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MATERIAL RECYCLING

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THE VOICE OF INDIAN RECYCLING INDUSTRY



SPECIAL FEATURE

WOMEN IN RECYCLING

Jain Metal Group

LEADING REVOLUTION IN SUSTAINABILITY

Amitabh Kant on Recycling

Surendra Patawari on Incentives

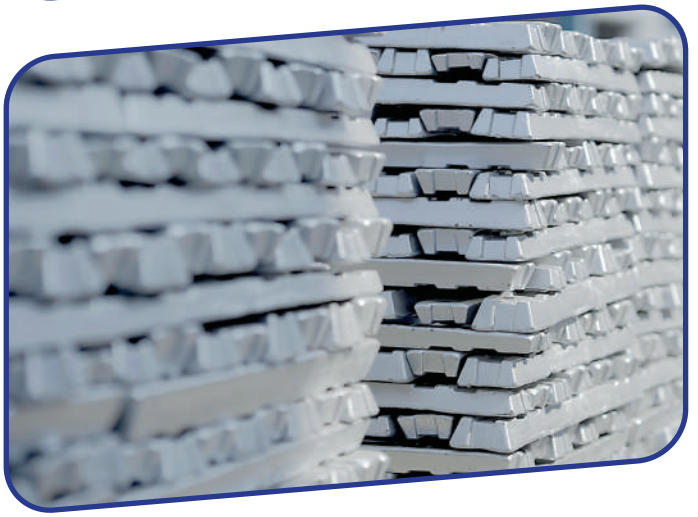


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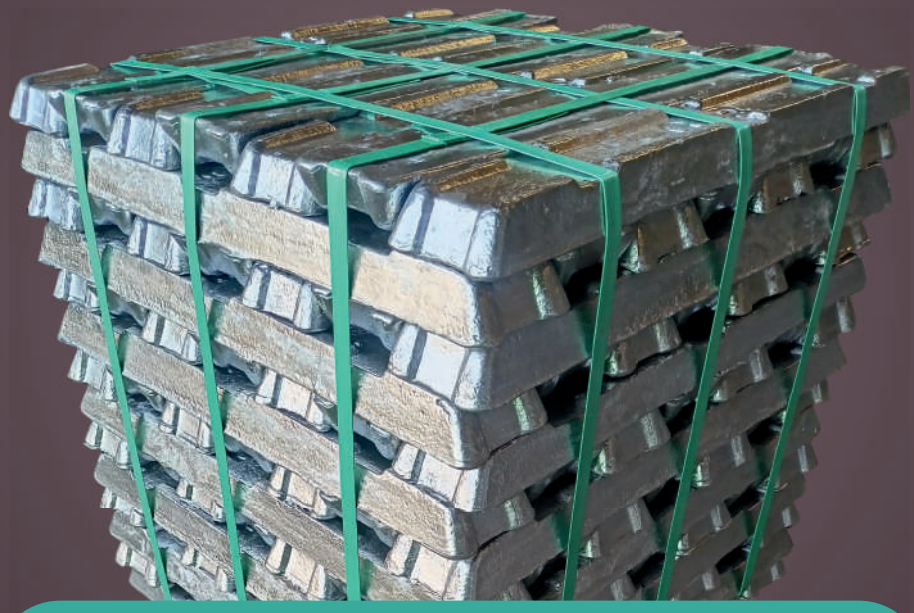
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Women have been increasingly playing their invaluable role in recycling from time immemorial, starting from their homes. On the occasion of International Women's Day (March 8) four leading lights of the industry share their thoughts in a special feature. There is something to cheer about, they say in unison, that women empowerment is on the rise.

This edition's cover story on the seven-decade old metal recycling pioneer – Jain Metal Group – is a telling story of a family-owned enterprise. After learning the dynamics of the business & trade, it is trying to leverage the emerging ecosystem to contribute for sustainable future.

What stands out for the Group is the way they carry on with their agenda – silently and unassumingly but without any ambiguity. We wait for more news to come by, sooner or later.

When it comes to reading and hearing, the more you read or hear Amitabh Kant, the celebrated G20 Sherpa during the Indian Presidency, or Surendra Patawari of Gemini Corp, who is regarded as an undisputed think- tank on global recycling industry, the more you will be convinced that it is a boon for a country like India. Hope the excerpts from their IMRC 2024 speeches in this edition would find like-minded readers.

MRAI and its magazine would be participating at the premier ISRI 2024 at Las Vagas. The exposure, it is hoped, could be an epoch-making one with the incredible world of recycling that is going to be showcased before us.

Here is wishing ISRI the very best.

Happy Recycling



Ayyappan V.



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MARCH 2024

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The innovative technology unveiled at Banaras Hindu University has the potential to revolutionize green hydrogen production on a massive scale

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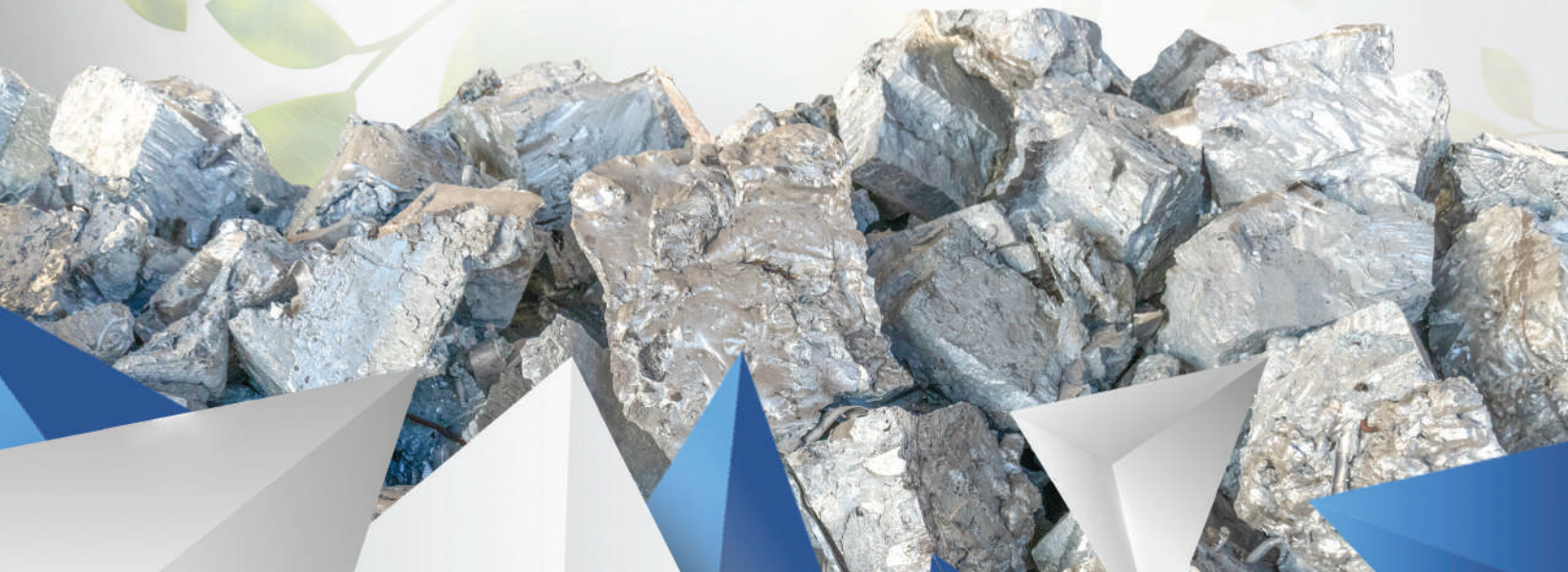
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Advancing Quantum Technology

