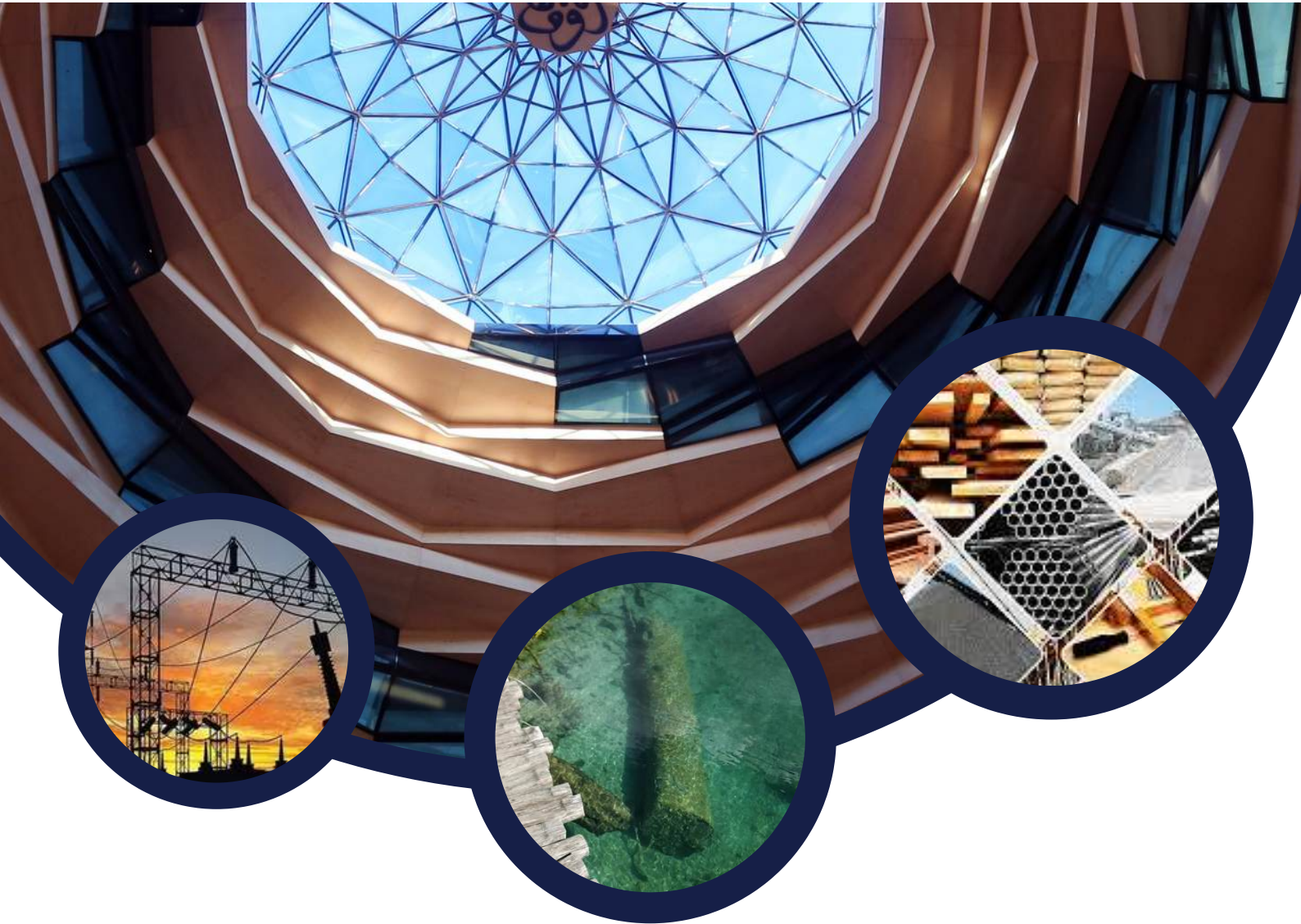




Office of the Principal Scientific Adviser
to the Government of India



India Circular Economy Forum ICEF2024

Key Recommendations

Leading India's Circular Transition: Emerging Technology & Innovation in Industry

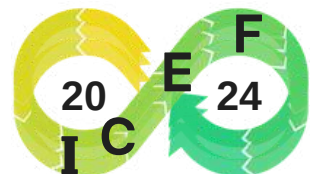
11-12 July 2024 | Venue - IHC, Lodhi Road, New Delhi



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INDIA CIRCULAR ECONOMY FORUM
ICEF2024

INDIA CIRCULAR ECONOMY FORUM

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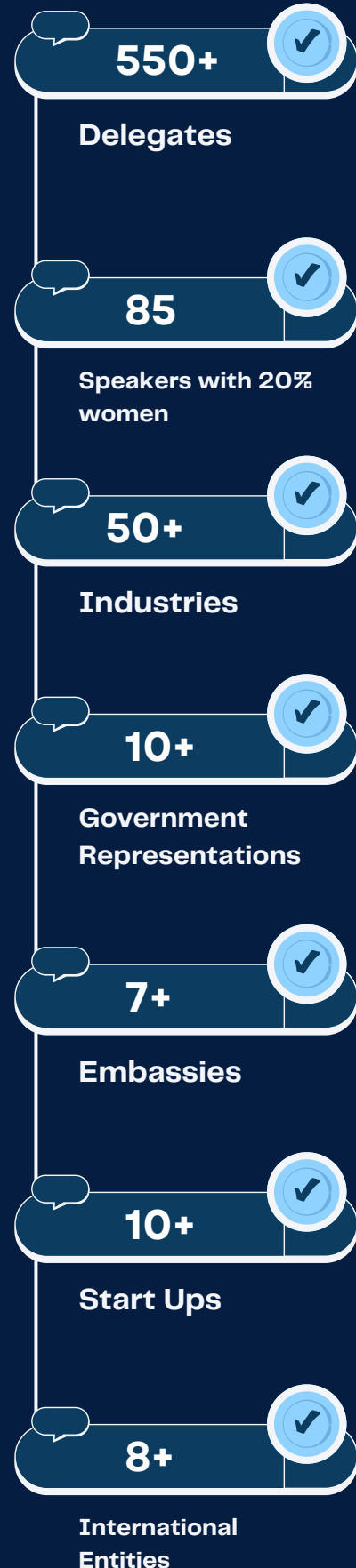
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SMT SUNITA VERMA
Scientist C
Ministry of Electronics and Information Technology (MeitY)
Government of India



Over the past decade, the Indian electronics sector has seen unprecedented economic growth in the country. India became the third largest generator of e-waste and on the other hand third largest consumer of raw materials produced globally. If current economic trends persist, then India's material requirement could be nearly 15 billion tonnes by 2030, and little above 25 billion tonnes by 2050. In order to fulfill the resource need, it is imperative that India should also follow circular economy approach rather than the current linear economy principle of take-make-dispose. The circular economy approach for management of e-waste, will play an important role in resource efficiency, reduction in pollution and waste, longer product-life, recovery of precious and rare materials, minimization of occupational and health hazards as well as giving impetus to the evolution of recycling industry, thereby leading to formalization and job creation.

I would like to appreciate and extend congratulations to the International Council for Circular Economy (ICCE) for orchestrating such an impactful event which addresses the Circular Economy mission of Govt. of India. This initiative marks a significant milestone in the collective journey towards a sustainable future, particularly in the realm of electronic waste management to meet the critical raw material requirement of the country.

The conference featured numerous insightful presentations, engaging discussions, and valuable networking opportunities, contributing to a deeper understanding of the challenges and opportunities within the E-waste sector. The experts around the globe shared their knowledge and experiences, and fostered a collaborative environment that is essential for driving innovation and implementing effective solutions.

I extend my gratitude to all the participants, speakers, and organizers of ICEF 2024 for their valuable contributions. I hope this conference report will be very helpful for all the stakeholders to work collaboratively towards a sustainable and circular future for the electronics sector.



SHALINI GOYAL BHALLA
Founder & Managing Director
International Council for Circular Economy

India finds itself at a critical crossroads, tasked with balancing its impressive economic progress with the urgent imperative for sustainable practices. The nation boasts a population exceeding 1.4 billion people and an economy expanding at a rate of 7.8% year-on-year. This remarkable growth is evident in India's achievements in renewable energy, reaching a total capacity of 194 GW and setting an ambitious target of 500 GW by 2030. However, the economic advancement must be carefully calibrated with a deep commitment to sustainability. Meeting the needs of the present generation must not come at the expense of future generations, and overconsumption must be resisted. The global landscape is rapidly evolving, with new regulations like the Carbon Border Adjustment Mechanism and impactful reports like the Circularity Gap Report highlighting the urgent need to reduce material extraction.

