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Note : General articles published in this Bulletin do not necessarily reflect the views of the Bombay Chamber of Commerce and Industry

## Editorial.....

Circular Economy (CE) is now widely discussed in Indian businesses, Government and Academia. NITI Aayog released "Status Paper and Way Forward on Resource Efficiency & Circular Economy" and four sectoral strategy papers in early 2019. Following these publications, Ministry of Environment, Forests and Climate Change came out with a draft National Resource Efficiency Policy.

Businesses have been focusing however more on the waste recycling segment of circularity. Push on the Extended Producer Responsibility for management of plastic and e-waste has led to emergence of Producer Responsibility Organizations. Engagement with informal sector and recyclers has increased due to initiatives such as by UNDP in partnership with Urban Local Bodies, Hindustan Coca Cola and Hindustan Unilever. ITC's Wealth out of Waste program that operates in several cities of India has gained significant traction.

Relatively less emphasis is given on the "upstream", especially on eco-design. Move towards sustainable packaging is however picking up due to pressure from regulations and commitments made by some of the large FMCG players. Use of recycled PET fibers in the fabric has started closing the loop and "green" fashion such as Reliance's R Elan 2.0 is in the market.

UN Environment launched Partnership for Action on Green Economy (PAGE) for India in 2019. PAGE is currently working with Ministry of Finance to prepare Action Plan for Sustainable Public Procurement.

In view of above, building capacity on CE at academic institutions becomes rather critical. In November 2019, Ekonnnect Knowledge Foundation (Ekonnnect) conducted a Winter School on CE in partnership with IIT Madras and Madras Chamber of Commerce and Industries. In May 2020, Ekonnnect will conduct a Summer School details of which are featured in this Newsletter.

- Dr. Prasad Modak



## BUILDING A CIRCULAR ECONOMY FOR IMPROVING MATERIAL RESOURCE EFFICIENCY IN AUTOMOBILE SECTOR IN INDIA

- Shilpi Kapur Bakshi<sup>a</sup>, Nitish Arora<sup>b</sup>

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<sup>b</sup>Research and Policy Lead, OLA Electric Mobility Pvt Ltd

One of the major issues that the world is currently grappling with is the unprecedented growth in the demand for various resources and the associated challenges in meeting this demand. Automobile manufacturing requires different metals-steel, aluminum, copper, lead, chromium, nickel and zinc, as well as significant amounts of plastic, glass, rubber and fabric. Analyzing the direct and indirect raw material requirements in the Indian automotive sector during the period 1997-2007<sup>1</sup>, it was found that the material requirement of the sector doubled in this period of 10 years. If current growth trends continue, the total number of registered cars could exceed 100 million by 2030, with a concomitant rise in material requirements. Under business as usual scenario, the total material demand from 2015 to 2030 in the auto sector is expected to increase from 14.1 million tonnes to 102.1 million tonnes (TERI-GIZ-DA, 2016).

However, resource efficiency and circular economy thinking can create significant potential for reducing the material demand at different stages of the life cycle of an automobile. Auto manufacturers can improve the resource efficiency of their production processes and products through innovation that could improve the design of motor vehicles to reduce the material demand and also allow for their efficient repair. Adopting the 'design for sustainability' concept, vehicles can be built to be as sustainable as possible over their entire lifecycle. Further OEMs can actively contribute to resource efficiency by remanufacturing a wide variety of parts, including engines and gear-boxes. Remanufactured parts can be 30-50% less expensive while having the same guarantee and quality control as new parts. Remanufacturing a passenger car engine uses only 23% of the energy used to produce a new engine from raw materials (Ellen McArthur, 2016).

