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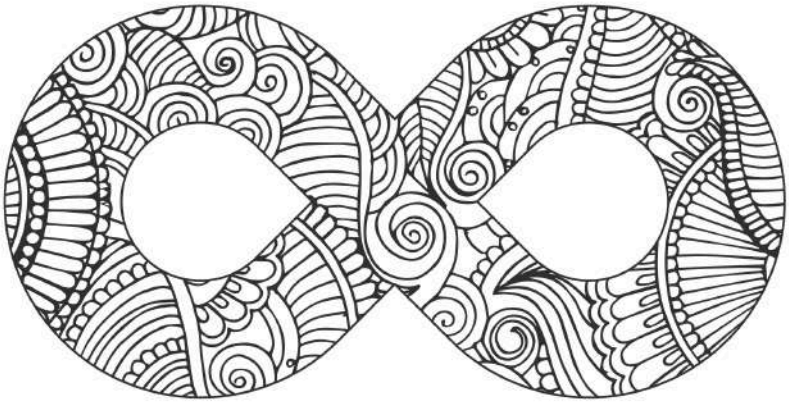
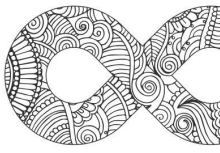


Circular SMEs

A MANUAL ON

IMPLEMENTATION OF CIRCULAR ECONOMY IN SMEs

FOCUS ON PLASTICS & RECYCLABLE RESOURCES



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The project is jointly funded by Mobius Foundation and ICE&SDGs, India. ICE&SDGs acknowledge the support provided by Mobius Foundation, India.

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The manual aims to offer specialised knowledge, essential skillsets and mindsets required to develop core competencies and enable the implementation of circular economy models in educational institutions.

KNOWLEDGE PARTNERS

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Dr Shalini Sharma is the Founder of Global Institute for Circular Economy and Sustainable Development Goals, the first of its kind of organisation in India, dedicated to march for meeting global goals UN SDG 2030. She also founded unique 'International Alliance on Circular Economy and SDGs' (IAoCE&SDGs), currently having more than 100 experts, organisations, industry and academia from India , Europe and Asia, as its members.

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PURPOSE OF THE MANUAL:TRAINING THE TRAINERS ON CIRCULAR ECONOMY-IMPLEMENTATION OF CIRCULAR ECONOMY IN SMEs

The project *on* ***"Design, Development and Conducting Training Programmes on Circular Economy:The Programme for Training of Trainers on Circular Economy (ToTCE); for Educational Institutions and SMEs (Focus on Plastic Waste Management)"*** is conceptualised by the Global Institute for Circular Economy and Sustainable Development Goals (ICE&SDGs) in partnership with the Mobius Foundation, India.

The project aims to develop the vision, mission, mindset, thought leadership and skillset for much-needed transition from linear to circular economy.

This manual, developed as part of the ToTCE project, aim towards providing guidance, resources, insights and relevant links to support SMEs to implement circular economy in their units.

By aligning and guiding the SMEs for implementation of circular economy models, the manual will enable and **strengthen capacities to address resource use, resource conservation, enable the ecosystem to transform and create innovative ways to respond to the challenges pertaining to use of resources, waste management, recycling, greening the supply chain and more. This manual provides stepwise guidance (in form of Checklist Annex-I, Annex-II and Annex-II-B) to handhold the SMEs for implementation of circular economy in their units.**

This manual aims to:

- **Offer guidelines for SMEs** to implement circular economy within their contexts,
- **Provide essential knowledge and skillsets** to build the capacity of SMEs to implement circularity in their processes or their unit,
- **Accelerate transition towards restorative and regenerative processes and design** in SME industries and operations, and
- **Provide step by step guidance**, as checklist- Annexure-I, Annexure-II and Annexure-II-B, to facilitate the Team of Employees and the Management Team of SMEs, to implement Circular economy at their SME unit.

EXECUTIVE SUMMARY

The circular economy is the latest sustainability paradigm that is restorative and regenerative by design, and aims to keep products, components and materials at their highest utility and value. According to The Circularity Gap Report 2020, the world was only 8.6% circular and the circularity need to increase exponentially, to enable sustainable development.

The circular economy helps in "closing the loop" of product lifecycles through greater recycling and re-use, and bring about benefits for both the environment and the economy.

Small and medium-sized enterprises (SMEs) are increasingly aware of the benefits of closing loops and improving resource efficiency. They are beginning to understand the advantages of implementing circularity such as, saving material costs, creating competitive advantages, and accessing new markets.

However, there continue to be a number of barriers that pose challenges in implementing circularity for small businesses, mainly due to the lack of financial resources and technical skills.

This manual intends to provide stepwise guidance to SMEs, for structuring circularity within their context and offer contemporary approaches and models to support them in doing so. To be more precise, this **manual and the checklists (Annex-I, Annex-II and Annex-II-B)** aims to empower SMEs to create a vision, mission and action of greening their processes, while 'closing the loop' by improving resource efficiency, strengthening product life cycles, durability and its marketplace.

The manual provides readers with a step-to-step approach for aligning, applying and implementing circular economy, learning how they can pitch it in their setting using methodological tools, guidelines, benchmarking, assessment and rating frameworks and checklists Annex-I, Annex-II and Annex-II-B.

The manual offers businesses interested in transitioning to circularity with three key approaches:

- **The 4P model:** Plan, Prepare, Prioritize and Proceed
- **ReSOLVE Framework:** Regenerate, Share, Optimize, Loop, Virtualize and Exchange and
- **PDCA Model and IES Framework:** Plan-Do-Check-Act and Improvise-Establish-Sustain Framework

The manual is also a practical toolkit to mobilise stakeholders at every stage of their supply chain to develop a shared circular economy strategy and value chain. It provides checklists, exercises and case studies for SMEs to have an interactive approach to learning, upgrading, upscaling, and implementing circularity.

It also allows SMEs representatives to place before their management and board key learnings and skill set required for upgradation needed in strengthening their organisation approach and strategy in implementing best practices in circularity. This will not only benefit the organisation at large, but also co-create a wider platform for implementing circularity with varied stakeholders and in turn motivate deep-rooted engagement with cities, regions, communities and other associated stakeholders. The training also shares information on how to align, apply and implement teaching circular economy models/ practices with UN Sustainability Development Goals (SDGs): **Goal 4:** Quality Education, **Goal 8:** Decent Work and Economic Growth, **Goal 9:** Industry, Innovation and Infrastructure, **Goal 12:** Responsible Production and Consumption, **Goal 16:** Peace, Justice and Strong Institutions and **Goal 17:** Partnership for the goals.

CHAPTER-1: INTRODUCTION

1.1 Why Should SMEs Steer Towards Circularity?

The circular economy is armour to shield a resource constrained world. Geographies across the world need to significantly accelerate transitions towards regenerative and restorative models from the traditional linear 'take-make and dispose' model. Scaling up the circular economy towards mainstreaming economic players will make a strategic contribution to achieving climate neutrality by 2050 and decoupling economic growth from resource use. Reducing, recycling and refusing of material resources will ensure long-term competitiveness and sustainability. Developing a market base of circular economy shall strengthen the manufacturing and industrial base and foster business creation and entrepreneurship among SMEs.

A majority of the products' environmental impacts are pre-determined at the design phase. There is a growing awareness on the economic benefits of circularity. However, the linear pattern of 'take-make-use and dispose' does not provide producers with sufficient incentives to make their products more circular. Products can be broken down easily if one looks into its deeper market base and value. Currently, the lack of competencies to transition to circularity significantly hampers SMEs to bring in circularity at its heart of supply chain.

Training, capacity building and advising SMEs enable them to establish, improvise and adopt circular economy strategies and practices. It allows them to upscale circularity solutions far better.

Why circularity: To enable the flow of resources back into the economy, to address resource constraint.

Where to apply it: At the Raw material procurement level, Production/ manufacturing, Packaging, Labelling, Market, Use phase; Reduce, Reuse, Recycling phase; Redesign phase, Re-manufacturing phase, Raw material recovery, Communication, Reporting level.

Circular economy can be apples a*cross entire supply chain of SMEs and SMEs those are supplier to OEMs.*

The implementation of circular economy for SMEs can be simply understood by applying the formula in the box below:

Producer Level + User Level = Product as Service

Product as Service + Cost = Value Creation

Value Creation + Reduce + Reuse + Recover + Recycle + Redesign + Remanufacture + Re-market + Infuse = Circular Economy Business Model Implemented

1.2 Circularity for Business Entities – Barriers

Circular economy opportunities have a sound underlying profitability. However, there are often non-financial and financial barriers limiting further scale-up, holding back development pace for businesses to implement circularity.

Policymakers can play an important role in helping businesses overcome these barriers. SMEs with a structured strategy to implement circularity can access knowledge platforms and support channels to find ways, placing this agenda as a priority and advocate for policy support.

A sector-by-sector analysis can be a valuable approach to address the variety of barriers and enablers involved in transitioning towards the circular economy. Within each sector, effective circular economy policymaking requires the combination of many policy interventions.

For a strategic and systemic transitions to circular economy, there is a need of fiscal instruments and measuring tools to measure economic performance, and at the same time future proof SMEs, business entities and associated stakeholders from unforeseen uncertainties and risks.

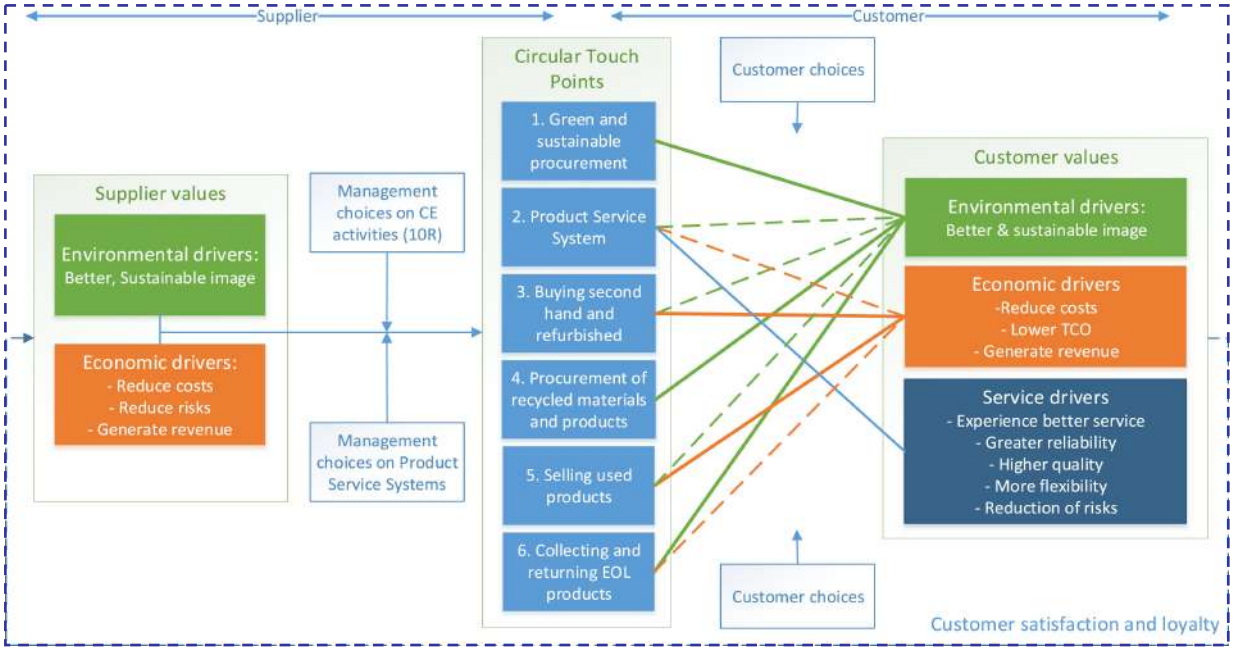
Figure 1: Overview of the barriers in circularity for businesses

Source:Author's analysis

1.3 Drivers for Circular Economy

While there are challenges in implementing circular economy for businesses, there are also key drivers that can fast-track growth for businesses while saving costs. These drivers can also accelerate customer satisfaction, and support the brand evolution of businesses. The figure below describes the key drivers and impact on growth of businesses.

Figure 2: Drivers for circular economy



Source: Drivers and approaches to the circular economy in manufacturing firms, Journal of Cleaner Production, 2019

1.4 National Status of Circular Economy

In developed economies, the business benefits of circular economy are well understood, placed and distinguished. There are ample opportunities in high-income countries, especially in Europe, to transition to circular economy at every stage and sector. Other countries have opportunities to gain know-how from developed countries through its implementation databases available.

On the other hand, for countries with high economic growth and rapid societal changes, attitudes and perceptions having expanding population, urbanisation and an ever so growing middle-class status, proof of circular economy aligning, and applicability is limited. India being an emerging economy aims to expand our ability to maximise our resource efficiency, minimise consumption of finite resources and encourage the emergence of new business models and entrepreneurial ventures. It is estimated that circular economy has the potential to generate 1.4 crore jobs in next five to seven years and create lakhs of new entrepreneurs (NITI Aayog, 2019).

The circular economy path to resource efficiency and sustainable growth is being adopted by India at varied levels – in cities, sectors, business entity level, corporates, community level and country level. This could bring India annual benefits of 40 lakh crore (US$ 624 billion) in 2050 compared with the current development path – a benefit equivalent to 30% of India's current GDP (Ellen MacArthur Foundation, 2016).

The Indian 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, among others.**

In 2015, India launched the Indian Resource Panel (InRP), an overarching framework on resource efficiency that strives to decouple economic growth from resource use, reduce burden on the environment and strengthen sustainability and competitiveness of the Indian economy.

InRP was launched as an advisory body under the Ministry of Environment, Forest and Climate Change (MoEFCC) through the support of the Indo-German bilateral cooperation, to assess resources related issues and advise the government on comprehensive strategy for resource efficiency.

1.4.1. Eleven Priority Areas for Government Action

In March 2021, the Indian government announced its decision to expedite the transition of the country from a linear to a circular economy through the formation of 11 committees. Going forward these committees shall be led by the concerned line ministries, comprising of officials from the MoEFCC, NITI Aayog, domain experts, academics and industry representatives for 11 focus areas.

The committees shall 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 and waste material.

Table 1: Eleven Focus Areas and Corresponding Ministries

Focus Areas	Concerned Ministries
Municipal Solid Waste and Liquid Waste	Ministry of Housing and Urban Affairs
Scrap Metal (Ferrous and Non-Ferrous)	Ministry of Steel
Electronic Waste	Ministry of Electronics and Information Technology
Lithium Ion (Li-ion) Batteries	NITI Aayog
Solar Panels	MNRE
Gypsum	Department for Promotion of Industry and Internal Trade
Toxic and Hazardous Industrial Waste	Department of Chemicals and Petrochemicals
Used Oil Waste	Ministry of Petroleum and Natural Gas
Agriculture Waste	Ministry of Agriculture and Farmers' Welfare
Tire and Rubber Recycling	Department for Promotion of Industry and Internal Trade
End-of-life Vehicles (ELVs)	Ministry of Road Transport and Highways

Source: *NITI Aayog, Press Release, 18th March 2021*

The priority areas for transition to the circular economy include:

- Formulation of a national policies
- Establishment of the Bureau of Resource Efficiency (BRE)

- Mainstreaming circularity in existing flagship missions
- Encouraging modern recycling industries to support primary and secondary producers
- Research and Development (R&D) for production of scalable technologies and
- Development and promotion of skill and capacity building programs for the informal sector

1.4.2. National Status Profiling: Current and Projected Scenarios

Circular economy development pathways in India could create significant cost savings, providing the same level of utility in the circular development scenario. Cost savings amount to 11% of current Indian GDP in 2030 and 30% in 2050 (FICCI, 2018). By adopting circular economy approaches, businesses could achieve material cost savings and increase their profits.

The **key drivers** of value creation include better product design, innovative business models, and reverse logistics. For example, shifting from selling cars to providing vehicles as a service can create new revenue streams for the automotive industry and capture the value of more intensive use of each car. Innovative vehicle design to make maintenance easier and in turn boost fuel efficiency.