To advance the circular economy in India, a dedicated body is required that could provide centralized leadership and coordinate policies across sectors. This body could streamline efforts and drive the national transition to circular practices. Additionally, implementing policies to stimulate demand for circular products is crucial. This includes green public procurement, extended producer responsibility, and tax incentives for sustainable products and services. India

India has a crucial role in the global transition towards a circular economy. By embracing innovation and technology, fostering robust partnerships, and empowering the informal sector, India can unlock a future where economic growth and environmental sustainability go hand in hand. Furthermore, developing institutions at national and global level focussing on skilling, exchange of knowledge, fostering innovation and technology will boost India's efforts.

Encouraging industry leaders to publicly commit to sustainability principles and practices can drive significant change. Equally important is establishing open channels for regular dialogue and feedback between industry stakeholders, the government, and the public to ensure policies are shaped by diverse perspectives and insights.

Key Insights

India's Growth Rate
7.8%
making it the fastest-growing economy globally.

Global Circularity Rate
9.1% to 7.2%
Reduction in the past five years.

ICCE Initiatives
50
Innovation Challenge new certifications in 2024.



Last year's discussions focused on raising awareness about the circular economy. This year, the conversation shifts to concrete next steps, with emerging technologies driving this transition. Startups, often highlighted in shows like Shark Tank, play a key role in this shift, showcasing the circular economy as a significant business opportunity. GT has released a report today, developed in collaboration with the International Council for Circular Economy. This report moves beyond the traditional understanding of circularity as simply recycling, highlighting its vast potential across various sectors. This is particularly relevant in light of India's "Viksit Bharat" agenda, which aims to achieve developed nation status by 2047 and net carbon zero by 2070. Achieving these ambitious goals necessitates 100% circularity in economic activities. The report identifies three key sectors with high potential for circularity-

- Net zero water consumption. This involves implementing water-efficient technologies, promoting rainwater harvesting, and significantly scaling up water recycling efforts, particularly in the agriculture sector, which accounts for a large portion of water usage.
- Textiles: The textiles sector presents a significant opportunity for circularity. By adopting practices like textile recycling, upcycling, and design for durability, the industry could generate an estimated \$673 billion by 2047 while minimizing its environmental footprint.
- Metals: The metals industry already operates at a relatively high level of circularity (68%) due to the inherent economic value of metal recycling. However, there is still potential to further optimize recycling rates and explore innovative approaches like urban mining to recover valuable metals from existing products and infrastructure.

Establishing a dedicated government body focused on the circular economy is crucial for providing centralized leadership, coordinating policy efforts, and driving the transition across different sectors. Implementing policies that stimulate demand for circular products is essential for creating a market for these products and encouraging businesses to adopt circular business models. This could include measures like green public procurement, extended producer responsibility policies, and tax incentives for circular products and services. Creating academic institutions and programs specifically focused on circular economy principles is vital for nurturing a new generation of professionals equipped with the knowledge and skills to innovate and drive the transition to a circular economy. This will ensure a pipeline of talent capable of developing and implementing circular solutions across various industries.

Key Insights

Net-Zero Vision

2070

India aims for net-zero carbon emissions, ensuring 100% circularity in all sectors.

Circularity in Sectors

3 Sectors

Immense growth expected in water, textiles, and metal sectors.

Economic Opportunities

Environmental Sustainability & Financial Resilience

Key drivers of circular practices



SHRI ROHIT KANSAL
Additional Secretary
Ministry of Textiles
Government of India



I am honored to address you today on a topic of immense significance: the transition to a circular economy in the fashion industry. The urgency of this transition cannot be overstated. A recent Financial Times report highlighted a company that has successfully implemented circularity principles within its fashion-based operations, demonstrating the potential for impactful change.

Drawing from our rich cultural heritage and modern sustainability principles, I want to emphasize the teachings of the Atharv Veda, which stresses the importance of respecting Mother Earth, and the Brundtland Commission's call to meet present needs without compromising the ability of future generations to meet theirs. The concept of circularity has evolved significantly, marking a shift towards environmentally conscious practices throughout a product's lifecycle. This includes everything from usage and waste segregation to disposal. The linear fashion model, characterized by its "take-make-dispose" approach, has a devastating environmental impact. Textile production contributes over a billion tons of emissions annually and is the third-largest source of municipal waste.

However, the transition to a circular economy in fashion presents immense opportunities. Embracing circularity could create 1.5 million new jobs. Companies like "Usha Yarns," specializing in recycled yarns, serve as prime examples of success in this domain. India is already making significant strides, with 900 dedicated textile recycling units and established recycling hubs in various states. I would like to particularly commend the crucial role of women entrepreneurs leading these initiatives and emphasize the importance of traditional craftsmanship in promoting reuse and upcycling. To further this progress, we need to embrace the 4 R's: Reuse, Reduce, Recycle, and Redesign, transition from Linear to Circular Systems, support textile recycling initiatives, empower women entrepreneurs, and promote traditional craftsmanship.

Key Insights

Textile Emissions

1 Billion

Amount of textile emissions generated annually from textiles, with clothing that is barely worn and rarely recycled.

Job Creation

1.5 Million

New jobs through circular practices.

Recycling Initiatives

900

Dedicated textile recycling units, with recycling hubs in Panipat and numerous centers in Gujarat, Tamil Nadu, and Maharashtra.



SMT. RUPINDER BRAR
Additional Secretary
Ministry of Coal
Government of India

The recent scorching temperatures in Delhi underscore the urgent need to address climate change. India remains steadfast in its commitment to the Paris Agreement and achieving net-zero targets. However, we must balance these goals with the needs of our vast and growing population.

Embracing circular economy principles, resource efficiency, and waste reduction are crucial for achieving this balance. The coal industry is making significant strides in this direction. Coal India, our largest coal producer, and a global giant, is adopting cutting-edge technologies like surface miners, continuous miners, and high-wall techniques. These advancements enhance efficiency, minimize environmental impact, reduce dust, and improve worker safety.

Furthermore, Coal India is investing heavily in energy-saving technologies such as LED lighting, energy-efficient conveyor belts, and sophisticated energy management systems. These initiatives reduce power consumption and lower carbon emissions. New policies are transforming coal transportation and utilization. We are establishing power plants near mines and implementing coal gasification projects. The recent approval of a coal gasification plant in Orissa will boost domestic syngas production and reduce our reliance on imports. Coal India is also committed to maximizing resource utilization from each land parcel, including the extraction of critical minerals like lithium, which are essential for our clean energy goals. Every policy has to be made for public good so it requires

Coal India is promoting holistic mining, the prospecting has to be inclusive and comprehensive, The closed mining sites are now being repurposed to benefit the community. Mining companies ensure that closing of mines does not negatively impact workers or the surrounding towns. Closed mines are converted into parks or other functional spaces, helping to support and revitalize the community. This process aims to create a smooth shift from mining to other industries in affected areas. The Indian coal industry is committed to responsibly source critical minerals, utilize advanced technologies, and maintain environmental sustainability to pursue growth in harmony with nature, ultimately aiming to enhance the lives of all Indians.

Key Insights

CO2 Emission Reduction

78 tons

Amount of CO2 saved by Coal India in 2023 and 2024.

Technological Upgrades

\$5 to \$10 Trillion

Need for technological upgrades to support India's ambition of becoming a 5 to 10 trillion-dollar economy while maintaining quality of life as a cornerstone in policy-making.



MR. KIMMO LAHDERVITA,
Ambassador,
Finland Embassy in New Delhi

Finland views the circular economy as a transformative force, not just nationally but globally. Finnish efforts extend beyond waste reduction to encompass holistic resource management, innovative technologies, and cross-sectoral collaboration. Examples include the "Finnish Waterway" strategy for integrated water management, energy-efficient wastewater treatment plants that contribute to city power grids, and a strong focus on smart water management using digitalization and smart metering. The Finnish forest industry exemplifies this approach, with mills transforming into biorefineries that utilize 100% of wood raw material and rely heavily on renewable energy. Finland's commitment to circularity is evident in its national green deal, specialized training programs for businesses, and the integration of circular economy principles into education at all levels. Recognizing the need for global cooperation, Finland actively shares its expertise through initiatives like the World Circular Economy Forum, which has become a leading international platform for advancing circular economy solutions. Acknowledging India's growing engagement in the circular economy, Finland expresses a strong desire to deepen collaboration, share experiences, and explore mutually beneficial projects with Indian partners.