Businesses that identify ways to close material loops can realize greater profit margins through alternative revenue streams and lower manufacturing costs. Indian companies are starting to recognize these

benefits. Tata Motors ProLIFE, for example, has realized the value of remanufacturing components in their commercial vehicles as these vehicles have long use cycles, are very sensitive to cost increases, and are often managed as a fleet, making the use of remanufactured parts more attractive, especially with a warranty. Tata Motors ProLIFE buy backs, or exchange, the used vehicle parts like engine, gearbox, or alternators. The company then remanufactures the returned part and offers the remanufactured product with a warranty. This approach allows longer use of parts, reduces demand for energy and materials, thereby creating new revenue streams for Tata Motors ProLIFE. Here, tie-ups with start-up companies that bring in new ideas and innovative solutions in the domain of waste management could prove to be a value addition to promote the remanufacturing process.

Moving to the use phase of automobiles, there could be contribution to the circular economy by supporting the longevity of vehicles by ensuring that they can be serviced, repaired and maintained. The extension in the lifetime of a vehicle not only reduces costs for consumers, but also helps conserve natural resources and energy. Further, consideration of product as a service needs to be promoted and there should be creation of leasing options and sharing platforms where product remains owned by manufacturer and consumers pay for its usage. The idea seems to have found seeds in the recent start-ups of Zoomcar, Ola Cabs, Uber etc. Convenient pay-per-use models that give people access to tailored transportation, whenever required, can replace the need for vehicle ownership. Further, given that the contribution of automobiles in total air pollution in mega Indian cities is reported to be between 40–80%, out of which nearly 20% of passenger transport emission is by private automobiles supporting only 4% of total passenger transit activity in Indian cities, promoting public transport becomes extremely critical.

Tapping the potential source of supply for secondary raw materials from the end of life vehicles (ELVs)

1. Material Consumption patterns in India: A Baseline study of the Automotive and Construction Sectors, March 2016



such as metal and other materials, which if salvaged and/or reused/recycled, can be fed again into the economy thereby helping to close the loop of sustainable resource circulation and reducing the demand for virgin raw materials, giving an opportunity to the auto sector to show its commitment to making Indian economy resource efficient. It can also be a major step towards reducing carbon footprint. Estimates suggest that large volumes of steel scrap could be generated from approximately 28 million ELVs<sup>2</sup>. There is a need for expediting the regulatory processes and coming up with a robust ELV policy. Imposing bans on older vehicles to curb pollution will only add to the problems in absence of vehicle scrappage policy. Procurement law and guidelines could also incorporate the principles of circular economy (Ellen McArthur, 2016). Also, with the government eyeing large-scale implementation of National Electric Mobility Mission 2020, there is a need to ensure high-grade recycling capacity with the aim of recovering lithium, cobalt, and other metals used in traction batteries which is important from an ecological and industry-specific point of view.

Many OEMs have also taken several initiatives in the recent past to reduce demand on virgin resources by bringing about resource efficiency along the different life cycle stages, but given the quantum of resources that the sector demands, these initiatives need to be scaled up. Innovative business models coupled with regulatory framework that codify the zero effect and zero defect in policies would accelerate the transition towards closing the loop.

This becomes all the more important at a time when government is mulling over ways in which Electric Vehicle (EV) production can be accelerated. The availability of these critical metals is still unknown in India (no geological survey confirms that), and it remains import dependent. This makes it inevitable to ensure that whatever material that enters the domestic boundary should not get leaked out.

The framework can be based on shared responsibility approach and help in sustainable ELV recovery and management system helping implement the CPCB guidelines. This system in addition to preserving the environment, will engage the stakeholders and lead to economic profitability and social benefits. What will be important is to integrate the 6R (reduce, remanufacture, reuse, recover, recycle, and redesign) principles of sustainable manufacturing as essential elements to ensure the creation of a circular economy.

## ACKNOWLEDGEMENT

This article draws from the research that was supported by the project- 'Resource Efficiency and Sustainable Management of Secondary Raw Materials' supported by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB).