A circular economy development path could significantly mitigate negative environmental externalities. For example, greenhouse gas (GHG) emissions could be 23% lower in 2030 and 44% lower in 2050 compared with the current development scenario, helping India deliver on its targets promised in the recently ratified Paris Agreement. It is envisaged that, with circular economy models, water usage in the construction industry would be 19% lower in 2030 and 24% lower in 2050, while synthetic fertiliser and pesticide use would be 45% lower in 2030 and 71% lower in 2050 compared to the current development path (OECD, 2021).

Circular development pathways would reduce vehicle kilometres travelled on roads by 38% in 2050, compared with the current path, and reduce congestion and time spent in traffic (Circularities Asia, 2020). The circular scenario would also include more zero-emission vehicles reducing pollution and their associated negative effects on health and costs. Moreover, with only about 2% of the Indian population currently owning cars, and the demand for mobility increasing, designing and building a mobility system that enables safe, convenient, and comfortable travel without car ownership could meet people's mobility needs with lower cost and fewer negative externalities than in the current development scenario.

Construction and building also have significant advantages with the adoption of the circular economy. 70% of the buildings expected to stand in India by 2030 are not yet built (Circular Economy- (Re) Emerging Movement, 2020). The application of circular economy principles to all new construction could leverage this competitive advantage by developing circular construction skills and innovation to export to other countries.

The Indian construction sector is poised to become the third largest globally. Already creating more than 8% of GDP, this highly fragmented and largely informal sector will play an increasingly important role as the population and, with it, demand for buildings expand.

1.5 International Status of Circular Economy

The European plastics industry plays a vital role in the European economy, with 1.45 million employees and a turnover of €350 billion. In Europe over 40% of plastics are used in packaging and a large amount in construction and the automotive industry (Plastics Europe, 2019).

The construction sector plays an important role in the European (EU) economy. It generates almost 10% of the EU's GDP and provides 20 million jobs, mainly in SMEs. It could influence 42% of total final energy consumption; about 35% of total GHG emissions; 50% of the total amount of extracted materials; and in specific regions it could save up to 30% of water (European Commission, 2020).

By 2035, increased remanufacturing in the machinery sector could reduce demand for 60,000–90,000 tons of iron/steel annually (6–10% of total consumption in that sector). In plastic packaging, demand for virgin plastic could be reduced by 80,000–100,000 tons annually due to increased recycling (40–50%) of total in that sector (European Commission, 2020). A transition towards the circular economy can bring about the lasting benefits of a more innovative, resilient and productive economy.

1.5.1 Countries Practicing Circular Economy: Strategies to Create Impact

Circularity is an essential part of a wider transformation of industry towards climate-neutrality and long-term competitiveness. The European Union, UK Denmark, Japan, Korea, Norway and Netherlands are some of the nations that are leading in best practices for circular economy in their SMEs.

The new SME Strategy for their circular economy action plan, includes: fostering circular industrial collaboration among SMEs, building on training, advice under the Enterprise Europe Network on cluster collaboration, and on knowledge transfer via the European Resource Efficiency Knowledge Centre.

The Netherlands

The Netherlands moved towards circular economy, designing policies to accelerate the process in 2013. They found that the overall impact of the circular economy was estimated at EUR 7.3 billion annually, creating 54,000 jobs. The current value of the circular economy for 17 product categories from the metal and electrical sectors is EUR 3.3 billion and that an additional market value of EUR 573 million per year could be achieved. The use of the 34 of the most important waste streams represents a value of EUR 3.5 billion (Eionet Report, 2019).

Circular approaches where material from demolitions and secondary material for construction can be used combined with energy and water efficiency in buildings is being implemented in the Netherlands. The construction sector is ready to take this step, however, there are regulatory and financial obstacles to overcome. Groningen is developing a circular economy strategy focusing on waste, public procurement and knowledge building.

Spain

The recent transformation of the wastewater treatment plant into a bio-factory in the city of Granada stimulated a city debate on the circular economy. It aims to reach zero waste, zero energy and zero CO_2 emissions by 2020. The circular vision for the city could be based on two of its major strengths: culture and science.

Valladolid in Spain was one of the first signatories of the Declaration of Seville in 2017 – a commitment towards implementing circular economy in Spanish municipalities. Since then, the Innovation Agency of the municipality developed a roadmap for the circular economy implementation. For the future, clear objectives and priorities are being set to create an enabling environment and generate coherent circular economy initiatives, while scaling-up existing ones.

CHAPTER-2: WHAT IS CIRCULAR ECONOMY?

A circular economy is an economy system that tackles global challenges like climate change, biodiversity loss, waste, and pollution. According United Nations Industrial Development Organisation (UNIDO), the circular economy is a new way of creating value, and ultimately prosperity. It works by extending product lifespan through improved design and servicing and relocating waste from end of the supply chain to the beginning – in effect, using resources more efficiently by using them over and over, not only once. ***(UNIDO, Circular Economy)***

More than a 100 billion tons of resources enter the economy every year. This is sourced from metals, minerals and fossil fuels, plants and animals. The use of resources has tripled since 1970 and could double again by 2050 if business continues as usual. We would need 1.5+ Earths to sustainably support our current resource use (WRI, 2021).

In 2019, over 92 billion tonnes of materials were extracted and processed, contributing to about half of global CO_2 emissions. The resulting waste – including plastics, textiles, food, electronics and more – is taking its toll on the environment and human health. The world right now is only 8.6% circular (Circularity Gap Report 2020).

The earth has survived five mass extinctions and will survive futures scenarios as well. Climate change, circular economy, resource efficiency and similar concepts are not about saving our earth. They majorly focus on saving our resources and using it judiciously. It's about the smart use of limited resources and requires extraordinary capabilities to manage a highly fragile planet, dependent on natural resources for our survival.

Circular economy is not about waste management or recycling only. It's also about changing the operating system of how the world runs. It's about the fundamental shift of thinking, behaviour and consumption patterns.

One of the key aspects of a circular economy is that it requires collaboration and cooperation from individuals, SMEs, organisations, the government and corporations, to achieve the world we want for our survival and for our next generations. A circular economy is a systemic approach to economic development by a regenerative design and aims to gradually decouple growth from the consumption of finite resources.

2.1. Principles of Circular Economy

Design-out Waste and pollution

- Sustainable material selection
- Standardised components
- Designed-to-last products
- Design for easy end-of-life sorting and separation
- Design that facilitates reuse, recycling and cascading of product or material

- Design-for-manufacturing criteria that considers possible useful applications of by-products and wastes

Keep Products & Materials in Use

- Innovative and profitable business models
- Leasing, renting, reusing, recycling, refurbishment
- Initiatives from leading brands with significant market share and capabilities to inspire other players.

Regenerate Natural Systems

- Cascading and final return of materials to the soil or back into the industrial production system
- Cost-efficient, better-quality collection and treatment systems
- Effective segmentation of end-of-life products
- Decreasing leakage of materials out of the system

Circular economy is the opposite of our current linear model of 'Take - Make – Dispose', which inevitably leads to declination of natural resources and the increase pollution and waste.

2.2 Schools of Thought on the Circular Economy

Cradle to Cradle Approach: This approach by Michael Braungart and Bill McDonough suggests that 'all material involved in industrial and commercial processes are to be nutrients'. Cradle to Cradle (C2C) is about seeing garbage as an eternal resource and doing the right thing from the beginning. In practical terms, C2C requires products to be designed in such a way to ensure that all materials can be classified into one of two cyclical systems:

i. Biological Cycle
ii. Technology cycle

Performance Economy: This approach by Walter Stahel and Genevieve Reday suggests the importance of **selling services, rather than products.** The focus is **on the maintenance and exploitation of stock** (mainly manufactured capital) rather than linear or circular flows of materials or energy.

Biomimicry: This concept by Janine Benyus suggests takes its inspiration from nature. It shares the approach to follow nature for innovation and design - **nature as model, nature as measure, nature as mentor. Biomimetics** or **biomimicry** is the emulation of the models, systems, and elements of nature for the purpose of solving complex human problems.

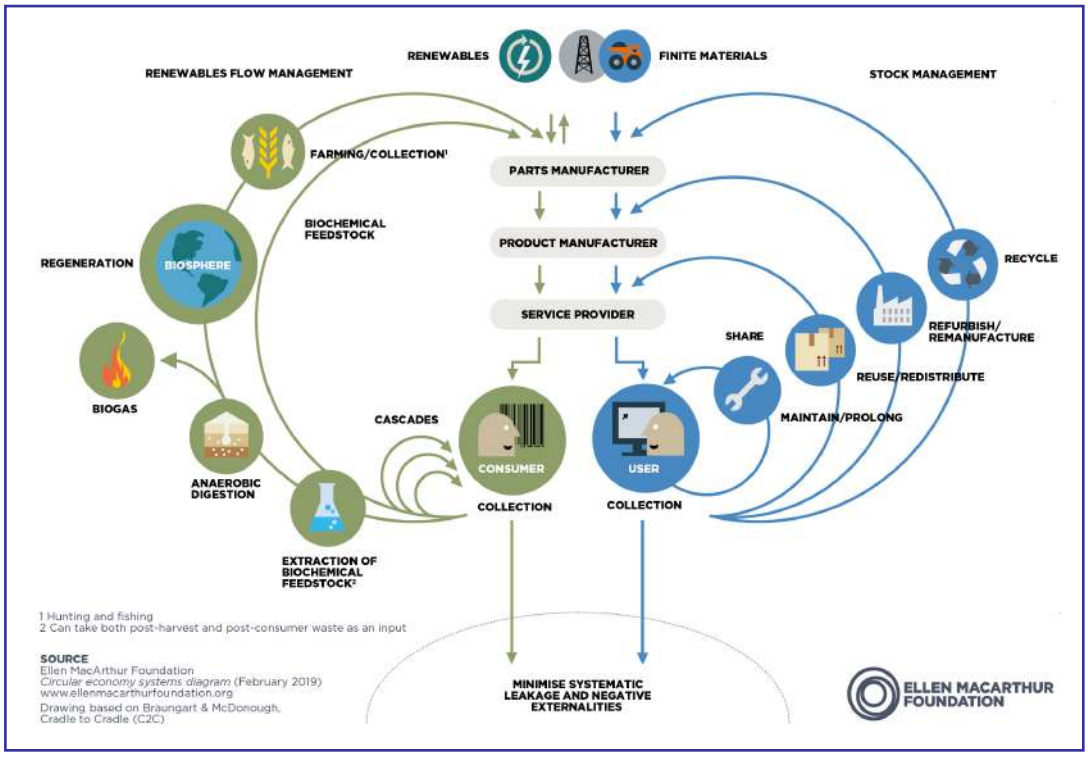
Industrial Ecology: Industrial ecology (IE) is the study of industrial systems that operate more like natural ecosystems. Industrial ecology is concerned with the shifting of industrial process from linear (open loop) systems, in which resource and capital investments move through the system to become waste, to a closed loop system where wastes can become inputs for new processes.

Blue Economy: An approach by Gunter Pauli encourages **better stewardship of our ocean** or 'blue' resources'. It is a term in economics relating to the exploitation, preservation and regeneration of the marine environment.the term is generally used in the scope of International development when describing a sustainable development approach to coastal resources.

Circular Economy, MacArthur Foundation: Circular economy is defined as systems solution framework that tackles global challenges like climate change, biodiversity loss, waste and pollution. It suggests that a circular economy seeks to rebuild capital (financial, through manufacturing process, human, social or natural) to ensure enhanced flows of goods and services.

The system diagram (given below) illustrates the continuous flow of technical and biological materials through the 'value circle'

Figure 3: System diagram for flow of materials through the 'value circle'



Source: Ellen MacArthur Foundation: Circular economy Systems Diagram (2019)

The circular economy is a model of production and consumption, involving sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products for as long as possible. In this way, the life cycle of a products is extended significantly.

In practice, it implies reducing waste to a minimum. This means that when a product reaches the end of its life, its materials are kept within the economy wherever, and however possible. These then can be productively used again and again, creating further value.

This is a departure from the traditional, linear economic model, which is based on a take-make-consume-throw away pattern. This model relies on large quantities of cheap, easily accessible materials and energy.

Figure 4: Circular Economy - Key Components

Moving towards a more circular economy could deliver benefits such as reducing pressure on the environment, improving the security of the supply of raw materials, increasing competitiveness, stimulating innovation, boosting economic growth and creating jobs.

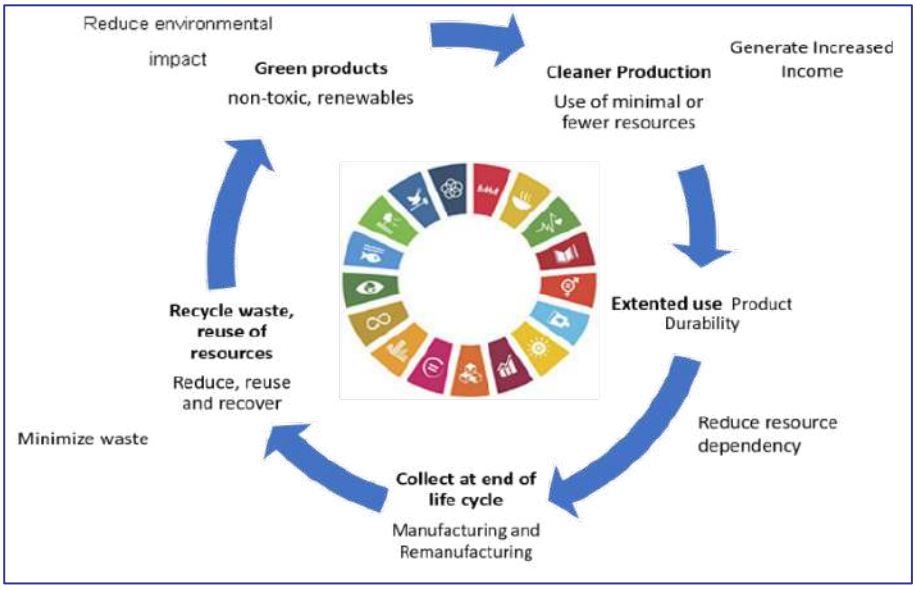
Source: Circular Economy, European Union

2.3 Aligning Circular Economy with SDGs

Since circular economy is a resource centric economy, its aligning with sustainable development goals is an obvious attribute and are both synonymous in its action for working towards a sustainable world in a resource constraint economy.

Every strategy and best practice guideline provided for SMEs allows them to achieve the 2030 sustainable development goals (SDGs). Goals such as 1,2,6,7,8,9,11,12,13,14,16 and 17 can be easily aligned, applied and implemented for having mutual or co-benefits.

Figure 5: Circular Economy & SDGs



Source: Circular Economy and SDGs, European Union

CHAPTER-3: PLASTIC WASTE MANAGEMENT POLICY IN INDIA

3.1 National Policy on Plastic Waste Management Rules, 2011

The MoEFCC announced the Plastic Waste (Management and Handling) Rules in 2011 to replace the Recycled Plastics Manufacture and Usage Rules, 1999 (amended in 2003). The intention was to impose a blanket ban on the single use plastics. The real challenge back then was to improve municipal solid waste management systems. In addition to the privatisation and mechanisation of the municipal solid waste management systems, the ban took a backseat and plastic use continued, calling attention to job creation in the plastic sector.

The government's sensitivities to the needs and concerns of the lakhs of people involved in the informal sector was called to focus. Following this, a series of amendments and policy issues were discussed, deliberated and drafted.

3.2 National Policy on Plastic Waste Management Rules, 2018

Moving ahead from the 2011 policy frameworks, on 18 March 2016 the MoEF&CC, Government of India issued the Plastic Waste Management Rules, 2016 via G.S.R 320 (E) to protect public health and the environment. These Rules replaced the previous Plastic Waste (Management and Handling) Rules, 2011 and are applicable to every waste generator, recycler, manufacturers, importers, producers, distributers sellers and users of plastic bags, plastic sheets, covers made of plastic sheets and multi-layered packaging.