The Government of Finland has adopted a commitment to carbon neutrality by 2035. In addition to that, Finland has a national action plan that includes precise steps to attain circularity, along with sectoral roadmaps that companies have developed.

Training programs on circular design for businesses are important, and incentives should be given for developing circular products and services. Lastly, we should extend support to transform traditional industries like forestry into bio-based, resource-efficient models.

Integrate circular economy principles into education at all levels. Promote cross-sector collaboration i.e., government, businesses, academia, and communities and support international cooperation and knowledge exchange through forums like the World Circular Economy Forum.

Key Insights

Climate Neutrality Goal

2035

Finland aims to achieve carbon neutrality.

Circular Economy Roadmap

2016

Established as a model for other nations.

MR MICHAEL BUCKI,
Counselor and Head of the Sustainable Modernization Section
EU Delegation to India



I am emotional to be invited to ICEF for all the three consecutive years. It is heartwarming to see the progress that ICCE made in these years. The pace of the Circular Economy is slow and erratic globally, but it is imperative to understand the urgent need to accelerate the transition, particularly for rapidly developing nations like India. The recipe for the Circular Economy in Europe may not correspond to the circumstances in other regions but when you see the larger picture, all economies are interdependent and connected by global value chains which are then connected with the standards. We can look at the case of China's dominance in critical raw materials mining and their focus on investing in recycling capacity at the same time.

Circular Economy offers not only the environmental benefits but also the economic gains, as we witnessed the acceptance of this framework in Europe, it led to the participation of the private sector when it started to consider this as a process for industrial competitiveness and effectiveness. India has an inherent quality of sustainability with systems like 'Jugaad' - the fuel for circularity, but the risks attached to the excess use of such systems should not be avoided. We must find industry-led identification of gaps in circularity implementation, enforcement and transparency. Nature is diverse and self-stabilizing and can be considered as the guiding light for designing sustainable and resilient solutions.

Sharing Knowledge and Best Practices, efficient resource utilization, proper enforcement of regulations, transparency and guidelines to encourage and incentivize circular practices across industries and collaborative partnerships is the need of the hour.

We need a multi-stakeholder approach, drawing inspiration from nature's wisdom, and leveraging industry expertise to develop and implement practical and scalable solutions.

Key Insights

Critical Raw Materials

Magnets & Batteries

Importance of efficient recycling for sustainable resource management globally.

Biomimetic Approach

Sustainability & Resilience

Using nature as a guide for circular economy practices. developing innovative solutions that mimic natural systems.



MR KARI HERLEVI,
Head, of Global Collaborations
for Sustainability Solutions,
SITRA, Finland

The current linear "take-make-dispose" economic model is unsustainable. This advocates for a circular economy that prioritizes resource reuse, resource efficiency, and sustainable production and consumption patterns. This approach aims to decouple economic growth from environmental degradation, ensuring both the health of the planet and human well-being are valued.

There is immense potential for the circular economy in India, particularly given the alarmingly low global circularity rate of 7.2%. It emphasizes specific opportunities for India, including driving economic growth, creating jobs, reducing environmental impact, and conserving resources. Key strategies for realizing this potential include technological innovation, developing circular models for electronics, implementing efficient and localized waste management systems, and exploring and utilizing plant-based materials. Beyond the circular economy, there is an urgent need to restore nature by prioritizing the restoration of natural systems and biodiversity. It calls for embracing sustainable living by transitioning towards consumption and production patterns that minimize environmental impact. A "digital green shift" is presented as a crucial enabler for achieving these goals. This involves harnessing technology for economic growth while reducing environmental harm and ensuring equitable benefits.

Key Insights

Global Circularity Rate

7.2%

Global economy is
circular

WCEF 2025

Latin America

The next World Circular
Economy Forum

Collaboration

PPP

Emphasis on private-public sector
partnerships to drive circularity.



India's Swachh Bharat Mission, under the Ministry of Housing and Urban Affairs, encapsulates all aspects of a Circular Economy. Waste management solutions in India need collective collaborative action to implement effective solutions. The deep connection between the circular economy and the Swachh Bharat Mission lies in the importance of efficient resource utilization. Forums like the ICCE play a crucial role in fostering collaboration between the government and stakeholders. These platforms enable knowledge sharing, influence policy decisions, and ensure coordinated efforts in the planning, implementation, and maintenance of circular economy initiatives.

Rapid urbanization and changing consumption patterns are growing challenges and need effective solutions. Projections indicate that India will generate 136 million tons of solid waste annually by 2030, presenting significant environmental and logistical challenges. Over 50,000 million litres of sewage (liquid waste) are generated daily. With a treating capacity of half of this, it's a major threat to health and the environment. We need practical, immediate solutions, identifying and replicating successful models from other regions, and focusing on simple, immediate solutions to prevent waste accumulation.

The ministry has started several initiatives to build capacity within urban local bodies and private entities. Documents and guidelines are being developed to encourage circular practices in waste management. Substantial funds, including the Urban Infrastructure Development Fund, are available to support projects related to water supply and other infrastructure, encouraging the use of these resources.

Key Insights

Public-Private Collaboration
Waste management & Infrastructure Development.

Essential for addressing environmental challenges.

Government Collaboration
Swachh Bharat Mission

Aligned with circular economy principles.



MR. SANJAY KHAJURIA,
Director Corporate Affairs & Sustainability,
Nestle India

Sustainability is now a basic expectation for employees, suppliers, investors, and consumers alike. Nestlé India has organized its sustainability efforts around five task forces: Sourcing, Sustainable Packaging, Manufacturing and Logistics, Communication, and Regulatory. These task forces collaborate to address climate change, packaging waste, sustainable sourcing, and water conservation.

A major goal is achieving net-zero emissions by 2050, with interim targets of a 20% reduction by 2025 and a 50% reduction by 2030. To achieve this, Nestlé is implementing initiatives like low GHG feed and carbon sequestering in dairy farming, a sector where they have been actively involved since 1961. Recognizing the importance of collaboration, Nestlé works closely with farmers, providing technical support and exploring solutions like biodigesters to manage manure and reduce emissions. On the packaging front,

We have achieved 100% plastic neutrality in 2020 and has undertaken projects like replacing plastic straws with paper straws and promoting plastic segregation. Their innovative project, Hildari, focuses on digitizing plastic waste management in hill stations and beach towns, directly benefiting waste workers. Sustainable sourcing efforts prioritize reducing pesticide and fertilizer use while promoting sustainable agricultural practices. For example, Nestlé developed a low GHG feed that reduces emissions by 8%, enhancing both environmental and economic sustainability for farmers. Water conservation is tackled through initiatives like Project Zirao, which extracts water from milk processed in factories, reducing groundwater extraction.

Nestlé's holistic approach—characterized by clear priorities, a focus on impactful initiatives, a shift towards positive impact, innovative solutions, stakeholder engagement, and regular progress monitoring—underscores their commitment to creating a sustainable future.

Key Insights

Net-Zero Emissions Target

2050

Achieve net-zero emissions by 2050, with intermediate targets of 20% reduction by 2020 and 50% by 2030.

Sustainability Initiatives

100%

Achieved 100% plastic neutrality since 2020 and switched from plastic to paper straws before the legislation was passed

Consumer Engagement

80%

Reduction in emissions through initiatives like biodigesters for manure management, biomass boilers in the Punjab factory, and transitioning logistics from road to



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MR SANJAY SINGH,
Director,
Strategy & External Affairs,
JSPL

The time for climate action is now. Some reports have predicted a 4.5 degrees Celsius temperature increase and heightened dryness in Delhi by 2080. We must intensify our efforts, to meet the Paris Agreement goals, especially since the global average temperature has already risen by 1.5 degrees Celsius.

A significant contributor to this crisis is the steelmaking industry, which accounts for 20-40% of global carbon emissions. As one of the world's leading steel producers and consumers, India faces considerable challenges in meeting its ambitious carbon emission reduction targets – a 20% reduction by 2030 and 50% by 2047. The demand for steel is expected to rise with ongoing construction and building projects. Although steel is already the most circular metal with a 68% recycling rate, there is enormous potential to enhance circularity further by addressing challenges related to scrap quality, collection, and processing.

