



# Indian Climate Leadership

Life and Circular Economy



## 1. Transitioning from a Linear to a Circular Economy

India is one of the fastest growing economies in the world and is poised to become the most populous country, with a population of 1.66 billion by 2050<sup>1</sup>. However, India's growth ambitions and rapid economic expansion across a range of sectors has been accompanied by tremendous increases in material consumption and waste generation. For perspective, India registered a six-fold increase in annual material consumption (from 1.18 billion tonnes to 7 billion tonnes) between 1970 and 2015. Further, it is projected that by 2030, India will double its material consumption from the 2015 levels to 14.2 billion tonnes – in response to a rise in population levels and rapid urbanisation<sup>2</sup>. Moreover, India extracts resources per acre of land at a rate that is 251 percent higher than the world average, and India recycles only 20 percent of its consumption items<sup>3</sup>. Against this backdrop, it is vital that India transitions from a *linear economy* towards a *circular economy*. India's economy is presently largely linear – it is marked by a 'take-make-waste' approach, wherein resources are extracted, transformed into products, sold to consumers, and then disposed of after usage. This carries the risk of immense waste generation and environmental damage<sup>4</sup>. On the other hand, a circular economy approach looks to minimise waste materials while maximising the longevity of products through reusing, recycling, refurbishing, and repairing.

India's adoption of a circular economy path could bring in substantial benefits across different spheres: environmental (through the reduction in waste generation, congestion, pollution, and carbon emissions), economic (through resource efficiency, supply chain management, development of new business models, judicious use of finite inputs/resources at the company and national level), and technological (through the development of new technologies for waste management, innovative mechanisms for reuse and recycling)<sup>5</sup>. In particular, the economic case for a circular economy in India is strong: evidence suggests that the circular economy path to development could provide India annual benefits of \$624 billion by 2050<sup>6</sup>. Further, moving to a circular economy model would enable Indian businesses to realise material cost savings, avoid getting locked into linear models of infrastructure development, and achieve a competitive advantage over mature economies. For instance, it is estimated that 70 percent of the buildings expected to stand in 2030 are not yet built in India, as compared to 25 percent in the UK. This places India in a comparatively advantageous position to embed circularity in building construction and infrastructure development, while lowering the total costs for shifting to a circular model, and while building skills/expertise in circular economy practices (which can be exported to other markets)<sup>7</sup>. In this context, it is important to discuss: *To what extent can we reimagine the economy along the lines of 'repair, reuse and refurbishment' to fulfil vital circular economy goals? How can a circular economy adequately address the trade-off between economic growth and ecological welfare in India?*

## 2. Advancing India's Circular Economy Agenda

Transitioning from a linear to a circular economy requires a radically different consumption model for India – one that is propelled by multistakeholder efforts (across businesses, civil society institutions, households) and overarching policy support at the national, state, and local levels.

### Policy efforts and interventions

Recognising that circularity in consumption and production is a strategic lever for India's growth, the Government of India has instituted a number of policy measures to expedite India's transition to a circular economy model. For one, the Government of India has formed *11 committees* – led by concerned line Ministries and with the participation of officials from NITI Aayog and Ministry of Environment, Forests, and Climate Change (MoEFCC) – to prepare action plans for embedding more

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<sup>1</sup> Department of Economic and Social Affairs, United Nations. 2022. [Link](#).

<sup>2</sup> Observer Research Foundation. 2020. [Link](#).

<sup>3</sup> Observer Research Foundation. 2020. [Link](#).

<sup>4</sup> Economic Advisory Council to the Prime Minister. Government of India. 2023. [Link](#).

<sup>5</sup> Press Information Bureau. Government of India. 2021. [Link](#).

<sup>6</sup> Ellen Macarther Foundation. 2016. [Link](#).

<sup>7</sup> Natural Resources Defence Council (NRDC) and Administrative Staff College of India (ASCI). Constructing Change. 2012. p. 1.



circularity across focal areas, including 11 end-of-life products/recyclable materials/wastes that either continue to pose considerable challenges or are emerging as new challenge areas<sup>8</sup>.

