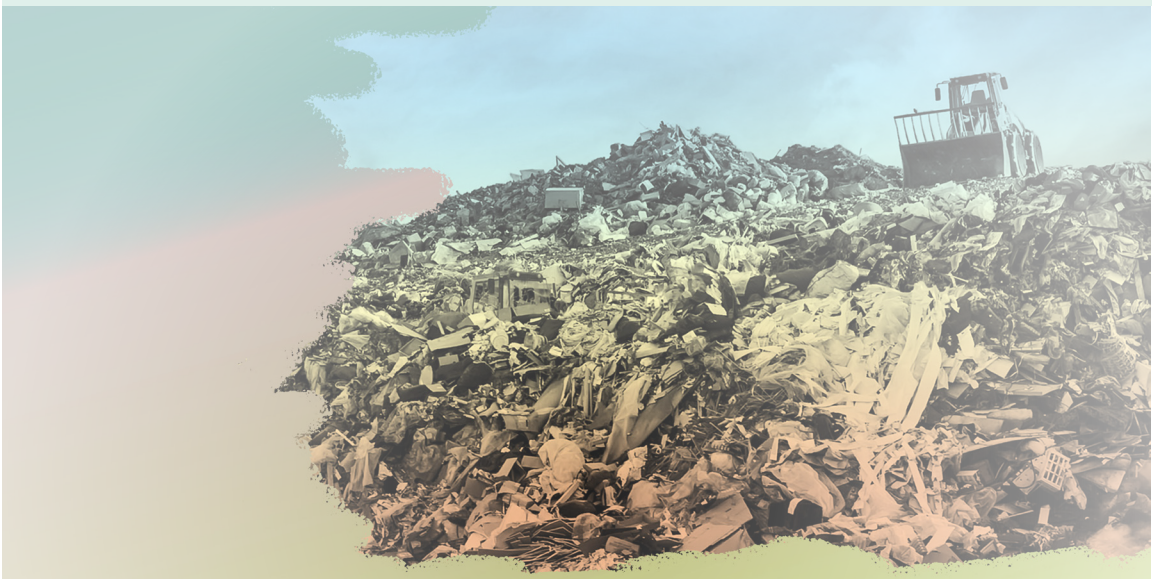
CII 3R AWARDS
EXCELLENCE IN WASTE MANAGEMENT
Reduce, Reuse, Recycle

Confederation of Indian Industry

INDIA'S LEADING COMPANIES IN MANAGING WASTE



Award 2022 - Supported by

Blue Planet
Environmental Solutions

CII 3R AWARDS COMPENDIUM 2022

CONTENTS

FOREWORD

Protecting the planet is everyone's responsibility as it is vital for our very existence. The CII 3R Awards since its inception in 2020 have been aiming to recognise the industry and start-ups for their commendable work in managing waste generated from their own activities; developing minimum/ zero waste yielding products; managing municipal solid waste; and in managing other urban wastes such as plastic and e-wastes under EPR strategies.

The awards also recognize the municipal corporations (MCs) which are effectively managing the municipal solid waste in respective cities/ towns.

The purpose of these awards is to encourage, recognize and reward best practices of industry, start-ups and municipal corporations in order to set a benchmark of excellence in waste management for large number of players to thrive to adopt these best practices and improve upon them.

Different industries, start-ups and municipal corporations have been encouraged to participate in the awards and the entries were evaluated by experts of the appraisal committees and further members of eminent jury.

This current compendium briefly presents waste management processes & best practices of 13 companies and start-ups which are winners and recipients of Merit Award of the CII 3R Awards 2022. It is expected to be a reference document for industry and start-ups to learn and understand best waste management practices and ecosystem that is embraced and practised by some of the fellow companies and start-ups in India.

I would like to sincerely thank members of the Grand Jury and experts for their continuous guidance and support for evaluating the industries, start-ups and MCs.

I must also thank industries, start-ups and MCs across the country for their participation in the awards.

It is an extremely important initiative by CII to encourage 3R (reduce, reuse and recycle) practices amongst the industry, start-ups and municipal corporation for managing the wastes and extracting values, thereby promoting principle of circular economy and help protecting the planet.

Anil Kakodkar (Dr.)
Chairman, Grand Jury, CII 3R Awards
Chairman, Rajiv Gandhi Science & Technology Commission
Former Chairman, Atomic Energy Commission

FOREWORD

The environment in which we live in is very significant not only for today's generation health but also for the health of future generation. To mitigate the impact of waste generated on the environment and health, an efficient waste management system and effective practices need to be adopted by all stakeholders, including industry.

Many industries are adopting innovative and cost effectives approaches, and solutions to manage waste and extracting value added products, thereby promoting principle of circular economy

Confederation of Indian Industry (CII) in its continuous endeavour towards promoting sustainability of industry has undertaken various initiatives to help industries manage their environment impact. We have given a special focus to waste management as part of our effort towards promoting the circular and has been working on various "waste to worth" initiatives.

As a part of this efforts, CII in 2020 instituted 3R Awards to recognize and reward the industry, start-ups, and municipal corporations which have embraced best practices for managing waste.

I believe, these awards would not only create the awareness amongst industry and municipal corporations but also encourage them to adopt the new, innovative, and better practices to manage and extract value from waste, thereby minimize impact on the environment.

With this, I sincerely thank Dr. Anil Kakodkar, Chair of this Awards for his leadership, guidance and encouraging CII towards taking the Awards to next level. I must also thank members of the Grand Jury and experts for their continuous guidance.

My congratulations to all industries, start-ups and MCs who are consciously and actively engaged in waste management initiatives and look forward to adoption by others for a cleaner, healthier environment.

Chandrajit Banerjee
Director General
Confederation of Indian Industry (CII)

CII 3R AWARDS
EXCELLENCE IN WASTE MANAGEMENT
Reduce, Reuse, Recycle

CII
Confederation of Indian Industry

ABOUT CII 3R AWARDS / CATEGORIES

ABOUT CII 3R AWARDS 2022

Whole world is adopting newer, innovative, cost-effective approaches and solutions to address the growing menace of Waste. It is important for a country like India, where the population is very large and waste management practices are not yet fully adhered adopts innovative and scientific management of waste that is socially, environmentally and commercially sustainable.

Many innovations and solutions are available and to some extent practised in many parts of the country by industries, start-ups and ULBs to manage Municipal Solid Waste (MSW). However, large scale implementation of solutions is yet to be seen.

Similarly, Indian industry have adopted and practised processes and solutions to encourage Reducing, Reducing and Recycling of plastic & packaging waste, e-waste and waste generated in industrial activities or waste generated from their own activities. Most of the industry follows stipulated guidelines of waste management through sanitary landfills and other processes. However, there are industry primarily MSMEs are yet to fully adapt such practices.

Industry is also conscious about the fact of waste generated by the consumers/users while consuming/using their products. Industry is in constant process of designing their products those will increasingly use non-polluting materials and will generate

minimum waste at the users end. However, Industry's efforts in designing their products including its packaging are still not adequate.

It is important to capture and disseminate the best practices for others to follow and at the same time to recognise and reward the industry, start-ups and ULBs who have setup benchmarks in (1) managing waste generated in by industry from their own activities (2) designing, developing products those will generate minimal waste at the user's end, (3) managing Municipal Solid Waste (MSW), (4) managing plastic & packaging and e-waste, (5) Innovative Solutions by Start-ups for Sustainable Waste management, and (6) Excellence of MSW management by ULBs.

With this background, CII under its waste to worth initiative, this year has announced **3rd edition of 3R (Reduce-Reuse-Recycle) Awards** to recognise and reward best practices of industry, start-ups and ULBs in order to set a benchmark of excellence in waste management for large number of industries to thrive to adopt these best practices.

CII 3 AWARDS 2022 CATEGORIES

All the large industries, MSMEs and start-ups across the sectors can apply for below categories and sub-categories

1. Excellence in Managing Municipal Solid waste by Industry
2. Excellence in Managing Municipal Solid waste by ULBs
3. Excellence in Innovative Solutions by Start-ups for Sustainable waste Management
4. Excellence in 3R by Industry (Managing own waste)
5. Excellence in developing the zero / minimum waste products
6. Excellence in Best Practices managing plastics and packaging wastes under EPR

   Sub-category

   - Producers, Importers, Brand Owners (PIBOs)
   - Public Responsibility Organizations (PROs)
   - Recyclers / Co-processors

7. Excellence in Best Practices managing E-waste under EPR

   Sub-category

   - Producers, Importers, Brand Owners (PIBOs)
   - Public Responsibility Organizations (PROs)
   - Recyclers / Co-processors