3.2.1 Registration of Producers, Recyclers and Manufacturers

Every producer, manufacturer and recycler of plastic carry bags or recycled plastic bags or multi-layered packaging must obtain a 'certificate of registration' from the State Pollution Control Board (SPCB) or the Pollution Control Committee (PCC) of the Union Territory concerned, as the case may be, prior to the commencement of production. Every application for renewal of registration must be made at least 120 days before the expiry of the validity of the registration certificate. (MOEF&CC, GoI, 2016)

3.2.2 Extended Producer Responsibility (EPR)

Extended Producer Responsibility (EPR) puts the financial and/or physical onus on manufacturers. Under the EPR, producers would have to work out modalities for the plastic waste collection system based on PER targets and involving State Urban Development Departments; either individually or collectively, through their own distribution channel or through the local body concerned.

In its efforts towards circularity and aligning with EPR commitments, manufacturers, retailers and endorser organisations recognise this need and make three firm commitments:

1. Ensure that entire organisation is aligned on, and their actions are in line with EPR
2. Be constructive in their engagement with governments and other stakeholders: advocating for the establishment of well-designed EPR policies and being supportive in working out how to implement and continuously improve EPR schemes in the local context

3. Engage with the peers and the relevant associations and collaborations and as integral part to work towards aligning their positions and actions accordingly.

In June 2020, the MoEFCC introduced the **Uniform Framework for EPR** under the Plastic Waste Management Rules, 2016. Here, a final draft guideline document on uniform frameworks of EPR has been prepared. The uniform framework of EPR shall be based on creation of national registration and database repository through which all the registration of various stakeholders will be done online. Further, the stakeholders need to timely update the requisite information in the database for proper functioning. (MoEFCC, 2020). Refer the Plastic Waste Management (Amendment) Rules, 2022, MoEF&CC, GoI, for more details.

3.2.3 Requirements for Producers, Importers and Brand Owners

The existing producers must figure out modalities for waste collection systems, within a period of six months effective from 18 March 2016, based on Extended Producers Responsibility (EPR) and involving State Urban Development Departments, either individually or collectively, through their own distribution channel or through the local body concerned.

- The collection of used multi-layered plastic sachets or pouches or packaging is the primary responsibility of producers, importers and brand owners. A system for collecting waste generated from their product must be established and a plan for such system must be submitted to the State Pollution Control Boards (SPCB) while applying for consent to establish or operate or renewal.
- The manufacture and use of non-recyclable multi-layered plastic must be phased out in two years' time.
- The existing producer must submit an application to the Pollution Control Board or the Pollution Control Committee, within a period of three months effective from 18 March 2016, as the case may be, of the States or the Union Territories administration concerned, for grant of registration.
- No producer on and after the expiry of a period of six months from 18 March 2016 must manufacture or use any plastic or multi-layered packaging for packaging of commodities without registration from the concerned State Pollution Control Board or the Pollution Control Committees.
- Every producer must maintain a record of details of the person engaged in the supply of plastic used as raw material to manufacture carry bags or plastic sheets or like or covers made of plastic sheets or multi-layered packaging.

3.2.4 Requirements for the Waste Generator

- Measures must be taken to minimize the generation of plastic waste. Segregation of plastic waste at source in accordance with the Solid Waste Management Rules, 2000 must be done. Segregated waste must be handed over to urban local body or *Gram Panchayats* or agencies appointed by them/registered waste pickers'/registered recyclers /waste collection agencies.
- All institutional generators of plastic waste must segregate and store the waste generated by them in accordance with the Municipal Solid Waste (Management and Handling) Rules, 2000 and must handover segregated wastes to authorized waste processing or disposal facilities or deposition centres either on its own or through the authorized waste collection agency. (MOEFCC, 2016).

3.2.5 Marking or Labelling

Plastic carry bags and multi-layered packaging must have the following information printed in English:

- ➢ Name, registration number of the manufacturer and thickness in case of carry bag.
- ➢ Name and registration number of the manufacturer in case of multi-layered packaging; and
- ➢ Name and certificate number [Rule 4(h)], in case of carry bags made from compostable plastic.

Recycled carry bag must bear a label, or a mark "recycled" to conform to the Indian Standard: IS 14534: 1998 titled as "Guidelines for Recycling of Plastic". Additionally, each carry bag made from compostable plastics must bear a label "compostable" and shall conform to the Indian Standard: IS or ISO 17088:2008 titled as Specifications for "Compostable Plastics".

The manufacture, importer stocking, distribution, sale and use of carry bags, plastic sheets or like, or cover made of plastic sheet and multi-layered packaging, must be subject to the following conditions:

Table 2: Standards and Conditions for the Production of Plastic Products

i.	Carry bags and plastic packaging must either be in a natural shade which is without any added pigments or made using only pigments and colourants which are in conformity with Indian Standard : IS 9833:1981 titled "List of pigments and colourants for use in plastics in contact with foodstuffs, pharmaceuticals and drinking water".
ii.	Carry bags made of recycled plastic or products made of recycled plastic must not be used for storing, carrying, dispensing or packaging ready-to-eat-or-drink food stuff
iii.	Carry bag made of virgin or recycled plastic, must not be less than fifty microns in thickness;
iv.	Plastic sheet or the like, which is not an integral part of multi-layered packaging and cover made of plastic sheet used for packaging, wrapping the commodity must not be less than fifty microns in thickness except where the thickness of such plastic sheets impairs the functionality of the product
v.	The manufacturer must not sell or provide or arrange plastic to be used as raw material to a producer, not having valid registration from the concerned State Pollution Control Boards or Pollution Control Committee
vi	Recycling of plastic waste must conform to the Indian Standard: IS 14534:1998 titled as Guidelines for Recycling of Plastics, as amended from time to time,
vii	The provision of thickness must not be applicable to carry bags made up of compostable plastic. Carry bags made from compostable plastics must conform to the Indian Standard: IS 17088:2008 titled as Specifications for Compostable Plastics, as amended from time to time,
viii.	The manufacturers or seller of compostable plastic carry bags must obtain a certificate from the Central Pollution Control Board before marketing or selling;
ix.	Plastic material, in any form including vinyl acetate – maleic acid – vinyl chloride copolymer, must not be used in any package for packaging Gutkha, Pan Masala and tobacco in all forms.

Source: Info. From Plastic Waste Management Rules

NOTE: These rules do not apply to the export-oriented units or units in special economic zones, notified by the Central Government, manufacturing their products against an order for export.

3.3 National Policy on Plastic Waste Management Rules, 2021

The draft Amendment to 2011, 2016 and 2018 was published on 11th March 2021 by the Central Pollution Control Board mentioning:

The draft Plastic Waste Management Rules, 2021, issued by the MoEFCC on March 11, has necessitated a few changes in the country's handling of its plastic waste.

One, the amendment has extended the applicability of the rules to brand-owner, plastic waste processor, including the recycler, co-processor, etc. It will also include new definitions of:

- Non-woven plastic bag
- Plastic waste processing
- Single-use plastic items
- Thermoset plastic
- Thermoplastic

The Union Ministry has proposed increasing the thickness of carry bags made of virgin plastic to 120 microns from 50 microns.

This also proposes a ban on the manufacture, import, stocking, distribution, sale and use of specific single-use plastic from January 1, 2022. These include plastic sticks for balloons, plastic flags, candy sticks, ice-cream sticks, and thermocol (extended polystyrene) for decoration.

The draft was opened for public suggestion for 60 days for consideration, following which it will be published in the Gazette of India. These rules shall be called as *Plastic Waste Management (Amendment) Rules, 2021,* and shall come into force on the date of publication in the Official Gazette.

As per the policy, the draft Plastic Waste Management (Amendment) Rules, 2021 shall be implemented in three stages starting this year i.e.: January 2021 and culminating in mid-2022. The first set of rules has been proposed for plastic bags with effect from September 30. The rules propose that each sheet of non-woven plastic carry bag shall not be less than 60 (GSM per square metre) or 240 microns in thickness. A carry bag made of virgin or recycled plastic shall not be less than 120 microns, with effect from the same date.

The **second stage** will come into effect from January 1, 2022; when six categories of single-use plastic — ear buds with plastic sticks, plastic sticks for balloons, plastic flags, candy sticks, ice-cream sticks, polystyrene (thermocol) for decoration etc. will be banned for sale, use, manufacture, stocking, import and distribution.

In the **third stage** from July 1, 2022 — the list of banned items will grow. It will include single-use plastic plates, cups, glasses, cutlery such as forks, spoons, knives, straw, trays, wrapping/packing films around sweet boxes; invitation cards; cigarette packets, plastic/PVC banners less than 100 micron and stirrers.

3.4 Policy and Regulatory Framework for Plastic Industry in India

The Indian government enacted various forms of environmental legislations and regulations at the national, state, or local levels for plastics, particularly on the end-of-life management and mitigation of plastic waste pollution.

What is lacking is the efficacy with which it is implemented to get those converted into action. The policy pushes towards resource efficiency and circular economy in plastics and is relatively new, lacking a systematic approach and monitoring & verification systems.

Table 3: Circularity Implications of Legislative and Regulatory Framework for Plastics in India

POLICY	YEAR	MINISTRY / DEPARTMENT	DESCRIPTION
Upstream			
Plastics and recycled plastics manufacture, sale, and usage rules	1999, 2002, 2003	MoEFCC , GoI	Rules have laid down provisions for the manufacturing, usage, management; criteria for manufacturing plastic carry bags and containers. Amendments (2002; 2003) provide specifications for virgin and recycled plastic manufacturing, extend definition of vendor, and mandate registration and authorization for manufacturers, production, sale, or trade for plastic packaging.
Policy resolution for promotion of petroleum, chemicals, and petrochemical investment regions (PCPIRs)	2007	MoC&F, GoI	Provision for specifically delineated investment regions for the manufacturing facilities for domestic- and export-led production in petroleum, chemicals and petrochemicals, along with associated services and infrastructure.
Midstream			
National Design Policy	2007	MoCI, GoI	It focuses on 'Design in India' and to enhance the competitiveness of Indian industry
Hazardous and Other Waste (Management, Handling and Transboundary Movement) Rules	2008, 2016	MoEFCC, GoI	It has laid down responsibility for handling and storage of hazardous waste. It also deals with the import, export of hazardous waste for recycling, recovery, and reuse. It defines processes generating hazardous waste including plastic production, and where such processes are prohibited. The new (2016) rules banned the import of solid plastic waste, including PET bottles. It also distinguishes hazardous waste from others and recognizes waste as a resource for recycling and reuse supplementing industrial processes
Food Safety and Standards Regulations	2011	MoHFW, GoI	It lays down general requirements for packaging and labelling

Notice for withdrawal of producer responsibility organizations	2019	CPCB, MoEF&CC, GoI	Discontinued recognition of PROs with CPCB, and the producers and other stakeholders can plan their EPR implementation as per requirement of PWM Rules, 2018
Downstream			
Guidelines for recycling of plastics	1998	BIS	Describes types of wastes, classification of recycling, and steps involved in the recycling process
Bio-medical waste Rules	1998, 2016	MoEFCC, GoI	Earliest policy that addresses the treatment of plastic waste in biomedical area. Focuses on recycling of plastics, sharps and glass to authorized recyclers. Provides color coding and the type of container for disposal of biomedical wastes containing plastic bags
Municipal Solid Wastes (Management and Handling) Rules	2000	MoEFCC, GoI	Declared responsibilities of authorities on national, state, and municipal levels
	2016	MoEFCC, GoI	New rules have mandated source segregation of waste and event organizers, RWAs, market associations, gated communities, institutions, and SEZ have been assigned the responsibility
Plastic Waste Management (Amendment) Rules	2011	MoEFCC, GoI	Rules put ban on use of plastic materials in sachets for storing, packing, or selling gutkha, tobacco and pan masala
	2016, 2018	MoEFCC, GoI	Requires producers/brand owners who introduce plastic carry bags, multi-layered plastic sachets, pouches, and packaging into the marketplace to submit an EPR plan. The amended (2018) rules state that only those multi-layered plastics (MLPs) will be phased out which are non-recyclable or non-energy recoverable or have no alternate use. Also, there will be a central registration system for the registration of the producer/ importer/brand owner
Guidelines for disposal of thermoset plastic waste including: Sheet Molding Compound (SMC)/ Fiber Reinforced Plastic (FRP)	2016	CPCB, GoI	According to these guidelines, the most preferred option is minimization of use of SMC/FRP/ polycarbonate polymer products and promote the use of alternate material which are easily recyclable/reusable/ degradable

Guidelines for the disposal of nonrecyclable fraction (multi-layered) plastic waste	2018	CPCB, GoI	Guidelines provide the source of non-recyclable plastic waste and management of non-recyclable plastic waste
Guidelines for coprocessing of plastic waste in cement kilns	2016	CPCB, GoI	Guidelines provide the protocol to be followed by different stakeholders and description of co-processing plastic waste in cement kilns
Consolidated guidelines for segregation, collection, and disposal of plastic waste	2017	CPCB, GoI	Guidelines provide roles and responsibilities of different stakeholders in efficient plastic waste management and technologies for disposal of plastic wastes
Prohibition of import of PET flakes	2019	MoEFCC, GoI	GOI prohibits the import of PET bottle waste/ scraps PET flakes made from used PET bottles, etc.
Guideline Document: Uniform Framework for Extended Producers Responsibility (Under Plastic Waste Management Rules, 2016)	2020	MoEFCC, GoI	Mandate manufacturers to take responsibilities over materials used in their products beyond the sale-phase.
Source: TERI and Government of India Report on Circular Economy, 2018.			
National Policy on Plastic Waste Management Rules, 2021	2021	MoEF&CC , GoI	Proposes a ban on the manufacture, import, stocking, distribution, sale and use of specific single-use plastic from January 1, 2022.
Guidelines on Extended Producer Responsibility Compliance, Plastic Waste Management (Amendment) Rules, 2022	2022	MoEF&CC , GoI	Proposes- (9.1) Environmental Compensation shall be levied based upon polluter pays principle, with respect to non- fulfilment of Extended Producer Responsibility targets by Producers, Importers & Brand Owners, for the prupose of protecting and improving the quality of the environment and preventing, controlling and abating environment pollution .

CHAPTER-4: WHY SHOULD THE CIRCULAR ECONOMY BE IMPLEMENTED FOR THE PLASTIC SECTOR?

In the linear model, plastic polymers and raw materials are majorly made from fossil fuels, accounting for 8–9% global oil and gas in its production (TERI, 2021). In the midstream, manufacturing and design stage, a significant portion of plastics are made for single use, which significantly contributes to waste generation.

From a circular economy perspective there are three main issues related to plastic use:

1. **Plastics are often based on virgin fossil feedstock**
2. **Plastics are often not recycled**
3. **A significant number of plastics end up in the environment where it degrades very slowly and has a large impact on the functioning of ecosystem.**

4.1 Types of Plastic

There are seven types of plastics most commonly used in our markets:

1) Polyethylene Terephthalate (PET or PETE)
2) High-Density Polyethylene (HDPE)
3) Polyvinyl Chloride (PVC or Vinyl)
4) Low-Density Polyethylene (LDPE)
5) Polypropylene (PP)
6) Polystyrene (PS or Styrofoam)
7) Other

Figure 6: Overview of the seven most commonly used plastics

Symbol	Polymer Examples of Application	Environmental Qualities
PET polyethylene terephthalate	Soft drink and water bottles, salad trays	Recycled into fleece coats, carpets, surfboards
HDPE high density polyethylene	Milk bottles, shampoo bottles, toys, houseware	Recycled into plastic lumber products
PVC polyvinyl chloride	Window frames, floor coverings, pipes, cable insulation	The by products from manufacturing are known to cause cancer, recycled into handrails, house siding
LDPE low density polyethylene	Carrier bags, bin liners, packaging films	Recycled in small amount into bags
PP polypropylene	Microwave-proof containers, automotive parts, food packaging	Difficult to collect for recycling; Recycled into car battery cases
PS Polystyrene	Yoghurt pots, insulating packaging and building materials, plastic cutlery, protective packaging for consumer goods	No longer made with CFCs but by-product from manufacturing degrade air quality
Other	PUR, Hub caps (ABS); optical fibres (PBT); eyeglasses lenses; (PC) touchscreens (PMMA); cable coating in telecommunications (PTFE);other applications in aerospace, medical implants, surgical devices, membranes, valves and seals, protective coatings etc.	Layered aspects make this difficult to recycle, recycled into benches, marine pilings

Source: Boosting the Circular Economy Amongst SME's, KPMG report on circular economy for SMEs, 2018

These are commonly used, particularly for consumer and commodity packaging and non-packaging plastic products. A combination of dyes and additives are added to these polymers to produce the desired colour, shape, and texture in the final plastic product.