ACQUIRING CRITICAL MASS





DR GARAI

The innovative quantum technology unveiled at Banaras Hindu University recently has the potential to revolutionize green hydrogen production on a massive scale, writes the Green Keplerate Team at the University

Transitioning to a decarbonized future demands a shift to sustainable energy. Green hydrogen, produced through renewable-powered electrolysis, shows promise for reducing CO_2 emissions. Despite ongoing challenges in the cost-effective production of green hydrogen, Green Keplerate Lab at the University has developed quantum-derived technology that provides scalable solutions. Through its newly invented water splitting process, it is possible to achieve high production rates for green H_2, even when dealing with saline or polluted sources, and optimizing hydrogen-natural gas blends for clathrate formation enhances storage. This led to switching internal combustion engines to hydrogen-powered versions, promoting environmentally-friendly transportation. The innovations tackle key hurdles in green hydrogen production, storage, and utilization, moving us towards a hydrogen economy based cleaner future.

> **The new high-quantum-backed green hydrogen production technology would be useful in a wide range of applications from various sectors across energy production, automobiles and agriculture**

FEASIBILITY STUDY

The Green Keplerate Laboratory is at the forefront of pioneering sustainable energy solutions, particularly green hydrogen production. Leveraging intricate photochemical pathways, the team has developed a cutting-edge photocatalytic reactor capable of yielding 50 litres of green hydrogen per hour using just a 200-watt LED illumination source.

This breakthrough, achieved as early as May 2022, underscores the feasibility and scalability of the technology. It further demonstrates the reactor's adaptability by achieving a peak throughput of 1 litre per minute, even when processing saltwater. These results, though unpublished, mark a significant milestone in the quest for sustainable hydrogen production.



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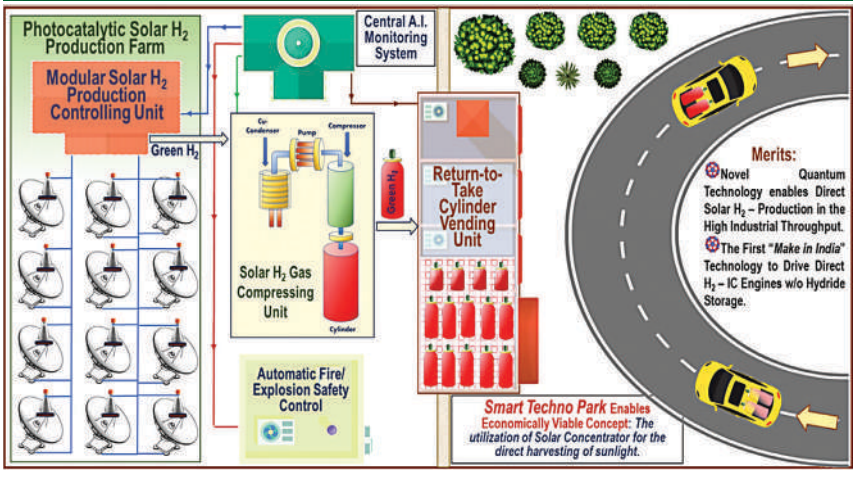
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The team then expanded its endeavours with the development of a lab-scale solar-powered reactor, showcasing its commitment to renewable energy sources. Subsequent testing last year had revealed a production rate of approximately 50 litres per hour, validating the efficacy of the solar-driven approach. The innovation lies in the utilization of "Quantum Confinement Technology" to enhance reaction kinetics and thermodynamics. By simulating industrial waste material-based electron donor systems, the experiment has optimized green hydrogen generation rates, highlighting the novelty and potential impact of the approach.

The proof of concept demonstrates the rigor, credibility, and potential of the quantum-derived technology for bulk-scale production of solar green hydrogen. Through innovative approaches to photocatalysis, waste utilization, and hydrogen storage, it is poised to significantly contribute to the global transition towards sustainable energy solutions.

The vision entails the development of a cutting-edge Solar H_2 refueling station, seamlessly integrated with an in-situ solar green H_2 production plant. This pioneering facility will feature state-of-the-art fuel gas compression technology and a non-hazardous bottling system, meticulously designed to facilitate efficient and safe refueling of hydrogen-powered vehicles.

The comprehensive plant design prioritizes safety and sustainability by minimizing challenges associated with the storage and transportation of volatile fuel gas. The incorporation of a Solar Green H_2 production farm represents a groundbreaking solution, allowing for on-site generation of fuel gas, thus reducing transportation costs and minimizing waste.

By strategically integrating fuel gas compression technology, non-hazardous bottling procedures, and on-site production, the team aim to optimize safety, efficiency, and sustainability in hydrogen mobility. This holistic approach will position the facility at the forefront of technological innovation, setting new standards for hydrogen refueling infrastructure and paving the way for a greener future.

"The technology powered by green hydrogen has the potential to revolutionise energy generation of large scale production of 'Solar Green Hydrogen' and utilizing it for internal combustion engine"

The research is supported by the CEST Division of DST headed by Dr. Anita Gupta under the Hydrogen and Fuel Cell programme (Coordinator: Dr. Ranjith Krishna Pai).

