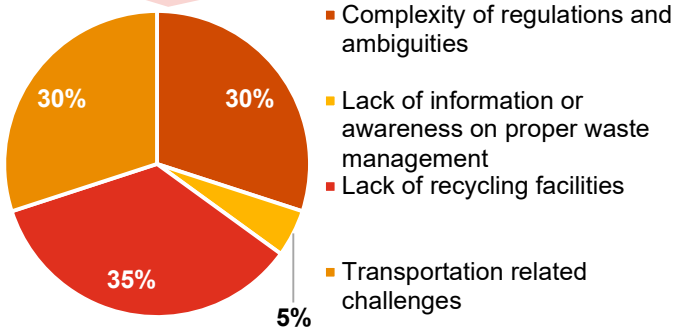
How could the government best support industrial symbiosis in the future?



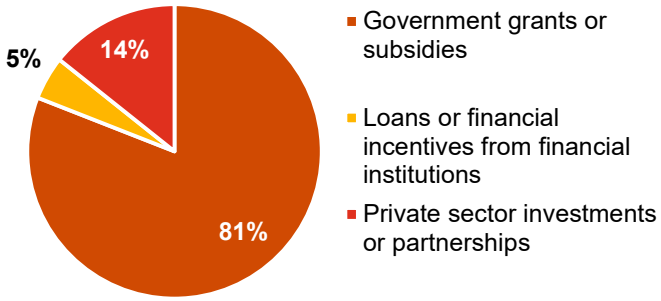
- Establish a database/platform to connect waste generators with potential users
- Make industrial symbiosis a requirement for Consent to Operate/Consent to Establish (wherever applicable)
- Offer financial incentives to industries that engage in symbiotic practices
- Organize workshops to educate industries on benefits and best practices

Industries - Response from Stakeholders

What is the most significant barrier for industries to derive value out of waste produced?

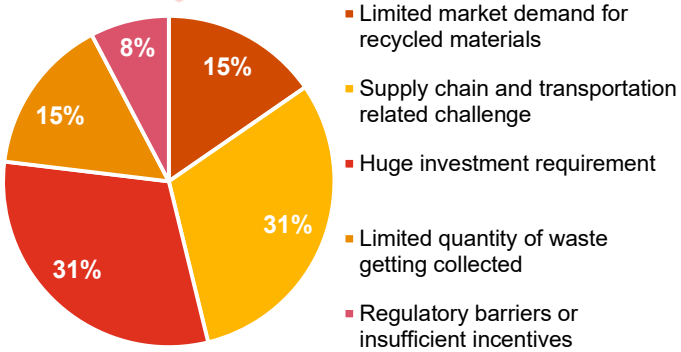


What types of financial investments or support would be necessary for industries to address these challenges?

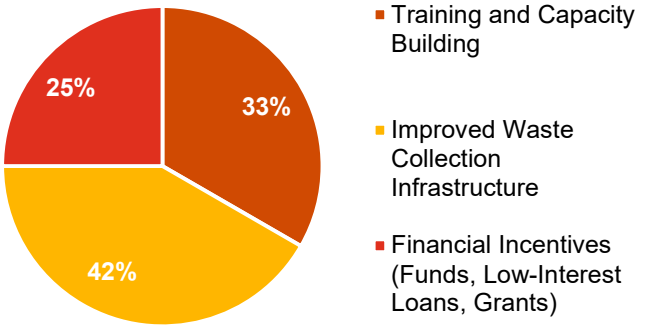


Recyclers - Response from Stakeholders

What are the primary barriers to the recycling sector in Odisha given the current waste management ecosystem?



What type of support would ease facilitating recycling facilities in Odisha?



For the recyclers, most beneficial technical support to facilitate their circular economy initiatives includes:

- Digital Platforms for Waste Tracking
- Advanced Recycling Technologies
- Blockchain Solutions for Supply Chain Transparency

All recyclers highlighted **government grants or subsidies as financial investments or support** for addressing supply chain and market demand-related challenges.

NGOs - Response from Stakeholders

Primary challenges the NGOs in Odisha face when promoting circular economy practices

- **Difficulty in collaboration with other stakeholders**
- **Limited funding**

Most important support that the government can provide in facilitating circular economy in Odisha