In October 2022, the Government of India launched *Mission LiFE* (Lifestyle for Environment), a global movement to promote behaviour change and to nudge individuals towards sustainable consumption choices and circular economy practices. This programme has targeted elements focussed on promoting recycling, minimising 'destructive consumption', and reducing waste generation – that are implemented on a nation-wide basis<sup>9</sup>. Moreover, transitioning to a circular economy has been a key theme for the G-20 deliberations under India's Presidency. Recently, as part of the G-20 discussions, the industry-led Resource Efficiency and Circular Economy Industry Coalition (RECEIC) has been launched. This coalition aims to promote company-to-company collaboration, and to unlock private-sector action in enabling India's circular economy transition<sup>10</sup>.

In this context, it is important to discuss: *How can we drive the economic case for policy action to promote a circular economy model for India? How can Mission LiFE be made more 'real' and less intangible, as a cornerstone of a consumption model for the planet? Can we quantify the costs saved and the benefits realised from Mission LiFE in monetary terms, to make a stronger economic case for its widespread implementation? How does India inform the global discourse on climate change on circularity? In what ways can India utilise its G-20 presidency to influence high carbon-intensive, industrialised countries to adopt circular economy practices?*

A circular economy transition for an economy as large and complex as India requires policy coordination and alignment at multiple levels. A comprehensive circular economy policy roadmap, that is developed by the central government, and which has the buy-in of state and local governments is the need of the hour. Such a policy roadmap should look to align with the provisions of existing rules/laws (including the Plastic Waste Management Rules, e-Waste Management Rules, Construction and Demolition Waste Management Rules, Metals Recycling Policy) and build partnerships across Ministries/Departments, in pursuit of institutionalizing India's circular economy goals. Reusing resources and scrap materials from first-generation production processes forms the cornerstone of circular economy transitions – in this context, it is vital to institute robust waste management systems, that prioritise segregation at source, and which address the health and environmental hazards associated with plastic, battery, and electronic waste<sup>11</sup>. Further, policy and funding support should be extended to research and development (R&D) on steel scrap recycling. Promoting scrap markets – which provide raw materials for second-generation production processes – will be vital for waste management and resource use efficiency in future production. Future policy support should also look to replicate innovative practices, such as the setting up of Circular Economy Parks in Maharashtra, in pursuit of sustainable scrap recycling and waste management goals.

Here, it is vital to ask: *What policy measures should India prioritise to expedite the transition to a circular economy? How can vital industrial and environmental policies (including that on industrial parks, critical minerals, and resource energy efficiency) be adequately aligned to promote circular economy? To what extent can waste and scrap management ensure the availability of resources for second-generation production processes in India? How economically and technologically viable is recycling across various sectors (including critical minerals from batteries)?*

## **Sectoral interventions**

In India's transition to a circular economy, it is crucial to build industry-level roadmaps and institute robust sectoral interventions that support such a movement. Notably, India's construction sector holds the potential to impact India's circular economy transition significantly. It is estimated that applying circular economy principles to this sector could create annual benefits worth \$76 billion for India in 2050<sup>12</sup>. Within this sector, circular economy practices have started becoming increasingly widespread, through the construction of modular buildings (which minimise the quantity and cost of raw materials used), the use of regionally appropriate and non-toxic resources, and the improved focus on water and energy efficiency in all construction projects. Further, India's cement industry – which is highly relevant for all construction projects – has been rated as one of the best performing industries in terms of energy

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<sup>8</sup> Press Information Bureau. Government of India. 2021. [Link](#).

<sup>9</sup> Mission LiFE. Government of India. [Link](#).

<sup>10</sup> Press Information Bureau. Government of India. 2023. [Link](#).

<sup>11</sup> United Nations Environmental Programme. 2014. [Link](#).