CII 3R AWARDS
EXCELLENCE IN WASTE MANAGEMENT
Reduce, Reuse, Recycle

CII
Confederation of Indian Industry

WINNERS OF CII 3R AWARDS 2022- INDIA'S LEADING COMPANIES MANAGING WASTE MOST EFFICIENTLY

WINNERS OF CII 3R AWARDS 2022 - INDIA'S LEADING COMPANIES MANAGING WASTE MOST EFFICIENTLY

1st Winner of Excellence in Managing Municipal Solid Waste by Industry	Re Sustainability Limited
2nd Winner of Excellence in Managing Municipal Solid Waste by Industry	Mahindra Waste-to-Energy Solutions Ltd
Winner of Excellence in Best Practice in Managing Plastics & Packaging Waste under EPR (PIBO sub-category)	Dabur India Limited
Winner of Excellence in Best Practice in Managing Plastics & Packaging Waste under EPR (PRO sub-category)	IPCA
Award of Merit for Excellence in Best Practice in Managing Plastics & Packaging Waste under EPR (PRO sub-category)	NEPRA
Winner of Excellence in Best Practice in Managing Plastics & Packaging Waste under EPR (Co-processer sub-category)	Dalmia Cement, Belagavi

Award of Merit for Excellence in Best Practice in Managing E-waste under EPR (Recycler/ Co-processer sub-category)	Exigo
Winner of Excellence in Innovative solutions by Start-ups for Sustainable Waste Management	Green worms
Award of Merit for Excellence in Innovative solutions by Start-ups for Sustainable Waste Management	GreenMitti
Winner of Excellence in Innovating and Developing Zero/ Minimum yielding products	Godrej Construction
1st Winner of Excellence in CII 3R for Industry (Managing Own Waste)	Tata Steel Ltd., Jamshedpur
2nd Winner of Excellence in CII 3R for Industry (Managing Own Waste)	JK Cement, Mangrol
3rd Winner of Excellence in CII 3R for Industry (Managing Own Waste)	GHCL, Sutrapada

WINNERS OF THE CII 3R AWARDS 2022 - MUNICIPAL CORPORATIONS MANAGING MUNICIPAL SOLID WASTE EFFICIENTLY

1st Winner of Excellence in Managing Municipal Solid Waste by Municipal Corporations	Municipal Corporation, Durg
2nd Winner of Excellence in Managing Municipal Solid Waste by Municipal Corporations	Municipal Corporation, Jagdalpur

RECEIPENT OF LETTER OF APPRECIATION FOR CII 3R AWARDS 2022

Excellence in MSW by Industry
JBM Environment Management Pvt Ltd
Saahas Zero Waste

Excellence in Best Practice in Managing Plastics & Packaging waste under EPR
Producers/ Importers/ Brand Owner Sub-category
Adani Wilmar
Reliance Industries Limited
Recyclers/ Co-processor Sub-category
Re Sustainability Ltd

Excellence in Innovative by Start-ups for Sustainable Waste management
Earthron
Greenathon Technologies Pvt. Ltd

Excellence in 3R by Industry Managing own waste
Aarti Industries -Palghar
BIEL Infrastructure
Danfoss
RIL-Nagothane
Vedanta

Excellence in Yielding zero/ minimum waste products
Calco Poly Technik Pvt. Ltd.
Greenathon Technologies Pvt. Ltd
Green Waves Environmental Solutions
Shakti Plastics Limited

1st Winner of Excellence in Managing Municipal Solid Waste by Industry

Sustainability

Municipal solid waste poses a serious threat to environmental, residential, commercial, and urban areas & leads to unimaginable degradation. At the present rate of urbanization, India itself produces an annual accumulation of 62 million tons worth of municipal solid waste. Hence, we act as a leading municipal solid waste management service provider to expedite this threat by providing end-to-end collection, transportation, treatment, disposal, recycling, and converting waste to energy at an extensive scale.

We at Re Sustainability, follow cradle to grave approach for the complete processing and disposal of extensive quantities of municipal solid waste across 11 states in India including 2 Waste to Energy (WTE) plants. With an experienced staff of more than 8,000 workers,

we offer technically enabled & connected transportation fleets in the country to manage municipal solid waste at distinctive quarters. We primarily serve several municipal corporations as our imperative clients and offer them end-to-end waste collection, processing, and disposal facilities. Moreover, we rely on our transfer stations to temporary stage all the collected waste and process further for eventful journey related to treatment & disposal.

Technology Deployed

- Aerobic Windrow Composting
- Aerated Static piles – Fully Covered
- Bio Methanation from Fresh Organic Waste
- CBG From Capped Landfills
- Waste to Energy

2nd Winner of Excellence in Managing Municipal Solid Waste by Industry

Mahindra Waste to Energy Solutions Limited plays an important role in integrated scientific waste management facility is the most viable solution to alleviate the waste issue in the country. Our own developed technology has unique features of combined (aerobic & anaerobic) process which has homogenous feed, higher stability & improved digestion. The main advantages of our projects are Environment friendly and Zero discharge concept. Gravitational feed to reduce the electrical consumption and water sealing technology to avoid gas leaks and our own developed purification system are added advantages in our projects. The main motivation of our technologies is with the minimum consumption of resources, increasing production, time and cost effective.

Mahindra Waste to Energy Solutions Ltd, has demonstrated the value and potential of biogas for various utilisation at Indore Municipality. Bio-CNG is used as vehicular fuel which can be more economical at the same time possess huge potential for greenhouse gas reduction. This project plays a major role in Smart city evaluation and Indore got "India's Cleanest city" award in 2018. 72 nations of Asian and African countries adopted this technology for conversion of Waste to Energy. Our projects at Aurangabad, Tirupati, Piduguralla , Adoni has more commercial values. The Organic fertilizer has highly enriched NPK values, which has high demand in organic farming.

Winner of Excellence in Best Practices: Managing Plastic & Packaging Waste under EPR as a PIBO

From growing and sustainably cultivating medicinal herbs to engaging the consumers in reducing the negative impact of plastic pollution, our commitment to protecting and preserving the environment runs deep, covering all aspects of our business.

The last few years have seen Dabur take rapid strides on the ESG (Environment, Social & Governance) front and set ambitious targets for us going forward. In 2021-22, Dabur became the first Indian consumer goods company to turn 100 per cent plastic waste neutral, having collected, processed and recycled around 27,000 MT of post-consumer plastic waste from all over India.

Not one to rest on our past laurels, this year we have targeted to become plastic waste positive by collecting, processing and recycling more plastic waste than the amount that we sell in our product packaging in a year. We have set ourselves the target of collecting 35,000 MT of post-consumer plastic waste and have already collected close to 27000 MT till end Oct 2022.

Dabur's Plastic Waste Management initiative was rolled out in the year 2017-18 as part of the Plastic Waste Management (PWM) Rule 2016, 2018 (amended). Under this initiative, Dabur has to date collected a total of over 81,000 MT of plastic waste (Recyclable and Non-Recyclable) direct from the end-users with the help of around 5000 + local rag pickers in 34 States,150 cities, 155 Urban Local bodies, 250 collection

partners across India. We are sending these collected plastics to 60 Recyclers and 20 Coprocessor's for sustainable waste disposal. Dabur has also put in place a robust audit mechanism to ensure complete transparency and compliance to the state and central regulations and guidelines on Plastic Waste Management.

My 10 Kg Plastic Campaign" adopted by Dabur India Ltd in July 2019. Under its CSR initiative with the support of EDMC. This was designed to create awareness on plastic waste collection and its segregation at the source and to stop littering. Under this campaign various general citizen, people from RWAs, Schools, Corporate and Institutes participated to segregate their plastic and store separately. Each month IPCA collected the plastic waste stored by them and sent it to respective recycling/ co-processing units. The participating citizens and the organization were given an appreciation certificate and a product made from recycled material. Under this initiative various activities such as clean drives, awareness workshops, and competition were conducted to generate awareness

- Since its inception, a total of 58370.8 kg of segregated plastic waste has been collected and channelized for recycling/co-processing.
- At present more than 120 societies are associated with this campaign in Delhi NCR.
- More than 2 Lac people are associated with this campaign.
- Hoardings installed in 77 societies where collection is being done under this campaign.
- Total 20 bins installed, eighteen out of which were made from recycled plastic.
- More than 50 workshops were organized for residents & school students on source segregation.

Moving forward on its mission to protect the environment and roll out special initiatives for ecologically sensitive areas, Dabur launched various campaign in Various States to create awareness within communities

on managing plastic waste within their household. The Company will be distributing Cotton Carry Bags to replace the Plastic Bags that are currently being used in households. As part of this commitment, Dabur has also been working with school children across small towns and villages, educating them about various types of waste and the benefits of segregating them at the source. "We have also been supporting government schools by supplying them with waste bins, sanitation facilities, Information, Education and Communication (IEC) material, etc. Dabur is a registered brand-owner with Central Pollution Control Board (CPCB) since November 2018 and with all State Pollution Control Boards across the country and is committed to collecting different types of plastic waste from across the country.

Winner of Excellence in Best Practices: Managing Plastic & Packaging Waste under EPR as a PRO

Indian Pollution Control Association (IPCA) is a not-for-profit, non-government organization (NGO) registered under the Society Registration Act XXI of 1860 and 80G &12A of Income Tax Act in India since 2001. IPCA is also an ISO 9001:2015, ISO 14001:2015 & ISO 45001:2018 certified organization.

IPCA is the pioneer Producer Responsibility Organization (PRO) certified and approved for plastic waste management in India. IPCA has been preparing and executing EPR action plans for PIBOs since 2017 and is involved in advocacy, networking and capacity building for collection, segregation and scientific disposal of plastic waste at pan India level. IPCA has made its EPR execution strategy aligned with the updated SOP and hired professional and competitive team, who have better understanding on rules and regulations.