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TERI-GIZ-DA (2016) "Material Consumption Patterns in India: A Baseline Study of the Automotive and Construction Sectors". Available at: [https://www.international-climate-initiative.com/fileadmin/Dokumente/2016/GIZBaselineReportSummary\\_SinglePages.pdf](https://www.international-climate-initiative.com/fileadmin/Dokumente/2016/GIZBaselineReportSummary_SinglePages.pdf)

## Publications from EU-REI website

In 2019, NITI Aayog in partnership with EU Resource Efficiency Initiative (REI) published Status Report on Resource Efficiency & Circular Economy and in addition, four in-depth sector specific reports. These reports and other sectoral reports can be accessed in: <https://www.eu-rei.com/publications.html>

2. Concept Note: Voluntary Vehicle Fleet Modernization Programme, 2016, Ministry of Road Transport and Highways, Government of India: [https://morth.nic.in/sites/default/files/Concept\\_Note\\_on\\_Voluntary\\_Vehicle\\_Fleet\\_Modernization\\_Programme.pdf](https://morth.nic.in/sites/default/files/Concept_Note_on_Voluntary_Vehicle_Fleet_Modernization_Programme.pdf)



## ADVANCING REMANUFACTURING IN INDIA

- Rajiv Ramchandra,  
Founder, Recreate India Research Foundation

According to the India Brand Equity Foundation (IBEF), the manufacturing industry has emerged as one of the high growth sectors in India and the nation is poised to become the fifth largest manufacturing country in the world by the end of 2020<sup>1</sup>. Concurrently, there is a growing awareness of the need for environmental stewardship and social inclusion, which are being recognized as critical catalysts to sustainable development. This is evidenced by the urgency of transitioning to a resource efficient circular Economy<sup>2</sup>. This is where Remanufacturing (or Reman) comes into the picture, described by the European Remanufacturing Council as the "backbone of the Circular Economy"<sup>3</sup>.

### Definition of Remanufacturing

According to the American National Standards Institute (ANSI) approved standard<sup>4</sup> developed by the Remanufacturing Industries Council (RIC)<sup>5</sup>, "Remanufacturing is a comprehensive and rigorous industrial process by which a previously sold, leased, used, worn, or non-functional product or part is returned to a "like-new" or "better-than-new" condition, from both a quality and performance perspective, through a controlled, reproducible and sustainable process." Remanufacturing is not synonymous with recycling, reconditioning, refurbishing, reusing or repairing, but can simultaneously include several of these modalities.

### Remanufacturability Criteria

For a product to be remanufacturable, certain general criteria<sup>6</sup> need to be met. These include:

- Technology exists to restore the product
- The product is made up of standard interchangeable parts
- Cost of the core<sup>7</sup> is low relative to the cost savings achieved through core reuse
- The product technology is stable over more than one life cycle
- Sufficient market demand exists to sustain remanufacturing operations/enterprises

### Benefits of Remanufacturing

According to the Centre for Remanufacturing & Reuse<sup>8</sup> in the UK and Boston University ,

remanufacturing has several benefits. Some of these include:

- **Local jobs** - remanufacturing activities usually take place close to market, so while a product may have originally been manufactured overseas, remanufacturing provides the opportunity for creating local jobs.
- **Lower Costs/Higher profit margins** - remanufactured products often have higher profit margins than for traditional manufacturing. Remanufactured product prices are typically 45% to 65% of comparable new products.
- **Reduced raw material consumption** - as remanufacturing preserves much of the material in original product, less raw material is used than for manufacturing new products.
- **Reduced energy consumption** - by limiting the amount of raw material extracted/recycled and the manufacturing of new components, remanufacturing typically uses less energy than manufacturing a new product.
- **Reduction in CO2 emissions** - a reduction in energy consumption is usually accompanied by a reduction in CO2 emissions.
- **Reduction of material sent to landfill** - remanufacturing reduces this flow of material by keeping material in use for longer.
- **Toxic Waste Management** - when disassembling products, remanufacturers are able to segregate toxic or hazardous materials and safely dispose of them.