PE, which is the most extensively consumed polymer, is made as high-density polyethylene (HDPE), low-density polyethylene (LDPE), and linear low-density polyethylene (LLDPE) in household items, such as plastic containers, bottles, bags, and plastic toys.

In terms of consumption, the share of polymers for making different types of plastic products, estimates for 2020 suggest these to be as follows: PP (38%), LLDPE (11%), LDPE (2%), HDPE (14%), PVC (10%), PS (2%), PET (15%), and others that include other thermoplastics and thermoset plastics (10%) (CPMA, 2020). PP together with the three types of PE accounted for over 50% of India's polymer consumption for plastic products in 2018–19 (TERI, 2021).

4.2 Plastic Production & Consumption

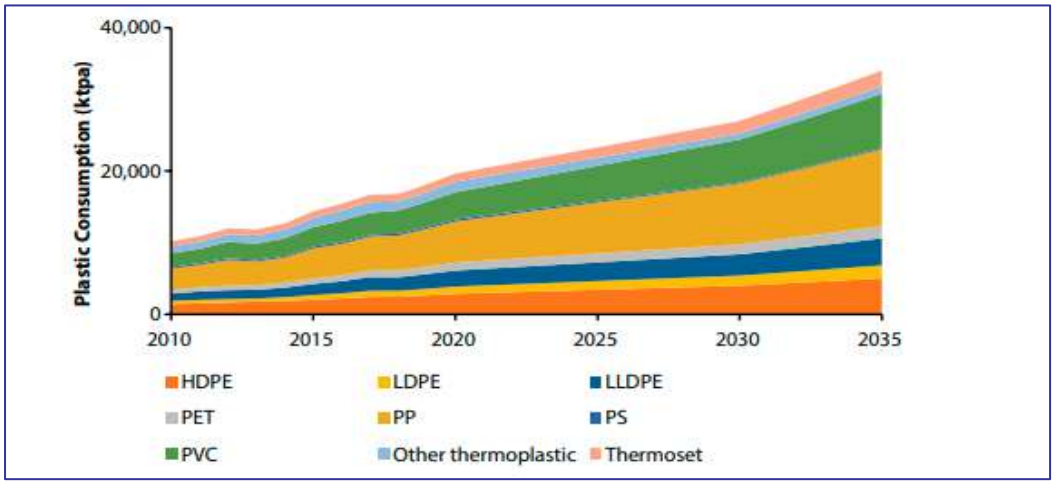
99% of feedstock for plastics is fossil based. For producing plastic products out of plastic polymers, virgin feedstock's account for 90% share, and the remaining 10% is met by recycled polymers. Plastics account for 8–9% of global oil and gas production and its production is projected to double by 2040 (TERI, 2021).

Switching to bio-based plastics has the potential of lowering GHG emissions from plastics production. However, this impact will depend on the source of bio-based feedstock and its direct and indirect impact on land-use change.

The circular economy rationale is increasingly promoted as a means to move from a global plastic waste dilemma to a plastics economy that is aligned with the principles of sustainable development.

A majority of the post-consumer plastic waste that gets collected end up in open dumpsites and landfills. Also, studies show that contrary to perception or claims biodegradable plastics do not decompose into the expected benign chemicals (CO_2, CH4H2O) and certainly not overnight, and inevitably end up as litter and micro plastics. Decoupling growth of plastics production is extremely important.

Figure 7: Plastic consumption projection by plastic type, 2010–35

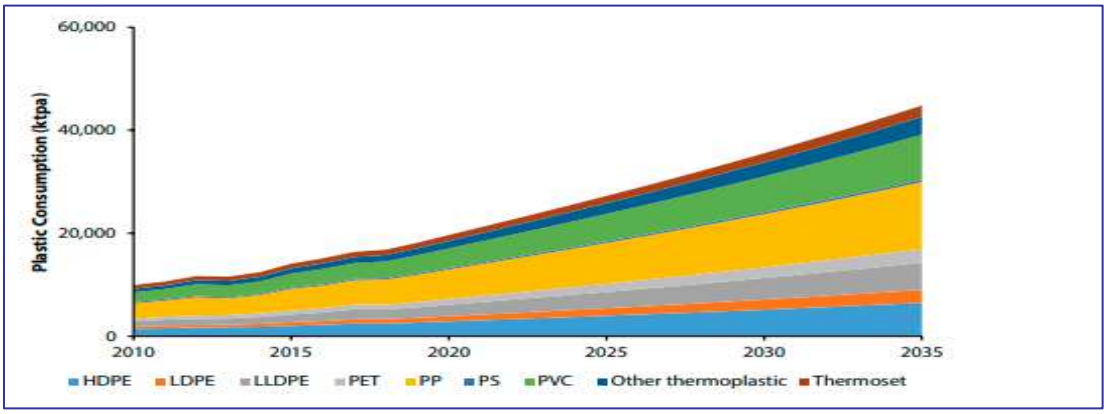


Source: TERI and Government of India Report on Circular Economy, 2018

The above projections reflect Business-As-Usual (BAU) scenarios, with little or no intervention in shifting the type of production and consumption patterns. However, these would change with the implementation of circularity interventions through policy measures, application of circular models and approaches. For example, the implementation of Plastic Management Rules, 2021, for Single Use Plastics (SUP) in 2022; or the implementation or circular models of business by SMEs and OEMs.

Figure-8 projects plastic consumption with the implementation of the government ban taking effect in 2022.

Figure 8: Plastic consumption projection by plastic type with SUP (Single Use Plastics) ban Implementation 2010–35



Source: TERI and Government of India Report on Circular Economy, 2018

It is important to note that although the government is set to implement the ban, it may be more realistic to assume that the relevant policy reaches 100% efficacy by 2030. Based on these assumptions, by 2035, the implementation of SUP bans in India will reduce plastic consumption by nearly 25%, versus a scenario where no SUP bans were implemented (TERI, 2021).

4.3 Circularity Scenarios of Plastics

4.3.1 Demand Side Potential and Key End Use Sectors

Plastics are used for variety of purposes, application and end use sectors. These include packaging and non-packaging uses.

Packaging is broadly categorized into rigid packaging and flexible packaging. Flexible packaging, which is the newer form of packaging has the largest share amongst the key end-uses.

Table 4: Key End-Use Sectors

Sectors	Share in 2013–14	Share in 2019
Flexible Packaging	35%	42%
Rigid Packaging	13%	17%
Household	10%	7%
Building and Construction	12%	13%
Agriculture	9%	9%
Electrical and Electronics	14%	2%

Automotive	3%	7%
Others	4%	3%

Source: PlastIndia Foundation, 2019 and 2014

- **Household use** of plastics include FMCG products such as toiletries and cosmetics, furniture, toys, luggage, house wares, and other lifestyle-related goods.
- **Construction materials** include water pipes, water tanks, roof shelters, sheets, etc.
- **Other materials** include sports and leisure, medical, dental care, and industrial machinery
- In the **automotive sector**, a car on an average consists of 10–20% plastics in the total weight; there can be variation in this share depending on fuel efficiency standards and performance requirements.

Table 5: Circularity: Existing practice, Scope, Opportunities

CIRCULARITY	EXISTING PRACTICES/ SCOPE	OPPORTUNITIES
Use of bioplastics	• Largest application (60% of total bioplastic consumption) in India for packaging - Used in bottles, loose-fill, cups, pots, blows, flexible films, etc. • In India, selected FMCG companies aiming for 100% biodegradable plastic for packaging ready-to-eat and cosmetic products.	• Use of PBS as alternatives in packaging including the use in fresh food packaging to enhance lifespan. • With bans against SUPs and economic of scale setting in for bioplastics, their share in packaging sector is expected to increase.
Reusable packaging	• Pepsico India: scaling up its nonreturnable glass bottles for its packaging. • Leadec India: provided reusable crating solutions for automotive components made of HDPE which can be folded. • Reffin: aims to offer restaurants with an alternative means of delivering their foods to consumers by using tiffin carriers, generally made out of stainless steel.	• Many opportunities in business-to-business (B2B) applications, which are generally better understood and adopted at scale. • Designing packaging solutions in business to-consumer (B2C) applications • Potential to meet individual needs, specificities for packaging, improved user experience and create brand loyalty • Replacing existing SUP containers in the growing online food delivery services by using re-usable containers

Use of recycled plastics	• Commitment by large companies (both Indian and MNCs) will move to 100% recyclable plastic packaging by 2025 • Cargill Oils India, in association with Dow Chemical, reformulated its plastic material, making 90% of its plastic packaging recyclable.	• Use recycled plastic in non-food applications • Inclusion of pro-environment messaging on packages and to nudge the consumer towards responsible behavior that includes giving preference to products containing recycled raw material.
Redesign of packaging	• Lush, handmade cosmetics have a packaging free line • Cargill's oil business in India has redesigned its packaging by cutting down on the amount of raw plastic used across all products • Cremica Food Industries is reducing lamination in packaging	• Avoid use of extra packaging material or create packaging free line of products • Fewer types of standardized plastics for specific uses in FMCG-reduce plastic waste leakage and improve recycling • Replacing packaging material like shrink wraps with more durable and reusable long lasting alternatives • Stay on tabs for beverages, flip flop caps for FMCG products • Replacing multi-polymer plastic packaging with single polymer plastic packaging • Color coding and labels for disposing bio-based and/or compostable after use.

4.4 Resource Efficiency (RE) & Circular Economy (CE) Scenarios

Circularity Interventions and Scenarios

- ➢ Business as usual scenario
- ➢ Moderate RE&CE scenario (2035)
- ➢ High ambition RE&CE scenario (2035)

Substitution between Plastic Polymers

- ➢ Move to a biobased as alternative feedstock to fossil feedstock
- ➢ Shift from multipolymer material to mono-polymer material
- ➢ Bio-based plastics account for less than 1% of the plastics produced
- ➢ Use of multipolymer material continues to grow (R&D initiated to identify substitutes)

Expansion of Segregated Waste Collection

- ➢ Improved collection and transportation infrastructure
- ➢ Awareness generation

Increased Recycling or Reprocessing into a Secondary Material

- ➢ Increase mechanical recycling capacity and efficiency
- ➢ Scale up chemical recycling capacity

Design for Recycling

- ➢ Fewer types of plastics to reduce the complexity in plastic waste management
- ➢ Design to enable easy disassembly at the EoL

Reduction in Plastic Consumption

- ➢ Use of alternatives to plastics products and reduction in specific uses (across key end use sectors/ applications)
- ➢ Re-use of end use products
- ➢ Design to bring in efficiency in plastic raw material use.

4.5 The Need to Foster Circularity for Plastic Sector In India

Implementing circular economy is important for the plastics sector to:

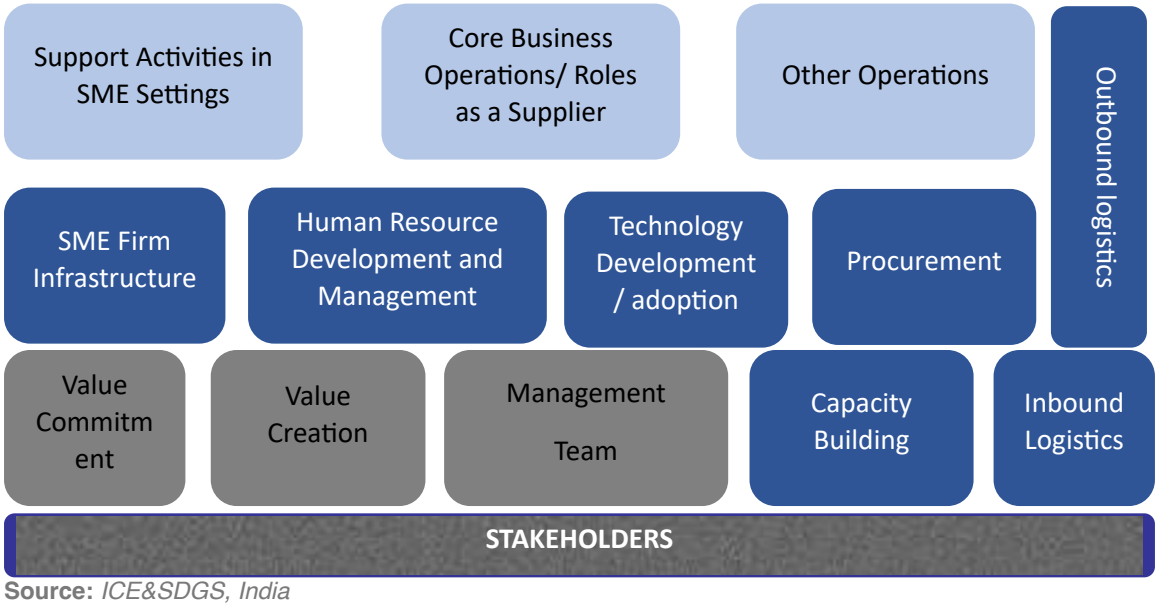
- Providing a special focus to **address difficult-to-recycle plastics**, using methods such as reduce, redesign or eliminate
- Expand and strengthen on existing **policy instruments, encourage public procurement of recycled plastics and support regulatory push** for sustainable and circular production and use of plastics.
- Assist with positive **fiscal measures** to reduce the use of virgin plastics and increase the use of recycled plastics in production, and in supply chains. This can be done by offering investment support and include the provision of grants or low interest loans to enable SMEs to access bank finance, viability gap funding, and the use of revolving funds
- **Improving infrastructure** through schemes such as the Swachh Bharat Abhiyan, towards creating recycling sectors and zones for pollution control, safe working conditions, and quality check on secondary raw materials.

CHAPTER-5: PREPARING SMEs FOR CIRCULARITY

Shifting from linear to circular economy, requires the team members of SME unit and stakeholder to be involved in the process. Getting all stakeholders involved, through a co-creation platform, allow reap joint value for all, through the continuous engagement.

The figure below details the types of operations, processes and stakeholders likely to be involved for preparing the SMEs to implement circular economy models at their unit:

Figure 9: Various Aspects: Co-creation Platforms For Implementation of Circular Economy



Source: *ICE&SDGS, India*

Bringing the SME team together is essential for preparing a robust plan for transition to circularity. Following steps may help the SME unit to implement circular economy within their premises:

5.1 Steps to Prepare SMEs for Circularity

1. **STRATIGIZE- Building commitment, knowledge and capacity:** To initiate the implementation of circular economy, starting the conversation is the first step. Leadership, decision makers, management and staff need to be aware of the foundations of circular economy, its benefits and it prevent barriers to implementing the circular economy model. To build this, the first step can be- designing the organisation's 'Circular economy policy', or to organise trainings/awareness building workshops, or open announcements, so each stakeholder is aware of their role in the process of transition.

2. **PLAN- Setting time-bound goals and plans:** SME shall plan the segments decided to eliminate the use of plastic, material replacement, testing, standard & certification, issue in production, and all related parameters that are important to prevent any impact on their business. Impact on existing market and possibilities of market expansion need to be assessed.

A time-bound plan is the key for the SMEs, or any business. Setting time bound goals will help cover all the aspects and components within a time frame to ensure the success and monitor the progress towards circularity.