(The Green Keplerate Team consists of Shankab J. Phukan, Suraj Goswami and Dr. Somenath Garai from BHU, Varanasi and Dr Manas Roy from NIT Agartala)

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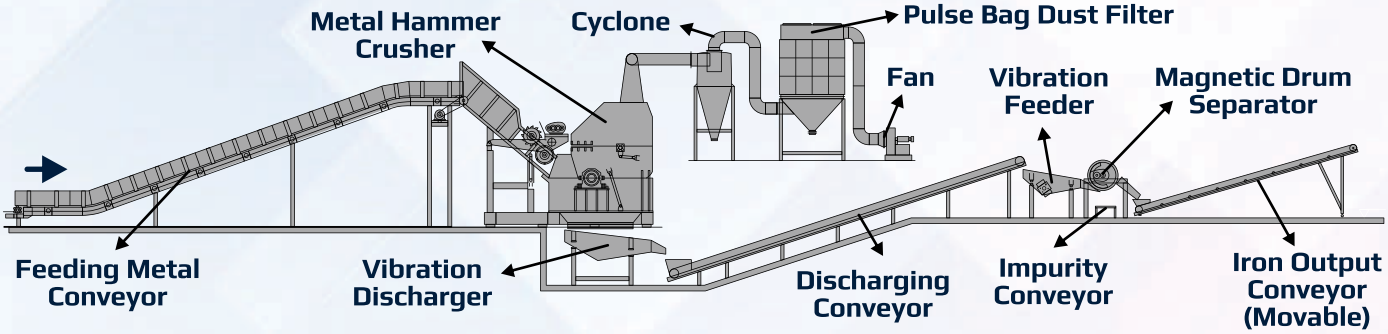


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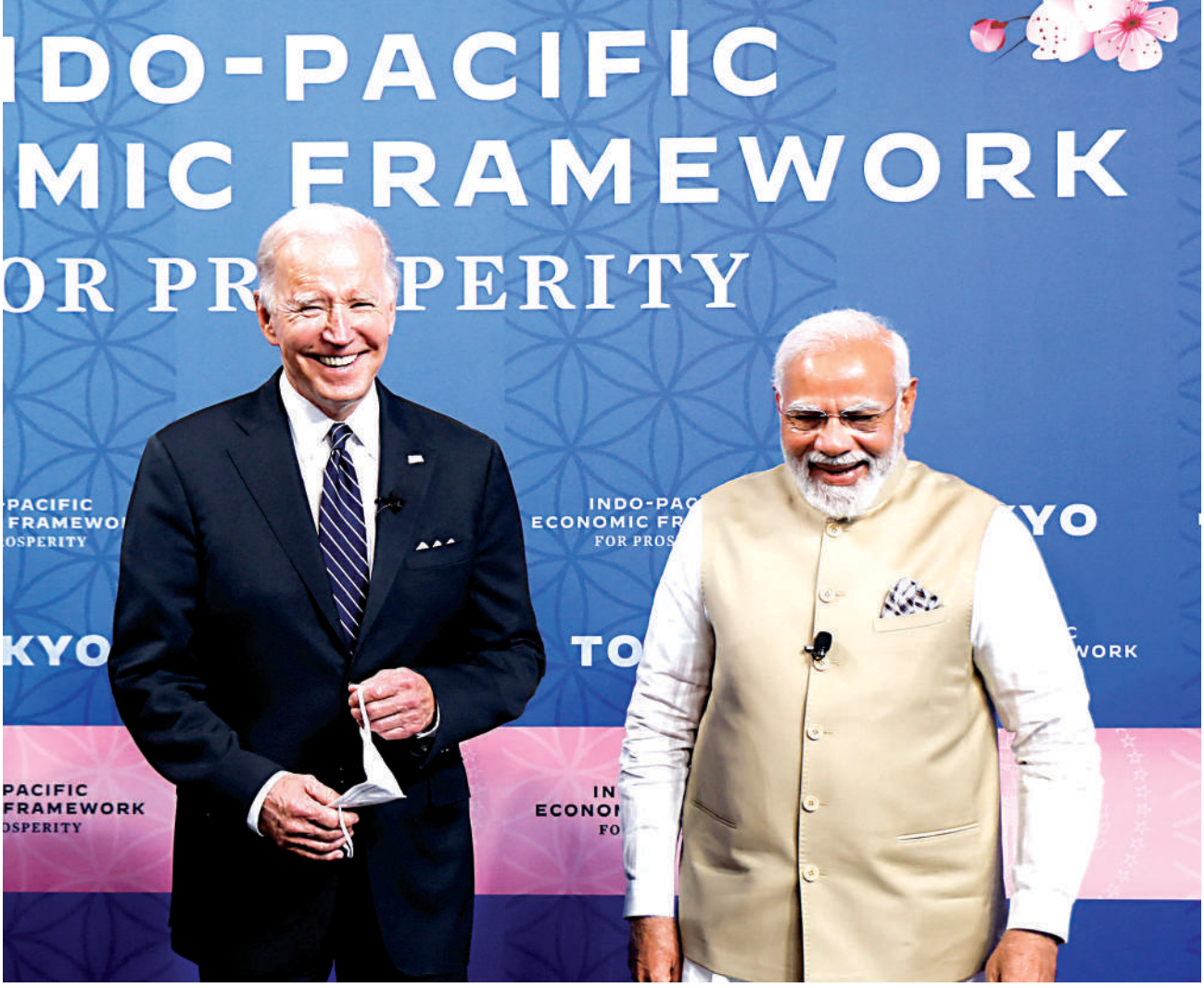
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ENJOYING IT TOGETHER: US President Joe Biden and Indian Prime Minister Narendra Modi share a light moment

India calling



As vibrant democracies, both India and USA are natural partners and have trade complementarities, long standing strategic and economic relationship, and people to people contact. Given the huge potential that exist in the subcontinent, India is a veritable market for growth for multinational corporations and for USA a partner to reckon with to fulfil its global ambitions

> ***Rapidly expanding trade and commercial linkages between India and the US form an important component of the multi-faceted partnership***

Over the years, India-U.S. trade relations have developed into a "global strategic partnership", based on shared democratic values, and increasing convergence of interests on bilateral, regional, and global issues. Despite the COVID-19 pandemic, India-U.S. cooperation witnessed intense engagement under various bilateral dialogue mechanisms in a wide range of areas including defence, security, health, trade, economic, science & technology, energy, and people-to-people ties.

Rapidly expanding trade and commercial linkages between India and the US form an important component of the multi-faceted partnership between the two countries. Total bilateral trade (goods and services) between India and US increased at a CAGR of 11.5% from US$ 20 billion in 2000 to US$ 142 billion in 2018. In 2021, overall US-India bilateral trade in goods and services reached a record US$ 157 billion.

The US emerged as India's biggest trading partner in 2022-23 on account of increasing economic ties between the two countries. According to the provisional data of the Commerce Ministry, the bilateral trade between India and the US increased by 7.65% to US$ 128.55 in 2022-23 as against US$ 119.48 billion in 2021-22.

India-USA trade is likely to touch US$ 300 billion in 2026-27 from its current trade, a report released by industry body PHD Chamber of Commerce and Industry (PHDCCI) stated.

