

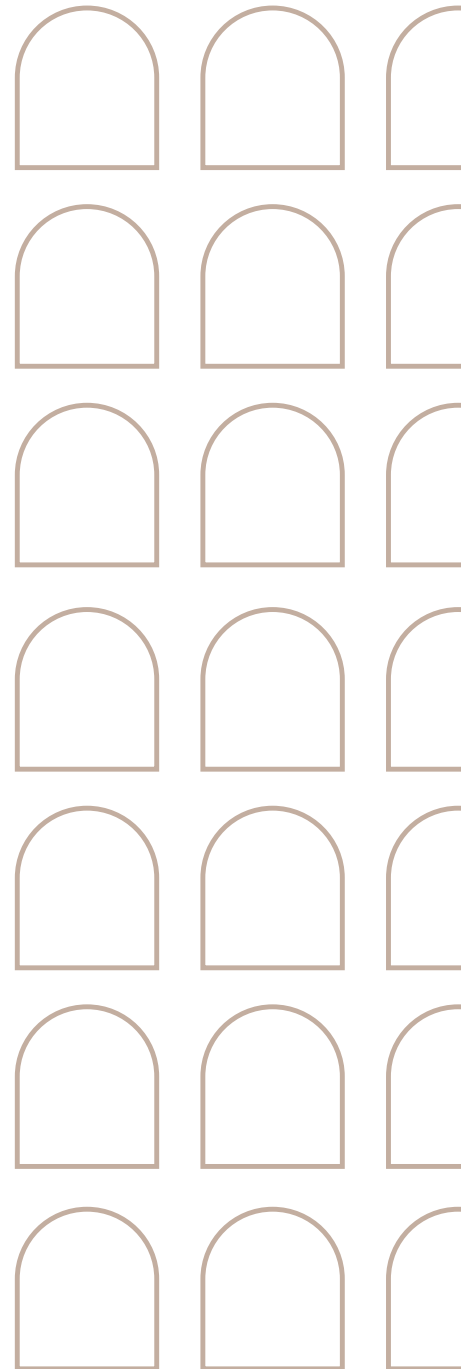
STG Policy Papers

POLICY BRIEF

CIRCULAR ECONOMY APPROACH - ECONOMY, LIVELIHOODS, AND ENVIRONMENT

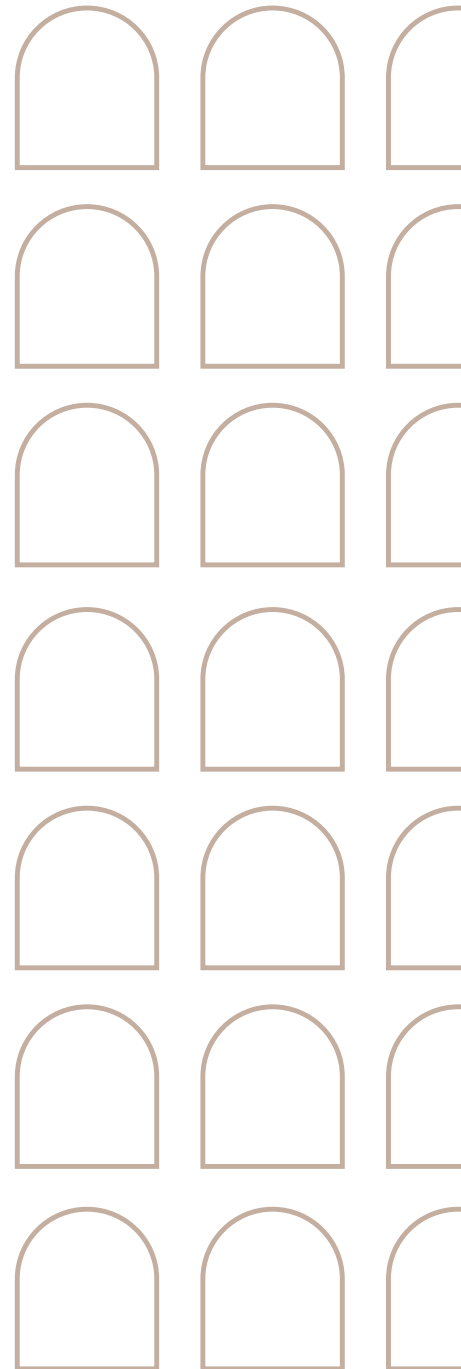
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EXECUTIVE SUMMARY