3. **IMPACT-Assessing externalities:** Assessing key externalities that can impact your business while transitioning to circularity is an important step to ensure you retain profitability while stepping into new systems. These could include market pricing, technologies being used and/or available in the market, and similar aspects.

4. **FINANCIALS- Analyse fiscal incentives:** This will support in justifying initial costs, project future savings that would help grow your business, while benefiting the organisation through hassles related to waste management, policy compliance and pollution reduction.

5. **PILOT- Piloting processes for review and long-term implementation:** Piloting the newly designed or selected circular economy model as time-bound project, shall help gather insight and data to strengthen the model/ practice. A successful pilot can be taken to next stage for implementation at large scale.

6. **ECOSYSTEM- Creating support platforms:** Creating a platform for SMEs to share information exchange, best practices and develop a cohesive strategy for reducing waste and increasing recycling rates with a view to establishing your business as a frontrunner in the country.

The generic approach stated above, can be applied in every SME unit, for implementation of circular economy. Specific challenge need specific solution, that can be devised by the unit, as per their requirement.

Various other approaches and methodologies are explained in chapters further, can be well used in conjunction with the process stated above.

CHAPTER-6: APPROACH AND METHODOLOGIES TO IMPLEMENT CIRCULAR ECONOMY FOR SMEs

Experts from international and national institutes have developed a series of methodologies to implement circular economy practices specifically for SMEs. These have been tried and tested, proving to be effective in accelerating the transition from linear to circular practices, maintaining profit margins, and in some cases, resulting in significant reduction of costs in production cycles.

Some key methodologies and approaches are described here. These may be customised and implemented by the businesses for transition to circularity.

6.1 Approach

The ReSOLVE Framework

The ReSOLVE Framework developed by published by the Ellen MacArthur Foundation, in partnership McKinsey, takes the core principles of circularity and applies them to six actions: *Regenerate, Share, Optimise, Loop, Virtualise,* and *Exchange*. Each action represents a major circular business opportunity.

In different ways, these actions all increase the utilisation of physical assets, prolong their life, and shift resource use from finite to renewable sources. Each action reinforces and accelerates the performance of the other actions, creating a strong compounding effect.

Regenerate

- Shift to renewable energy and materials
- Reclaim, retain, and restore health of ecosystems
- Return recovered biological resources to the biosphere

Share

- Sharing the usage of assets (example: through sharing schemes or exchange platforms).
- Reusing assets (example: through resell/resale, redistribution).

Optimise

- Increasing performance/efficiency of products,
- Remove waste in production and supply chain,
- Leverage big data, automation, remote sensing, and tracking systems for resource tracking and optimizing its efficacy accordingly for its use, recovery and reuse,
- Prolonging or extending the product use through maintenance, design for durability and upgradability,
- Decreasing resource usage (example: increasing efficiency, designing out waste),
- Optimising the logistics system through implementation of reverse logistics.

Loop: Keeping products and materials in cycle

- Remanufacturing and refurbishing products and components (example: through design for disassembly)
- Recycling materials (example: through making the right material choices in the design process)

Virtualize: Dematerializing resource use and delivering utility virtually

- Replacing physical products with virtual services (example: e-books instead of books)
- Replacing physical stores with virtual locations (example: online shopping/e-commerce, virtual travel)
- Delivering services remotely (example: cloud computing and storage)

Exchange: Selecting resources and technologies wisely

- Shifting to renewable energy and material sources
- Using alternative material inputs (example: cascading by using by-products or extracting biochemical feedstock from biological nutrients)
- Replacing old with advanced technical solutions (example: 3D printing)
- Replacing product-centric with new service-centric delivery models.

For more details, refer ReSOLVE Framework in *'Growth within: A circular economy vision for a competitive Europe'* by McKinsey and Ellen MacArthur Foundation.

6.2 Methodology

Plan-Do-Check-Act & Improvise-Establish-Sustain Model

Organization/ office/ SMEs those keen to implement circular economy model in their unit, shall have strategic plan for implementation of circular economy. Thereafter, PDCA model can be followed for effective implementation of selected circular economy model.

The Plan-Do-Check-Act or PDCA model is an iterative design and management method that can be used to explore and test multiple solutions in a small, controlled and trial scenarios using the Total Quality Management or Six Sigma initiatives. These can be developed and improved to be applied across industries and organisational types.

6.2.1. PDCA MODEL

Plan

- Identify and analyse the problem areas and hotspots
- Identify the opportunity for change
- Develop hypothesis for what the underlying issues and causes are
- Decide one plan, to test first
- Write down the goal your organisation wants to achieve

Do

- Work on the strategies required for implementation

- Test your plan, at small scale
- Controlled conditions allow critical insights.

Check

- Note the results
- Review and analyse the results
- Evaluate your solutions
- Revise plan, if necessary.

Act

- Implement the tried and tested plan if all results were achieved as planned by the organisation.
- Go back to the planning stage to make adjustment and prepare for new trial if plan did not pan out as expected.
- If your plan was successful in controlled conditions or in test phase, then move ahead towards IES framework.

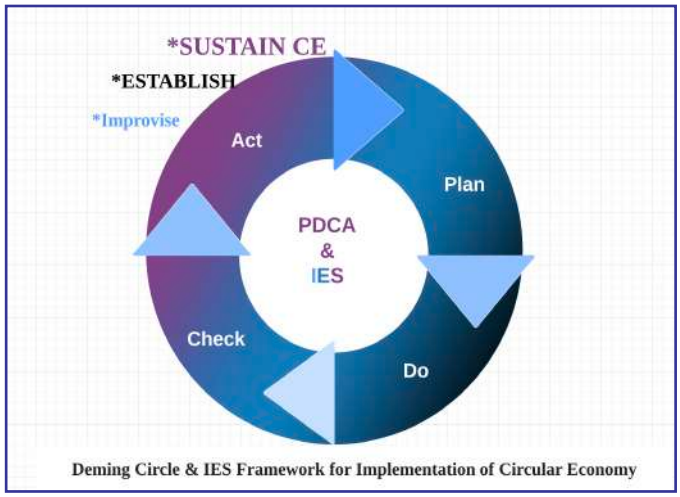


Figure 12: Deming Circle & IES Framework for the implementation of circular economy

6.2.2. The Improvise- Establish- Sustain (IES) Framework

The IES Framework is developed by the Global Institute for Circular Economy and Sustainable Development Goals, India (ICE&SDGs). It is a method to be implemented in continuation to the PDCA model (explained above). While PDCA enables organisations to implement circular economy, IES supports in improvising, establishing and sustaining these actions.

The user of PDCA cycle can use the IES framework as part of PDCA cycle. Mainstreaming action for circular economy is important for the organisation to make it as practice. Organisations using PDCA and IES frameworks together can experience a shift among their organisation and employees practicing circular economy, benefiting their organization significantly.

IMPROVISE

Organisations implementing circular economy can continue acting as usual, if the circular economy model is good to be used and practiced effectively. However, if these models fail, the organization can move towards 'improvised' actions integrated within the organisational practices.

ESTABLISH

Integrated circular practices help mainstreaming circular economy i.e. to establish circular economy practice within organisations.

SUSTAIN

Good practices shall continue mainstreaming organisation's efforts towards circular economy to achieve environmental - social - economic profits, sustainably.

6.3 Guidelines: Implement Circular Economy

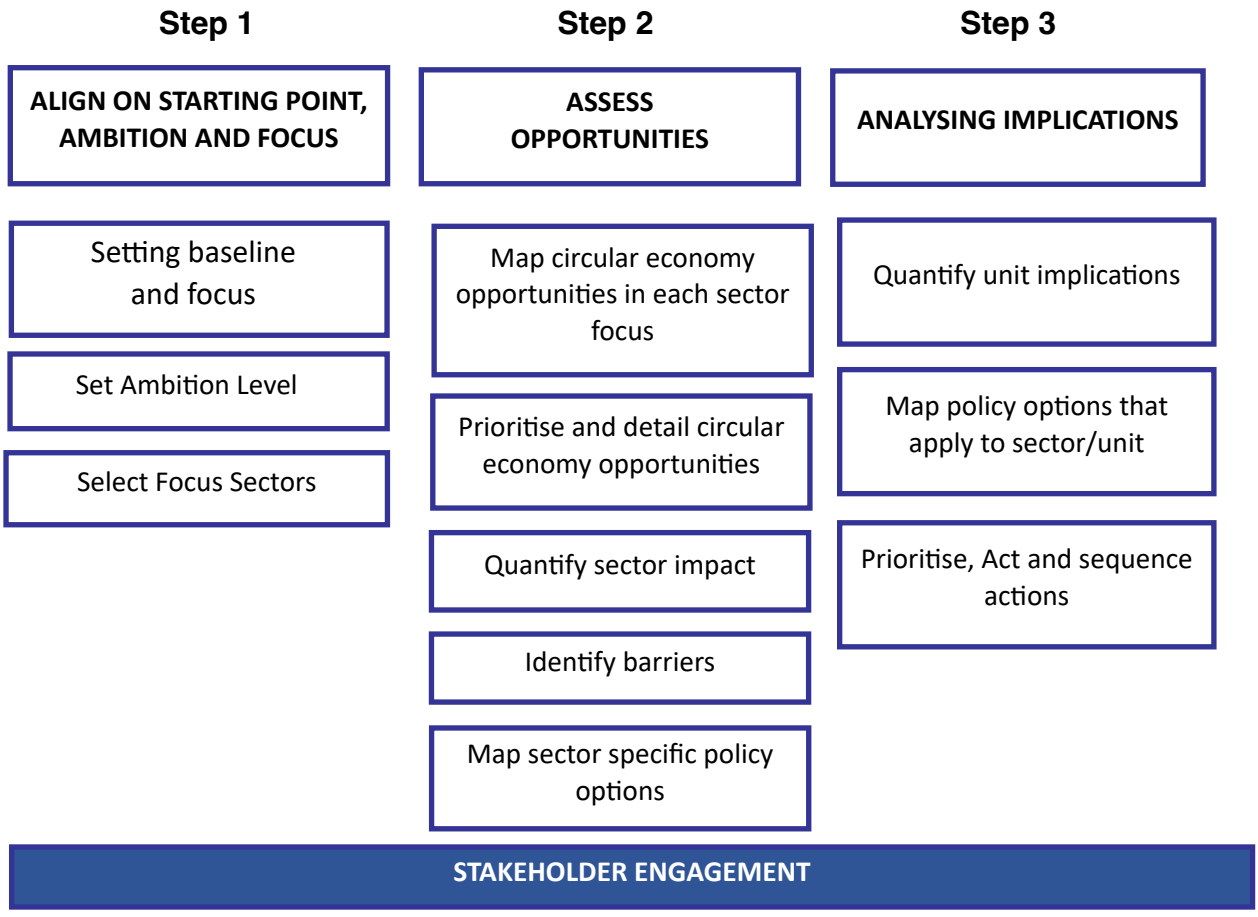
While these methodologies exist, it is important to explore definite ways of implementing these within the context of SMEs. The following details offers a step-by-step guidance for SMEs to explore and prioritise circular economy opportunities; quantify their impact; identify the barriers; map and prioritise the policy interventions and engage relevant stakeholders.

6.3.1 Align on starting point, ambition and focus: As in any strategic project, relevant stakeholders need to be mapped and engaged early on in the process. Based on an understanding of the national circularity and policy context, a realistic ambition level and sector scope needs to be defined.

6.3.2 Assess sector circular economy opportunities: Once the focus sectors have been selected, the sector-specific assessment can begin. This step can be conducted in parallel sector working groups, and heavily relies on the involvement of businesses.

6.3.3 Assessing implications: Once the sector-specific circular economy opportunities have been assessed, they can be aggregated, and implications analysed.

Figure 13: Applying guidelines for implementation of circular economy models



Source: Ellen MacArthur Foundation, Delivering Circular Economy.

Step 1.1 Setting baseline for aligning, setting ambition and focus:

Objective: Understand the starting point before deciding where to go.

Result: Assessment of the level of circularity compared to other SMEs. A broad understanding of the landscape of existing circular economy related policies.

Step 1.2 Set ambition

Objective: Align stakeholders on overall direction and focus of later sector deep dives to work towards a common direction.

Result: Clear, quantified ambition levels.

Step 2.1 Select focus sectors

Objective: Focus assessment of sector opportunities on the most relevant parts of the unit/ organisation.

Result: Set of focus sectors based on a prioritization matrix that maps sectors on 'role in national economy' and 'circularity potential'.

Step 2.2 Map circular economy opportunities in each focus sector

Objective: Create exhaustive overview of possible circular economy opportunities, to be prioritised.

End product: Structured map of potential circular economy opportunities for each focus sector, identified along the ReSOLVE framework.

Step 2.3 Prioritise and detail circular economy opportunities

Objective: Prioritise and detail opportunities in each focus sector based on potential impact.

End product: Set of (one to three) prioritised and detailed opportunities per sector.

Step 3.1 Analyse and quantify sector impact

Objective: Understand the economic (and resource) impact of circular economy opportunities, either as input to an economy-wide assessment

End product: Quantified impact for each opportunity and circular economy scenario

Step 3.2 Map sector-specific policy options

Objective: To lay out all relevant available policy options to address the barriers identified

End Products: A list of policy options for each barrier to each opportunity

6.4 Calculating Net Value Created as a Result of Circular Economy

6.4.1 Net-value Created

Circular activities bring two kinds of direct financial benefits to businesses:

(i) Cost savings from materials, components or labour

(ii) Increased revenues from additional sales and/or a higher unit prices

These need to be considered while calculating the net value.

6.5 Financial Benefit Analysis & Financial Instruments for Circularity

6.5.1 Circular Economy Models & Financial Benefits

Circular economy models promise financial benefits that can be achieved through resource efficient, resource conservation, use of secondary resources as raw material, reduction in CO_2 eq. emissions and more. Simple methods of analysing a baseline scenario (business as usual scenario), with an innovative circular model scenario is a key method to analyse financial benefits.

Business As Usual Scenario v/s Circular Models Scenario = Analysis of Financial Benefits

The formula above can provide qualitative and quantitative results for both the scenarios. SMEs can analyse the long term as well as short term benefits of circular economy model, planned for and implemented at the SMEs.

The formula to calculate circular economy benefits is:

Cost of production with practising circular economy model - Cost of production without circular economy model = Financial Benefit

SMEs can use these simple analytics or calculation methods to find our qualitative, quantitative or financial benefits.

6.5.2 Sustainable Financial Instruments

I. Green Bonds and Green Loans

UNEP Finance Initiative (2020) published that the International Capital Market Association (ICMA), voluntary Green Bond Principles (GBP), Social Bond Principles (SBP), and the Sustainability Bond Guidelines (SBG), provide globally recognised framework for the issuance of green bond, social and sustainability bonds.

For bonds and loans, the circular economy is addressed through the topics of energy efficiency, management of waste and efficient use of natural resources (forests, land, soil, water) logistics and technology. ICMA indicates that related to SDG-12, green bonds can organza their use of proceeds and means their contribution to sustainable consumption and production and circularity by reporting on various metrics like:

a) Avoided Resource Usage and avoided waste

b) Avoided emissions to air

c) Avoided emissions to land and soil

d) Secondary material use

e) Material recycled

f) Absolute / percentage reduction in local pollutants

g) Reduction of hazardous material used.

II. Sustainability ESG Linked Loans (SLL)

According to UNEP Finance Initiative (2020), sustainability linked loan is the general corporate loan that aim at raising capital for specific sustainability programmes of borrower.

III. ESG Investment Strategies

Few ESG investment strategies have embraced the transition to circularity theme. Organizations like BNP Paribas, BlackRock and RobecoSAM launched the CE themed investment funds. SMEs proven the implementation of circular economy models, can leverage the benefits of such funds.

6.6 Metrics For Financing Circularity

UNEP Finance Initiative (2020) published that the financial institutions responding prioritised the non-financial data like:

i. Circularity metric at product level

ii. Circularity metric as company level

iii. Data on product passport

iv. Data on toxicity levels

There are various other circularity metrics like water circularly, renewable energy, circular material uses and more.