- **Education and skill building**
- **Providing funding and incentive**

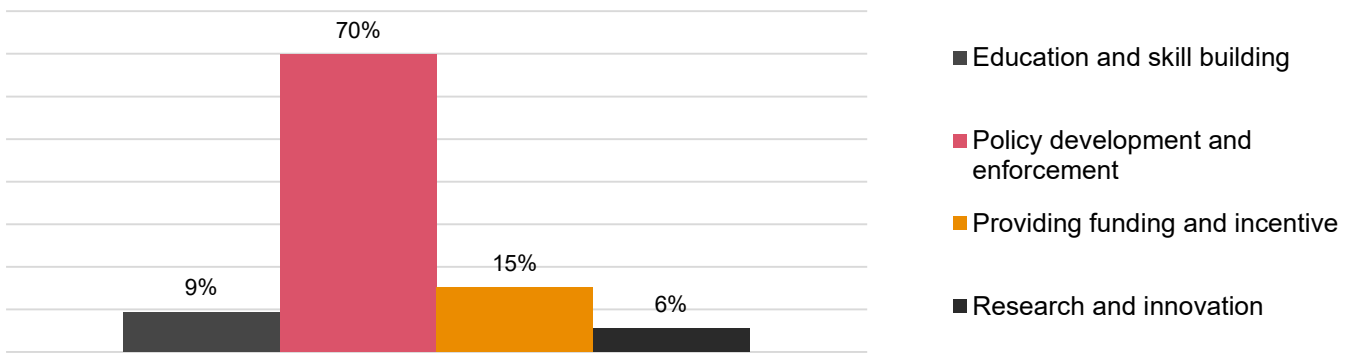
Capacity building of the informal sector, strengthening waste collection infrastructure, and creating and disseminating Training Programs on Circular Economy are support areas which would help NGOs effectively enhance circular economy practices.

Which of the following interventions would you categorize as a short-, medium- and long-term?

S – Short Term (up to 2 years), M – Medium Term (2-4 years), L – Long Term (More than 4 years)

		Government	Industry	Recyclers	NGOs
1	**Public Procurement Policy for goods with recycled content**	S	S	S/M	M
2	**Financial Incentives for businesses (Tax Benefits, Subsidies etc.)**	M	M	M	L
3	**Standard & Quality Assurance of recycled or recovered materials**	L	L	M	S/M/L
4	**Dedicated Circular Economy Investment Funds**	L	L	M	L
5	**Development of a Knowledge Network Platform**	L	L	M	L
6	**Establishment of a Research Center for circularity related aspects**	L	L	M	M
7	**Educational Workshops and Curriculum Integration of Circular Economy concepts**	S	S	M	L
8	**Training Programs and Workshops for government officials, industry representatives, recyclers**	S	S	M	S
9	**Centralized Monitoring System to track waste generation and resource recovery**	M/L	M/L	M	M
10	**Special programs targeting job creation in circular economy**	L	L	L	L

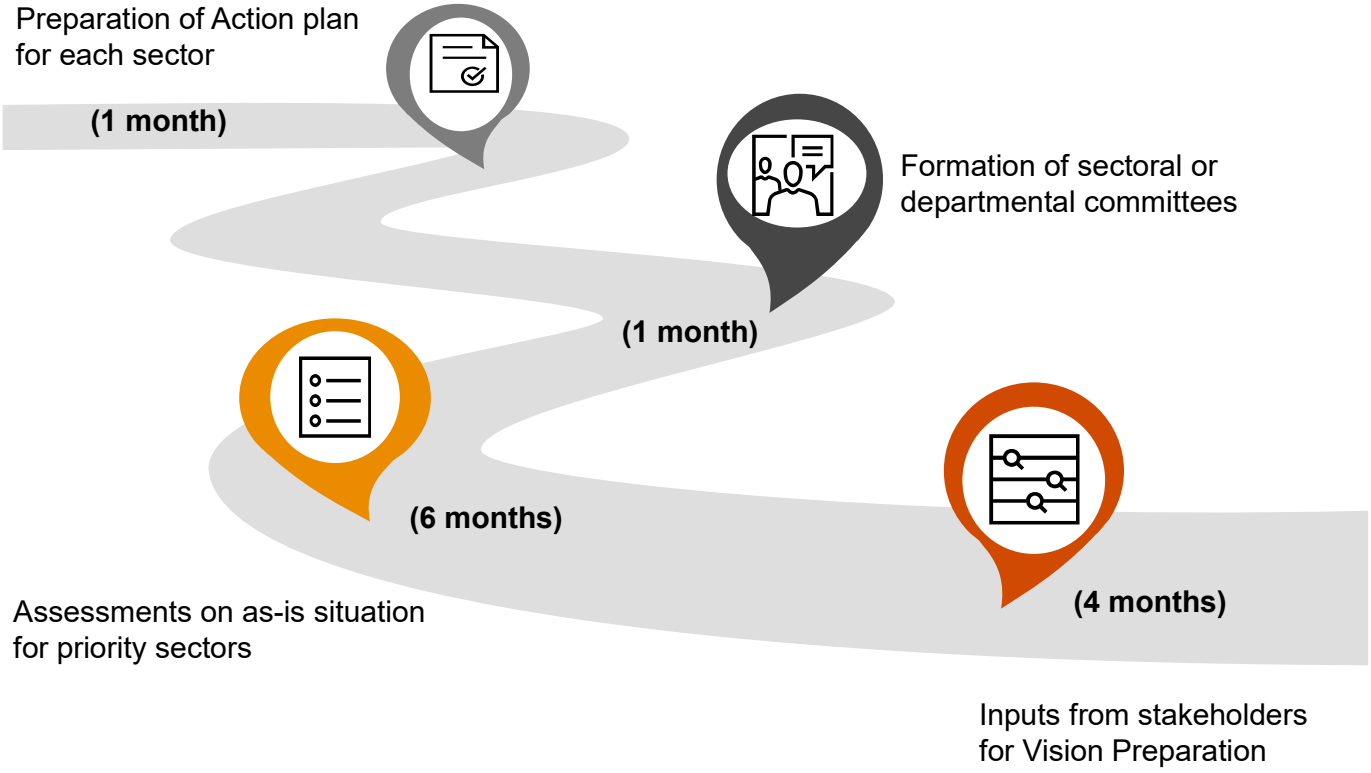
What is the most important support that the government can provide in facilitating circular economy in Odisha?