It is time to ask some simple and some not so simple questions about the various forms of circular economy (CE) and their existing business models. According to the European Commission, CE is a production and consumption model that aims to preserve the value of products, materials and resources for as long as possible by returning them to the product cycle at the end of their use, while minimising waste generation. CE is closely linked to environmental problems such as air and water pollution, waste generation, etc., as well as to climate change and the goal of limiting the temperature rise to 2 degrees Celsius. Therefore, it is necessary to understand the need for new business and governance models that go beyond sectoral policies for effective implementation of CE. This policy brief highlights the concept and approaches of CE and outlines the role of governments, businesses, and international institutions in improving the transition from a linear to a CE. Using India, a developing country, as an example, the authors highlight the opportunities and challenges in moving towards a CE approach. The authors conclude by identifying ways to improve the adoption of CE through increased investment flows, competitiveness, the emergence of innovative business models, and job creation.



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1. INTRODUCTION

From the perspective of climate change, the circular economy (CE) is an important concept to combat the excessive emission of greenhouse gases (GHGs) into the atmosphere. It is an economic system that aims to maximise the use of resources and generate as little waste as possible to dispose of. The approach not only contributes to the global debate on how to tackle the climate crisis, but also creates a more sustainable environmental and economic system by converting waste into resources, which is a fundamental step towards achieving climate goals.

The GHGs that cause climate change are a product of our fossil fuel-based resource economy, which does not manage resources for the long term, but merely depletes and wastes them. To meet the [Paris Agreement's](#) goal of 1.5°C by 2050, something needs to change to put the world on track to reduce its emissions to zero. According to a study by the Ellen MacArthur Foundation, the cost of climate change to the global economy is expected to be USD 54 trillion by 2100 and will rise sharply with each additional temperature increase. As the world's population grows, the demand for raw materials also increases exponentially, with significant environmental impacts. Moreover, the demand for resources, which are becoming scarcer and less accessible, is increasing and requires recycling and management of the huge residues/wastes that are being generated¹.

Resource efficiency (RE), i.e., producing more (economic) value with less resource use and reducing the environmental impacts associated with resource use, is also another way to practice effective circularity in economy. It helps to reduce the extraction and use of raw materials, energy consumption, and CO₂ emissions that contribute to climate change and pollution².

The European Commission (2011) defines

RE as using the Earth's limited resources in a sustainable manner while minimising impacts on the environment', and the United Nations Environment Programme (UNEP, 2009) defines RE 'as reducing the total environmental impact of the production and consumption of goods and services, from raw material extraction to final use and disposal'.

Increase in creation of local jobs from recycling and remanufacturing, cost savings on raw materials, reduced emissions from the energy used to extract new resources, less pollution from toxic substances, and human and environmental health benefits are just some of the benefits of moving to RE to make the CE a reality³. To show a possible trade-off between economic growth and environmental well-being, RE should be combined with CE ideas. This will encourage the use of secondary raw materials by reusing, recycling, or processing waste to produce new or different items. This will also accelerate the transition to self-sufficiency and inspire new business models and entrepreneurial endeavours.

2. MAKING ECONOMY CIRCULAR

The way value is created or maintained differs between the linear and circular systems. A linear economy often follows the sequential "take-make-dispose" model. This means that raw materials are collected, transformed into usable items, and then disposed of as waste.

Waste doesn't exist in a CE because goods and raw materials are continuously and thoroughly utilised. New raw materials are created from waste. On a micro- and macroeconomic level, a CE has advantages that are both tactical and strategic. This trillion-dollar opportunity has tremendous potential for economic growth, job creation, and innovation⁴.

1 OECD (2019), Global Material Resources Outlook to 2060: Economic Drivers and Environmental Consequences, OECD Publishing, Paris, Available at: <https://dx.doi.org/10.1787/9789264307452-en>.