6.7 Primary and Secondary Goal Setting Metrics

Table-6 provided the goals and example of metrics considered for calculating the value created by practicing circular economy. All metrics may not be directly related to SMEs, though ambitious SMEs may like to use national/ global standards and guidelines to calculate the impact after implementing circular economy model. The table below provides the standard guidelines to calculate the net-value addition, GDP generated, cost of externalities and opportunities.

Table 6: Goal setting attribute primary and secondary metric

Goal Setting Attribute	Primary	Secondary
Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows	Degradation-adjusted net value add (NVA)	• Annual monetary benefit of ecosystem services, example: from biodiversity and soils • Annual degradation • Overall remaining stock

Optimise resource yields by circulating products, components and materials at the highest utility at all times in both technical and biological cycles	GDP generated per unit of net virgin finite material input	• Product utilization • Product depreciation/lifetime • Material value retention ratio (energy recovery, recycling and remain industry)/value of virgin materials (rolling net average last five years)
Foster system effectiveness by revealing and designing out negative externalities	Total cost of externalities and opportunity cost	• Cost of land, air, water, and noise pollution • Toxic substances in food systems • Climate change, congestion, and health impacts

Source: Ellen MacArthur Foundation, SUN and McKinsey Centre for Business and Environment, *'Growth Within: A Circular Economy Vision for a Competitive Europe, 2015'*

CHAPTER 7: BENCHMARKING

After the implementation of suitable circular economy model in SME, is completed, the unit can take an initiative to benchmark their strategies, in order to set goals and future proof their businesses. Benchmarking can be done for the circular SME unit, or its products, its services, or its supply chain.

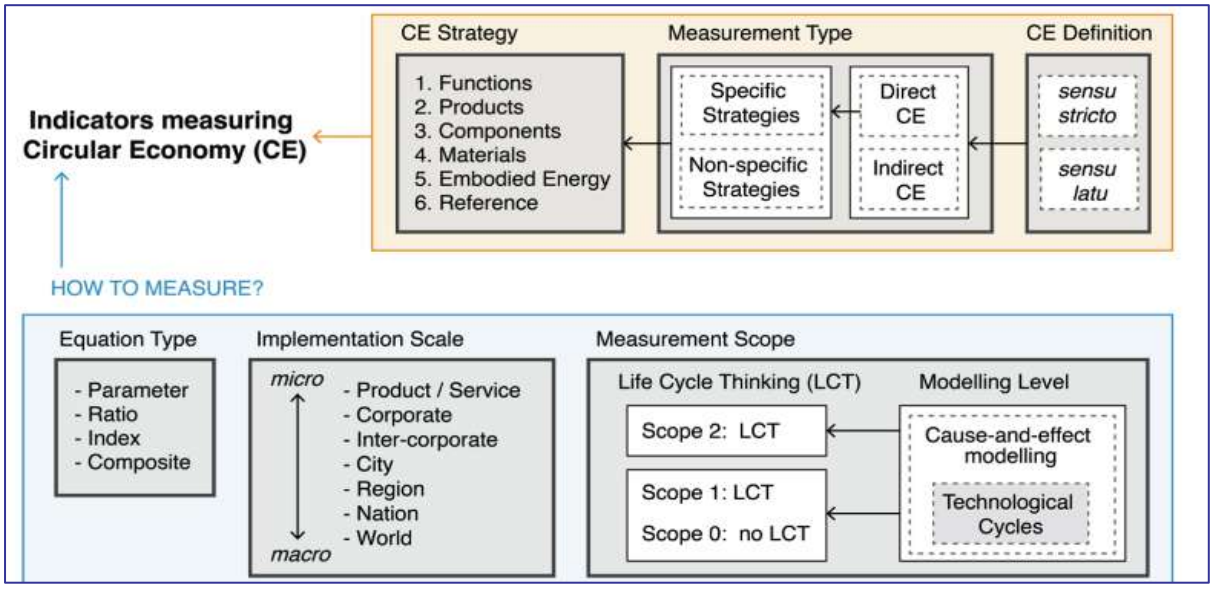
7.1 Strategic Benchmarking

For benchmarking, strategies to measure circular economy come into play. It can be initiated with the following strategies:

- **Strategy 1:** Preserve the function of products or services provided by circular business model, such as sharing platforms.
- **Strategy 2:** Preserve the product itself through lifetime increase with strategies such as durability, reuse, restore, refurbish, and remanufacture.
- **Strategy 3:** Preserve the product's components through their use, recovery and repurposing of parts.
- **Strategy 4:** Preserve the materials and resources through recycling, upcycling and down cycling.
- **Strategy 5:** Preserve the embodied energy through energy recovery.
- **Strategy 6:** Measure the linear economy as the reference scenario or the absence of a preservation strategy to show the BAU status/regress towards CE. For example, the indicator for waste generation per SME in a year might be, whether the implementation of CE is generating less waste or enhancing refurbishing /recycling.

To set up the benchmarking process, the SME need to focus on strategy, measurement type, equation type, implementation scale, measurement scope and modelling level.

Figure 14: How to measure circular economy – strategy step wise approach



Source: Delivering Circular Economy, Ellen MacArthur Foundation, 2018

7.2 Guidelines to Support Benchmarking Process

The tools mentioned below are currently practiced at beginner level. Thus, benchmarking leaves us with a scope for advancing further in transitioning to circularity and moving further from circularity to resource neutrality and carbon neutrality.

7.3 Assessment

Qualitative and Quantitative Assessment: This guideline recommends assessing qualitatively and quantitatively the (expected) environmental impact of the company or project focusing on material, energy and water use, waste generation, pollutant emissions, CO_2 emissions to help SMEs strengthen their commitment towards circularity.

The Circular Economy Guidelines Assessment recognises the overarching importance of working conditions, human rights, gender equality, health and other determinants of wellbeing. The Guidelines for circularity assessment for SMEs therefore propose:

- To cover the social aspects in the overall ESG policies and human rights statements of debt and equity providers
- To monitor the company's ESG performance too, as circularity and ESG are interlinked attributes.

Resource Efficiency Assessment are usually measured with material flow indicators. Material flow indicators measure total material use or relevant components of material use by SME unit/ city/ region/country. Due to the large scale of its use, water is not included; though water usage can be the integral part of resource efficiency assessment.

The following raw material groups are identified:

- Biotic raw materials: food and animal feed, fibres, timber, etc.
- Fossil fuel resources: oil, gas, coal
- Metallic raw materials
- Non-metallic mineral raw materials : construction minerals, industry minerals.

Furthermore, details are available in Annexure III.

CHAPTER-8: IDENTIFYING BARRIERS

Once the circular economy opportunities have been prioritized, it is time to look at the barriers that stand in their way. The manual provides a framework to categorize these barriers and analyse their severity.

The chapter refers to 15 types of barriers in four categories. It starts with the economic concerns of businesses those assessing the opportunities like : profitability, capital and technology. It includes the two 'classic' barrier categories from economic theory, market failures and regulatory failures, and its split into ten types:

Table 7: Barriers in implementing circular economy in SMEs

	Barriers	**Importance**	**Description and Comments**
Economics	Not profitable for businesses (even if other barriers are overcome)		N/A
	Capital intensive and/or uncertain payback times		N/A
	Technology - not yet available at scale		N/A
Market Failures	Externalities - true cost are not reflected in marketplace		N/A
	Insufficient public good or infrastructure provided by the marketplace		N/A
	Insufficient competition/ markets leading to lower quantity and higher prices than is socially desirable.		N/A
	Misleading information, example asymmetric or high-cost information that negatively affect market value		Not always clear to building owners and tenants whether sharing is profitable net of costs (example: related to safety)
	Split incentives (agency problem) when two parties to a transaction have different goals and levels of information		N/A
	Transaction costs such as the costs of finding and bargaining with customers or suppliers		It is costly (including in time) for building owners and tenants to find other individuals or organizations to share their building with

Regulatory Framework	Inadequately defined legal frameworks that govern areas such as the use of new technologies		Unclear rules and regulations related to example: taxation, creating uncertainty for parties that want to engage in sharing
	Poorly defined targets and objectives which provide either insufficient or skewed direction to industry		N/A
	Implementation and enforcement failures leading to the effects of regulations being diluted or altered		N/A
	Unintended consequences of existing regulations that hamper circular practices		Contractual restrictions exist on tenants sub-letting their houses or flats for less than a year and there is concern that companies such as Airbnb can start to turn residential areas into 'hotel areas'
	Capabilities and skills lacking either in-house or in the market at reasonable cost		N/A
Social Factors	Custom and habit: Ingrained patterns of behaviour by consumers and businesses		There is an inherent resistance to change habits around housing, such as sharing/renting out, and there are also deeply rooted norms and traditions around the use of offices
	Cultural barriers		Breaking old traditions / existing practices is difficult task and need continuous action.

Critical barrier ('make or break')

Very important barrier (to scale-up / acceleration of lever)

Important barrier (to scale-up/ acceleration of lever)

Limited or no barrier

CHAPTER-9: CIRCULAR BUSINESS MODELS FOR SMEs

There are various schools of thought that defined circular economy. SMEs can choose the best fitting model, suitable for their unit. The following are some important circular business models:

- **Circular Inputs:** Substitute virgin raw materials with secondary (recycled) materials ,originating from materials and resource recovery.

- **Circular design:** Eliminate and/or reduce input of hazardous, toxic materials; design for modularity, easy disassembly and re-pair to facilitate recycling, reuse, lifetime extension.

- **Sharing business models:** Companies or projects that increase the capacity utilisation of a product or asset during its useful life.

- **Lifetime Extension:** Companies or projects that increase reuse, refurbish, remanufacture to extend the useful life of products and assets.

- **Product-as-a-service:** Improve the circularity of the whole supply chain through product-as-a-service offerings based on:
    - A changed ownership structure, where the ownership of an asset remains with the supplier
    - Improved collaboration and alignment of interests between partners in the value chain
    - Improved traceability of products and materials.
    - Collaboration for collection and recycling

- **Material/resources recovery:** Companies or projects dealing value recovery from wastes, be it metals or materials, heat, bio-wastes or waste waters. This model consider recycling as a circular economy business model, as it recovers value from end-of-life materials and products.

- **Circular facilitators and enablers:** Establish networks and collaborate with facilitators in the circular economy such as consultancy, engineering, knowledge and data providers or accounting firms, facilitating the shift to a circular economy. These facilitators include their role in the circular economy in their business purpose or strategy. Some examples are:
    - Development of key enabling technology with circular economy applications
    - Facilitation of reverse logistics
    - Knowledge gathering and sharing on organizing the circular economy
    - Designing (measurement) tools for the circular economy
    - Setting up and/or operating marketplaces for used materials
    - Setting up and/or managing data repositories for material passports.

CHAPTER-10: CIRCULAR ECONOMY FOR OEMs

Original Equipment Manufacturers (OEMs) can achieve significant benefits with their shift from linear to circular economy. This chapter details, the ways and means, OEMs can implement circular economy, by taking the example of **automotive manufacturers industries** and the way they are adopting circular economy and leveraging venture capital opportunities.

The automotive industry has reacted to mounting pressures from policy makers and consumers to embrace the circular economy. Soaring prices of raw materials and advances in technology create opportunities to capture economic value from the circular economy. Some leading companies recognise this opportunity and are driving new revenue streams, harness circular technologies to lower their cost base, while responding to consumer demands.

Many of the leading car manufacturers have ambitious sustainability goals, which include lowering carbon emissions throughout production processes and ensuring that a high percentage of the material going into vehicles, is recyclable.

Raw material management, sustainable materials, waste as a resource and product life extension represent growing markets with accelerating demand where high investment in research and development is also the need of an hour.

Investing in these three key areas allows OEMs to stay ahead of regulators, and in touch with consumer sentiment.

10.1. Sustainable Materials

The case for a sustainable vehicle interior is a compelling. There is a pressing need to rethink the 'take-make-dispose' model. OEMs face increasing pressure to declare the provenance of materials, and to improve production processes. Localised sourcing is one solution. Eg. *Bridge of Weir Leather* Company in Scotland is often recognised as one of the most environmentally efficient leather manufacturers in the world and a key supplier of sustainable leather to the British automotive industry.

Low tolerances for imperfect markings in the automotive industry have traditionally resulted in high levels of waste. This creates a real incentive to make the switch to sustainable roll stock material where production can be controlled – provided quality is not compromised and consumer demand sustains such choices.

10.2. Waste as a Resource

Waste as a resource is a business model that promotes circularity and is vital to the automotive industry. The approach ensures that raw materials such as aluminium, textiles, and plastics are recycled and kept in use as much as possible in the local automotive industry.

Plastic recycling is becoming ever more important in the age of EVs. The light weighting phenomenon, whereby car manufacturers are increasingly using more plastics in vehicles to offset the weight of the batteries means that the car is gradually becoming less circular in nature. Manufacturers are increasingly looking for more natural and environmentally friendly materials to be incorporated in their vehicles. The use of recycled plastics will be key in adhering to both regulatory and consumer demands. Advances in material sorting technology are key to enabling this reuse of

waste. The longer-term goal is to lower the cost of recycled material over that of virgin materials, while not compromising on quality.

10.3 Product Life Extension

Predictive maintenance is still very much in its infancy in the automotive industry, not yet reaching the levels of maturity as in other sectors such as **aeronautics.** Maintenance still follows a traditional method whereby a service is recommended to be undertaken every 30,000km or two years on average. This presents a great opportunity for automotive OEMs and fleet managers to harness the technology needed to extend the lifetime of their vehicles and generate a new revenue stream in the process.

The recent rise of connected cars gives OEMs the opportunity to capitalize on the inflow of data they are collecting and subsequently offer remote diagnostic services. Revenues from new mobility services are expected to soar by 2030, with profits predicted to overtake those from vehicle sales.

Predictive maintenance combines both artificial intelligence (AI) and the Internet of Things (IoT) to help manufacturers compare real-time data from sensors on connected equipment to its historical performance data. For connected cars, this real-time information can help automotive OEMs and fleet managers accurately measure the condition of their vehicles and predict the need for replacement parts.

Figure 15: OEM Companies Adopting Steps for Circularity

Implementation of circular economy in heavy industries, automotive industry and their supply chain (as it consist of SMEs) is a wide open domain. This segment is highly energy and resource intensive. This sector having high potential to reap large benefits, with small investment in/for implementation of circular economy models.

CHAPTER-11: BENEFITS OF CIRCULAR ECONOMY FOR SMEs

Implementation of circular economy models provides innumerable benefits for user SMEs, as well as for its employees, environment and society around the unit. In addition, there are various circular economy models that allow SMEs to earn additional revenue or save from existing expenditure. Few benefits are stated herewith:

- SMEs can be at the forefront of circular economy innovations, **unlocking economic, environmental and social benefits** through the implementation of circular economy models.

- Circular Economy (CE) allows SMEs **to introduce new products** and services aligning with circular economy.

- CE **helps create new job opportunities** and the development of skill sets, supporting workforce future growth

- Helps **future proof business** with prospective funders who can help with the implementation and can be enablers to capture outcomes and impacts for varying SMEs.

- It provides requisite **skill sets for SMEs to increase their profitability,** waste diversion from landfill to energy generation and CO_2 emissions saving or emission reductions via circularity.

- Provides the requisite training for the SMEs on how **they can create value chain, shared value and capital,** again by connecting, communicating and partnering with varied stakeholders.