IPCA works in compliance with Plastic waste management Rules, 2016, in brand neutral and geography neutral manner on behalf of more than 100 Brand owners. Currently, IPCA is executing EPR across the country, in 35 states/UTs and having capacity to collect approximately 15,000 MT of plastic waste per month. IPCA has set up its own recycling facility in Greater Noida and in agreement with more than 40 authorized recyclers/co-processors in order to achieve the desired results.

Encompassing 35 States & UTs, IPCA has built a network of around 30,000 Waste Collectors across the country. At present, IPCA is in agreement with 106 ULBs for effective implementation of EPR and achievement of the commitment made to brands. In its endeavour to achieve the targets and to ensure proper recycling/co-processing of different kinds of plastic waste, IPCA provides services such as organization of awareness workshops for different stakeholders, capacity building of waste workers, collection, transportation and scientific disposal of plastic waste as per Plastic Waste Management Rules, 2016. The total amount of plastic packaging waste managed for PIBOs in last 03 years as against the commitment made is 222,461.416 MT.

Award of Merit for Excellence in Best Practices: Managing Plastic & Packaging Waste under EPR as a PRO

NEPRA is India's leading waste management and sustainability company which operates Pan India and has its head office in Ahmedabad, Gujarat.

NEPRA's core focus is on People, Process and Infrastructure. NEPRA currently operates under two models: City Level Dry Waste Management organization and as a Producer Responsibility Organization (PRO) operating Pan-India.

NEPRA collects all type of dry waste from Urban Local Bodies (ULBs), different waste generators and aggregators like waste pickers, educational institutions, commercial establishments, residences etc.

The company is a pioneer in designing, building and operating MRF (Material Recovery Facility) and currently operates MRFs in the cities of Indore, Ahmedabad, Pune, Jamnagar and Vapi. NEPRA operates these MRFs in a PPP (Public Private Partnership) Model with local governments and authorities.

NEPRA as a PRO under EPR (PWM Rules, 2016) currently facilitates over 150+ PIBOs across India and has helped them meet their EPR targets. With each amendment implemented, NEPRA has identified challenges in its execution and taken steps to mitigate it. It collects plastics- recyclables such as flexible, rigid and non-recyclables like MLP including packaging waste. The SOPs are defined creating a

perfect balance of demand and supply chain of each plastic category.

NEPRA's 'EPR Connect' helps to streamline EPR processes for PIBOs, WMA, PCBs and Plastic Waste Processors on a common platform. It creates a simple and fast interface that manages the entire audit life cycle from waste collection to its sustainable end disposal. This innovation has helped in achieving ease in data maintenance and reporting, transparency and ensures compliance on time.

Through its several initiatives, NEPRA is addressing the challenge of waste management and striving to make cities in India 'Zero Waste', working in line with the Swachh Bharat Mission (SBM), India's Net-Zero commitment and UN's Sustainable Development Goals (SDGs).

Winner of Excellence in Best Practices: Managing Plastic & Packaging Waste under EPR as a Co-processor

Dalmia Cement (Bharat) Limited, Belagavi plant commissioned in March 2015 has the installed capacity of producing 2.5 million tonnes of cement per annum and 2 million tonnes of Clinker per annum. We are co-processing Solid and Liquid, hazardous and non-hazardous Wastes generated by various industries which are direct replacement of conventional fuel and achieving 35% Thermal Substitution Rate (TSR).

DCBL, Belagavi has installed state of art facilities for pre-processing, co-processing of Solid Waste and feeding system for Liquid Waste. Pre-processing of Solid Waste is done by shredding, screening, blending, etc. This material is extracted through extractor and fed to Pre-heater through feeding system for incineration. Liquid Waste is fed directly to Pre-heater in pipeline through liquid feeding pumps. We have co-processed around 1.2 Lakh MT of Solid and Liquid Waste in last FY 21-22 contributing towards reduction in carbon foot print.

As a part of sustainable procurement, we have long term tie-up with Major Municipal Corporations, Pre-processors, PRO's, FMCG, Multinational companies for supply of hazardous and non-hazardous solid and liquid waste in consistence basis. In addition to this, DCBL, Belagavi also uses the wastes from other industries as raw material for Cement.

In near future, DCBL, Belagavi is targeting 40% of TSR through Green Fuel and team is confident to achieve the same. Plan is made based upon scientific data support and target is achievable maintaining quality parameter of final product. We have material availability; some capex is planned to remove bottle neck.

We are near to achieve TSR target of 40% which shall be a great achievement and model for cement Industries. By this we are not only extending life of conventional fuel but shall also contributing towards negative carbon foot print. We believe in spreading awareness of achievement to get holistic benefit to Nation as a whole.

Dalmia Bharat has successfully crossed EPR target set by Government by taking responsibility of post-consumer factor. We are also supporting other PRO and Other Brand Owner to clear their EPR requirement through co-processing in cement plant which is best way forward.

Award of Merit for Excellence in Best Practices: Managing Electronic Waste under EPR as a Recycler

Solar panels or Photovoltaic modules are a cleaner source of renewable energy worldwide. The best part of this technology is compensating its environmental manufacturing cost within a few years and onwards saving the environment from carbon generations from other alternative sources of energy such as (non-renewable) coal, petrol, diesel etc. But this important resource is not getting a good fate after its end of life and goes to dumping sites. For conscious material utilization, the processing of solar panels is required scientifically to reutilize the components such as silicon wafers, silica glass, metal and connectors etc.

Circular economy in solar industry benefits for India

- 300 GWp installed PV modules recycled, with existing technologies (85% recovery) at End-of-Life can supply raw materials to re-produce ~ 250 GWp
- Avoid Mining-Save millions of tons of CO2.
- Job creation – opportunity to create +1million man-days jobwork

Exigo recycling has developed and filed a patent on the eco-friendly material recovery from solar panels to bring the 'declared waste' resource back into the mainstream.

Most of the panels received at Exigo have broken glass, so intact glass recovery is not possible, our inhouse dismantling process

removes the aluminium frame- a non-manual work for further recycling. Further indigenously developed recycling processes of Exigo ensures that under strict environmental safety conditions, the process ensures extraction of metals and materials including Silicon to be used in multiple application industries.

The quality and yield being key to recycling operations are at a maximum.

A key feature being the Zero liquid discharge plant installed enabling no wastage and reuse internally various liquids.

Winner of Excellence in Innovative Solutions by Start-Ups for Sustainable Waste Management

Green Worms is a Social Impact and Circular Start-up in India. Started in 2014 Green Worms Mission is to create dignified jobs through a circular economy to eradicate both plastic pollution and poverty in India. Our operational focus in vulnerable islands and coastal villages with community at the centre of operations. Green Worms is currently operating in 44 coastal villages, 5 towns in Kerala and 6 islands in Lakshadweep and Andaman Islands UT. Green Worms provides end to end Waste Management services to local self-governments and creates local women collective to implement Waste Management systems in villages and ensure waste has been collected, traced and end disposal. At the same time we work with Brands to meet EPR and Compliance and achieve Circularity goals by ethical sourcing waste as raw materials instead of virgin materials. So far Green Worms has created 312 direct jobs and 900 Shared-mission jobs through Women collectives. Green Worms has been a Cash positive profitable Start-up and been backed by US based Impact Investors namely Upaya Social Ventures and The Small-Scale Sustainable Infrastructure Development Fund (S3IDF). Recently Green Worms has announced the scaleup plans to focus on converting on Waste into Raw-materials and have launched "Waste Circularity Hub" where waste will be converted into different types of raw materials. Green Worms aims to setup 10 such Hubs to support 300 villages and create 5000 jobs for women from local communities while create a Hub of Circular Corridors in collaboration with local Governments and Brands.

Award of Merit for Excellence in Innovative Solutions by Start-Ups for Sustainable Waste Management

greenmitti

To reduce the impact of plastic in the present-day scenario Green Mitti has come up with various alternatives and upcycling solutions. We need to be pro ecological in all aspects and one such kind is Upcycling, which takes unwanted products and puts them to use as the opportunities are endless on what you can make (with what you have). We upcycle plastic items as per the content such as decorative, utilizers etc. As an alternative for plastics, we have come up with coconut utensils, bowls, decorative, toys and biodegradable products like seed pencils using recycled paper, cloth bags and fashion ware made out of cloth waste. The first of its kind Marine litter Upcycling Project in the country aims to reduce the impact of discarded plastic, fishing nets and Ghost gear on Marine Biodiversity. This initiative by Green mitti is intended to provide alternative livelihood options for the coastal fishing community. We are doing regular beach clean-up activities to collect the marine litter in a segregated manner. The discarded nets will be channelized separately whereas other plastic and glass bottle waste is upcycled into products. The cleaned nets will be up cycled as per the type of net such as Nylon nets are up cycled into Bracelets, Bags. Shore cast nets are upcycled into Bags. Seine nets, Block nets are up cycled into Pots, Bands. Hand nets are upcycled into Earrings and Keychains. Landing nets are up cycled into bottle hangers and Bags along with ghost gear upcycling. We are also working on glass bottle upcycling under this project to bring up various artifacts. We are implementing a phased wise strategy to make people use more eco products and upcycled products on the note of sustainability.