2 Yang, M., Chen, L., Wang, J. et al. (2022) Circular economy strategies for combating climate change and other environmental issues. *Environ Chem Lett*. Available at: <https://doi.org/10.1007/s10311-022-01499-6>

3 Hirschnitz-Garbers, M., Montevecchi, F., Martinuzzi, A. (2013). Resource Efficiency. In: Idowu, S.O., Capaldi, N., Zu, L., Gupta, A.D. (eds) *Encyclopedia of Corporate Social Responsibility*. Springer, Berlin, Heidelberg. Available at: https://doi.org/10.1007/978-3-642-28036-8_728

4 <https://earth5r.org/crucial-reasons-implementing-circular-economy/>

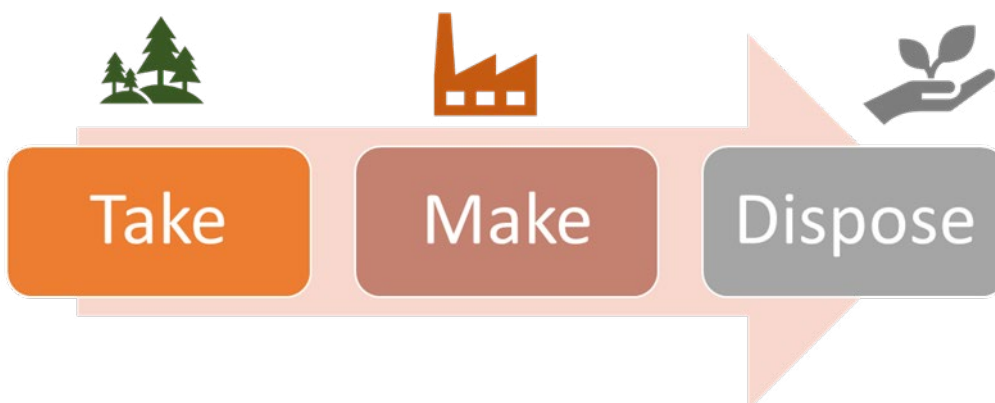
3. GLOBAL SCENARIO

The CE has the potential to reduce global GHG emissions by 39% and reduce the consumption of new resources by 28% by adopting smart practices and reducing material consumption. In addition, it has been found that only 8.6% of the 100 billion tonnes of materials entering the global economy each year are recycled back into the market⁵.

Figure 1: Waste is essential to CE



Figure 2: Take-make-dispose model



⁵ The Circularity Gap Report 2021. Available at <https://www.circularity-gap.world/2021>

The global material footprint, which measures the total amount of raw materials extracted to meet final consumption needs, has increased from 43 billion metric tonnes in 1990 to USD 54 billion in 2000 and USD 92 billion in 2017, according to the United Nations Department of Economic and Social Affairs⁶. This is an example of how the environment is stressed to support economic growth and meet the material demands of people. The use of natural resources has increased since 2000. Without concerted action by governments, it is expected to increase to 190 billion tonnes by 2060.

Global material extraction surged from 27 billion tonnes to 92 billion tonnes between 1970 and 2017, and material consumption is expected to rise to 167 billion tonnes by 2060, according to the United Nations Industrial Development Organization⁷. The medium-and long-term recovery efforts of the International Monetary Fund could result in enhanced sustainable, resilient, and inclusive communities and economies by combining CE and RE measures in specific sectors.

According to research by Circle Economy, an organisation supported by United Nations Environment Programme (UNEP) and the Global Environment Facility, only 9% of the 92.8 billion tonnes of minerals, fossil fuels, metals and biomass that enter the economy each year are recycled⁸.

The global economy would gain USD 2 trillion annually from more efficient resource use, according to UNEP calculations for 2050⁹. These benefits would undoubtedly be realised in a CE. On the one hand, by increasing the productivity of new cyclical activities, and on the other hand, by improving functionality while using the same resources and production methods. The design, manufacture, and maintenance of these circular products require specialised labour, which lead to an increase in related jobs. On the other hand,

the demand for the extraction and processing of raw materials will decrease, leading to a decrease in the number of less specialised jobs thereby increasing the value of labour.

4. CIRCULAR ECONOMY AND CLIMATE CHANGE

Material consumption and climate change are closely linked. According to Circle Economy, only 38% of global GHG emissions are released in the provision and use of goods and services, while 62% are released in the extraction, processing, and production of goods to meet societal needs. However, global material consumption is increasing¹⁰. The UN International Resource Panel estimates that material consumption has more than quadrupled since 1970 and could double again by 2050 if no action is taken.