Despite the potential of green hydrogen, its high costs and implementation challenges present significant obstacles. Additionally, small steel producers struggle to adopt carbon reduction technologies, posing another challenge to decarbonizing the industry. Immediate action and innovation are crucial for a sustainable future in the steel industry.

We need better ways to reduce carbon emissions, such as carbon capture and utilization. Jindal Steel Power is leading by example, taking concrete steps towards green steel production with its latest project in Oman. This facility will utilize carbon capture technology and build upon the company's expertise in low-carbon solutions, such as coal gasification.

There is a need for greater collaboration and innovation. I congratulate ICCE for driving these efforts forward. A collective approach is essential for developing and implementing circular economy solutions to combat climate change.

Key Insights

Carbon Emission Reduction Targets

20%

Expected carbon emissions target by 2030 and 50% by 2047 for the steel industry.

Steel Production

30 mT

Production of steel from scrap each year

Limited Awareness

40%

Small producers, often struggle with limited awareness and access to the advanced technologies necessary for reducing carbon emissions.



MR NARESH TYAGI
CSO,
ADITYA BIRLA FASHION RETAIL

Aditya Birla Fashion and Retail, one of India's largest fashion retail companies, is committed to sustainability, having initiated the journey a decade ago with ambitious goals for energy, carbon, and waste management. With a workforce that is 52% women and an average age of 28, the company has made significant strides in women's empowerment, particularly in rural areas. Aditya Birla's Sustainability 2.0 aims to encompass the entire supply chain and value chain, addressing the textile industry's environmental impact. Despite challenges such as low consumer willingness to pay for sustainable products and a lack of standardized guidelines, the company has achieved zero waste to landfill and zero liquid discharge in water management. Through collaborations with organizations like the Ellen MacArthur Foundation and Global Fashion Agenda, Aditya Birla is driving innovation and capacity-building in the sector. We focus on creating durable and recyclable products with sustainable packaging to promote a closed-loop system. ABFRL is leading the way to make sustainability mainstream in the textile and fashion industry.

Accelerate technological upgrades within the textile sector to improve resource efficiency, reduce environmental impact, and support sustainable practices. We need to ensure responsible use of resources by implementing efficient practices in reducing, reusing, and recycling materials throughout the supply chain. Establishing rigorous KPIs and monitoring systems to track sustainability goals, ensuring continuous improvement and accountability are needed.

The most important aspect is the innovation in packaging. Brands can reduce the environmental impact of packaging by increasing the use of reusable, recyclable, and sustainable materials.



Mr. Manoj Rustagi,
Chief Sustainability & Innovation Office
JSW Cement



Circular Economy is the solution to address sustainability challenges in the construction industry. JSW Cement is the result of solving a problem statement of JSW Steel. We created solutions in managing waste generation and reducing CO2 emissions through our innovative approach and genuine concern for the environment. JSW Group has a comprehensive strategy to achieve net zero emissions by 2070. The built environment can have a very big impact on CO2 emissions, the WBCSD report says the sector is responsible for 40% of it. Again, 40% of this portion comes from the embodied carbon. Cement constitutes a major part of this embodied carbon, so we have an urgent need to decarbonize the cement segment and integrate waste as raw materials in a circular economy. Additionally, we anticipate a substantial surge in new construction and redevelopment projects in India and globally, it is imperative to understand the long-term impact of carbon locked in buildings. We as an economy should look at reducing the CO2 emissions and developing resilience at the same time to fight the impacts of climate change. India is at a critical juncture to create a significant impact while transitioning to a circular economy.

It is essential to raise awareness and promote a shift towards transforming the built environment in order to effectively address and mitigate issues related to carbon emissions and environmental sustainability. One of the key challenges in metropolitan areas is the management of substantial amounts of waste generated from C&D waste during redevelopment projects. Implementing strategic waste management practices is critical to addressing this issue.

Embedding climate adaptation considerations into the design and construction processes is vital to ensure that infrastructure and buildings are resilient and able to adapt to the evolving impacts of climate change. This involves a focused effort on constructing buildings with minimal CO2 emissions and ensuring that they are resilient to the changing climate conditions. By prioritizing these factors, we can contribute to creating a more sustainable built environment.



DR SANDIP CHATTERJEE
Former Sr Director & Group Coordinator
MeitY



Globally, India is the third largest generator of electronic waste and already generated 4.17 million metric tons of e-waste in 2022 and also facing various growing challenges in e-waste management. India only classifies 106 products as e-waste, a stark contrast to the 642 products listed by European Union models. Before April 2023, this classification was limited to just 21 products. The primary concern is not just the environment but also the loss of significant volume of materials in the informal hand due to adoption of inefficient extraction process. The current rules emphasize recycling targets over collection targets. Despite efforts, 90-95% of e-waste still ends up in the informal sector, which generates pollution due to inferior processing technology, results in the loss of 70% of resource materials and degrades environment beyond its repairability. Sustainability requires using electronics to their fullest life and to do so often requires repair. Therefore, all forms of repair, individual, independent

service providers, and OEM repair are needed to keep electronics in use longer. The shift towards modular designs and recycling-friendly products is crucial. Recycling of waste stream from competent recyclers would be imperative to realise circular economy in truest sense. The manufacturers, producers should align with refurbishers and recyclers who obtain global standards, like R2, ISO. The global standards will ensure appropriate data destruction, ensuring legal compliance, better material traceability and robust environmental and health and safety assurances. In order to aspire a trillion-dollar economy, India needs to adopt best practices from developed world.

Electronic products, especially smartphones, need 69 elements from the periodic table to offer their functionalities, most of which even cannot be extracted with the of global best technology standard. Companies like Umicore can only extract 16 elements, underscoring the need for continuous to develop extraction technology and improve resource extraction.

Over the years, design and development in electronics have reduced the use of hazardous materials like lead, cadmium and mercury. However, the industry must continually innovate to meet evolving technological demands.

India, with 600 million smartphone users, requires significant resources to meet the growing demand, which necessitates the production of 2000 million smartphones. This demand heavily relies on imported materials, so it important to promote localizing of the supply chains. Government initiatives aim to upgrade informal e-waste operators and establish clusters to enhance recycling infrastructure. With newly discovered lithium reserves in Jammu and Kashmir and Rajasthan, India hopes to reduce import dependency in the future.

However, the immediate focus should be on better repairability of the products, developing local recycling technologies, secondary resource extraction and to ensure sustainable growth and environmental conservation.

Key Insights

Digital Economy Growth

25%

India's economy now operates in the digital space.

E-Waste Generation

400 mT

Generation of electronic waste annually.

Recycling Challenges

70%

Resource materials in e-waste are not recovered with current technologies.



MR MOHIT GARG,
Scientist C / Deputy Director,
BIS
India



India has been actively involved in the development of ISO standards concerning the circular economy, ensuring the representation of its viewpoints on the global stage. The concept of a circular economy, which aims to minimize waste and maximize reusability and resource transformation as opposed to the linear economic model, forms the basis for the necessity of standardization. Notably, the establishment of the ISO Technical Committee ISO/TC 323 on circular economy in 2019 represents a significant step toward developing comprehensive standards. This committee is responsible for creating standards, framework guidance, and supporting tools to facilitate the implementation of circular economy activities, thus contributing to sustainable development. The committee, which includes India, has 74 countries as team members and 26 additional members serving as observers for this international circular economy committee. The committee has produced three important international standards related to the circular economy. These standards cover terminology, principles, and guidance for implementation; guidance on the transition of business models and value networks; and the measurement and assessment of circularity performance and review of existing value networks. The initial standard defines the circular economy, its vision, principles, and general guidance on implementation, and introduces the concept of waste as a resource that may regain value in the future. The second standard offers advice on the transition of business models and value networks, while the third standard provides a structured approach and framework to measure and assess circularity performance. Additionally, the first standard outlines six principles for organizations transitioning to circular value chain models, focusing on system thinking, value creation, value sharing, resource stewardship, resource traceability, and ecosystem resilience.