Winner of Excellence in Innovating & Developing Minimum / Zero Waste Products

Godrej has always been committed to preserving the environment and aims for a more sustainable development. In line with our core values Godrej Construction (GC) has implemented various initiatives across its lines of business. This helps GC achieve its objective of sustainable and responsible construction. Some of these initiatives include, establishing an automated Recycled Concrete Materials (RCM) manufacturing plant in Mumbai.

At Godrej Construction, we are putting the principles of "Recover, Recycle and Rebuild" for recycling concrete debris to produce various prefabricated concrete products. We recycle concrete debris to produce recycled products such as building blocks, pavers, culverts, OTE ducts, and other customized precast concrete products of superior strength. These products are in fact just as good as any other concrete products made using virgin aggregates in terms of its quality and durability parameters. The recycled concrete, which uses Construction & Demolition (C&D) concrete waste for making Customized Prefabricated Concrete Products such as Box Culverts and Ducts are being used in some of the major infrastructure projects in Mumbai. Godrej Construction has recycled over 27,000 metric tonnes of concrete debris by implementing circular economy principles in their construction materials line of business. We are one of the first in the country to work jointly with Bureau of Indian Standards (BIS) to receive BIS certification for few variants of our recycled concrete

blocks. We are also collaborating with reputed entities in Norway to help test and develop these products as per international standards and global best practices.

Our Ready-Mix Concrete (RMC) plant, Recycled Concrete Materials (RCM) plant and the common areas of Godrej Business District building in Mumbai are now powered by 100% renewable energy.

Full Scale Demonstration Project on Use of RCA carried out in collaboration with Sintef, Norway-A successful demonstration project was conducted on the RCA in form of fine aggregates produced at Godrej Construction Recycled Concrete Materials plant, Vikhroli Mumbai. SINTEF, headquartered in Trondheim, Norway, is an independent research organization and one of the leading organizations in scientific research on C&D waste practical applications. A new Indo-Norwegian project had been initiated between Central Public Works Department and SINTEF where the aim is to increase the treatment and recycling capacity for construction and demolition wastes in India.

As part of this project, a full-scale demonstration was done with an objective to 1) Demonstrate the added value of using RCA in making of recycled concrete materials, 2) Assessment of natural CO2 Binding property of RCA.

The demonstration project was carried out in two phases. In the first phase, the concrete blocks made with RCA and blocks having natural aggregates produced at the plant were separately sampled for CO2 binding measurements and shipped to SINTEF Laboratory in Norway. The blocks were crushed and were exposed to CO2 exposure into patented test apparatus in Sintef laboratory. The exposure was based on varying Relative Humidity (RH), exposure days and pressure. The results were observed and tabulated as per the defined frequency of readings.

The above test results reinforce the theory that recycling concrete debris results in increased surface area and thereby likely to have higher carbondioxide binding due to increased ageing owing to carbonation.

1st Winner of Excellence in 3R for Industry (Managing Own Waste)

TATA STEEL

#WeAlsoMakeTomorrow

Tata Steel has been pioneering in value creation from waste and by-products in its quest to contribute to a sustainable ecosystem in Iron and Steel industry. Tata Steel operates with a 'Zero Waste' goal, using 3R (Reduce, Reuse & Recycle) principles of circular economy. In FY 2021-22, TSJ and TSK achieved 100% Solid Waste Utilization and horizontal deployment of best practices in TSM helped to achieve 97% Solid waste utilization.

Since years, the company has been investing in research to develop technologies for reuse of iron and steel slags. The journey of Tata Steel can be comprehended through the pioneering and materialized technologies as well as the innovation pipeline pertaining to slag-based products. Through an in-house developed process of accelerated weathering of steel slag (LD slag), Tata Steel developed manufactured aggregates branded as Tata Aggreto. This is India's first steel slag based branded product extensively used in construction of national highways which has helped in conserving natural aggregates and minimizing our environmental footprint. Through innovative initiatives aimed at supporting farming sector, a multi nutrient fertilizer-Dhurvi Gold has been which serves to provide low-cost soil conditioning solutions. Besides steel slag, various downstream products have been developed from blast furnace slag such as Ground Granulated Blast Furnace Slag (GGBS) which can be used as partial replacement of

Ordinary Portland Cement (OPC) for making concrete, thereby positively impacting carbon footprint of cement manufacturers.

A major sustainability initiative has been undertaken to reduce CO2 emission intensity of the company, to maximize the scrap charge into steel melting shops. Tata Steel charged ~1250 KT of steel scrap in the Steel Melt shops in FY22 across locations. Apart from recycling of internally recovered and collected scrap, Tata Steel also took initiative to procure scrap from market for charging in melt shops.

Tata Steel has O&M contracts with renowned third parties in material and waste handling with a clear emphasis on safety of employees involved in operations. Tata Steel has been engaging with various industrial, government bodies, research, and standardization agencies, to formalize the processes and applications in the form of codes to benefit steelmaking sector.

2nd Winner of Excellence in 3R for Industry (Managing Own Waste)

JK Cement Ltd. is a manufacturer of Grey Cement and White Cement in India. JKCL is moving ahead proactively on its sustainability journey and has drawn out an action plan to contribute to the journey of decarbonization and has aligned its business model with the UN's 2030 agenda for sustainable development and has committed SBTi for business. Being an active member of GCCA, the company has also joined UNFCC's 2050 "Race to Zero" campaign under the aegis of GCCA to achieve Net Zero-emission Goals for cement and concrete. Also, we are the First Indian Cement Company to submit the Energy Compact with the Ministry of New and Renewable Energy.

At JK Cement Works, Mangrol we have three kilns, with clinker production capacity of 5.56 MTPA and cement production capacity of 7.05 MTPA. We have a CPP of 25 MW capacity. All three units are having WHRS system with a total capacity of 29.1 MW. We commissioned a 5.6 MW Solar system on June,22. As on date, the Mangrol complex is utilizing 50% green energy and we are further investing to increase WHRS efficiency and Solar consumption to meet our green energy mix target.

Our major focus areas to decarbonize and to meet 2030 SDG are reducing the clinker factor, increasing TSR, replacement of fossil power with clean energy, improving energy efficiency, reduce dependency on use of ground water and increasing the green treasure.

Moving beyond the current "take-make-waste" model, we have adopted and implemented the concept of circular economy in our business. In our 2030 sustainability ambitions, JKCL has proposed the replacement of conventional fossil fuels to reach a TSR value of 35% by 2030 and as of now, we have achieved a TSR of 8.9%. We have signed MoU with PRESPL for the supply of biofuel, and biomass to achieve the TSR target. At one of the units located in Karnataka, we have achieved a TSR of 18% and we are aiming for a TSR of more than 35%. At our Mangrol complex, we have reached an average TSR of 12% in FY23-Q1 and aim to reach 35% by FY25.

All our cement kilns are equipped with state-of-the-art pre-processing and feeding of a wide range of liquid and solid waste materials in the calciner, further, the company is investing in advanced pre-processing & feeding facilities, and chlorine bypass systems to utilize all types of waste and hazardous waste.

Further imbibing circular economy principles, we have increased the share of blended cement in our cement production. In the FY 2020, our clinker factor was 70.3% and we aimed to reach 65% by 2030. As of now we have reached a value of 65.6% and are about to reach our 2030 target. At our Mangrol complex, we have attained Clinker Factor of 74% in FY23-Q1 from 76.5% in base year FY20.

On transition towards Green Energy, we submitted the UN's Energy Compact to MNRE with a target to increase the green energy share from 19% in the base year 2020 to 75% in 2030 at group level. In Mangrol Plant, our green energy mix has increased up to 50% and we are further investing to increase the capacity of existing WHRS and RE.

Sustainable Mining: We implemented world's best sustainable mining practices and our mines have been recognized and awarded for 5 star rated mines. Recently we implemented fully mechanized system for limestone transportation by shifting from road to OLBC from mine to plant to reduce the GHG emissions.

3rd Winner of Excellence in 3R for Industry (Managing Own Waste)

GHCL Limited has established itself as a well-diversified group with an ascertained footprint in Chemicals, Textiles and Consumer Products segment. The manufacturing facility of our Soda Ash plant is located at Sutrapada, in the state of Gujarat, India.

GHCL Limited, has an annual production capacity of 11 Lakh TPA, which contributes to almost 29% of the annual domestic requirement. Now a days all the industries are facing challenges of generation of wastes. This may include raw materials wastage, process wastages and wastages of different natural resources such as water.

For last few years organizations have started taking steps towards conversion of wastes into productive outputs. This also helps in controlling the economies of operations.

a. Wastes could be "reused & recycled" if not be substantially reduced.

b. Through the continuous research & development and innovations, methods have been devised to convert wastes into other useful products.

Manufacturing of fly ash bricks

- Fly ash generated in power plant is being used to manufacture in-house fly ash bricks.For 1 brick of 31 kg weight, 18 kg of fly ash along with cement and binders used.