Many US companies view India as a critical market and have expanded their operations. Many Indian companies are investing in the US and adding value. According to a CII study released in April 2023, 163 Indian companies invested over $40 billion in the US and created over 425,000 direct jobs.

U.S.A is the 3rd largest investor in India, with cumulative FDI inflows of US$ 62.24 billion from April 2000-September 2023. In 2023, the U.S. Embassy and Consulates in India processed a record-smashing 1.4 million U.S. visas.

The U.S. is one of the most favoured destinations of Indian students for higher education.

Of the 10 sectors identified in Indian market, Environmental Technologies and

MARKET ENTRY STRATEGY

Strategic planning, due diligence, consistent follow-up, patience, and commitment are prerequisites for business success in India, as it is with any other nation. Language, culture, consumer behavior, standards, and economic development often vary from state to state.

Indian business culture also values the rapport that comes from face-to-face interactions, and in-person meetings are often a prerequisite when formalizing business partnerships or agreements.

FINDING PARTNERS / AGENTS

U.S. businesses new to the Indian market must navigate route-to-market issues, such as sales channels, distribution, marketing practices, pricing, certification, and labeling, as well as the protection of intellectual property. These issues are often effectively addressed through an Indian partner or agent, and cultivating strong working relationships with potential agents is important to successful market entry and expansion. Due diligence is strongly recommended to ensure that credible, reliable partners are identified.

MARKET ENTRY CONSIDERATIONS

There is significant untapped potential across sectors in India, especially in recycling and waste management with many international companies eyeing market opportunities and facing a growing base of local firms across industries. Given the increased competition, identifying target markets and considering qualified partners who know these markets well is important. U.S. exporters should consider setting up subsidiaries or joint ventures in India. Creating strategies for specific regions, consumer segments, and economic groups; crafting offerings according to the target group to gain early acceptance; obtaining mandatory licenses and approvals; and understanding import documentation and procedures, are all important to success.

INDO-US: Salient features

India remains one of the world's fastest growing major economies although it faces challenges common to many other countries such as inflationary pressures, commodity price volatility, and supply chain disruptions

The United States-India relationship remains resilient, with total trade in goods and services topping $191 billion in 2022, almost double the amount recorded in 2014.

India's economy grew at 7.2 percent over the April 1, 2022-March 31, 2023, India's fiscal year (IFY), with growth particularly strong, at 8-9 percent, in the five states of southern India (Telangana, Andhra Pradesh, Tamil Nadu, Karnataka, and Kerala).

The five southern states of India account for 30 percent of India's GDP; Maharashtra and Goa account for another 20 percent of India's GDP.

The IMF projects India's economy will grow by 6.3 percent over the 2023-2024 fiscal year, higher than the global average.

Indian government FDI initiatives are concentrated in sectors such as information technology services, software, business services, pharmaceuticals, and industrial equipment.

U.S. stock of FDI reached $103 billion during IFY22-23, and the U.S. remained the largest single source of FDI in India for the second consecutive year.

Following a minor decline of Indian-origin foreign direct investment (FDI) into the United States in 2020, total stock of Indian FDI in the United States reached $14.4 billion in 2021. India's direct investment in the United States sustains more than 72,000 U.S. jobs.



U.S. companies operating in India emphasize that success requires a long-term planning horizon and the ability to adapt strategy to regional conditions.



India is the United States' ninth-largest trading partner, with U.S. goods and services worth $73.1 billion sold to India in 2022.

The United States maintained its position as India's largest trading partner, with $118.8 billion of imported goods and services.

India partnered with the United States and eleven other countries to launch the Indo-Pacific Economic Framework for Prosperity in May 2022, a high-standard agreement that aims to produce benefits that fuel economic activity and investment, promote sustainable and inclusive economic growth, and benefit workers and consumers.

A wide array of U.S. companies are active participants in the Indian market, across most sectors. The Indian government's focus on fostering "self-reliance" as a means of bolstering domestic businesses and employment also is seen fuelling more collaborative efforts between the two countries to expand the markets they operate.

As part of its self-reliance initiative, India has introduced various market access barriers. However, despite market access concerns, India remains an attractive destination for many U.S. exporters. Many Indian conglomerates stand on par with their international counterparts in sophistication of operations and market prominence. In sectors like information technology, telecommunications, pharmaceuticals, textiles, and engineering, Indian companies are renowned for their ability to innovate and compete.

U.S. companies operating in India emphasize that success requires a long-term planning horizon and the ability to adapt strategy to regional conditions. While complex and challenging, the Indian market offers significant opportunities for U.S. companies.

energy sectors provide huge growth opportunities for U.S. companies

INDIA-USA TRADE

India's largest trading partner is the US, and it is also one of the few countries with which India had a trade surplus in 2022-23.

India's major exports to the US include gems and jewellery, pharmaceutical products, light crude oil and petroleum, electrical and electronics goods, engineering products, apparel, frozen marine products, and others.

- In FY23, the bilateral trade between India and the US stood at a record US$ 128.78 billion as against US$ 119.48 billion in FY22.
- In FY23, India had a trade surplus of US$ 28.30 billion with the US.
- Of the total trade in FY23, Indian exports to the US stood at US$ 78.54 billion, while American exports to India stood at US$ 50.24 billion.
- USA is the 3rd largest investor in India with cumulative FDI inflows of US$ 62.24 billion from April 2000-September 2023.

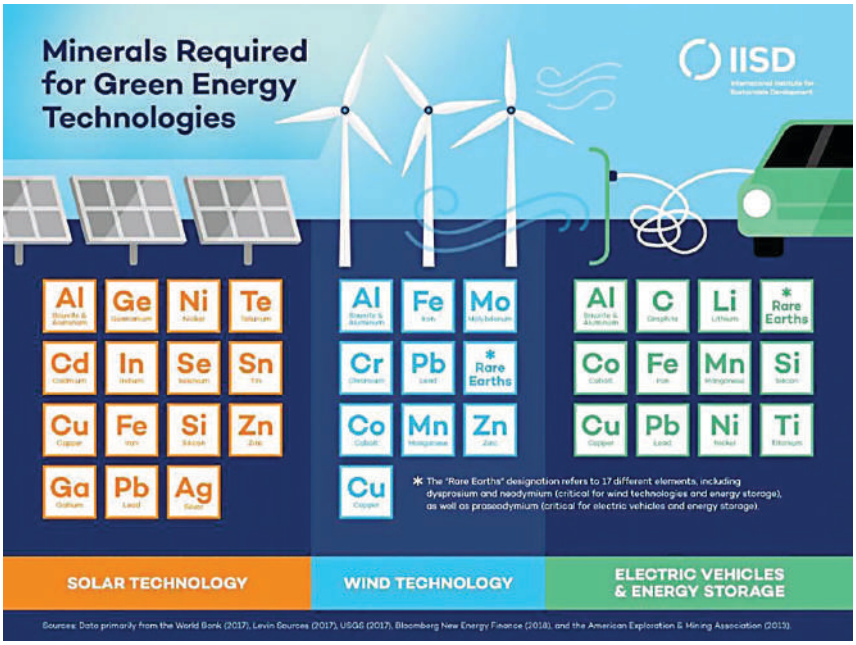


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Source: "Green Conflict Minerals: The fuels of conflict in the transition to a low-carbon economy," International Institute for Sustainable Development (IISD)

MeitY-gating raw materials shortage

India faces a shortage of critical raw materials but the Ministry of Electronics and Information Technology (MeitY) has developed a cost effective solution. Here are the details...