<sup>12</sup> Ellen Macarther Foundation. 2016. [Link](#).

efficiency, environmental sustainability, and adaptability to new technologies. India's cement industries have implemented a range of circular economy processes, including the use of fly ash and TPP waste as alternative fuels and raw materials (AFR). Further, cement manufacturing itself supports environmentally sustainable waste utilisation – since the high-temperature incineration processes involved leave no residue and thereby minimise all wastes<sup>13</sup>. In this context: *How can India's construction sector adequately embed circular economy practices, while ensuring economic growth and profitability? What forms of policy and technological support can help the construction and cement industries to become carbon neutral in their practices? How can the extraction of resources for the construction sector be sustainably managed, in the context of India's circular economy ambitions?*

Similarly, India's apparel and textile (A&T) contributes to 2 percent of the GDP, but is a major source of pollution, resource extraction, and carbon emissions<sup>14</sup>. The ecological implications of India's A&T sector call for circular economy practices to be instituted widely within this sector. Further, the global scrutiny on 'fast fashion' and demand for sustainable products also provides greater impetus to this push towards circular economy. There are several avenues through which circular economy can be achieved in this sector, including the use of alternative/recycled fibres (such as hemp and banana fibre), limiting chemical use through compliance measures, adopting energy efficiency, and optimising water consumption (through wastewater treatment and re-use). It is also important to analyse the impacts of the recent European Union Policy on Circular Economy for Textiles<sup>15</sup> on the A&T sector, particularly in the context of global trade prospects. While this initiative seeks to promote separate collection, sorting, reuse, and recycling of textiles in the EU, and seeks to introduce mandatory Extended Producer Responsibility (EPR) schemes for all EU member states, India's A&T industry is yet to absorb the full implications of these new legislations. Here, it is important to ask: *In what ways can India's A&T sector be transitioned using circular economy principles, while ensuring sectoral growth and preserving employment prospects? What would be the potential impacts of the recent EU textile policy on India's textile industry? How can policy, technology and financial support help create safeguards against export and job loss in India's textile sector, in the face of the new EU regulations?*

### **Best practices and case studies**

In India's transition to a circular economy model, it is important to leverage lessons from best practices, and to scale up successful case studies in sustainable production and consumption practices. For one, the use of biofuels has emerged as a best practice for promoting circular economy in India. Biofuels are fuels that are developed from the waste products of other production/processing activities. Such fuels promise a sustainable pathway to manage/reuse wastes (including agriculture and forest residue, Municipal Solid Waste, cow dung etc.), while addressing India's energy needs<sup>16</sup>. Feedstock availability and production costs are two key factors driving the sustainable and commercial production of biofuels in India. The Government of India has proposed a target of 20 percent blending of ethanol in petrol, and 5 percent blending of biodiesel in diesel by 2030<sup>17</sup>. More recently, India has proposed a Global Biofuel Alliance as one of its priorities under the G-20 Presidency<sup>18</sup>. This Alliance seeks to facilitate global cooperation, strengthen global biofuels markets, and intensify the use of biofuels – particularly in the transport sector. Against this backdrop: *To what extent can biofuels contribute to India's circular economy transition? Given that biofuels emit GHGs upon combustion, is their use carbon neutral and can it be environmentally justified? What forms of policy and infrastructural support are required to promote biofuel production and use at a wider scale in India? Does the production of biofuels pose negative externalities to other sectors?*

Another case study comes from the city of Indore in Madhya Pradesh, which has implemented a highly effective model of waste management and disposal. In Indore, all waste is segregated at source as wet waste, dry waste, and domestic hazardous waste. The waste is then processed efficiently, with bio-wastes being directed for the production of organic manures and biofuels<sup>19</sup>. Notably, 25 MTPD of waste from Choitham Mandi in Indore, the largest fruit and vegetable mandi in Central India, is processed in a bio-methanation plant, and used to produce bio-CNG on a daily basis, which in turn is used to power

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<sup>13</sup> Enhancing Future Skills and Entrepreneurship. 2020. [Link](#).

<sup>14</sup> Centre for Responsible Business. 2022. [Link](#).

<sup>15</sup> European Union. 2022. [Link](#).

<sup>16</sup> Ministry of Petroleum and Natural Gas. 2023. [Link](#).

<sup>17</sup> IEA Bioenergy. 2021. [Link](#).

<sup>18</sup> Press Information Bureau. 2023. [Link](#).