- Compressive strength test of these bricks have performed and found conforming under specification requirements.
- Plaster thickness required is less compared to other brick, thus it leads to saving in cement mortar.
- These bricks are being used as an alternative in civil work in plant and residential colonies.
- Soil stabilization is the permanent physical and chemical alteration of soils to enhance their properties.
- Using fly ash as a soil stabilization can increase shear strength, control the shrink-swell properties of the soil, and improve the load bearing capacity.
- Benefits of fly ash usage in agriculture includes higher resistance (R) values, reduction in plasticity, lower permeability, and elimination of excavation.
- Fly ash is alkaline and they improve soil quality .
- A trial study was conducted in agriculture field located in captive limestone wherein it was found that yield (production) of maize crop increased after using 10 MT of fly ash with 50% dose of chemical fertilizer per hectare.

Fly ash utilization in Agriculture/ Soil Stabilization

- Soil stabilization is the permanent physical and chemical alteration of soils to enhance their properties.
- Using fly ash as a soil stabilization can increase shear strength, control the shrink-swell properties of the soil, and improve the load bearing capacity.
- Benefits of fly ash usage in agriculture includes higher resistance (R) values, reduction in plasticity, lower permeability, and elimination of excavation.
- Fly ash is alkaline and they improve soil quality.

- A trial study was conducted in agriculture field located in captive limestone wherein it was found that yield (production) of maize crop increased after using 10 MT of fly ash with 50% dose of chemical fertilizer per hectare.

Utilization of undersize limestone through internal usage and selling to the cement industries

- Being the main raw material, Limestone also contributes majorly as wastage in terms of undersize generation.
- Handling this much quantity of undersize limestone is a challenge for the organization. Therefore, two methods have been identified and practiced to manage undersize LS wastes:- SOx emission is most essential for Environmental aspect & also as per Govt. Pollution control board rules & regulation it must not exceed 100 PPM

Utilization of undersize limestone through internal usage and selling to the cement industries

- To control the same undersize limestone (Waste generated from Soda ash industry) is fed to desulphurise the Sulphur present in fuel.
- Selling of undersize limestone to nearby cement industries
- Apart from Soda ash industries, one of the largest users of limestone are from cement sector.
- Undersize limestone quantity generated which is of no use for us can be used as raw material for cement.
- Therefore, we sell undersize limestone to nearby cement industries such as Ambuja Cement.

Manufacturing of briquette by using coke fines

- It is very unique initiative and after extensive research, GHCL has been able to utilize waste coke fines. Coke fines are bonded with special adhesives developed by GHCL to form briquette.

- Coke fines generated during process is recycled to manufacture briquette from in house developed briquette plant.
- Initially the objective was to find out some substitute of metallurgical coke which was getting costly and misbalancing the economies of production.
- Secondly was the aim to try and test methods to manage coke fines.
- Subsequent to attend both the above concerns, mechanized briquette plant had been setup and full fledged operations were started.
- GHCL was the only Soda Ash industry to successful setup mechanized briquette plant and got patented in year 2004.

Use of CaCl2 as a road dust Suppressant

- Dust is an inherent problem with unsurfaced and gravel surfaced roads. The problem ranges from a simple but costly nuisance to definite environment problems. Calcium Chloride is an excellent dust suppressant has an ability to pull moisture from seemingly dry air maintains the road at a fairly uniform level of moisture.
- Calcium chloride is a liquid distiller waste generated from our Soda ash Process.
- GHCL to address dusting from unpaved haul roads have started spraying Cacl2 (Liquid waste generated from our plant) for suppressing dust on roads.
- The spraying of Cacl2 on roads leads to binding effect on the fines in the gravel road, thereby stabilizes the road base and prevents dust. Calcium chloride (CaCl2) is salt that absorbs water in form of vapour from the air. For example, at 25°C and 75% humidity, this chloride absorbs more than twice its weight. Its performance depends on temperature, relative humidity, type of surface and traffic.
- Thus GHCL uses this inexpensive liquid waste whose cost-saving benefits easily outweigh its cost.

- Generally, water sprinkled by Fire tender is effective only for 1 hr approx & area is also not fully wet. So sprinkling of Cacl2 will be beneficial in open area / unpaved roads as it is hygroscopic & it tries to retain moisture for a longer time.
- Cacl2 sprinkled on road absorbs and retain sufficient moisture from the air to stabilize the soil . so It helped to control dust from areas where Cacl2 was sprinkled.

Value added products from Wastes generated during manufacture of Soda Ash

- Proposal to put up a manual plant for 200 blocks in 12 hours
- Total initial investment is around Rs. 100 lacs.
- Raw material to be used plastics & undersize limestone fines.
- Cost of Manufacture: Rs. 32 Per block of size 1 ft x 1 ft x 1 inch
- Sales price assumed as equivalent to quality of Kadapa or Granite Rs. 60 Per block & Payback period is five years assuming Rs. 20 as earning per block.
- Applications: In pathways. Paver block, Canal linings, floorings. They also confirmed that it can be used for wall construction, however size shall be different from present 1 ft x 1ft x 1 inch. However, these blocks cannot be used for road making.
- Final decision regarding implementation of the proposal is awaited.
- Raw materials used for manufacture of blocks : 35-40 % limestone fines of size 4.5 mm to 13mm , 10-20 % fly ash, Balance small plastics pieces made by passing big pieces through Shredder along with small amount of limestone dust .
- Compressive strength test done on these blocks and values found higher than M 30 Grade concrete which confirms to IS 15658 : 2006 :PRECAST CONCRETE BLOCKS FOR PAVING- SPECIFICATION.

CII 3R AWARDS
EXCELLENCE IN WASTE MANAGEMENT
Reduce, Reuse, Recycle

CII
Confederation of Indian Industry

PROFILES OF RECEIPENTS OF LETTER OF APPRECIATION FOR CII 3R AWARDS 2022

1. Excellence in Managing Municipal Solid Waste by Industry

JBM Environment Management Pvt Ltd

Integrated Solid Waste Management process at the Sonepat Cluster: The Waste Management process as hereunder:

Step 1 (Door-to-Door collection): JBM Enviro deploys more than 400 vehicles for Collection & Transportation (C&T) of Municipal Solid Waste (MSW) in the 4 Cities of Sonepat Cluster (including the cities of Sonepat, Panipat, Samalkha and Gannaur) with over 700 manpower. Through its activities, JBM Enviro caters to more than 12 lac citizens, living in these cities.

JBM deploy the requisite vehicles and perform C&T operations in view of the requirements of geographical area to be served within respective Cities, especially for congested areas & every region in the city. Our workers are dressed as per rules, are courteous and operate the C&T works in prescribed manner.

Typically, TATA ACE (capacity 1.3 tons) are deployed for primary C&T and we operate door-to-door from households and / or market areas till Secondary Points ('SCP') / Transfer Stations ('TS'). All our vehicles have partitions for dry & wet waste, follow prescribed route-maps and operate strictly at pre-informed timings. The vehicles carrying MSW are always covered. We have deployed limited number (on test basis) of e-vehicles and plan to gradually enhance such vehicles in our C&T operations.

The wet / organic waste is collected and transported separately to the composting plants – Vermi compost and/or Mechanical compost.

JBM also provide the necessary support and jointly operate alongwith the Municipal Corporations of Sonepat and Panipat for these compost plant(s).

Step 2 (Segregation: Transportation till Secondary Collection Points ('SCPs') / Transfer Stations ('TS')): At the SCPs / TS, the segregation of waste is carried out with help of machines, manual labour, JCBs and other equipment, the valuable material are recovered and waste is processed / dumped further. In the process of sorting, all the valuables discovered are extracted and sent for re-processing. The Material Recovery Facilities (MRF) are operated and maintained by JBM Enviro. From the SCPs / TS, secondary vehicles (compactors with capacity up to 14 tons) are deployed.

Step 3 (Processing Plant(s)): The segregated MSW is transported to the JBM's processing facility located at Sonepat. At its WtE Plant, JBM Enviro processes approx 650 TPD of MSW and convert it to power 8 MW and other valuables such as compost, bricks etc. The power generated from our plant is supplied to the State-owned grid and other valuables are sold to different parties. JBM has developed the state-of-the-art facility at Sonepat and deploys Martin (incineration) technology with a flue gas cleaning system, and a complete mechanised system for the Rankine cycle. JBM employs more than 200 manpower in its WtE Plant.

JBM Enviro's Vehicles, SCPs and TS are cleaned regularly and all its workers medically checked. JBM regularly conducts community awareness programs to promote source segregation and community cleanliness in general public.

Saahas Zero Waste

Saahas Zero Waste is a socio-environmental enterprise with 9+ years of experience in the waste management space. We believe in a circular economy where all waste is converted to resources. We are working with clients across Bangalore, Chennai, Goa, Hyderabad and Delhi NCR to move them closer to Zero Waste aspirations.

We specialize in designing, executing and running customized solutions through our flagship program – ZWP or Zero Waste Program across real estate developers, technology parks, apartment complexes, hotels, and restaurants to manage waste in a sustainable and eco-friendly manner and to recover maximum resources from it.

For us, waste management is synonymous with resource recovery. More than half of the world's total GDP amounting to around US $44 trillion is moderately or highly dependent on nature and its services. Recovery of resources enables giving back and makes us accountable to the materials we receive from nature.