Recycling, more efficient resource use, and circular business models can save a lot of emissions. The systematic application of these tactics could make the difference in the fight against changing climate.

The immense potential of the CE has been underestimated as the world has focused on climate change solutions such as renewable energy, energy efficiency, and avoiding deforestation. However, redesigning and changing supply chains will increase the efficiency of the economy, which will not only reduce emissions but also drive growth.

Central to today's efforts to prevent climate change is the critical role of renewable energy and energy efficiency measures. However, to achieve climate goals, the other 45% of emissions associated with the production of goods must also be reduced, and this can be achieved through the introduction of CE¹¹.

The recently concluded 27th session of the Conference of the Parties (COP 27) to the [United Nations Framework Convention on](#)

6 <https://unstats.un.org/sdgs/report/2019/goal-12/>

7 United Nations Industrial Development Organization (UNIDO), (2019) Industrial Resource Efficiency Division and Circular Economy.

8 <https://unfccc.int/news/circular-economy-is-crucial-for-climate-protection-patricia-espinoza>

9 <https://www.unep.org/news-and-stories/press-release/smarter-use-resources-can-add-2-trillion-annually-global-economy>

10 <https://unfccc.int/news/circular-economy-crucial-for-paris-climate-goals#:~:text=Circle%20Economy%20calculates%20that%2062,use%20of%20products%20and%20services.>

11 <https://unstats.un.org/sdgs/report/2021/goal-13/>

[Climate Change](#) highlighted the importance of harnessing the combined strength of the public and private sectors to close the implementation gaps between climate change commitments and actions, and to move forward in a fair and equitable manner. The need to decarbonize the globe is obvious, but the question we must ask is, how can we harness the power of economic and CE in a way that solves the global problems of pollution, climate change, and biodiversity loss?

The CE can help achieve [Sustainable Development Goals](#) (SDGs), especially SDG 12 (responsible consumption and production), as well as achieve [net-zero emissions](#) by 2050 in the medium to long term and address the causes and impacts of climate change¹². To achieve this, moving away from linear fossil fuel-based systems and create equitable and sustainable production and consumption processes is needed. This will further lead to creating communities and economies that are even more resilient, inclusive and sustainable¹³.

The CE framework has also been shown to promote biodiversity, reduce water pollution, and improve air quality. The guiding principles of the CE provide businesses with a variety of innovative options that save material costs, maximise asset utilisation, and respond to changing consumer needs.

The movement toward CE is gaining momentum, particularly in Europe, due to increasing amounts of waste that are clogging oceans, drowning cities and polluting air because of the lack of adequate systems to manage waste, and increasing GHG emissions, particularly from solid waste. EU businesses could save a net €600 billion, or 8% of annual turnover, by introducing CE measures such as waste reduction, eco-design, reuse and similar measures, while reducing GHG emissions by 2-4%¹⁴.

The report titled 'Climate Change 2022: Mitigation of Climate Change', published by the Intergovernmental Panel on Climate Change (IPCC) Working Group III, highlights how reducing emissions in industry involves using materials more efficiently, reusing and recycling products, and minimising waste. Technologies to produce basic materials such as steel, building materials, and chemicals with low to no GHG emissions are in the pilot phase to market¹⁵.

5. ROLE OF BUSINESS IN CIRCULAR ECONOMY

The output of an industry must not only have less impact on the environment, but also reduce operating costs as resources are used more effectively and efficiently if CE ideas are to be integrated into the business model. This, in turn, gives the stakeholders involved the opportunity to become more competitive, as the cost of products and services can be reduced due to lower resource requirements. It also provides a great opportunity for new business models and new methods of revenue generation, such as recycling waste streams or collaborating with other industry/companies, benefiting both parties.

Resource dependent industry should adopt a strategy of using recyclable or highly recyclable feedstocks in their production processes so that waste and pollution can be partially or fully reduced. In this way, the end product or waste is transformed into an asset rather than a burden that requires disposal fees. The following opportunities (see Figure 3) can help industry minimise environmental impact, i.e., reuse products, parts and raw materials at a high level¹⁶:

- i. Industry can expect lower production costs if they take a circular approach, as surplus and recycled materials can be used instead of searching for scarce resources.