### Status in India

According to the European Remanufacturing Network's (ERN) 2015 'Remanufacturing Market Study' published in 2015<sup>9</sup>: "Remanufacturing in India is underdeveloped, and repair is more common. Most of the remanufactured IT products in India are printer cartridges, although the definition of 'remanufacture' can be somewhat variable. More than 30,000 businesses reportedly engage in some form of cartridge refilling or remanufacturing, but it is said that the sector is largely unregulated, quality varies, and counterfeiting [is] common, and it is thought that only about 70 firms remanufacture printer cartridges under reputable brands.



In the HDOR [heavy-duty and off-road] sector, Volvo began remanufacturing construction equipment at its facility in Bangalore for the domestic market. Cummins operates two separate remanufacturing facilities—one for exports and the other for the domestic market."

Clearly, the potential is immense.

## Possible Challenges

Remanufacturing is not a panacea and has challenges associated with it. Some common challenges include<sup>10</sup>:

- **Lack of standards and legislation:** The lack of a commonly accepted definition and standards for remanufactured products in various sectors has been identified as the most prevalent barrier.
- **Lack of life cycle design awareness:** Many barriers encountered during the reman process could be eliminated if proper design features were included in the early stage of product design.
- **Skill/technology challenges and limited information sharing:** Many of the decisions made during the remanufacturing process require

technically skilled engineers or technicians.

## Conclusion

Remanufacturing can be the catalyst that enables India's transformation to a post-industrial circular economy. Within the circular economy framework, remanufacturing is part of its technical cycles<sup>11</sup>.

It can also support the effort to meet, and possibly surpass the targets set by the Sustainable Development Goals (SDGs)<sup>12</sup> like **Goal 8:** Decent work and economic growth, **Goal 9:** Industry, innovation and infrastructure and **Goal 12:** Responsible consumption and production as well as India's Intended Nationally Determined Contributions (INDCs)<sup>13</sup>.

## About the Author

Rajiv Ramchandra is the founder of Recreate India Research Foundation (Re:CREATe), a research and advocacy enterprise that aims to catalyse and advance the remanufacturing industry in India. To learn more, please visit [www.recreateindia.org](http://www.recreateindia.org).

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## ABOUT INDIA CIRCULAR ECONOMY

### WhatsApp Group on Circular Economy

Sharing of experiences on Circular Economy is critical. With this in mind, a WhatsApp group named 'Circular Economy' was founded by Dr Prasad Modak in June 2018. This Group consists of 130 plus professionals and discusses various topics related to circular economy and shares resources. The Group represents industry, research and academia, policy makers and regulators and finance professionals. Membership is only through referrals and by invitation. Contact Dr Prasad Modak ([prasad.modak@emcentre.com](mailto:prasad.modak@emcentre.com)) for more information.

### Events

#### **Circular Economy Symposium (CES) 2020:**

India's only symposium on circular economy, the Circular Economy Symposium (CES) 2020 will be held on 18 and 19 June 2020 at New Delhi. The objective of the symposium is to further strengthen the business case for CE through industry dialogues, B2B and a consortium of Industries on CE. For more information write to [ces@ficci.com](mailto:ces@ficci.com).

#### **World Circular Economy Forum:**

Canada will host the 4th edition of the World Circular Economy Forum-from September 29 to October 1, 2020- in Toronto. The forum will be co-organized by Environment and Climate Change Canada, on behalf of the Government of Canada, and Sitra. Forum partners include the Circular Economy Leadership Coalition, the Ellen MacArthur Foundation, the European Commission, the Government of Finland, the OECD, the Platform for Accelerating the Circular Economy, the UN Environment and the WBCSD. Details on the forum will be available in the coming months at [Canada.ca](http://Canada.ca).

### [www.indiacirculareconomy.com](http://www.indiacirculareconomy.com)

Ekonnect Knowledge Foundation and Environmental Management Centre LLP joined hands to establish a website ([www.indiacirculareconomy.com](http://www.indiacirculareconomy.com)) focusing on Circular Economy as relevant to India.



This website hosts Circular Economy newsletters published with Bombay Chamber of Commerce and Industries (BCCI). Monthly summaries of discussions held at the WhatsApp group on Circular Economy are also made available. In addition, useful resources such as reports, weblinks and videos are hosted.