Understanding of ISO standards in measuring and assessing the circularity performance of organizations is important. One must select appropriate indicators based on the organization's objectives, such as value recovery or resource retention. The process involves boundary setting, indicator selection, data acquisition, calculation, assessment, and reporting. ISO standards provide methods to assess environmental impacts, such as carbon and water footprints. The ultimate goal is to achieve circular economy objectives while minimizing negative impacts on the environment and society. To fully understand the benefits of implementing circularity within organizations, it is essential to assess the impacts on the environment, society, and the economy. The ISO 59020 provides standard and complementary methods to measure these impacts and offers practical examples from successful industries worldwide. Additionally, there are three significant documents currently under development at the ISO level: a performance-based approach analysis of case studies, a product circularity data sheet, and a document on secondary materials, all of which will be valuable in achieving a circular economy. India's participation and contribution through the committee CSD 34 are essential in providing expert views to the ISO.

CIRCULAR CITIES

The Swachh Bharat (Clean India) mission, launched in 2014, has made significant strides in promoting sanitation and cleanliness across the country. SBM 2.0 focussed on building on this momentum, and incorporated principles of sustainability and circular economy. Several panel during ICEF2024 explored how Swachh Bharat can drive India's transition towards a cleaner, greener, and more circular future, leveraging innovative practices and technologies to manage waste, conserve resources, and foster environmental stewardship.

The objectives of these panel was to reflect on the achievements and key learnings from the Swachh Bharat mission so far, identifying successful strategies and areas for improvement, discussing how to integrate circular economy principles into the Swachh Bharat mission, focusing on waste reduction, recycling, and resource efficiency, showcase innovative practices and technologies that can support the mission's goals of cleanliness, sustainability, and circularity, and to foster collaboration among government bodies, industry, civil society, and local communities to enhance the effectiveness and reach of the Swachh Bharat mission.

Targeted SDGs

SDG 6 | SDG 11 | SDG 12 | SDG 13 | SDG 17

Panel 1: Swachh Bharat: Shaping India's Cleaner, Greener, and Circular Future.

- Ms Neha Upadhyay, Founder of Guna Organics
- Dr. Manuj Kumar, Head of Marketing & Sustainability at Lakshya
- Mr. Dhiraj K Santdasani, Technical Advisor, C40 Cities
- Mr. JSR Annamaya, IEC Specialist, Rajamahendravaram Municipal Corporation,

Panel 2: Achieving Water Net Zero: Innovations and Strategies

- Mr Pankaj Arora, Director, GT Bharat LLP, India
- Mr. Nitin Bassi, Senior Program Lead, Sustainable Water, CEEW
- Mr. Ramveer Tanwar, Founder. Say Earth NGO
- Ms. Beate Langset, Counsellor, Climate & Environment, Royal Norwegian Embassy
- Ms. Mansi Tripathi, Researcher, International Water Management Institute

Panel 3: Urban Renewal: Navigating circular pathways for sustainable cities

- Ms Swati Sambyal, Expert, Capacity Development Waste, and Marine Litter Program GRID: Arendal
- Mr Manoj K Rustagi, Chief Sustainability and Innovation Officer, JSW Cement
- Ms Divya S, Scientist D/Joint Director, BIS
- Mr Anirban Chatterjee, Head Sustainability Bureau, Veritas Group
- Md Asf Raza, Program Officer NIUA

Panel 4: Unleashing Behavioral Innovations for Mission LiFE (Lifestyle for Environment) Success

- Prof. Yukti Sharma, Joint Director, Delhi University
- Mr Soumanil Mukerjee, PM Consultant Office of PSA
- Ms Ishita Wadhwan, Program Officer NIUA
- Mr Pankaj Arora, Director at Grant Thornton Bharat LLP
- Ms Merlyn Dsa, Ex-Municipal councillor, Mira Bhaindar

Panel 5: Role of MRFs in Achieving Circularity in India

- Mr Prabhjot Sodhi, Sr Program Director, CEE
- Mr Sanjeev Arora, CEO, Regional Urban Development Agency (RUDA)
- Mr Nikhil Panchal, Co-Founder & CEO, Green Aadhar
- Ms Amarpreet Kaur, CEE
- Mr Saurabh Shashi Nath Sharma, Head CSR & GM, Hyundai Motors, Gurgaon
- Rahul Nainani, Co- Founder & CEO, Recircle



Panel 1 : Swachh Bharat: Shaping India's Cleaner, Greener, and Circular Future.



Panel 2: Achieving Water Net Zero: Innovations and Strategies



Panel 3: Urban Renewal: Navigating circular pathways for sustainable cities



Panel 4: Unleashing Behavioral Innovations for Mission LIFE (Lifestyle for Environment) Success



Panel 5: Role of MRFs in Achieving Circularity in India

Key Recommendations

- **Inclusion of sustainable practices in education:** Integrate environmental education and sustainable development into the standard curriculum. Instill a sense of responsibility towards the environment from an early age through sustainable initiatives.
- **Effective implementation:** the gap between policy formulation and effective implementation should be reduced through rigorous monitoring to achieve desired outcomes.
- **Stakeholder involvement in policy formulation:** Involve various stakeholders, including businesses, educational institutions, and government bodies, in the formulation and implementation of environmental policies.
- **Fostering community development through mobilization:** Use the example of 'Swachh Sawari' project, conducted with the Municipal Corporation of Chandigarh. The project's success can be attributed to the active involvement of citizens and the collaborative efforts between citizens and the government. For water management, give communities the tools and knowledge they need to take charge of their water resources and projects.
- **International alliance formation:** Take the initiative to form and maintain worldwide alliances to exchange data, technology, and best practices. This involves developing practical and acceptable solutions within the given context, while also valuing and integrating traditional ecological knowledge.
- **Green standards:** Bring in green standards that can improve environmental efficiency.
- **Creation of smart villages:** Smart cities are places where traditional networks and services are made more efficient; therefore, we need to work on creating smart villages.
- **Collection and utilization of data:** Use primary data and surveys to implement waste management techniques that are specific to remote, rural, and urban areas.
- **Social aspect:** Prioritize access to necessities, especially in underprivileged communities and take steps to ensure a more inclusive growth of our economy.

TEXTILE, FASHION AND APPAREL

The Panel on “Textile Tech: Innovations Driving Circular Economy in Fashion” focussed on the fashion industry being a significant contributor to global environmental challenges, including resource depletion, waste generation, and pollution. The discussions were around the ways that would help to mitigate these impacts, integrating circular economy principles into the textile and fashion sectors. It also explored the latest technological advancements and innovative practices that are revolutionizing the industry and promoting sustainability. The objectives of the panel were to showcase cutting-edge technologies and innovative practices that are transforming the textile and fashion industries towards a circular economy, encourage the adoption of sustainable production methods, including recycling, upcycling, and the use of eco-friendly materials, facilitate collaboration among industry stakeholders, including designers, manufacturers, policymakers, and researchers, to drive systemic change and to motivate stakeholders to implement circular economy practices within their organizations and communities.

Targeted SDGs:

SDG 9 | SDG 12 | SDG 13 | SDG 17

Panel: Textile Tech: Innovations Driving Circular Economy in Fashion

- Prof Girija Jha, Associate Professor, NIFT
- Mr. Srinivas Naik, Head of Business Sustainability, Arvind Ltd
- Mr. Gourav Mishra, Scientist B / Assistant Director, BIS
- Mr. Abrar Ahmad, Founder of Syaahi Uniforms
- Mr Chander Kant, Business Lead, EGG Trident Group India



Key Takeaways

- **Sustainable Practices:** The fashion industry is increasingly adopting circular economy principles to reduce its environmental footprint.
- **Water Conservation:** Companies like Arvind Ltd are innovating by using sewage water for textile processing and achieving 100% water recycling.
- **Technological Solutions:** Technologies such as foam on yarn, blockchain for supply chain transparency, and ozone-based processing play a crucial role in circular fashion. Blockchain technology ensures supply chain transparency, allowing consumers to trace product origins.
- **Recycled Materials:** Emphasis on using recycled components and promoting eco-friendly materials like organic fibres. It is important to encourage consumers and stakeholders to adopt sustainable practices and their end-of-life product lifecycle management, which involves collecting old products for recycling.
- **Education and Collaboration:** Efforts to educate stakeholders, encourage women's participation, and collaborate with institutions for sustainability. Emphasis on the need for inclusive norms and the future goal of working with international organizations and experts to advance these initiatives.