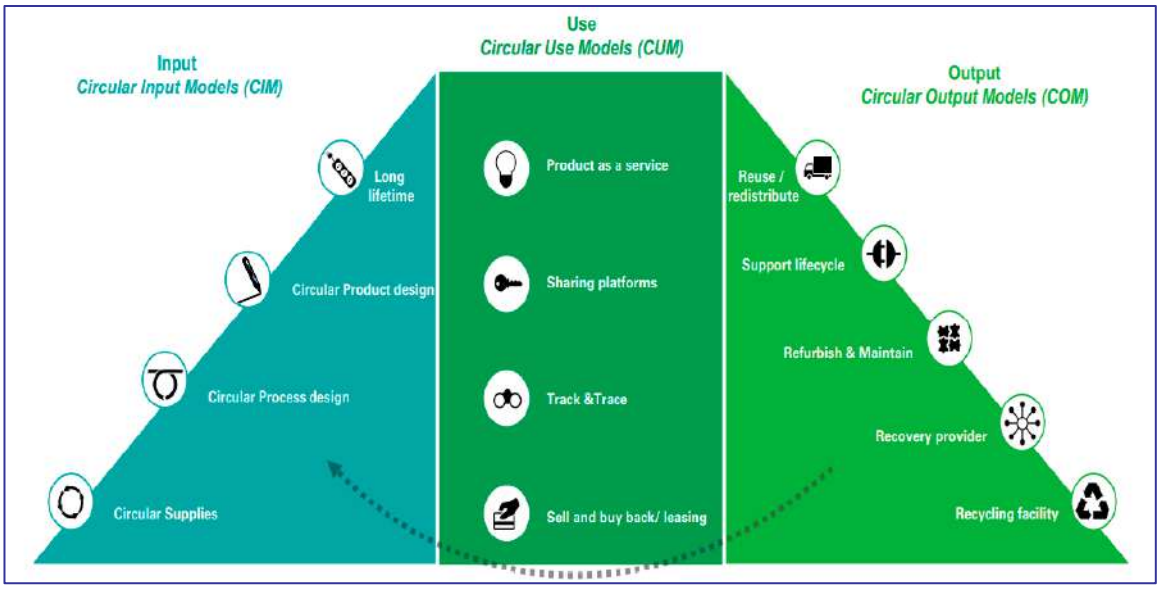
- Allows SMEs to not just **measure the progress of their transition efforts** but also make their action and efforts visible for future development based on the level of advancement.

- Helps **create economic resilience**.

- Life Cycle Assessments are useful tools **to compare products and to demonstrate environmental sustainability.**

Following diagram provides insight on circular economy model across the value chain.

Figure 16: Circular business models along the value chain



Source: Ellen MacArthur Foundation

Circular economy business models along the value chain is useful for SMEs to gain knowledge regarding the best suitable model and to develop the pathway for it's implementation.

CHAPTER-12: CASE STUDIES

CASE STUDY 1

Hindustan Unilever

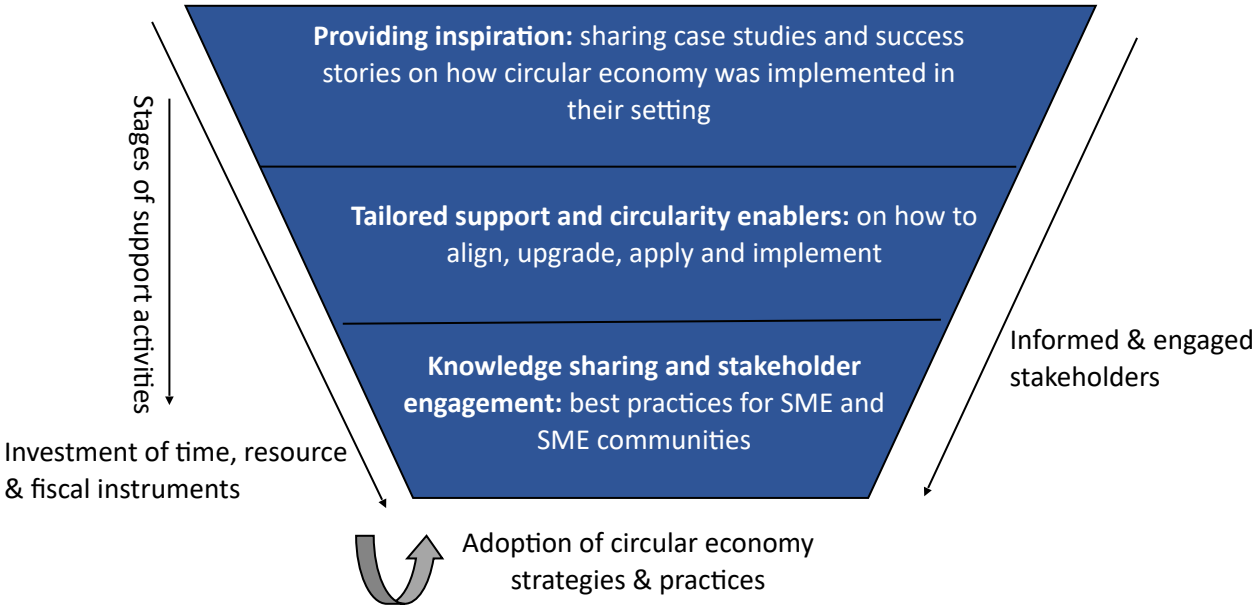
Location: India

Problem: Waste management – reduce and recycle

Solution/Action: **Developing an action plan in three steps:**

This includes a roadmap on how to establish, improve or expand your SME support organization's program and to help SMEs to adopt circular economy strategies and practices through a three-step process:

Step 1: List out the circular activities
Step 2: Determining the resources required to implement the circular project
Step 3: Develop a roadmap to establish, improve or expand circular economy program.



Outcome: Total waste generated from their factories in 2019 has reduced by 63%. All factories are equipped with pre-processing facilities such as waste segregation and waste reduction at source, thus improving recyclability. In 2019, they disposed of more than 39,000MTPA of plastic waste in environment friendly ways in India.

CASE STUDY 2

UNEP - Coca-Cola

Location: India

Problem: Non-availability of Recycling facilities

Action/Solution: The United Nations Development Program (UNDP) India, in partnership with Hindustan Coca-Cola Beverages Private Limited (HCCBPL) and Hindustan Unilever Limited (HUL) is building on existing systems to reduce the impact of plastic waste on the environment in India by promoting collection, segregation and recycling of all kinds of plastics to move towards a socio-technical circular economy model.

They established Swachhta Kendras within governance framework structures and enabled the improvement in the socio-economic conditions of waste pickers. They also developed technology, supported knowledge management to: promote cloud-based traceability, accountability and digital governance along waste value chain.

Approach of the case study

	Rethink	**Refund**	**Re-design**	**Re-engineer**
Goal	What is the criteria, how do we measure and ensure it?	Gather knowledge and make choices on the business model and financing options	Gather knowledge and make choices on design principles and material choices	Gather knowledge and make choices on the building process (Example: shaping a building coalition, contract structures)
Who	Decision makers on behalf of the case owners	All those involved in financing, (Example, partners in the supply chain)	All those involved in the design and material choices	All those involved in the collaboration and contracts (Example: partners in the supply chain)
Assignment	Determine clear criteria	choices regarding ownership and financial structures	Determine preferences regarding design, material.	Considerations regarding process

Outcome: The project is currently operational in 28 cities with 22 MRFs (Swachhta Kendras) and since 2018 has collected and processed over 17,000 MT of plastic waste.

CASE STUDY 3

Sanshodhan - Steering Circular Economy

Location: India

Challenge: Organisation's leadership in circular economy: Decision-making

Action/ Solution:

Sanshodhan has been working on design & development of customised, best suitable circular economy models and its implementation through their advisory, research undertaking, capacity building, government and international collaborations, in the areas of vehicular waste, e- waste and plastic waste.

Outcome:

Sanshodhan has designed the :

1. Digital-circular economy models for e-waste recycling and secondary resource recovery.
2. Digital -PRO system to support electronic manufacturers and plastic manufacturers to meet their EPR Compliance, with ease and without recurring investment.

Sanshodhan's innovation are awarded by She The People TV, DIPP, Government of India; World Economic Forum, Davos; Responsible Finance 7 Investment, UK and DDCAP Abu Dhabi and many others.

Since year 2018, Sanshodhan has been able to place India's actionable efforts in the fore front amidst the developed economies. India being an emerging economy is aspiring for net-zero and carbon neutrality and Sanshodhan as the unique innovator, is bringing in varied stakeholders at a common platform to bridge the gaps – for implementation of circular economy in Cities, SMEs, OEMs and institutions.

Sanshodhan provides advisory services and support its clients for interlinking their circular economy models with ESG Impact Assessment and Reporting and UN SDGs 2030.

More details can be found here: www.SustainabilityExchange.World

CASE STUDY 4

Denmark Uses Resolve to Apply Circular Systems in Focus Areas

Location: Denmark

Problem: Application of circular economy in focus sectors

Action/Solution:

The exercise is to scan the organisation and prepare the organisation for implementation of Circualr economy model. At initial stage, the organisation can map their readiness level, as provided in the table, below.

FRAMEWORK	Food and Beverage Industry	Construction	Machinery	Packaging	Hospitals
Regenerate					
Share					
Optimize					
Loop					
Virtualize					
Explore					

MODEL: Organisations can use the model RESOLVE and map on the parameters provided below, to understand their readiness level, to implement the circular model. This can be the first step, by any SME/organisation, keen to implement circular economy model in their unit.

Low potential

High potential

Prioritized for further assessment

Indirectly included or enabler of key sector opportunities

CASE STUDY 5

Circular Economy : Best Practice Aligned, Applied and Implemented

Location: Thailand

Problem: Assessing cost benefit of petroleum-based HDPE and of PLA resin obtained from cassava root.

Action/Solution: Cost benefit analysis of petroleum-based HDPE and of PLA resin obtained from cassava root and cassava starch in Thailand, is provided below.

Variables	HDPE (Million USD)	PLA Resin Obtained from Cassava root (Million USD)	PLA Resin Obtained from Cassava starch (Million USD)
Direct Cost (Production cost + Investment cost)	185.74	555.74	576.74
Indirect Cost (GHG emission + Opportunity cost of land)	143.92	30.92	20.92
Total Cost	329.66	586.66	597.66
Direct Benefit (sales of product	143	300	300
Indirect Benefit (sales of by product	NA	294 (Cassava Meals)	NA
Total Benefit	143	594	300
Net Benefit	186.66	7.34	-297.66

Outcome : The businesses preparing to implement circular economy model, need to conduct cost benefit analysis, can learn from the example provided above.

CASE STUDY 6

Danish Task-force for Resource Efficiency

Location: Denmark

Problem: Increasing the competitiveness of the Danish economy

Action/Solution:

The Danish Task-force for Resource Efficiency was set up with aim of increasing the competitiveness of the Danish economy and was part of the national growth strategy of the Danish Government, published by the Ministry of Finance in 2014. Its aim is to review existing regulations affecting resource productivity and circular economy practices, identify barriers and work to find solutions. The task-force identifies barriers blocking potential increases in resource efficiency; it establishes solution teams for each selected barrier to find the most effective way to overcome them. The key deliverables were:

- **Import/export of waste:** high barriers to start trading secondary raw materials
- **Take-back of products:** regulation is onerous when more than one product is collected
- **Definition of waste:** identical products can be subject to two different regulations if one is made from virgin materials and the other is made from recycled materials
- **Product design:** eco-design regulations do not sufficiently address resource efficiency and circular economy ambitions

Outcome:

> *'The Taskforce identifies regulatory barriers and underlying conflicting interests that prevent businesses from utilizing their input of materials and water more efficiently. The work of the Taskforce is an iterative process that alternates between business studies, other analysis, and development of solutions in dialogue with companies and relevant authorities.'* – **Anders Hoffmann, Danish Business Authority**.

OTHER CASE STUDY

NOTE: EXCERCISES

To learn more from various exercises, refer '**Circular Economy and Resource Efficiency in the Indian Context'**, EU-REI Project, GIZ-CII-TERI-adelphi, Internationale Zusammenarbeit (GIZ) GmbH, Nov. 2020.

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DEFENITIONS

Definition noting are taken from published sources, for user's understanding and providing knowledge base.

- **Circular economy** is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times
- **Cradle To Cradle** (C2C) Designing products "for continuous recovery and reutilization as biological and technical nutrients
- **Performance Economy** "Selling services rather than products" ("functional service economy"/ "performance economy")
- **Industrial Ecology** Creating closed-loop processes in which waste serves as an input, thus eliminating the notion of an undesirable by-product
- **Natural Capitalism** Recognizing the interdependencies that exist between the production and use of human-made capital and flows of natural capital"
- **Blue Economy** "Using the resources available in cascading systems, the waste of one product becomes the input to create a new cash flow"
- **Regenerative Design** Supporting "systems which are capable of being restored, renewed, revitalized through the integration of natural processes, community action and human behavior
- **Circular design** is at the heart of a circular economy, Skills in circular product design and production: Material choice optimized for circular setup :
    - *Design to last*
    - *More modularization/standardization*
    - *Easier disassembly*
    - *Production process efficiency*
- **Modular Design** is a design approach that creates things out of independent parts with standard interfaces. This allows designs to be customized, upgraded, repaired and for parts to be reused.
- **Eco design** means the integration of environmental aspects into product design with the aim of improving the environmental performance of the product throughout its whole life cycle.
- **Reuse** means any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.
- **Recovery** means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.
- **Downcycling** means "to recycle waste materials in such a way that the resulting products are of a lower quality] than the original.
- **Upcycling** means to reuse discarded objects or material in such a way as to create a product of higher quality or value than the original.
- **Closed Loop** Materials, components and products are 'technical or biological nutrients' circulating in closed loops, where nothing is wasted but instead channeled to different processes depending on the remaining properties and characteristics of the materials, components and products.
- **Open loops** are the opposite of closed loops. Therefore, an "open loop system creates waste or byproducts for which there is no use. Getting rid of unwanted byproducts usually costs money, degrades the environment, or both. Despite the economic efficiency of a closed loop system, most modern-day production is open loop.

ACRONYMS

BAU scenario : Business as usual scenario

CE: Circular Economy

SME: Small and Medium Enterprise

SUP: Single Use Plastics

GDP: Gross Domestic Product

NDV: Net Value Add

GVA: Gross Value Add

PEF: Product Environmental Footprint

OEF: Organizational Environmental Footprint

EMAS: Environmental Management Audit Scheme

ETV: Environmental Technology Verification programme

EL: Eco label

LCA: Life Cycle Assessment

LCI: Life Cycle Inventory

ANNEXURE: I

CHECKLIST FOR PREPARING THE EMPLOYEES/ TEAM

I. INITIAL ASSESSMENT

Questionnaire Attribute	**Level**									
What is your role in your organization?	Manager	Senior Manager	Supervisor	QC & QA official	Auditor	Supplier	Retailer	Business development officer	Analyst	Other
Questionnaire Attribute	***Aware***				***Not Aware***					
Do you as an employee or at individual level aware of circular economy?										
Questionnaire Attribute	***For developing core competencies***				***The training program content and coverage focusing on best practices in circular economy?***					
What motivated you to register for the training program on circular economy? Tick mark the two mentionable and provide details										
Questionnaire Attribute	Yes				No					
Does your organization plan to align, apply and implement circular economy in its supply chain?										
Questionnaire Attribute	Yes				No					

Are you aware of Reduce, Reuse, Redesign, Remanufacturing, Refurbishment and Recovery terminology and how to plan, prepare and set the chord for implementing best practices in circularity in your setting		
Questionnaire Attribute	Yes	No
Has the management team or board deputed you to attend the training? (This questionnaire is to get to know how much importance board gives to skill development and on job training in upgrading their competencies		
Questionnaire Attribute	**Yes**	**No**
How do you communicate the stewardship to your stakeholders? Is reporting or disclosure being done by your organization		

ANNEXURE: II-A

CHECKLIST OF TOP MANAGEMENT / DECISION MAKERS IN (EXISTING) SME

NOTE: It is NOT mandatory for SMEs to follow all points. SME can choose the points relevant to their unit.