The membership is open to all those interested. Only registered members can download the resources. The website currently has more than 200 members.



After the successful conduct of the Winter School on Circular Economy at IIT Madras, a four-day Summer School will be conducted between May 13-16 on Circular Economy at IIT Bombay.

This School will cover topics such as Evolution of Circular Economy (CE), Design Thinking, Life Cycle Assessment and Material Flow Analyses. The 6Rs of CE consisting repairs, refurbish, remanufacturing, reuse, recycling and recovery will be discussed with related policies, regulations and technology options. Business models in CE and role played by the informal sector will be explained with the help of case studies.

The students will be asked to work on preparing business plans and these plans will be presented to some of the established entrepreneurs and investors. Finally, an overview will be provided of CE initiatives at the national and international levels and way ahead. Apart from the presentations, there will be panels, group work sessions, student seminars, videos, field visits and sessions such as meet with CE entrepreneurs will be organized keeping the program highly interactive. Dr Prasad Modak will be the Chief Mentor.

In all, around 60 participants are expected. There are only limited seats so, please register and make payments as early as possible. Limited accommodation will be available at the IIT and NITIE campuses. All participants will receive certificates.

## Faculty Training

One of the unique features of the summer school will be an integrated component on training of trainers. Program for mentoring faculty will commence on May 12 at NITIE and after a day of immersion, the faculty will participate as facilitators to the 4-day Summer School that will follow. The objective of faculty training will not be just equipping them with the resources and teaching tools but helping them develop a CE curriculum at their college or university.

## Who will attend?

**Category 1:** Students (maximum 20 seats)

**Category 2:** Others representing industry, professionals, research organizations, NGOs, policy makers and regulators, investors

**Category 3:** Faculty

## Why attend?

- Achieve cost reduction, make your organization competitive and future-ready
- Increase your export potential to meet market regulations
- Leverage business opportunities to become an entrepreneur in CE
- Understand existing policies and incentives enabling transition towards CE across various sectors and value chains
- Learn approach and tools towards development of innovative CE solutions to meet Sustainable Development Goals
- Identify opportunities to redesign, maximize value and eliminate waste streams through cross-functional learning

## Venue

- NITIE May 12 only for the Faculty
- Third Floor, VMCC, IIT Bombay May 13-16 for both Faculty and Students

## Accommodation

Limited accommodation will be available at IIT Bombay campus on first-come, first-served basis. For assistance, contact Sivaranjani (sivaranjani@emcentre.com)

## Sponsorship and Stalls

Visit [ekonnnect.net](http://ekonnnect.net) for more details on sponsorship and about charges for putting up the stalls.



## BCCI SUSTAINABILITY COMMITTEE ACTIVITIES

### Activities

- Workshop on Technology Inclusion for CSR on October 04, 2019.
- Site Visit to Mokhada, CSR Project of Siemens on October 11, 2019.
- Course on Water Security Solutions for Business on October 18, 2019.
- Workplace Safety Awards on October 24, 2019.
- Webinar on Integrated Cities and Industrial Clusters Business Enabling Ecosystems for Make in India on December 18, 2019.
- Site Visit for Insight into Office Ergonomics Safety at Godrej Interio on December 19, 2019.
- Certificate Training in Electrical Safety on December 19 & 20, 2019.
- Certified Course on OHSMS Internal Auditor – Based on ISO 45001: 2018 on January 22 & 23, 2020.
- Practical Training in Advanced Fire Safety on January 30 & 31, 2020.
- Workshop for National CSR Awards 2020 portal for submitting nominations on February 07, 2020.
- Certified Training in First Aid - 12th & 13th February, 2020
- Site Visit to Johnson & Johnson, Mulund - 14 February, 2020

### Publications

- Workplace Safety Compendium 2019  
<http://bit.ly/377StXU>
- Workplace Safety Look Book  
<http://bit.ly/2XfiobC>
- Water: The Biggest Business Risk for India Inc.  
<http://bit.ly/2NKSzWH>

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