When it comes to achieving the energy transition from polluting fossil fuels to green renewable energy, there is a big catch… Such a transition is impossible without critical raw materials like lithium, cobalt and nickel.

Indian policymakers had read the writing on the wall quite a while ago and an early initiative to solve this problem came from a Planning Commission of India report (now NITI Aayog) in 2011. The Niti Aayog report had highlighted the need for the assured availability of mineral resources for India's industrial growth. The Aayog's report had also analyzed 11 groups of critical minerals under categories like metallic, nonmetallic, precious stones and metals, and strategic minerals.

A separate group outlining 12 minerals and metals as strategic minerals included tin, cobalt, lithium, germanium, gallium, indium, niobium, beryllium, tantalum, tungsten, bismuth, and selenium. The report had recommended the need for quicker exploration and mining, overseas mineral acquisition and finding substitutes through suitable R&D, as well as recycling of these critical raw materials.

There were other initiatives. In July 2023, as part of Mission LiFE's 'Promote Circularity Campaign' the Ministry of Electronics and Information Technology (MeitY) developed a cost effective indigenous lithium-ion battery recycling technology and transferred it to nine companies which includes start-ups.

MeitY developed this technology in partnership with the Telangana state government and industry partner Greenko Energies Pvt Ltd through the Centre of Excellence on E-waste Management established at the Centre for Material for Electronics technique (C-MET), Hyderabad. The novelty of the technology is that it can process assorted types of discarded Li-ion batteries, to recover more than 95% Lithium (Li), Cobalt (Co), Manganese (Mn) and Nickel (Ni) content in the form of their corresponding oxides or carbonates of about 98 per cent purity.

The recycling process involves leaching followed by hierarchical selective extraction of metal values through solvent extraction process. These secondary raw materials could be used for battery manufacturing or in other potential applications.

However, more such initiatives are needed to safeguard the supply of critical materials needed for the production of green hydrogen, solar power and wind power. Without such initiatives it would be impossible to achieve the transition from fossil fuels to renewable energy.

Making green hydrogen relies on catalysts containing precious metals like platinum and iridium. These minerals are used to make electrolyzers which produce hydrogen by splitting water molecules. Solar technologies like solar panels utilize minerals like silicon, tellurium and cadmium to convert sunlight into electricity.

Wind turbines, which are used to generate wind power require minerals like rare earths, specifically neodymium, praseodymium, and dysprosium. These minerals are used to optimize the efficiency and performance of generators in wind turbines.

Critical minerals also have a significant presence in everyday electronic devices. For instance, smart phones rely on minerals like cobalt rare earths and tantalum. Large quantities of platinum are needed to make fuel cells as well as catalytic converters for vehicles. It is up to India's recycling industry to work out innovative methods to recover rare earths from electronic waste.

It would be impossible to guarantee the availability of such critical raw materials without innovations by India's recycling industry. That would make it impossible for India to achieve the transition from fossil fuels to renewable energy without innovations in recycling.

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SPECIAL FEATURE
WOMEN IN RECYCLING

COMING TO THE FORE

As women are powering recycling and waste management sectors, Lady Fortitude is smiling on environmental and economic sustainability, believes Bineesha P as she takes stock of the emerging situation



India's journey towards the Sustainable Development Goals (SDGs) serves as an inspiring example of determination and ingenuity. The nation, which makes up one-sixth of the world's population, has a significant influence on the global environment and in shaping the SDGs.

For our nation to develop, gender equality (SDG 5) and SDG 8, which prioritize decent labour and economic growth, are essential. Therefore, India is committed to achieving the goal of "Promoting sustained, inclusive & sustainable economic growth, full & productive employment and decent work for all." Increasing global resource efficiency gradually until 2030 while giving everyone access to work and placing a particular focus on women is now part of all of our policies, implementation frameworks, and programs.

However, the current statistics of the women entrepreneurship ecosystem in our country is not very encouraging. India currently ranks 57th out of 65 nations, in the Mastercard Index on Women Entrepreneurship (MIWE). It ranks 70th among 77 countries on the Female Entrepreneurship Index. National surveys peg women entrepreneurship at 20% in the MSME sector. This demonstrates the urgent need for action to step up efforts in this area. Creating a robust ecosystem of support for women entrepreneurs is critical to bridge the gender gap in entrepreneurship. Out of the 432 million working-age women in India, only 19% of women participate in any formal and paid work. Estimates suggest that by accelerating women's entrepreneurship, India could create more than 30 million women-owned enterprises, potentially creating 150 to 170 million jobs.