Key Recommendations

Recommendation	Description
Reuse and Recycling of Water	Encourage the use of treated sewage water in textile processing to reduce freshwater consumption.
Innovative Technologies for Circular Fashion	Adopt advanced technologies like foam on yarn, ozone processing, and low water dyeing to save resources.
Operation Transparency and Product Traceability	Implement blockchain technology and transparent documentation to ensure supply chain transparency and consumer trust.
Inclusive Norms and Education	Develop inclusive standards and work with educational institutions to promote sustainability and circular fashion innovations.
End-of-Life Management	Design products for value recovery and implement end-of-life collection programs to ensure materials are recycled.
Support for MSMEs and Women's Participation	Educate and encourage MSMEs and promote women's participation in the workforce to support circular economy practices.
Zero Liquid Discharge (ZLD)	Commit to ZLD in manufacturing processes to ensure no water waste and promote sustainability.

ENERGY TRANSITION

As India embarks on an ambitious journey towards a sustainable energy future, integrating a closed loop approach within its energy sector becomes paramount. The closed loop, or circular, approach emphasizes the importance of resource efficiency, waste minimization, and the reuse of materials. This methodology enhances sustainability and ensures economic viability and environmental protection. By incorporating circularity into the energy sector, India can address critical issues such as resource depletion, environmental degradation, and energy security, paving the way for a more resilient and sustainable energy ecosystem.

The panel on “Energy Transition: Adding closed-loop approach to India's energy transition” focussed on discussing the integration of circular economy principles in the energy sector, focusing on resource efficiency, waste reduction, and material reuse, identifying the challenges and opportunities in adopting a closed-loop approach in India's energy transition, including technological, regulatory, and economic aspects, showcasing case studies and best practices from India and around the world that illustrate successful implementation of circularity in the energy sector, and develop actionable strategies and policy recommendations to promote circularity in India's energy transition, involving stakeholders from industry, government, and civil society.

Targeted SDGs:

SDG 7 | SDG 9 | SDG 12 | SDG 13 | SDG 11

Panel: Energy Transition: Adding closed-loop approach to India's energy transition

- Mr Ronnie Khanna, Partner: GT Bharat LLP
- Mr Tirthankar Mandal, Head of Energy Policy, WRI India
- Mr Mohammad Rihan, Director General, NISE
- Mr Debajit Das, National Project Coordinator, UNIDO
- Mr Nar Bahadur Khatiwora, Regional Programme Head (Asia)
- Mr Kuldeep Rana, Scientist E MNRE
- Dr Mahesh Kasture, Chief Manager, R&D Bharat Petroleum



Key Takeaways

- **Solar energy:** There are various government initiatives which aim at making material consumption, adoption of solar energy and processing more sustainable across the value chain. Solar energy is critical in driving decarbonization. The Solar Waste Action Plan (SWAP) is a necessary step to address the issue of disposal of solar equipment, to ensure sustainability.
- **Collaboration and Investment:** International collaboration and balanced investment flows are important in achieving Sustainable Development Goals (SDGs) and to support energy transition efforts across countries.
- **Resource efficiency in clean energy:** Resource efficiency approach in clean energy is important, focusing on decarbonization at each stage of energy generation, minimizing resource consumption and maximizing the efficiency of energy systems.
- **Continuous Innovation and R&D:** Continuous innovation and research and development (R&D) in advancing energy technologies is critical. Importance of the Indianization of materials and ensuring commercial viability of new technologies.
- **Importance of Batteries and Recycling:** Crucial roles of batteries for energy transitions. Advancements in material science are necessary for better storage solutions. Recycling and PLI scheme for battery technology circularity is important.
- **Energy Efficiency in Manufacturing:** Energy efficiency strategies are essential in the manufacturing sector, especially for MSMEs. Lifecycle approach in design is beneficial for sustainability and reducing environmental impacts.

Key Recommendations

Recommendation	Description
Holistic Energy Approach	Focus on conservation and efficiency to reduce energy requirements. Reduced energy needs can then be met by sustainable sources like solar energy.
Collaboration and Investment	Promote international collaboration and balanced investment flows to support energy transition efforts and mitigate climate-induced uncertainties. Encourage partnerships between governments, private sector, and international organizations to enhance resource allocation and project implementation.
Resource Efficiency	Implement a resource efficiency approach for clean energy, ensuring decarbonization at every stage of energy generation, from extraction to processing.
Innovation in R&D	Invest in continuous innovation and R&D to develop new materials, improve refining processes, and ensure commercial viability. Advocate for the Indianization of materials, such as replacing lithium with sodium, to enhance sustainability and reduce dependency on imported resources. Support the development of biofuels and green catalysts to close the loop on fuel needs.
Battery Recycling and EPR	Enhance battery recycling initiatives and establish Extended Producer Responsibility (EPR) schemes for batteries to promote circularity and innovation. Implement policies that encourage the collection, recycling, and safe disposal of batteries to minimize environmental impact.
Life Cycle Approach for MSMEs	Adopt a life cycle approach in the design stage for manufacturing, focusing on extending product life and ensuring the sustainability and survival of MSMEs. Provide financial incentives, training, and capacity building mechanisms to help MSMEs adopt sustainable practices and technologies.

INNOVATION AND TECHNOLOGY

As the global community increasingly recognizes the urgent need for sustainable development, innovative technologies are playing a crucial role in facilitating the transition to a circular economy. In India, where rapid industrial growth and urbanization present both opportunities and challenges, leveraging technology can significantly enhance resource efficiency, reduce waste, and promote sustainable practices across various sectors. Several panels at ICEF2024 explored how cutting-edge technologies drive India's circular transition, focusing on sector-agnostic applications that can be replicated and scaled across different industries.

The panel highlighted technological advancements that support circular economy principles, such as waste-to-resource technologies, digital platforms for resource optimization, and renewable energy solutions, encouraged collaboration between different sectors to adopt and integrate circular technologies, highlighting the synergies and shared benefits, discussed the barriers to adopting innovative technologies, including regulatory, financial, and technical challenges, and propose solutions to overcome them, and formulated strategic roadmaps for implementing circular technologies at scale, involving stakeholders from industry, academia, government, and civil society.

Targeted SDGs

SDG 9 | SDG 11 | SDG 12 | SDG 13 | SDG 17

Panel 1: Innovative Technologies: Driving India's Circular Transition

- Ms. Rachna Arora, Team Leader, GIZ, India
- Mr. Sandeep Tandon, National Project Manager, UNIDO
- Mr. Gaurav Dolwani, CEO, Lico Materials
- Mr. Zach White, Senior Insights Manager, GSMA
- Mr. Naveen Ahlawat, Head- Power to X, Jindal Steel and Power Ltd
- Mr. Surendra Gothrwal, Scientist D, MeitY

Panel 2: Circular Design & Materiality

- Ms. Monika Shrivastava, Head of Sustainability, JSW Cement
- Ms. Manjri Gopalan, India and SW Asia Regional Manager, Hewlett Packard Enterprise
- Mr. Padmakar Pandey, AVP Sustainability, ABFRL
- Mr. Vaibhav Rathi, Senior Technical Adviser, GIZ India
- Ms Sunitha Varadan, Founder, LoopM Alternatives

Panel 3: Role Of MSMEs in enabling CE in India

- Mr Vinod Raghvan Head of Sustainability Recykal
- Ms Neha Vyas Lead Environment Specialist The World Bank
- Mr Ratnesh Jha Executive Director UNGC
- Ms Kavita Tiwari Strategic Alliance Manager Office of PSA
- Ms Paulina Chormik, Second Secretary, Eco & Comm Affairs, Netherlands Embassy

Panel 4: Reinventing Plastics: Innovations for a Circular Economy

- Ms Shilpi Karmakar Project Manager UNDP
- Mr Shivam Dwivedi Scientist C/ Deputy Director BIS
- Ms Rajkanya M Manager, Sustainability/ Communications Zomato
- Mr Akshay Gunteti Co-Founder Green Worms
- Mr Yash Sharma Founder, GoRewise
- Mr Vishal Dev Director- Sustainable Business WWF India
- Mr Jai Kumar Gaurav Sr Advisor Climate Change & CE GI

Panel 5: Industrial Approach to Innovation and Technology

- Dr Sunita Purushottam Head Sustainability Mahindra Lifespaces
- Mr Ashish Jain Director IPCA
- Mr Rahul Kulshreshtha Strategic Alliances Office of PSA
- Ms Deepti Kapil Scientist CPCB
- Dr R Ratheesh Director CMET , Hyderabad