12 <https://www.un.org/en/climatechange/net-zero-coalition>

13 <https://enb.iisd.org/events/beyond-decarbonization-tackling-triple-planetary-crisis-through-systemic-resource-efficiency>

14 European Commission (2014): Questions and answers on the Commission Communication "Towards a Circular Economy" and the Waste Targets Review.

Available at: <https://ec.europa.eu/commission/presscorner/home/en>

15 <https://www.ipcc.ch/2022/04/04/ipcc-ar6-wgiii-presrelease/>

16 <https://kenniskaarten.hetgroenebrein.nl/en/knowledge-map-circular-economy/how-is-a-circular-economy-different-from-a-linear-economy/>

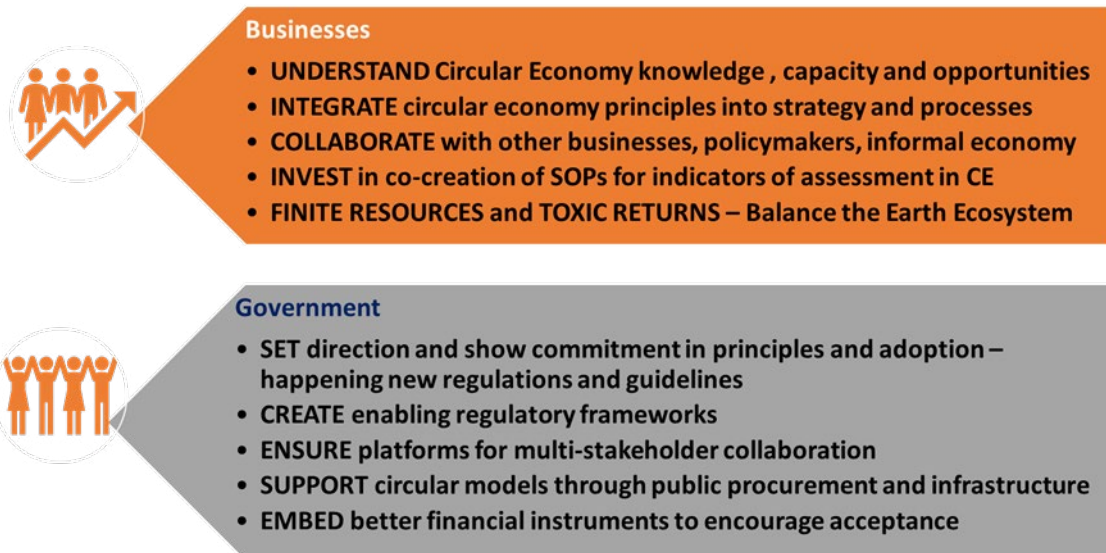


Figure 3: Role of Businesses and Government in CE

ii. Industry can also expect lower production costs if they design products that end up at the end of the cycle of current use rather than at the end of their life cycle, ii) To maintain the revenue stream throughout the product use cycle, the company should also ensure that its products are repairable, upgradable, reusable, easy to disassemble, remanufacturable, and recyclable. iii) For emerging industry to further integrate CE into the value chain, it is important to focus on efficiency, innovation, and consumer engagement.

According to a survey by the World Business Council for Sustainable Development (WBCSD), nearly 40% of companies adopting the CE cited growth and competitiveness as the top two business justifications¹⁷.

6. INNOVATION AND EFFECTIVE COLLABORATIONS

Only if the value of the product can be recovered economically is a CE model sustainable. This can be done by recycling the product, which increases the value of the resources and labour used to produce it, or by breaking down the final product into its component parts or raw materials. The following exam-

ples show how to develop a circular business model whose value is almost exclusively intangible.

The French tyre company Michelin appears to be moving in this direction, although it has not overtly linked the two tactics. The company has purchased Lehigh Technologies, a Georgia-based manufacturer of environmentally friendly rubber powder made from shredded scrap tyres and has also committed to using 80% sustainable resources in its manufacturing. Michelin’s leasing business relies on state-of-the-art information systems to monitor carbon emissions, fuel consumption and other performance parameters to build a sustainable supply chain¹⁸.