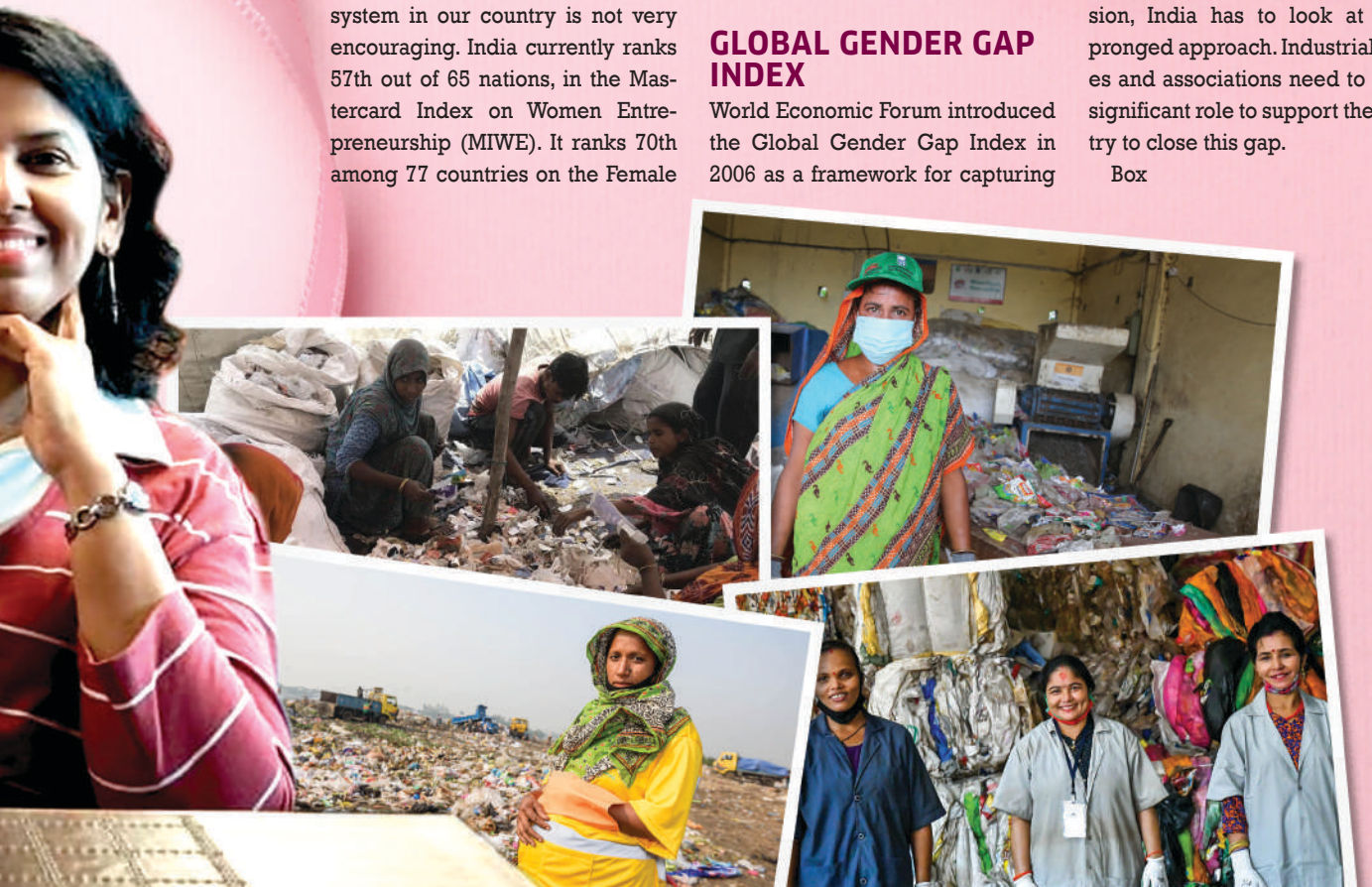
The Indian Waste Management industry, especially recycling sector which is growing at a CAGR of 6.10% for the forecast period 2024-29 (Source: Mordor Intelligence Industry Report), is a good entry point for women entrepreneurship.

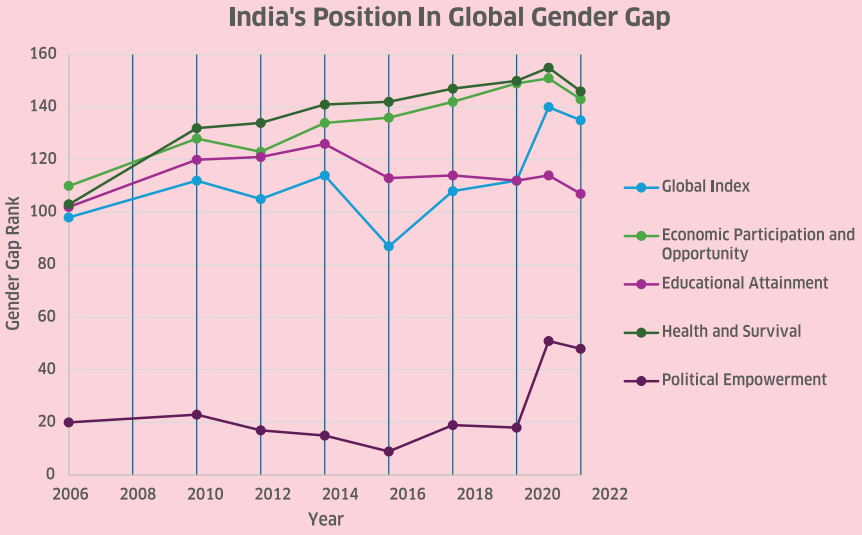
GLOBAL GENDER GAP INDEX

World Economic Forum introduced the Global Gender Gap Index in 2006 as a framework for capturing the magnitude and scope of gender-based disparities and tracking their progress over time across four thematic dimensions and they are Economic Participation and Opportunity, Educational Attainment, Health and Survival and Political Empowerment. Although India has been progressing steadily, the gap is fairly wide with 33% yet to be bridged.

The most important aspect is the fact that although India is doing extremely well in Education Attainment and Health and Survival Indices, it is abysmal in economic participation and opportunity and political empowerment. With the Government passing the Women's Reservation Bill, 2023, it has a clear roadmap for bridging the Political Empowerment gap. However, in order to close the Economic Participation and opportunity thematic dimension, India has to look at multi-pronged approach. Industrial houses and associations need to play a significant role to support the country to close this gap.

Box





MRAI'S INITIATIVE

In a significant move, the leading recycling association of the country, Material Recycling Association of India (MRAI) has set up a "Women's Strategic Unit" (WSU) to thrive, lead and contribute equally to creating a sustainable planet for the next generation.

MRAI will be taking various measures towards Women's Empowerment within the recycling trade and industry and also within MRAI as part of a proactive inclusive approach.

The objectives are to develop strategies to increase leadership roles for Women Recyclers and seek active, frontline participation in MRAI's goals and scope.

Like the UN mission, which focuses on addressing economic disempowerment and inspire inclusion, MRAI recognises the importance of inclusion in advancing gender equality across the Indian recycling sector.

Women have played a significant part in the recycling business, from sorting & collecting in the yards to serving as executives in organizations and associations like ISRI and BIR.

The leading association made the announcement on the just concluded International Women's day. MRAI plans to collectively drive the entire recycling industry towards greater diversity, equality, and towards the mission of inclusive growth.

According to Amar Singh, Secretary General of the Association, the initiative will strive to achieve a balanced representation of women in leadership roles and throughout the workforce. "This proactive and inclusive approach aims to develop strategies to enhance the workforce in the Recycling Sector," he said

"We are committed to creating diversity and more gender inclusive participation in the recycling industry," said Sanjay Mehta, President, MRAI.

He hoped that the initiative will certainly enhance women's participation and it will also strengthen our industry.

RECENT TRENDS



- For companies where sorting of waste is a major activity, 18 to 20% of employees are women.
- There are a few companies which are exceptional in hiring women for the shop floor, wherein 50-60% are women employees.
- However, when it comes to smelting and refinishing sectors, it is largely male dominated.
- Off late, there is a trend of women being employed in the administration, trading and logistics sections of the sector.