Our business model looks to prevent waste from reaching a landfill. Our landfill diversion rate is more than 96%. The larger focus however is on resource recovery which is made possible by bringing together Nature, People and Technology. Nature acts as a catalyst to compost all organic waste, process it into bio-CNG or recycle materials. People play a critical role in operations and maintenance and finally technology brings our processes to scale and efficiency.

As a social enterprise, our thriving business model puts environmental and social impact ahead of profits. This makes us truly a 21st century company because this is what it will take to build a circular economy.

2. Excellence in Best Practices managing plastics and packaging wastes under EPR

A. Producers, Importers and Brand Owners

Adani Wilmar LTD

An Environment-Friendly Approach

Adani Wilmar Limited (AWL), as a responsible corporate takes various measures to safeguard the environment in which it dwells. Be it exploring new avenues to reduce the use of plastics or put a check on the carbon credits at all plant locations, the company leaves no stone unturned:

Use of Recyclable Packaging Material:

Adani Wilmar is committed to undertake a gradual overhaul of its edible oil packaging to make it entirely recyclable. As part of the plan, the company is using plastic films comprising a novel formulation of polyethylene (PE) resins to creating a new, sustainable, all PE laminate solution. The new edible oil packaging is used for 1 litre pouches for the first time ever in the industry making almost 97% packaging of all its products – recyclable.

Extended Producer's Responsibility (EPR):

Adani Wilmar has prepared the action plan to comply with Plastic Waste Management Rules and has signed agreements with multiple agencies for ensuring the plastic waste collection from across the nation. So far, the company has successfully lifted more than 39,000 MT cumulatively over the span of three years from across the nation. The aim is to collect 100% of our total generation of plastic in the coming years.

Zero Liquid Discharge:

AWL is working to conserve water resources both in its products and production activities. Our Environmental Policy stipulates that we

make efforts to conserve water resources by using water efficiently and preventing pollution, and to achieve the aforesaid target we have installed the Zero liquid Discharge (ZLD) systems in our Effluent Treatment Plants (ETPs).

Solar Energy:

We recognize the international concern about the climate change, resource scarcity and reducing carbon emission. To mitigate the carbon emission and reduce dependence on fossil fuel we have installed solar plant in our processing units.

Reliance Industries Limited

Reliance is building the India of the future, with responsibility towards all its stakeholders and nature. We, ourselves, have set a target to become Net Carbon Zero by 2035. This is part of a wider ambition to achieve best-in-class standards across environmental, social and governance parameters under the oversight of our Board.

RIL has adopted a multi-pronged approach to prevent plastic waste from entering the environment. We have successfully developed patented continuous catalytic pyrolysis technology for Circular Polymers through Chemical Recycling. The technology proven at a pilot scale, can convert unsegregated mixed waste plastics including SUP and MLP into Pyrolysis Oil. RIL has also developed an innovative product for hard-to-recycle end-of-life plastics called ReRoute™. This project utilizes waste plastics in roads improving their properties and supports Circular Economy. RIL is developing circular polyolefins (Polypropylene and Polyethylene) products, which use post-consumer plastics as raw materials, with our partners. The products, branded as EcoRepol™ and EcoRelene™, provide sustainable packaging solutions for non-food and non-pharma applications. Green Gold™ Polyester Staple Fibre (rPSF), part of our line of eco-friendly fabrics, are produced by recycling waste PET bottles through mechanical recycling. RIL has a recycling

capacity of 2 billion bottles per annum for rPSF, which would double to 5 billion bottles per annum by FY 23. RIL as a brand owner and manufacturer is fulfilling our EPR obligations as required under PWM 2016 and subsequent amendments. We are also involved in Beach Clean-up and additional awareness activities.

As we invest in future-ready businesses, we view sustainability as an enabler that can aid our purpose and deliver superior outcomes for all. RIL is committed to pioneering circular economy practices and become one of the leading plastic recyclers in the world.

B. Recyclers

Re-Sustainability Ltd

Our goal of plastic recycling is to eliminate plastic pollution by taking out plastics from the ocean and landfills as well as conserve resources in the process. What's mind-blowing is that recycling plastic requires 88% less energy than manufacturing plastics. Furthermore, recycling a single plastic bottle can provide a 100W bulb, enough power to last for an hour. Indian plastic recycling domain is dotted with large presence of informal sector engaged in collection and segregation of plastic waste. We intend to formalise these marginalised community by providing them social security, identity and enable them to be benefitted by the various social inclusion programs being run by the government and CSR groups.

Our ambition of to be a pan-India player in plastic recycling and leverage technology to produce resins which can be used in high end applications. Our focus is primarily on the LDPE, HDPE, PP and PET recycling although the value addition in each of the categories are different. We aim to build large capacity plants, leverage digital to build robust supply chains and use our business model to also catalyse a social transformation for the workforce engaged in waste management.

3. Excellence in Innovative Solutions by Start-ups for Sustainable Waste Management

Earthron

EarthRon, since its inception in 2019, has been focused on building tools (technology platform) to track the 3Rs in real-time and make it a sustainable process.

EarthRon's approach has been to enable the move or shift of waste management processes from estimate-based modelling to designing processes and infrastructure planning based on the actual data. EarthRon's online information portal for a Municipality/ULB enables the tracking of the journey of waste from each ward to the destination. The technological solution also adds information layers about quantity of waste by ward and type of waste at the source as well as at the destination, thus helping to track segregation levels. Segregated waste at the source level is the key to promoting recycling and creating value in the ecosystem.

The Municipality/ULB measures the gaps in real-time and works on deploying targeted actions to reduce them with the aim of ensuring minimum landfill. An innovative approach to "bring your own device" for front-line workers and drivers as the apps are small and simple to use. The Apps are designed to work in "zero-data" entry mode.

The SaaS model makes the solution "scalable, allowing it to be used by a small town or a metro with no major design changes.

The technological platform has also incorporated an "intelligent algorithm" to identify gaps with the SOP (Standard Operating Procedure) and, wherever required, auto populate the data with derived logic. The acceptance and usage of the pilot solution is more than 90% in the

deployed wards and has been deployed across multiple stakeholders: the ULB, Drivers, Self Help Groups, NGO and EarthRon.

Benefits to the ULBs: The benefits are that the ULB has a broad visibility of various performance parameters in each ward of the destination of the waste generated [i.e., Compost /Recycled/Landfill] both by quantity and quality. ULBs can now target each municipal ward with specific awareness campaigns and corrective actions to promote the 3R principles of the circular economy.

Greenathon Technology Industrial Solutions

Greenathon Technologies Pvt. Ltd. (DIPP69360; UDYAM-RJ-17-0139710) developed an innovative product BIOZYME. It is a biodegradable technology ready for the industries across textile hubs of the nation & facilitating business to comply with Environmental Social Governance audit points The startup deploys microbial technologies to remediate environmental pollution due to textile industries and enables to the circular economy. With a Clean Technology Mission, it is an Academic Spinoff to serve the society to meet the Sustainable Development Goals.

Product BIOZYME

Biozyme caters textile industries by providing waste management solution with eco-friendly and cost-effective technology to Decolour, Degrade and Detoxify dye contamination. Biozyme treat the textile industrial effluent with high efficacy as per the compliance limits of Pollution Control Board (PCB).

Creating Future Ready Green Ecosystem using 7R tools through the novelty fraction as it breaks open wide spectrum of dyes from disperse, acid, direct category & even pigments. Retrofittable technology in existing setups of Effluent Treatment Plants. We have a record degradation/detoxification of 98% efficacy in one day with dye concentration as high as one lakh ppm. It is superior to biodegrade

and detoxify dye contamination with Economic feasibility, Ecofriendly, and biodegradable.

First establish our model in Rajasthan followed by various textile hubs of the nation and go global. There is an urgent need since across the world the textile industries are facing challenges in handling the regulatory compliances, there is a clear-cut unmet need of the product. It is matching with the Sustainable Development Goals of United Nations Development Programme.

The primary objective of WASTE TO VALUE: as to treat and upcycle the industrial effluent back to the same industries to meet the growing demand of the water over time.

Greenathon Infrastructure and projects

Greenathon ensures its consistency in goods and services as per the global competence with expertise to handle complex textile industrial effluent. The organization believes in creating great social impact for the development of Green Ecosystem.

Other Upcoming Products as Product under R & D at Greenathon ready for translation in the successive years from lab to the industry as BioDeinkSol (Paper manufacturing and recycling Industries), BioReclaim (restoration of oil contaminated sites), BioDiaCure (Herbal cure for Diabetes) and BioDerm (Herbal tropical medicine for fungal dermatophytic infections).

4. Excellence in Innovating & developing the zero / minimum waste products

Calco Poly Technik Pvt. Ltd

It has been a thrust of management since 2016 that Calco will move towards the most sustainable product and process along with the green conservation. The company has given its own slogan of Go Green Initiative. Calco having Innovated with production process has helped us save CO2 equivalent to planting 12000 trees per year.