Packaged consumer goods company Hindustan Unilever Limited, popular detergent brand Surf Excel has transitioned to recyclable bottles made from 50% post-consumer recycled plastic while using 100% biodegradable actives in its formulation. The company has achieved plastic neutrality by collecting and responsibly processing over 0.116 million tonnes plastic in 2021. They have a framework called ‘Less Plastic, Better Plastic, No Plastic’ with which they evaluate their plastic footprint, and is a good example

¹⁷ World Business Council for Sustainable Development (WBCSD). Business Cases for the Circular Economy. Available at <https://www.cbd.int/business/case-studies/wbcd-8-business-cases-for-the-circular-economy-en.pdf>

¹⁸ <https://hbr.org/2021/07/the-circular-business-model>

of creating CE for plastic¹⁹.

As a responsible corporation, Infosys is striving to drive its business sustainably through focused action, collaboration, advocacy, and thought leadership. RE and circularity is the foundation of their sustainability programme²⁰. Over the last decade, Infosys has been driving energy and water efficiencies to deliver reductions in per capita consumptions of over 55% and 65%, respectively. Infosys has also built over 28 million sq. ft. of LEED²¹ Platinum certified office space.

Collaborating with local municipalities to train waste workers and rag-pickers in these concepts and to provide an efficient collection system that covers virtually all segments: households, offices, schools, hospitals and commercial establishments, is done by ITC Limited in Waste Management stream. ITC's solid waste management program works to build effective waste management chains through multi-stakeholder partnerships. Households, citizens, schools and corporates are the beneficiaries of and the financial contributors to the program. Raggpickers, waste workers and self-help groups are also beneficiaries, carrying out the main activity of door-to-door waste collection²².

The transition to a CE has the potential to reduce each country's GHG emissions by 70% while increasing employment by 4%, according to a study of seven European countries (Ellen MacArthur Foundation, 2015). Companies that develop circular business models are seen as having enormous profit potential. However, the transition from a linear to a CE requires very profound changes and a break with one of the most fundamental aspects of the production of goods and services²³.

7. CIRCULAR ECONOMY IN INDIA

In view of [AatmaNirbhar Bharat](#), the Government of India's vision to make India a self-reliant nation, it is important that long-term

measures are taken to promote the CE to minimise dependence on the extraction of natural ores, and that recommendations and approaches are developed for the metals industry to develop environmentally friendly, cost-effective, and energy-efficient strategies, policies, and practices. Using the example of the energy-intensive metal and steel industry, which is considered "difficult to reduce" due to high GHG emissions and lack of technological capabilities, the CE method can help reduce energy demand by 70-90%²⁴. Increased adoption of CE concepts based on relevant technologies can help industries adhere to the 6R principles - reduce, recycle, reuse, recover, transform and remanufacture - to create a strong CE.

The Indian government's policy think tank, [NITI Aayog](#), has set up 11 committees to develop CE action plans for various waste categories, including lithium-ion batteries, e-waste, toxic and hazardous industrial waste, scrap metals, tyres and rubber, end-of-life vehicles, gypsum, waste oil, solar cells and municipal solid waste, to accelerate the country's transition from a linear to a CE. This will result in increased employment and per capita income. According to Ellen MacArthur Foundation it is been shown that a CE trajectory could bring India annual benefits of INR 40 lakh crore (USD 624 billion) in 2050 and would in addition reduce negative externalities such as air and soil pollution. GHG emissions, for example, would be 44% lower in 2050 compared to the current development path²⁵.

8. CONCLUSION

Moving from linear to circular models is the way forward. Stakeholder participation is required to co-create sustainable and creative solutions. In other words, developing new business models in the context of the CE requires looking beyond the organisational level and focusing more on the interorganizational or systemic level, for example through

19 2021- 22 HUL Sustainability Report. Available at <https://www.hul.co.in/files/92ui5egz/production/8a1b3f103408328781a6ebf434b8e5172e4bfc91.pdf>
20 2021- 22 Infosys Annual Report. Available at <https://www.infosys.com/investors/reports-filings/annual-report/annual/documents/infosys-ar-22.pdf>
21 Leadership in Energy and Environmental Design
22 <https://www.itcportal.com/sustainability/solid-waste-management.aspx>
23 https://link.springer.com/chapter/10.1007/978-3-319-91971-3_8
24 Press Information Bureau (PIB). 2022. Ministry of Steel. 2022. Available at <https://pib.gov.in/PressReleaseSelfframePage.aspx?PRID=1854079>
25 NITI Aayog. 2021. Government Driving Transition from Linear to Circular Economy. Available at <https://pib.gov.in/PressReleasePage.aspx?PRID=1705772>

establishing cross-sector partnerships or collaborations. To establish the CE in business models, collaborations known for developing a shared vision, designing a common strategy, initiating conversations, or negotiating agreements should also be encouraged.