Mr. Zain Nathani, Vice President, MRAI asserted "By harnessing the talent and potential of women, we can achieve greater success and contribute significantly to a sustainable future." validating the vision for the WSU.

THE END

The Material Recycling Association of India (MRAI) has always been supporting the Government in nation building activities. Acknowledging thissine quo non, MRAI has agreed to contribute by setting up a Strategic Unit for Women, to empower and strengthen the participation of women in this sector.

The MRAI Leadership, championed by Shri Sanjay Mehta and Dhawal Shah, has set a target of one year to show casepivotal participation of women in recycling. The announcement of Women's Strategic Unit (WSU) at MRAI on the 8th March 2024, is a landmark initiative towards this direction. Several activities have been lined up to support the members of MRAI, to reach this goal.

Establishing a baseline data on women in recycling sector is an activity which has began as a first activity of WSU. Lack of data is a bane, this sector has been groping with, which is similar for women's participation statistics. It is heartening to notice that many of the members have come forward with the data and are very enthusiastic to this cause. With the establishment of this database, MRAI will brainstorm with the WSU to draw a plan to increase the women's participation with time bound targets.

MRAI will work closely with the Central and State Governments to leverage the benefits and schemes already offeredto industries, for this cause.It is an effort which each and every entrepreneur has to internalise that the 'Lady fortitude' participation is paramount for the economic growth of this sector. The dream of a five trillion dollar economy by 2030 will be a reality only with active contribution of women power!

(An Advisor at MRAI, where she is the interim Chairperson of the Women's Strategic Unit, Ms Bineesha is the Executive Director of International Institute of Waste Management, Bangalore)

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SPECIAL FEATURE
WOMEN IN RECYCLING

‘We are still very much a male dominated industry, but a shift is occurring’

ISRI President Robin Wiener scans through her journey into the world of recycling ever since she joined the organisation in 1989

As we strive as a global society for equality, inclusivity, and diversity in all spaces, I am excited to see the changes that are occurring within the recycled materials industry – at home in the U.S. and around the world. While we certainly still have more work to do, I am filled with hope as there are more female leaders in our industry than ever before; and more importantly, a more vocal group of women, as well as allies, who recognize the vital importance of diversity and equality in all areas.

The number of women serving on ISRI’s Board of Directors, as Committee Chairs, and as officers within our chapters has increased dramatically since I first joined the association back in 1989 as the environmental compliance manager. Similar increases have also occurred within the recycled materials industry, with more women at all levels of operations and management within companies. We are still very much a male dominated industry, but a shift is occurring.

Similar changes have occurred within the industry globally. It has been years since I have been alone as the only woman running a national recycling association. In 1994 I was joined by Alicia Garcia-Franco Zúñiga (Director General of FER in Spain). Now our ranks include Victoria Ferrer Maymo (Gremi, Catalonia), Tracy Shaw (CARI, Canada), Janny Tercero Cordoba (CARENIC, Nicaragua), Liana Bratasida (APKI, Indonesia), Antonia Biggs (ANIR, Chile) and Julia Blees (EuRIC), among others. And just last year, BIR – which represents our global industry – elected its first female President: Susie Burrage!

There is considerable research demonstrating that diversity within organizations unlocks innovation and creativity, as well as drives market growth and improves problem solving. I can certainly attest to those benefits within ISRI, where a diversity of voices has brought a diversity of thought, insights, and ideas – all to the benefit of our members and the industry.



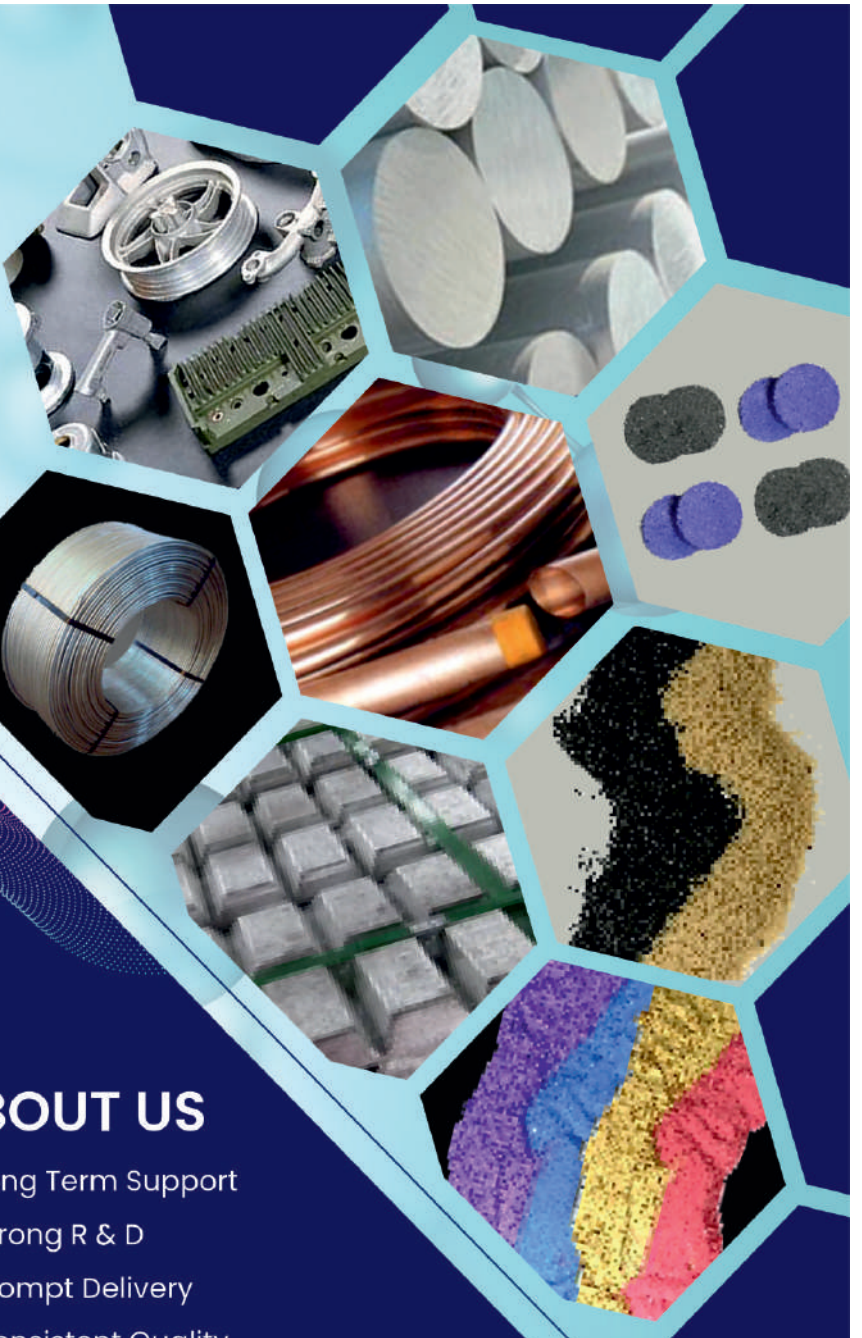
MS WIENER

I am very excited to see the recent announcement from MRAI of the formation of a ‘Women’s Strategic Unit’ to help advance gender equality across the Indian recycling sector. I applaud MRAI for this initiative and stand ready to offer my support – and that of ISRI