Calco's product brand range has been developed as a zero-waste product from reprocessed waste. We have developed "Nanotechnology" polymer, a novel technology which enhances the properties of conventional Nylon 6 by 25%, thus enabling replacement with Glass Filled product. Calco is working with a sustainable mechanism and carried out an R&D activity to come up with the "GREEN PRODUCT" range to utilize our 2% of process waste. After rigorous testing, we come up with the "eCiLON" - a sustainable product, which is being procured by Automobile Industries.

Working on sustainable, circular product has helped us recycle almost 10,000MT till date, which otherwise would have been consumed with virgin polymer, which consumes higher energy, water, thus higher CO2 emission, during production and logistics.

All of this has helped us to develop a "unique, truly circular product" with product and process, having ONE OF THE LOWEST carbon footprints on our products in the world.

Impact of having sustainable vision cannot be measured just in sales (topline or bottom-line), its effect on our company employees is also truly remarkable. They want to now come up with innovative ideas to

save every drop of water, minimize electricity consumption, maximum use of renewable energy which can be called as an achievement for waste to worth.

Greenathon Technologies Pvt. Ltd.

Greenathon Technologies Pvt. Ltd. (DIPP69360; UDYAM-RJ-17-0139710) with a moto is to have greener and healthier tomorrow, matching with the SDG (Sustainable Development Goals) of UNDP (United Nations Development Programme).

Operates with a 'Zero Waste' goal, with clearly defined environment and sustainability policies of the organization, and on the "7R Tools" (Rethink, Refuse, Reduce, Reuse, Refurbish, Recover, Recycle) to upcycle the textile industrial effluent with Zero Liquid Discharge contributing to the circular economy.

Greenathon is a deep tech startup targeting translational research from lab to industry, recognized by various government and non-government organizations as Department of Science and Technology, Department of Biotechnology, Biotechnology Industry Research Assistance Council, Ministry of MSME, TiE (The Indus Entrepreneurs), Delhi Management Association and Network of Women Entrepreneur; Association of Biotechnology Led Enterprises, Federation of Rajasthan Trade and Industry.

Product Bio-Zyme

Greenathon solution to textile industry of nation to provide ecofriendly and cost-effective technology to Degrade and Detoxify dye contamination. (Funded DST, GoI and MSME, GoI). It aims at Zero Liquid Discharge (ZLD) approach by upcycling the treated water for the same industrial sector and satisfy the growing demand of the industry. Out solution is B2B & B2G as we are plug & play. We have method to disrupt the market to deliver low maintenance affordable technology for all the players in textile-ecosystem.

Innovative waste management model: Biozyme degrade and detoxify wide spectrum of dye contamination with 98.8% efficacy under industrial scale capacity. Patentable technology for handling the menace created by the dye contamination by the textile sector. Current technology works on Zero Liquid Discharge (ZLD) mechanism to upcycle the water for the textile industry to satisfy the growing need of water to the textile sector. Our model works excellently well with any volumes of water from 5-500 MLD water capacity treatment daily.

Economic benefits: Greenathon deliver a natural source of pioneer microbial technology with consortium of novel enzymes. Have a great impact being biodegradable and environmentally safe, catering all scale of MSME's with effective Zero Waste Generation by upcycling the water as a Green Technology Innovative Technology Solution.

Environment benefits: Greenathon focusses to use "7R Tools" to upcycle the textile industrial effluent with ZLD (Zero Liquid Discharge) approach of sustainability. The product that we are offering helps businesses to comply with Environmental Social Governance (ESG) criteria in their audit points by contribution to the circular economy to Creating Future Ready Green Ecosystem.

Green Waves Environmental Solutions

In today's world we need to be ecological on all aspects in our life and we Greenwaves provide you with reliable Environmental solutions. A company which is dedicated to minimize the electronic waste along with promotion of efficient waste management, proper education through practical works and conservation. Green Waves, associated with Pollution Control Boards as authorised Recyclers, works mainly on E-waste management and Zero Waste Management in the states of Andhra Pradesh, Telangana, Goa, Kerala and Andaman .

As a part of Biodiversity improvement we are working on a native seed bank, seed balls, Seed Ganesha, Seed Rakhis, plantations also.

It is the first of its kind as integration of Waste Management, Wildlife conservation and Water Management by working on eco products and reducing waste outcome and creating awareness on conservation.

As a part of zero waste management we have come up with various eco products like Incense and dhoop sticks, colors from floral waste, articrafts and decoratives from coconut waste, seed papers, seed pencils, seed pens, Seed Flags from recycled paper, bracelets and bags from marine litter.

Shakti Plastic Industries

For the past 5 decades, Shakti Plastics has been recognized widely as a pioneer in the field of plastic waste management. We have a strong network of rag pickers, collection centers & logistics partners in PAN India for collection, segregation, and transportation of post-consumer and industrial plastic waste management. CPCB / SPCB authorizes the Shakti Plastic Industries for collection of plastic waste and scrap.

Why do we recycle products?

1. **Ecofriendly Products:** Products that are made from recycled plastic have a low carbon footprint and are comparatively cheaper for manufacturing while diverting waste from landfills.
2. **We make the most of our resources:** The resources we have with us are very limited. Every day, we consume fossil fuels the equivalent of 2,600 years of accumulation of oil. Also, the linear economic model produces several tonnes of plastic. Our objective is to Enable remanufacturing and implement high-quality recycling, Reducing carbon and environmental footprints.
3. **Value out of waste:** Segregation and recycling help us to convert the plastic waste material into granules and then turn them into plastic products that are significantly higher in value than they could have generated in process of energy recovery.

5. Excellence in 3R by Industry (Managing own waste)

Aarti Industries, Palghar

Aarti Industries Limited is a leading pharmaceutical company and manufactures Active Pharmaceuticals, Intermediates & Specialty chemicals at the site. Our objective is "Use the 'Right Chemistry for a Better Tomorrow' and make the best use of available resources". Towards this objective, we are strategizing to achieve zero-liquid discharge (ZLD) for our facilities. Our environment-friendly manufacturing processes include Environment Impact Assessments (EIA) for new projects. EIAs helps us to prepare a mitigation plan to address the potential impact of our projects on the environment. As an outcome of these studies, we choose the right technology at the design stage itself to ensure minimal impact on the environment and communities around us. For the existing projects, we have set up Environmental Management Systems (EMS) and compliance is regularly assessed through Aarti Pharma Management System (APMS).

Energy management: We are managing our energy requirements through natural resource conservation, emission reduction and cost-efficiency. With the growing scarcity of conventional resources of energy, we have strategically focused on increasing energy efficiencies and productivity of our plants. We have been successful in developing integrated energy systems for optimal energy use. We have fixed LED systems to reduce electricity & thus by 14% carbon footprint reduction. We have Installed VFD on AC air compressor, Multiple AC & AHU outlets combined & used for Jet mill operation. Installation of dedicated air compressor for instrument air for energy reduction.

Water management: Long-term water availability is a challenge we foresee, and We are aiming to become self-sufficient in our water

consumption and its associated risks by mapping various factors and considerations. This approach helps us in prioritizing our objective of water positivity in the future. Our major focus is on recycling water back into operations to reduce dependency on fresh water supply. At Aarti Industries Limited, water obtained from municipal sources is normally used for heating, cooling, washing and scrubbing operations. Water used in the heating operation is recycled back taking precaution of not losing its temperature thereby reducing energy consumption in heating.

We improved the steam condensate recovery up to 76% and we are also giving MEE steam pure condensate to the boiler which resulted in 90 KL/day saving of fresh water consumption.

Waste Management: Waste management is a challenge at the site as various raw materials, chemicals are used for the manufacturing process. We have installed MEE with an ATFD facility for treatment of high polluted streams along with Primary, Secondary and tertiary wastewater treatment systems including a 3 stage Reverse osmosis system. RO recovery is 90%. All the treated trade effluent is recycled back in the utilities. Also Domestic effluent is treated through the Sewage treatment plant and treated domestic effluent is used for gardening. We are conducting a Monthly campaign ''Waste Reduction'' conducted with training. Site has a yearly training calendar regarding EHS activities. Every month we take a campaign on EHS topics like Waste reduction/minimization, electrical safety, slip trip fall hazards etc.

Hazardous waste (HW) management: All Hazardous waste generated at our site are analyzed comprehensively to decide the mode of disposal. We reduced hazardous waste (Chemical) by using various drying methods and also Spent solvent reused at third party locations. Inhouse solvent recovery capability enhanced.

Management of Air Emissions: Stacks & scrubbers are in place to handle the fugitive emissions through process. We comply with the air emission norms prescribed by the Pollution Control Board and do

not use any ozone-depleting substances (ODS) in our manufacturing processes.

We have future plans opting for projects like waste heat recovery to reduce energy consumption. Also, We have plans to invest in renewable energy sources through solar installations in the manufacturing sites. Scaleban and Nanofiltration technology is being initiated to reduce scale formation and energy reduction in the Cooling towers & Multiple Effect Evaporator (MEE), PVA gel technology to reduce the retention time at aeration tank intending to reduce energy consumption,

A conscious and continuous effort is made to explore and adopt best practices in environmental management with an efficient governance system to achieve our sustainability goals.

BEIL Infrastructure Limited

BEIL is a Company that specializes in the management of solid and hazardous waste. It operates a centralized landfill site along with a common incineration system built specifically for the safe and secure disposal of hazardous waste coming in from member industries in the region.