Panel: Energy Transition: Adding closed-loop approach to India's energy transition



Panel 2: Circular Design & Materiality



Panel 3: Role Of MSMEs in enabling CE in India



Panel 4: Reinventing Plastics: Innovations for a Circular Economy



Panel 5: Industrial Approach to Innovation and Technology

Key Recommendations

- **Systematic Shift and Economic Incentives:** Incentivize models that focus on systemic change. While the product level changes are required, a bigger perspective keeping whole process/system should be prioritized.
- **Taxation for Systemic Change:** Restructure consumption tax, like GST, to encourage sustainable consumption and production patterns.
- **Sustainable Product Design:** Incentivize products that focus on recyclability and reusability, ensuring materials can be effectively repurposed at the end of their life cycle.
- **Establish and Enforce National Standards:** Develop and implement national standards product declarations for circular economy practices that are both region-specific and aligned with international frameworks.
- **Capacity building of industry:** Engage and train industry stakeholders in the development and execution of circular economy principles like dematerialization, intensifying and narrowing resource loops, slowing down resource consumption into clear, actionable guidelines to ensure feasibility and compliance.
- **Targeted Outreach and Education:** Promote widespread awareness and understanding of circular economy principles through targeted outreach and educational initiatives.
- **Reduce Operational Carbon Emissions:** Promote policies that would help industry transition to energy-efficient technologies to reduce operational carbon emissions and optimize resource use.
- **SDG 17 and Partnerships:** Leverage Sustainable Development Goal 17 to foster partnerships at all levels, including international organizations like the WTO and UNEP. Encourage the government to participate and consult in initiatives related to the circular economy.
- **EPR Implementation:** Enforce EPR policies nationwide to hold producers accountable for the entire lifecycle of their products, including collection, recycling, and disposal. This promotes recyclability in product design and reduces waste's environmental impact.
- **Promoting innovation for creating alternate materials:** Innovations are crucial to finding alternative materials that can match or exceed the functionalities of existing materials, especially those with recyclable features.
- **Mandatory Labeling for Recyclability:** Clear and mandatory labelling about the recyclability of product packaging should be made mandatory.
- **Private Sector Participation:** Facilitating natural returns on private investments could encourage greater private participation in environmental initiatives.

ROLE OF STANDARDS

Standards and compliance play a crucial role in ensuring the successful implementation of circular economy principles. By establishing clear guidelines and benchmarks, standards help businesses and governments align their practices with sustainability goals. This session, "Setting the Standard: Driving Circular Economy through Quality and Compliance," explored the importance of standards in promoting circularity, the role of regulatory frameworks, and the impact of compliance on achieving sustainable development objectives. The BIS team shared more about the latest ISO standards in Circular Economy and how they could help businesses in compliance management and thus build a competitive advantage.

The objectives of this discussion was to emphasize the importance of standards and compliance in driving circular economy practices across various industries, promote and showcase examples of successful implementation of standards and compliance measures that have facilitated circular economy initiatives, foster discussions between policymakers, industry leaders, and standard-setting organizations to harmonize efforts and create conducive regulatory environments and to motivate businesses to adopt and adhere to standards that support circular economy principles.

Targeted SDGs

SDG 9 | SDG 12 | SDG 13 | SDG 17

Panel: Setting the Standard: Driving Circular Economy through Quality and Compliance

1. Mr Bhaskar Chatterjee CEO Anil Agarwal Foundation (Moderator)
2. Mr Suman Kumar Das Researcher University of Brescia Italy
3. Mr Pranoy Koul Engineer-Sustainable Buildings ARUP
4. Mr Sujeet Samaddar Advisor MRAI
5. Mr Sachin Joshi Independent Advisor



Key Takeaways

- **Importance of Systematic Approach:** The session delved into various aspects of circular economy, including the importance of establishing frameworks, industry involvement, and the need for a systematic approach to achieve sustainability goals.
- **Dematerialization:** The concept of dematerialization and the necessity for data at the micro level to support circular economy initiatives was highlighted. The discussion about the rebound effect of the circular economy, such as repurposing buildings instead of constructing new ones.
- **Frameworks:** The dynamic nature of circularity and the need for performance-based frameworks and energy approaches was raised. Highlighting the importance of accurate source data and environmental product declarations to understand the actual recovery in manufacturing and transport. The significance of scoring and assessing the circularity of products and systems.
- **4M's:** The uniform segment plays a crucial role in Textile industry for both buyers and sellers must adhere to uniform standards to ensure effective circular economy practices. The 4Ms—Men, Material, Machinery, and Money—and the necessity for standards in various services, including hospitality. The importance of global partnerships and cross-border trade of scraps, particularly in the context of SDGs 9, 12, 13, and 17.

Key Recommendations

Recommendation	Description
Develop and Implement Standards	Establish and adhere to comprehensive standards, such as ISO 5559 series, tailored to specific sectors to support circular economy practices.
Promote Systematic Thinking	Adopt a systematic approach to the circular economy, considering the entire lifecycle of products and services, from raw material extraction to end-of-life management.
Enhance Data Accuracy and Transparency	Ensure accurate data collection and transparency in reporting to support circular economy initiatives and enable effective decision-making.
Encourage Industry Involvement	Foster active participation from industries in developing and adhering to circular economy frameworks, ensuring that all stakeholders are accountable.
Facilitate Public-Private Partnerships (PPPs)	Encourage collaboration between public and private sectors to develop innovative solutions and frameworks that drive circular economy practices.
Address Systemic Issues	Tackle fundamental issues such as finance, tax regimes, and product specifications to support the transition to a circular economy.
Raise Awareness and Educate Stakeholders	Increase awareness and education about circular economy practices among stakeholders, including policymakers, industry players, and the public.

“LOW CARBON BUILDING TRANSITION THROUGH INNOVATIVE MATERIALS”



The Global Green Growth Institute (GGGI), headquartered in Seoul, South Korea, supports emerging economies in addressing climate change across energy, transportation, and buildings. Operating in Cambodia, India, Indonesia, Vietnam, and China, GGGI promotes low-carbon building practices by emphasizing minimal emissions in design and reducing embodied carbon in construction materials. Recognizing that 75% of carbon emissions come from operational sites and 25% from construction sites, GGGI envisions a low-carbon, resilient future with inclusive growth.

Key Takeaways

- **Government Initiatives and Collaboration:** India plans to deliver 40 million houses under various schemes and expects 40% of its population to be urban by 2030, needing 600-800 million square meters of urban space annually. The Pradhan Mantri Awas Yojana (PMAY) incorporates climate resilience and carbon reduction through technology, collaborations with IITs, and on-site training for artisans, policymakers, and construction workers.
- **3D Printing and Innovative Construction Technologies:** India has indigenously printed its first post office using 3D printing technology. This fast-track construction method is gaining popularity for its efficiency and effectiveness.
- **Certified and Labeled Materials:** Certified and labeled materials are important, with emphasis on embodied carbon (total greenhouse gas emissions in a product's life cycle) and operational carbon.
- **Minimizing Transportation Costs and Renewable Energy:** Reducing transportation costs and using renewable energy is necessary to lower the carbon footprint. Local solutions tailored to state-specific climatic conditions and material availability are needed.
- **Lifecycle Approach in Building Design:** Sustainability comes with lifecycle approach in building design, considering both embodied and operational carbon.
- **Affordable Cooling and Energy Efficiency:** Reducing the energy footprint of cooling systems is imperative. Alternative cooling solutions like geothermal and solar air conditioning and the role of rating agencies promotes carbon reduction.
- **Economic Disparity and Job Opportunities:** There is a need for training programs and collaborations with bilateral and multilateral partners to scale job opportunities and economic benefits.

Key Recommendations

Recommendation	Description
Holistic Energy Approach	Focus on conservation and efficiency to reduce energy requirements. Reduced energy needs can then be met by sustainable sources like solar energy.
Collaboration and Investment	Promote international collaboration and balanced investment flows to support energy transition efforts and mitigate climate-induced uncertainties.
Resource Efficiency	Implement a resource efficiency approach for clean energy, ensuring decarbonization at every stage of energy generation, from extraction to processing.
Innovation in R&D	Invest in continuous innovation and R&D to develop new materials, improve refining processes, and ensure commercial viability. Advocate for the Indianization of materials, such as replacing lithium with sodium.
Battery Recycling and EPR	Enhance battery recycling initiatives and establish Extended Producer Responsibility (EPR) schemes for batteries to promote circularity and innovation.
Lifecycle Approach for MSMEs	Adopt a lifecycle approach in the design stage for manufacturing, focusing on extending product life and ensuring the sustainability and survival of MSMEs. Provide financial incentives to support these efforts.