<sup>19</sup> Press Information Bureau. Government of India. 2022. [Link](#).

the city's buses<sup>20</sup>. Here, it is vital to discuss: *How can the Indore model be promoted more widely across India? What infrastructural and policy support will be required to institute 100 percent segregation and collection of waste at source? To what extent can every State in India have a 'lighthouse' city like Indore guiding the way for more sustainable consumption and waste management practices?*

Other best practices emerge from the private sector. For instance, Tata Steel has exemplified its commitment to circular economy in several ways. The Company's scrap collection and shredding facility focuses on producing high-quality steel scrap, which in turn adds productivity to steelmaking, while reducing waste generation and GHG emissions. Further, Tata Steel has shown its commitment to a 'Zero Waste' goal by ensuring 100 percent solid waste utilisation by Tata Steel Jamshedpur and Tata Steel Kalinganagar for FY 2021-22<sup>21</sup>. In addition, the Company has invested in technology to re-use iron and steel slags, thereby conserving natural aggregates and minimising its overall environmental footprint. With this backdrop, let us ask: *How can best practices pioneered by Tata Steel and other private sector institutions be replicated at scale across the country? What is the potential for public-private collaborations in India's circular economy transition? How can an economic case for circular economy be made to address the priorities of corporates and business houses?*

### 3. Challenges to India's Circular Economy

While India is ramping up multi-stakeholder efforts in pursuit of its circular economy transition, certain challenges remain to be addressed. For one, transitioning to a circular economy requires a 'paradigm shift' – one that comes with substantial costs<sup>22</sup> (R&D and asset, investments, stranded investments, subsidies, and spending on digital infrastructure). However, investment in circular economy processes, infrastructure and services still remains relatively low in India, with spending directed towards specific sectors or limited to certain policy areas. Going forward, it would be vital to explore multi-stakeholder partnerships (across policy bodies, business houses, research organisations, and academic institutions) to collectively fund and develop viable, cost-effective technologies and processes for India's circular economy transition. This would help overcome some of the existing funding challenges, while unlocking new collaborations and transcending new R&D frontiers. *How can business houses and corporates be incentivised to fund R&D in circular economy practices? What platforms can best integrate the interests of policy, business, and research, and address the broader circular economy agenda?*

Another challenge relates to the segregation of wastes. Despite policy requirements and significant awareness raising activities to segregate wastes, the bulk of India's solid waste is dumped without proper handling, leading to harmful consequences on human health and the environment<sup>23</sup>. Mixed, biodegradable wastes are often dumped along with inert wastes, and open burning of wastes is a common practice – which contributes to significant carbon emissions and air pollution. Further, informal waste handlers and rag pickers form the bulk of India's solid waste management infrastructure, and often lack the knowledge and awareness to segregate at source. In addition, behavioural changes that underpin waste segregation at source have been limited across households and industries. Against this backdrop, it is vital to discuss: *How can India scale up the 100 percent waste segregation at source model? What forms of behavioural interventions will help promote circularity in waste management, disposal, and recycling? To what extent can programmes like Mission LiFE ensure behaviour change at scale to promote circular economy in the long run?*

Finally, a third challenge relates to India's fulfilment of global circular economy requirements, while also protecting its domestic economic interests. For instance, the emerging European Union circular economy legislations related to the textile sector have implications on India's textile industry, exports, and domestic employment opportunities<sup>24</sup>. Similarly, other circular economy requirements – introduced by other nations – inevitably present trade-offs between India's trade and growth prospects, and its environmental commitments. Going forward, it is vital to ask: *how can Indian negotiators and Indian industry respond to the emerging circular economy requirements of other industrialised economies, and multilateral agencies? How can India balance its commitments to expanding global trade, protecting domestic production, and promoting planetary welfare?*

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<sup>20</sup> Smart City Indore. Government of India. 2023. [Link](#).

<sup>21</sup> Tata Steel. 2023. [Link](#).

<sup>22</sup> McKinsey and Company. 2016. [Link](#).

<sup>23</sup> Royal Society. 2017. [Link](#).

<sup>24</sup> European Union. 2022. [Link](#).