Located in Ankleshwar, Gujarat BEIL has partnered with some of the world's leading organizations to develop technology that helps for handling, treatment and disposal of waste in scientific manner.

Our exceptional capability in building state of the art various environmental management projects as per international standards and good engineering practice stand us apart in the business.

BEIL has partnered with some of the world's leading organizations to develop technology that helps for handling, treatment and disposal of waste in scientific manner.

- Facility can handle HW liquid, solid, semi solid and Tarry.

- First hazardous waste management facility in India to be certified under ISO 14001-2015 and OHSAS 18001 – 2007, amongst few elite facilities in the world to have been awarded this certification.
- Giving service to more than 1800 Industries like chemical, Pesticides, Pharmaceuticals, Paints, Dyes & Pigments etc. for secured landfill facility and common incineration system.
- Hazardous Waste (HW) Management (HW Collection and Transportation, Treatment, Storage and Disposal)
- Industrial Effluent Treatment Plants/ Common Effluent Treatment Plant
- Municipal Solid Waste (MSW) Management (collection, transportation, treatment and disposal (Landfilling) of the waste) and producing Refused Derived Fuel (RDF) and Compost fertilizer.
- Construction and Demolition waste management.
- Package/mobile plants for treatment of solid and wastewater.
- Waste Electrical and Electronic Equipment (WEEE) management.
- Environmental Monitoring and Auditing.
- Providing Design, Engineering, DPR preparation and PMC for waste Management.
- Waste to Energy (including pre-processing and co-processing).
- Biomedical waste.
- Incineration plants.
- Plastic Processing plants (waste to products).
- Drums and Tanker Decontamination.

Danfoss India

Danfoss firmly believes that Waste management is ongoing and beneficial to both the organization and the environment.

Danfoss is committed to 3R waste management & most of the waste from the Danfoss campus aids energy conservation directly or indirectly, contributing towards CO2 reduction and the use of alternate resources combined to achieve Sustainable Development.

- LEED Platinum & LEED ARC Certification
- Co2 Reduction
- Alternative Fuel resource
- Inhouse Solar Park & Wind Energy
- ZLD concepts
- Waste to Wealth (WoW)
- Energy Conservation
- IOT-based Water Management
- E-Vehicles for internal shuttle
- CNG vehicle/PNG utilization
- Resilex Packaging
- Green gas (Biogas)
- Miyawaki Afforestation (Biodiversity)
- Energy Storage System (ESS)
- 10K + Tress inside the campus
- Digitalization Paperless OHC/
- Life Cycle approach
- Internal shuttle –200+ Bicycles
- Rainwater harvesting system
- Smart Lighting System Classified as Public

We are sure "3R Waste Management Initiatives Today, for a Sustainable Tomorrow"

Reliance Nagothane

RIL-NMD is a Petrochemical complex located in Nagothane, Maharashtra. Erstwhile IPCL-MGCC commissioned in in 1989-90. RIL acquired IPCL in 2002. RIL-NMD is the first Gold rated Petrochemical complex by CII as per Green Co rating criteria. Site generated Hazardous Waste, Non-Hazardous waste, Treated Waste water and Gaseous waste from the operations of the complex.

Site have acted for reduction of waste generation and proper disposal of the same. Rest of the feature are as below:

- 34% reduction in Oily Cotton rags
- Installation of UF-RO system for treated effluent increasing the Treated Effluent reuse from 40% to 80% from Jan 2022
- Reduction of hazardous waste to disposal facility
- Wet waste composting and Domestic Dry waste to recycler from the full fledged Township (1500 houses)
- Vermi composting from Garden waste
- Non-Haz waste to landfill reduced by 25% by engaging a local vendor for segregation and sale.
- 40 km Plastic Road in plant and township using 50 MT of waste plastic
- 100% utilisation of treated sewage in Horticulture activities
- 100% Biological sludge usage as Horticulture manure
- Demonstration and distribution of Matka Incinerator for sanitary waste disposal in 16 nearby villages
- Non-Haz waste used to prepare display items for World Environment Day 2022
- Site has a Recycle PET plant which is intended for recycling of Waste PET bottles.
- Initiative of Cloth waste reduction is taken in coordination with nearby Self Help Group.

Vedanta Limited

The world's largest single-location Aluminium plant at Jharsuguda has a smelting capacity of 1.8 MTPA & 3615 MW Power plant. With large natural resources consumption, the Al metal industry produces a relatively large amount of waste and We recognize that the subject of waste management is of material significance to us and our stakeholders because of the associated health and environmental concerns.

Vedanta Aluminium Limited follows the hierarchy of reduce, recovery/ reuse/recycle, & disposal in the management of solid wastes. Priority is given to avoidance and minimization of waste generation followed by recovery, reuse and recycling which is as per the management approach of the company having its own systems and standards.

Non-Hazardous Wastes: These are segregated into biodegradable & non- biodegradable wastes. The biodegradable wastes are Vermi composted for utilization in the gardening & non-Biodegradable wastes are further classified in to salable & non-Salable wastes. The salable wastes are shifted to scrap yard from where they are auctioned on monthly/quarterly basis. The non-salable wastes like construction debris are utilized for low lying area filling & for road making. High Concentration Slurry Disposal (HCSD) method has been adopted by the industry for disposing ash generated from the CPP, which is first of its kind in the State of Orissa.

Hazardous Wastes: Process has been designed to minimize the amount of wastes as well as by ensuring the implementation of good practices, innovative ideas, and R&D projects. Waste recycling maximized by supplying waste to local authorized recycling companies to recycle/reuses.

Segregation and proper storage of different types of waste in different containers skips or stockpiles to enhance reuse or recycling of the materials. Finally, all hazardous waste which is ultimately destined to be disposed is disposed in nearby CHWTSDF.

Biomedical waste: The First Aids follows autoclaving and needle incineration for sterilization of the Biomedical Wastes. The autoclaving is done by trained personnel strictly as per the guidelines. The wastes are finally disposed to deep burial pits after complete sterilization. The pits are frequently sprinkled with lime for additional disinfections.

Path to Circular Economy: Our commitment towards circular economy commands efforts towards minimizing waste-to-landfill and/or incineration.

Runaya LLP Project- to improve aluminium recovery present in the dross to nearly 90%. By adopting cutting edge technology and international collaborations, Runaya is able to take the non-metallic portions of the residual dross and process it to produce briquettes that can be used as slag conditioner in the steel industry resulting in zero waste, and therefore zero landfill.

To manage SPL from Aluminium Smelters at Vedanta Limited, Jharsuguda, we have identified authorized recyclers for detoxification of SPL carbon portion for the purpose of energy recovery in the industrial process, as per the Standard Operating Procedures (SOP) laid down by the Government of India. In a period of two years, this model has become successful, serving the dual purpose of efficient waste management as well as reduction of fossil fuel consumption of other industries.

We have tied with M/s Nepra resource management private Limited to manage all land fillable dry and wet waste generated from our site to increase the scope of circular economy and litigation to CO2 emission due to land filling.

Also, the following studies are being conducted by our R&D division along with other institutes for sustainable management of hazardous waste:

- Synthesis of AlF3 and Cryolite from Aluminium Dross (IIT Kharagpur)
- Recovery of Carbon and Bath material from Shot Blast Dust (IMMT Bhubaneswar)
- Value recovery from Spent Pot Liner (IMMT Bhubaneswar)

Confederation of Indian Industry

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering Industry, Government and civil society, through advisory and consultative processes.

CII is a non-government, not-for-profit, industry-led and industry-managed organization, with around 9000 members from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 300,000 enterprises from 286 national and regional sectoral industry bodies.

For more than 125 years, CII has been engaged in shaping India's development journey and works proactively on transforming Indian Industry's engagement in national development. CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues.

Extending its agenda beyond business, CII assists industry to identify and execute corporate citizenship programmes. Partnerships with civil society organizations carry forward corporate initiatives for integrated and inclusive development across diverse domains including affirmative action, livelihoods, diversity management, skill development, empowerment of women, and sustainable development, to name a few.

As India completes 75 years of Independence in 2022, it must position itself for global leadership with a long-term vision for India@100 in 2047. The role played by Indian industry will be central to the country's progress and success as a nation. CII, with the Theme for 2022-23 as **Beyond India@75: Competitiveness, Growth, Sustainability, Internationalisation** has prioritized 7 action points under these 4 sub-themes that will catalyze the journey of the country towards the vision of India@100.

With 62 offices, including 10 Centres of Excellence, in India, and 8 overseas offices in Australia, Egypt, Germany, Indonesia, Singapore, UAE, UK, and USA, as well as institutional partnerships with 350 counterpart organizations in 133 countries, CII serves as a reference point for Indian industry and the international business community.

Confederation of Indian Industry
The Mantosh Sondhi Centre
23, Institutional Area, Lodi Road, New Delhi – 110 003 (India)
T: 91 11 45771000 / 24629994-7
E: info@cii.in • **W**: www.cii.in

Follow us on

cii.in/facebook cii.in/ **twitter cii.in/** **linkedin cii.in/** **youtube**

Reach us via CII Membership Helpline Number: 1800-103-1244