“STARTUPS ACCELERATING CIRCULAR ECONOMY FOR SUSTAINABLE BHARAT”



About the Session: The accelerator session at ICEF2024, titled "Startups Accelerating Circular Economy for Sustainable Bharat," focused on the role of startups in promoting a circular economy in India. The session included discussions on innovative strategies, challenges, and opportunities for startups in the circular economy sector. Key topics included policy clarity, funding, capacity building, and technological advancements.

Key Takeaways

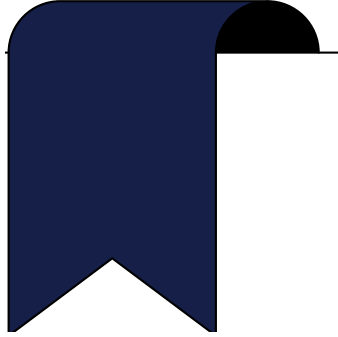
- **Startup Significance:** Startups play a crucial role in fintech, insurance, and technological innovations. Their impact extends to circular economy practices, emphasizing the need for ecosystem integration.
- **Focus Areas:** Survey insights reveal that startups concentrate on recycling (33%), waste management (25%), and plastic waste management (41%). Better technology adoption (52%) and attention to CSR (36%) and skilling (30%) are essential.
- **Policy Clarity and Awareness:** Dr. Reva Prakash stressed the importance of clear government policies. Startups face challenges related to certifications, standards, and Extended Producer Responsibility (EPR) platforms. Talent retention is critical.
- **Upstream Policies and Design:** Ms. Shalini Goyal Bhalla highlighted India's potential in circular economy practices. Policies should address upstream processes, utilizing waste generated during production. Innovations and incentives drive progress.
- **Funding and Mentorship:** Mr. Shiv Rao discussed funding challenges and the need for mentorship. Seed funds under the Startup India initiative are available. Learning from international examples, such as tax incentives for angel investors, can benefit Indian startups.

Key Recommendations

Recommendation	Description
Funding and Investment	Increase investment in startups through seed funds and incentives for investors. Promote public-private partnerships to enhance resource allocation and project implementation.
Skilling and Capacity Building	Implement skilling initiatives to equip the workforce with the necessary skills for a circular economy. Focus on training programs for artisans, policymakers, and construction workers.
Technological Advancements	Encourage the adoption of innovative technologies, such as 3D printing and renewable energy solutions, to promote sustainable practices. Support R&D for developing new materials and processes.
Incentives for Reuse and Repair	Implement policies that incentivize reuse, repair, and refurbishing practices. Encourage startups to focus on these areas to reduce waste and promote sustainability.
Integration of Circular Design	Promote the integration of circular design principles in product development. Ensure that waste generated during production is utilized by other sectors to create a closed-loop system.



ACE AWARDS



Dr Michael Bucki, Counsellor & Head of Section – Sustainable Modernization, European Union Delegation to India and Mr Pooran Chandra Pandey, International Visiting Fellow and Advisor to International Council for Circular Economy presented the ACE awards. Awards were given to K-12 schools, Higher Education Institutes and Enterprises.



K-12 SCHOOLS



*St. Mark's Sr. Sec. Public School, Janakpuri
Progressive Zero Waste School*



*Bhatnagar International School
Environmental Initiatives*



*Disha Delphi Public School
Innovation in SDGs*



*Tagore International School
Education for Sustainable Development*

HIGHER EDUCATION INSTITUTES



*Centre for Materials for Electronics
Technology (C-MET)
Best CoE - R&D and Innovation In E-
waste*



*Gokhale Institute of Politics and Economics
Waste Management*



*Research Innovation For Smart Enterprises
(Laboratorio RISE), Italy
Research in the Circular Framework*



*Indian Maritime University
Curriculum Integration*

ENTERPRISES



Indian Pollution Control Association (IPCA)
NGO Category



LoopM Alternatives Pvt. Ltd!
StartUp' Category



Ferraille Global Private Ltd
Small Enterprise Category



Green Waves Environmental Solutions
Small Enterprise Category - Special Mention



Mahindra Lifespace Developers Ltd
Medium Enterprise Category,



Welspun Corp Limited, Anjar
Large Enterprise Category - Textiles



Coca-Cola India Private Limited
Large Enterprise Category - Plastics



Arcadyan Technology Corporation
Large Enterprise Category - Special mention
Technology in Circular Economy



JSW Cement.
Large Enterprise Category - Cement



PEPSICO

PepsiCo India
Large Enterprise Category - Special mention
Resource Recovery



AMARA RAJA

Gotta be a better way

Amara Raja Energy & Mobility Limited Large
Enterprise Category -Special Mention
Electronics

FEEDBACK FROM DELEGATES

The meticulous attention to detail and last-minute arrangements by the team were truly impressive. I greatly appreciate the seamless coordination of all the necessary elements for the conference. Team's efforts ensured that everything was in place and ran smoothly throughout the day. Additionally, I am grateful for the timely updates you provided regarding the second conference. --- **Amardeep Darade, CEO, Panchtatva Fusion Pvt Ltd**

It was indeed an amazing panel and I truly enjoyed the discussion with all panelists and learnt about a lot of new initiatives. Thanks ICEF team for organising such a stellar event. - **Dhiraj Santdasani, Technical Advisor, C40 Cities**

Thank you team for giving us the opportunity and the platform to share our thoughts and suggestions. -**Manuj Kumar, Head Marketing & Sustainability, Lakshya Foundation**

A well-organised meet by ICCE team. It was a pleasure to connect with all the panelists. -**Shrinivas Naik, CSO, Arvind Ltd**

It was a pleasure to be a part of the India Circular Economy Forum (ICEF2024) and learn from the keynote speakers through panel discussions. Your organization and leadership of the event were impressive, and I appreciate the efforts of your team in making the event a success. - **Merlyn Dsa - Ex-municipal Corporator, Mira Bhaingar Municipal Corporation**

It was indeed an experience interacting with everyone, especially the panelists in this session were very insightful and I appreciate their commitment to the cause. Many Congratulations to ICCE team for managing to bring together professionals from diverse contexts for meaningful dialogue. --- **Prof Yukti Sharma, Joint Director, ILL, Delhi University**

On behalf of Hyundai, I would like to thank ICCE for inviting me. It has been a great opportunity to share our initiatives and vision for sustainable waste management. We look forward to continuing our efforts in sustainability and collaborating with all stakeholders to create a better future. ---**Saurabh ShashiNath Sharma, Head CSR & General Manager, Hyundai Motors**

It was a good learning experience to listen and discuss multiple things at the city level. Congratulations to the team ICEF for putting this all together. Great work. ---**Md Asif Raza, Program Manager, CITIIS, NIUA**

ICEF is a great opportunity curated by ICCE to gain new insights from different sectors and to know of the excellent success stories shared by everyone.GIZ. --- **Monika Shrivastava, Head Sustainability, JSW Cement**

It was an absolute delight to share a panel with practitioners of circular economy. Congratulations to the ICEF team for a well organized event with a good selection of invitees. Our Q&A session was filled with exciting questions, some of which we had no answers to! That speaks of the curiosity that was there among our audience. --**Vaibhav Rathi, Sr Technical Adviser, GIZ India**

The discussion at ICEF were indeed enriching, and I appreciate the effort put in by the entire organizing team to ensure everything ran smoothly. It provided valuable viewpoints on CE and materiality. I learned a great deal from each of you and appreciated the depth and breadth of our dialogue. **Manjari Gopalan, India and SW Asia Regional Manager, Market Access, Hewlett Packard Enterprise India Pvt Ltd**

This is a wonderful and most appropriate initiative to drive the CE discourse to more serious and practice-oriented discussion at national level. Possibly this is the only big platform on CE in India today, that I am aware of. I definitely look forward to attending the next summit!!

-- **Biswaksen Mishra MDI Gurgaon Research Scholar**

The professionalism and dedication of the team did not go unnoticed, and I wanted to express my thankfulness for making the event a success. I look forward to attending more such conferences and contributing effectively in the future. ---- **Sunita Purushottam Head of Sustainability Mahindra Lifespaces**

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