In light of accelerating trends in environmental degradation, such as increasing GHG emissions, deforestation, and biodiversity loss, foreign direct investment (FDI) should be further encouraged. FDI should be encouraged because it can bring significant resource transfer benefits (financial, technical, and human), especially for developing countries.

Adoption of good environmental, social and governance (ESG) practices - Unlike linear economies that rely heavily on resources while producing a lot of waste, circular economies maximise value creation while minimising waste generation. As a result, fewer resources are extracted and more materials are reused and recycled. Industries should focus more actively on their ESG goals. Indian multinational consumer goods company Dabur, for example, has launched a plastic waste management programme that is currently being deployed in 27 states. From 2021 to 2022, it collected, processed and recycled about 27,000 tonnes of post-consumer plastic waste.

Focus on the potential benefits of the CE in terms of job creation and market growth through increased value-added activities is essential. Innovation is critical to all of these efforts, not only in the production of goods and services, but also in the implementation of mechanisms for the smooth integration and execution of CE practices and/or activities. The many configurations of CE systems that can solve the technological and structural problems of running CE at the local, state, national, and global levels, best determined by technological and design breakthroughs.

As global leaders look to India while it assumes the G20 presidency and deliberates steps to implement an integrated, comprehensive, and consensus-based approach to

environmental and climate challenges, it is time to simultaneously seek active international cooperation to accelerate the development and deployment of the CE. While India would work towards pushing for developing national and global strategies for sustainable materials management, resource efficiency, or CE to lead the global community through the challenging period, it will also use the G20 momentum in crafting a vision that will help further coordinate and align national efforts while fostering international cooperation among G20 members.

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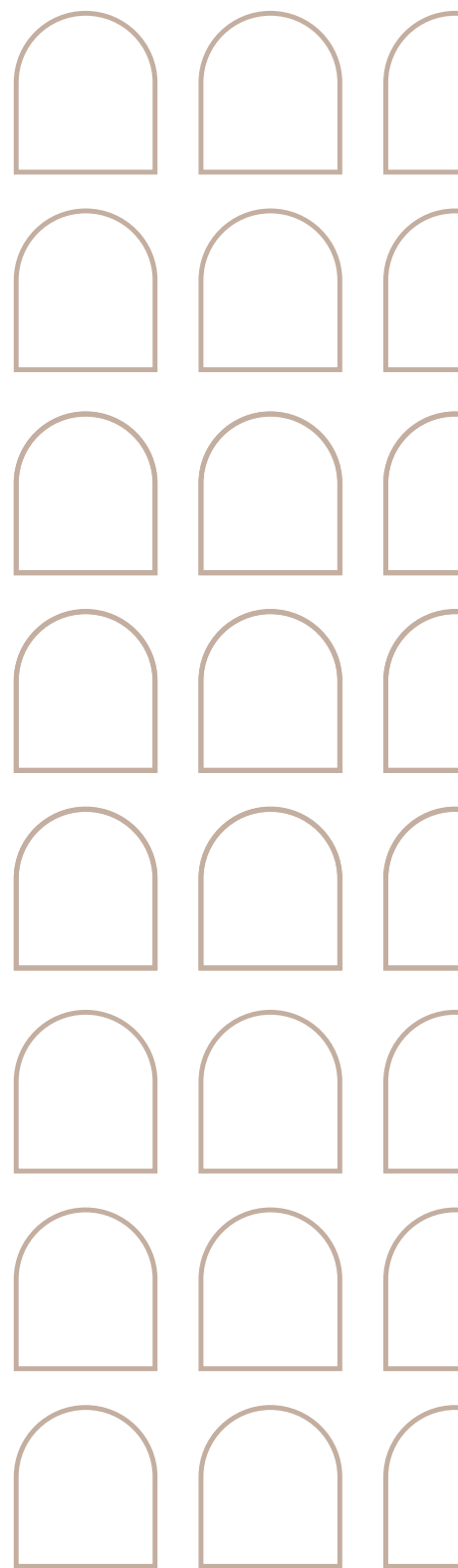
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