The insights gathered from this consultative process would be instrumental in implementing Odisha's Vision Framework, making it more robust and effective in achieving the state's circularity goals.

8. Way Forward

The transition to Circular Economy, which could be a key lever for Viksit Odisha, represents an ambitious but achievable goal. Achieving the goal requires sustained and coordinated efforts across all sectors. Critical assessment and recommendations from various stakeholders across sectors would pave the way to a realistic and implementable roadmap towards achieving the vision set for Circularity. This framework for the preparation of a Vision for Circular Economy would serve as the foundation to further planning and preparation of sector-specific action plans for Circular Economy. The Immediate Actions for Government of Odisha in the next 12 months are prioritized as given below.



The successful implementation of a Vision for Circular Economy requires collective action and long-term commitment. Taking decisive steps through planned stakeholder-inclusive approaches help build a resilient and sustainable circular economy that benefits every segment of the society. Such action could transform the aspirations into tangible outcomes, ensuring a future of efficient resource utilization, minimized waste and thriving economic ecosystems.

Bibliography

- Khajuria, Anupam. (2021). Nexus of Circular Economy and Industry 4.0 to achieve the UN Sustainable Development Goals. The International Journal of Engineering and Science (IJES), 10(12), 30-34. https://www.researchgate.net/figure/Strategies-of-12Rs-from-Linear-Economy-to-Circular-Economy-III-NEXUS-BETWEEN-CIRCULAR_fig1_357366438

- S&P Global. (2023). *India Forward Volume 1.* https://www.spglobal.com/content/dam/spglobal/global-assets/en/special-reports/india-forward/India%20Forward%20Volume%201.pdf

- Ellen MacArthur Foundation. (2023). *Circular economy in India: Rethinking growth for long-term prosperity*. https://emf.thirdlight.com/file/24/J9rgf6tJ_n44R-J9iLzJkHfmd4/Circular%20economy%20in%20India%3A%20Rethinking%20growth%20for%20long-term%20prosperity.pdf

- Karthik, P. (2023, October 12). India rebuilds economy: Time to make it circular and sustainable. *Observer Research Foundation*. https://www.orfonline.org/expert-speak/india-rebuilds-economy-time-make-circular-sustainable

- Council on Energy, Environment and Water. (2023). *India's circular economy potential*. https://www.ceew.in/sites/default/files/india-circular-economy-potentialwebceew16dec.pdf

- Ministry of Housing and Urban Affairs. (2023). *Circular economy in waste management*. https://mohua.gov.in/pdf/627b825fd31b3Circular-Economy-in-waste-management-FINAL.pdf

- Society of Indian Automobile Manufacturers. (2023). *ELV Recycling Status of Circular Economy in India*. https://www.siam.in/uploads/filemanager/377ChakriytaContextPaper.pdf

- Patro, S. (2023, October 12). How India's metal scrap recycling industry is growing. *BusinessWorld*. https://www.businessworld.in/article/how-indias-metal-scrap-recycling-industry-growing-447133

- Confederation of Indian Industry. (2023). Battery Storage & its Ecosystem https://www.cii.in/PressreleasesDetail.aspx?enc=6UYt9FK13Sa34a6GeomIIKIavi8RCedYYNjaH0U1+2vp3HCKU+qX9AWibtxRm9DBPuG6MrfG/0vdPv0kz3mbgw==

- Council on Energy, Environment and Water. (2023). *How can India enable a circular economy with solar waste management?*. https://www.ceew.in/sites/default/files/how-can-india-enable-circular-economy-with-solar-waste-management.pdf

- Energy Alternatives India. (2023). *Industrial waste types in India*. https://www.eai.in/ref/ae/wte/typ/clas/india_industrial_wastes.html

- EACPM. (2024). *Challenges of Solid Waste Management in Urban India*. https://eacpm.gov.in/wp-content/uploads/2024/05/Solid_Waste_management_Updated.pdf

- Indian Council of Agricultural Research. (2023). *Creating Wealth From Agricultural Waste*. https://icar.org.in/sites/default/files/Circulars/Creating-Wealth-From-Agricultural-Waste.pdf

- Government of Odisha. (2024). *Odisha Economic Survey Chapter 1 (Main Booklet)*. https://pc.odisha.gov.in/sites/default/files/2024-07/OES%20Chapter_1%28Main%20Booklet%29_0.pdf

- Government of India. (2023). *National Mineral Scenario*. https://xn--i1b3b2bo4aigq6hf7n.xn--11b7cb3a6a.xn--h2brj9c/website/nationalmineralscenario

Thank you