II. PLAN: Initial Screening to Identify the Hotspots for Implementation of Circular Economy Model

Questionnaire Attribute	Yes	No
Does your SME have a dedicated team to bring about best practices in sustainability, climate change, energy and aligning it with circular economy and net zero commitment?		
Does the board plan to induct a dedicated team in the upcoming months (If the answer to question-1 is NO?		
Does the board or management team has dedicated specialist/ advisors' part of board panel to place in key issues and gaps and advises on how to resolve it?		
Does the management team have a Chief Sustainability Officer?		
Does the management team have a Chief Financial Officer?		
Does the board have designated charter being communicated to its employees on how to align, apply and implement circular economy?		
Does the board from time to time communicate its requirement to its suppliers, retailers and service providers and other associated stakeholders aligning with circularity?		
Does the board or management team has framed a circular economy policy (sector specific) in consultation with its employees and other associated stakeholders?		
Does the SME have a Sustainable Procurement Policy in place?		
Does the board has inducted piloting the integration of waste reduction and recycling management into employee training		
Has the board or management team articulated and approved setting waste minimization and recycling targets?		
Has the Board or management team communicated the company environmental, economic and social, Governance (ESG) framework policy to its employees?		
Has the board or management team approved fiscal incentives to avoid non-hazardous waste streams to level the existing markets for recycling initiatives - incentives to motivate type policy?		

Has the SME setting created **any supporting and co-creating platform,** to share information, exchange best practices and developed a joint strategy for reducing waste and increasing recycling rates to establish SME as a frontrunner in circularity?		
Does your SME best practice in circularity contribute to the regional / national economy in terms of gross value added?		
Does your SME provide equal opportunity for sustainability, climate change and energy practitioners as workforce?		
Does your SME have Sustainable Procurement Manager?		
Does Competitiveness – trade openness and security of supply, is visible in your organization? (includes Export and import volumes included to reflect each sector's competitiveness on the international market)		
Does the board or management have a circularity potential dimension placed in its company policy?		
Does the board have a grasp of Material intensity ?		
Does the board or management team have in place a platform to initiate and discuss on pricing in of externalities?		
Does the company do Environmental profiling – Includes weights of both total waste volumes and recycled material, to reflect both-leakage of material, and the proficiency with which the material is recovered, improvised and reused.		
Does your SME setting incorporate accounting for externalities (example: the life cycle/carbon/water/virgin materials footprint) into the guidelines or rules to create full cost transparency?		
Does the SME employee /workforce by the board or management team is provided with requisite facility to develop skillsets for circular economy?		
Does your SME setting have the requisite infrastructure so that there is no leak of nutrients from the biocycle to the technical cycle? *(Applicable for natural chemical industry/SME).*		
Does the board or management team provide the core competencies or allow to upgrade the competence on how to avoid leakage of non-circular materials / by-product or assess best end-of-use option?		
Identified the hotspots through the points stated above?		
Choose the best fit circular economy model, for your SME.		

Source/ Reference: *Various text books and publications on circular economy.*

ANNEXURE: II-B

CHECKLIST OF TOP MANAGEMENT / DECISION MAKERS IN (EXISTING) SME

III. CHECKLIST BASED ON PDCA MODEL

NOTE: It is NOT mandatory for SMEs to follow all points. SME can choose the points relevant to their unit.

PARAMETERS	YES	NO
PLAN- Follow the Checklist Annexure II-A		
DO		
Implemented the best fit circular economy model for your SME?		
Identified the challenges faced?		
Listed the challenges faced? If Not, list down the challenges faced during implementation.		
CHECK		
Checked the reasons behind the challenges?		
If not, list the reason behind the challenged faced		
Plugged in the reasons behind the challenges? If not, close the reasons/ challenges.		
ACT		
Re-Implemented the circular economy model?		
Assessing each stage of implementation of circular economy model?		
Noting down the parameters that need to be monitored to assess the success of implemented circular economy model?		

ANNEXURE: III

REFERENCE/ FORMULAS

MATERIAL FLOW INDICATORS

Extraction of raw materials + imports = Domestic Material Input (DMI)

Exports = Domestic material consumption (DMC)

If imported goods are measured in so-called = Raw Material Equivalents (RME)

Raw materials required to produce a good are denoted as = Raw Material Input' (RMI).

If exports are also measured in RME, material consumption is denoted as Raw Material Consumption' (RMC).

Resource efficiency is measured by relating the material flow indicators to the gross values added. In general, it is defined as:

Resource efficiency = GDP/Material flow indicator

**All indicators are measured in metric tonnes of raw materials.*

ANNEXURE-IV

STATE OF ART: KEY ACTIONS ON CIRCULAR ECONOMY

KEY ACTIONS	DATE
SUSTAINABLE PRODUCT POLICY FRAMEWORK	2021
Legislative proposal for a sustainable product policy initiative	2020
Legislative proposal empowering consumers in the green transition	2021
Legislative and non-legislative measures establishing a new “right to repair”	2020
Legislative proposal on substantiating green claims	As of 2021
Mandatory Green Public Procurement (GPP) criteria and targets in sectoral legislation and phasing-in mandatory reporting on GPP	As of 2021
Review of the Industrial Emissions Directive, including the integration of circular economy practices in upcoming Best Available Techniques reference documents	2022
Launch of an industry-led industrial symbiosis reporting and certification system	
KEY PRODUCT VALUE CHAINS	
Circular Electronics Initiative, common charger solution, and reward systems to return old devices	2020, 2021
Review of the Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment and guidance to clarify its links with REACH and Eco-design requirements	2021
Proposal for a new regulatory framework for batteries	2020
Review of the rules on end-of-life vehicles	2021
Review of the rules on proper treatment of waste oils	2022
Review to reinforce the essential requirements for packaging and reduce (over)packaging and packaging waste	2021
Mandatory requirements on recycled plastic content and plastic waste reduction measures for key products such as packaging, construction materials and vehicles	2021/2022
Restriction of intentionally added micro-plastics and measures on unintentional release of micro-plastics	2021
Policy framework for bio-based plastics and biodegradable or compostable plastics	2021
EU Strategy for Textiles	2021
Strategy for a Sustainable Built Environment	2021
Initiative to substitute single-use packaging, tableware and cutlery by reusable products in food services	2021
LESS WASTE, MORE VALUE	
Waste reduction targets for specific streams and other measures on waste prevention	2022

EU-wide harmonized model for separate collection of waste and labelling to facilitate separate collection	2022
Methodologies to track and minimize the presence of substances of concern in recycled materials and articles made thereof	2021
Harmonized information systems for the presence of substances of concern	2021
Scoping the development of further EU-wide end-of-waste and by-product criteria	2021
Revision of the rules on waste shipments	2021
MAKING THE CIRCULAR ECONOMY WORK FOR PEOPLE, REGIONS AND CITIES	
Plan for Social Economy, the Pact for Skills and the European Social Fund Plus	as of 2020
Supporting the circular economy transition through Cohesion policy funds, the Just Transition Mechanism and urban initiatives	as of 2020
CROSSCUTTING ACTIONS	
Improving measurement, modelling and policy tools to capture synergies between the circular economy and climate change mitigation and adaptation at EU and national level	as of 2020
Regulatory framework for the certification of carbon removals	2023
Reflecting circular economy objectives in the revision of the guidelines on state aid in the field of environment and energy	2021
Mainstreaming circular economy objectives in the context of the rules on non-financial reporting, and initiatives on sustainable corporate governance and on environmental accounting	2020, 2021
LEADING EFFORTS AT GLOBAL LEVEL	
Leading efforts towards reaching a global agreement on plastics	as of 2020
Proposing a Global Circular Economy Alliance and initiating discussions on an international agreement on the management of natural resources	as of 2021
Mainstreaming circular economy objectives in free trade agreements, in other bilateral, regional and multilateral processes and agreements, and in EU external policy funding instruments	as of 2020
MONITORING THE PROGRESS	
Updating the Circular Economy Monitoring Framework to reflect new policy priorities and develop further indicators on resource use, including consumption and material footprints	2021

ANNEXURE-V: EXERCISES

EXERCISE-1

LEVEL-1: Planned: Please mark yourself at Level-1 if you have already selected the circular economy models and planned every aspect, for the implementation.

LEVEL-2: Planning: Please mark yourself at Level-2 if you are planning for implementation of circular economy.

LEVEL-3: Initiator: Please mark yourself at Level-3 if you decided to implement circular economy but still need to start somewhere.

CIRCULAR ECONOMY

a) How relevant you think circular economy to your enterprise?

Question Attribute	1	2	3	4	5
Information and awareness					
Collaboration platform/ Co-creation platform (team cohesiveness)					
Business support schemes					
Green procurement and infrastructure (existing /					
Regulatory frameworks					
Fiscal frameworks					
TOTAL					

Low

Medium

High

GUIDELINES

Plan:

1. Are you aware of circular economy? Yes or No
2. Is your organization aligning its business with circular economy? Yes or No
3. Is your organization planning to align, apply and implement – plan and prepare for circularity its business in near future say example next 2 months or so? Yes or No

4. If the answer to question 2 is yes then at what level its aligning? Beginner level / Intermediate Level / Advanced Level. Mention the level. If the answer is no then when would your organization plan to initiate?

Do

1. Does your board is having a team to do planning, preparing and prioritizing circularity in its business? Yes or No
2. If yes, does your board from time provide opportunity to advance the skills of its employees to circularity? Yes or No
3. Do you have a circular business framework model prepared in consultation with your board member or management team? Yes or No
4. If no, then do you want ICE & SDGs as a knowledge focal point/service provider / mentor/organizer/capacity building expert or specialist assist / advice in preparing the business case model for circular economy for your organization?

Check

1. Do you have a checklist for the entire supply chain with whom you coordinate? Yes or No
2. Does your SMEs setting have stakeholder engagement platform – reporting done for circular economy/Sustainability reporting done or a TCFD (Task force related climate disclosures) Yes or No
3. Does your SME practice preparing gap document for its best practices for future proofing its business case? Yes or No
4. If no, do you want ICE & SDGs as a knowledge focal point/service provider /mentor/ organizer/capacity building expert or specialist assist / advice in preparing the business case model for circular economy for your organization?

BENEFIT: Learn the current status of your company and explore the possibilities for transformation to circular SME.

EXERCISE: 2

1. **Does your SME have comprehensive representation of materials and products flows? Yes or No; (For - manufacturing unit)**
   If yes, please provide detailing and if no do you want ICE&SDGs as a knowledge focal point/service provider /mentor/organizer/capacity building expert or specialist assist / advice in preparing the business case model for circular economy for your organization?

2. Does your SME, practice reduce, recycle and recovery? If yes, then at what level? Beginner/Intermediate /Advanced Level?
   Please, be noted it is a common question as regard to the linear model that is practiced.
   GUIDANCE:** Circular economy is a not just reduce, recycle and recovery but a include procurement, fiscal instruments and other requisite infrastructure. S**o, LIST the good practices and the level of implementation at your organisation.

3. Does your SME organisation has a Chief Sustainability Officer**?** Provide the details about the action taken by CSO.
   Yes or No

4. Do you plan to connect with ICE&SDGs even after the training programme so as to be a part of stakeholder engagement platform/eco-innovation hub and co-benefiting partners? For Share, report, communicate, integrate and implement best practices.
   Yes or No
   *** Comprehensive representation of material and product flows would enable a much more precise quantification of supply, demand, price and externality impacts from the circular economy.*

***BENEFIT:** Learn the current status of your company and explore the possibilities for transformation to circular SME.*

EXERCISE-3

Quantitative profiling of SMEs circularity practices: Whether Available or Not?

1. Does you SME plan, do and check, environmental profiling: Yes **or** No
    - If YES, then What is the waste volume?
    - What is share of waste not recovered?

    - **If NO, then explain** why it's not done?

2. Is sector contribution to local, regional or national economy in terms of Gross Value Add (GVA) being practiced by SME?
   Yes or No

3. Sector contribution to opportunities and job creation being quantified?
   Y**es or No**

BENEFIT: *Map the additional source of financial, social and environmental benefits.*

EXERCISE-4

- Plan and organize a **Circular Economy Month** in your organization
  - *Share your success story with your stakeholders.*

- **Maintain a log of your barriers and enablers encountered in the supply chain** with and without best practices of circular economy applied.

&/OR

- *Communicate with your training provider, the issues so as to have a **track**, **check** and **resolve** the challenges.*

BENEFIT:

- *Identify the hotspots / Enhance the supply chain*
- *This will help your SME to have strong connect with your customers and associated stakeholder.*
- *Transform your SME, as a Green Brand.*

About Mobius Foundation, India

The Mobius Foundation is a Delhi-based non-profit sustainability think tank, working towards the promotion of sustainability through education and empowerment using various approaches, tools, and technologies for a safe and secure planet. The Foundation was set up in 2015 with a view to mobilizing individuals and communities including a diverse range of International and National Agencies, civil society partners, NGOs, and institutions, to contribute towards the achievement of sustainable development goals (SDGs) specifically goals related to education (Goal 4) and other environment and population goals.

Major programs of the foundation are mentioned below:

International Conference of Sustainability Education (ICSE)

It is a major initiative of the Foundation for strengthening sustainability education through the exchange of ideas and experiences, best practices, case examples, and providing a platform for networking of Sustainability Education professionals, practitioners, and policymakers.

"MISSION SUSTAINABILITY- POPULATION VS. PLANET"

A campaign based on pressing environmental issues due to overpopulation and overconsumption titled "MISSION SUSTAINABILITY- POPULATION VS. PLANET" for English audience on WION Channel and संभलना ज़रूरी है - जनसंख्या बनाम प्रकृति" for Hindi and regional audience on Zee News and its regional network is also being conducted.

Project Aakar

This program is about shaping the family size for stabilizing the population in the State of Uttar Pradesh. Focussed on building awareness, counseling, facilitation, and influencing attitude towards Family Planning.

Circular Economy

Mobius Foundation is working towards empowering the educational institutions, organizations, and SMEs in Circular Economy as the latest sustainability paradigm that is restorative and regenerative by design.

There are many such projects and participation by Mobius Foundation in various other sectors like Education, Youth-oriented program, Plantation drives, Mobile Health Camps, School Support Programs, etc.

CONNECT

URL: www.mobiusfoundation.in ; **Email**: info@mobiusfoundation.in

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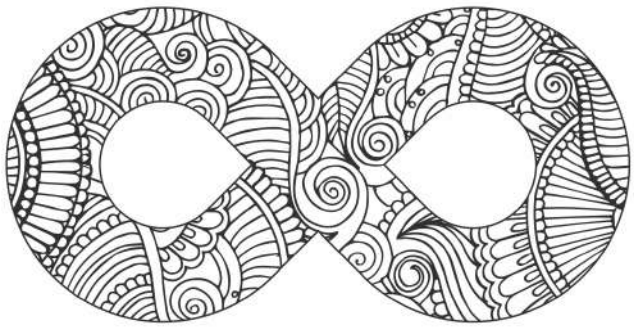
Global Institute for Circular Economy and Sustainable Development Goals (ICE&SDGs)

The Global Institute for Circular Economy and Sustainable Development Goals (ICE&SDGs) is an international think tank that works towards the advancement of science and technology through cutting-edge R&D and innovation and foster to the principles of good governance, supporting the business for social good through its service offering.

ICE & SDGs is unique organisation (NGO), dedicated to work on resource efficiency, circular economy and sustainable development goals (SDGs). ICE&SDGs works on circular economy, circular cities, SDG mapping, advisory services for corporates and industry, sustainability reporting, government for policy making, R&D projects, capacity building, CIRCULAR ECONOMY CERTIFICATION for Products, Offices & Manufacturing units, ZERO-WASTE Certification for businesses and offices, GHG accounting and management plan for industry and states, and creating enabling ecosystem to meet the global goals, UNSDGs 2030.

Also, ICE&SDGs has launched 'International Alliance on Circular Economy and SDGs', where we have founder members and mentors (senior officials) from Niti Aayog, Government of India; Tata Chemicals, Government of Telangana, Government of UP; Minion, WeGot, Vascobel Brussels; EEB Europe, Hindalco, Marks & Spencer, Sopra Steria and more.

ICE&SDGs lead the YouTube channel **SUSTAIN, A Leadership Talk Series** **(channel link:** https://bit.ly/3AFXIfs**). Visit us on** www.CE-SDG.org



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