Leadership also brings responsibility to help others, which is necessary to increase diversity. I learned that lesson early on. When I was in college studying engineering, I greatly benefited from my participation in the Society of Women Engineers, where I met other women who offered themselves to mentor me and ultimately give me the confidence to succeed. Years later, when I became President of ISRI, I was reminded of the importance of this when, at a local ISRI chapter meeting, a young woman approached me and thanked me for just being at the front of the room, and showing her what was possible.

As both the President of ISRI, and the mom of two beautiful (inside and out) daughters, I believe strongly in the need to provide support and mentorship, especially to young women and girls, so they can see what is possible and we can all achieve a truly gender equal world. I am very proud of the mentoring programme started by ISRI’s Women in Recycling (WIR) Council, which has been in place now for several years. WIR’s mission is to create an environment where women in recycling feel connected and supported to further their industry knowledge, skills and advancement into leadership and management roles.

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SPECIAL FEATURE
WOMEN IN RECYCLING

'Women play a crucial role in driving the industry forward'

For in the realm of waste, there's beauty untold, a story of transformation, waiting to unfold. With perseverance and grit, we'll pave the way, turning waste to wealth, every single day, writes Hemal Gandhi of GRP Ltd

As a woman deeply immersed in the recycling industry, I've encountered misconceptions that echo outdated stereotypes. Far too often, recycling and waste management are unfairly pigeonholed as mere corporate social responsibility endeavors or relegated to the realm of physically demanding tasks, not realizing its pivotal role in sustainability and its positive impact on the future.

Women representation in the global manufacturing sector has been traditionally low; currently trending around 30%. The trend in India is however around 20%. Recycling has been predominantly male dominated, given the nature of work and societal norms. The truth is, recycling is not just about sorting through bins or hauling away discarded materials.

It's a multifaceted endeavor that requires strategic thinking, innovative solutions, and collaborative efforts. Women, with their diverse perspectives and innate problem-solving abilities, play a crucial role in driving this industry forward. We are champions of change, leading the charge towards a more sustainable world. Our work goes beyond the surface-level tasks; it encompasses advocacy, education, and the implementation of cutting-edge technologies to revolutionize the way we manage waste and conserve resources.

The presence of women in recycling activities is not only beneficial for gender equality but also for the effectiveness and success of recycling efforts.

Traditionally ingrained with recycling and upcycling practices, especially in Indian culture, women have been pioneers in innovating new methods for responsible consumption within their households. Their creativity and resourcefulness will pave the way in advancing sustainability goals.

At GRP, our endeavour has been to empower women across the strata of the society. By identifying roles where women can contribute effectively depending on their skills, creating appropriate infrastructure and work processes ensuring their safety and convenience, prioritising apprenticeship and internship opportunities for girl students have helped us to build an ecosystem where girls can aspire to join the recycling sector and contribute to the overall sustainability journey. These steps have enabled us to double our women participation on the shopfloor and across the organisation over the last five years.



MS GANDHI

> Women, with their diverse perspectives and innate problem-solving abilities, play a crucial role in driving this industry forward

In conclusion, challenges arise from misconceptions about the industry's complexity and value. Automation in the supply chain, in the operations, and initiatives by government and corporates for fostering an inclusive culture will eliminate a few of these barriers. Education on the importance of recycling industry and its positive environmental impact is essential. As the momentum continues to build, lets support and empower women in recycling sector, ensuring their voices are heard, and their contributions are valued in shaping a more greener and equitable future - one innovative idea at a time!

Let's celebrate the powerful impact of women in driving the sustainability agenda forward.

(Ms Gandhi is Executive Director at GRP Ltd, which is one of the leading recyclers of the country that manufacture reclaimed rubber from used tyres, upscaled polyamide from nylon waste and engineered products die-cut from end-of- life tyres)

‘It is satisfying to see many women entering and breaking the glass ceiling’

Pune-based Dr Medha Tadpatrikar is an ardent believer of what women can do in recycling, a belief that she got to know first hand from her own life history

When I started my career in recycling almost 14 years ago, it felt like I was one of the very few women in a very male domineering sector. It was difficult for them to adjust to my presence also. My role as co-founder of a company involved in innovative recycling at that time was a novelty for many. It was difficult to break down the barriers but when I look at the struggles and hardships, I do feel more like it was worth a journey and many to come. It is satisfying to see many women entering and breaking the glass ceiling in the recycling sector.

Traditionally, women have always been great recyclers in households. I remember my grandmother used many old things in novel ways once they became of no use. Else she used to give old clothes, things to someone needy. Throwing things in waste was a big no-no, but with ever changing lifestyle throwing things has become a norm. That is why there is a focus on repair and reuse also. In India, women have always been an integral part of informal sector of waste management. Traditionally women have been responsible for waste collection in the households and in the initial stages of collection, segregation of the waste. Many households in Africa, Asia where women rag pickers collect the waste and then sell them to recyclers, making them important part of recycling industry. Women are also involved in recycling as sorters and are also trusted with intensive job of segregation of particular type of waste while actual recycling jobs remaining the domain of men. Women have found ways to upcycle waste into value added products. This is empowering women and by participating in the waste sector they also get recognition.

The sector is always changing. It is a very dynamic environment procuring waste, scrap, as well as there is an ever-increasing interest in sustainability across the globe. The households are making a difference to as many women are composting their food waste, segregating their paper, metal and plastic at households which are finding their way to recycling.



DR TADPATRIKAR

The industry has changed massively in the recent years and is still evolving today. The area is becoming more appealing to women as a career as well

The industry has changed massively in the recent years and is still evolving today. The area is becoming more appealing to women as a career as well. That way they can influence positive changes. Companies should continue to challenge stereotypes and promote gender equality, recognise individuals who have the best knowledge and skills for the job, regardless of their gender.

According to the WOW! Global Survey II, conducted in 2022 by ISWA, women are uncovering career opportunities in the waste sector – across regions, across the waste hierarchy, across organisation types, and across levels of responsibility. But there are signs that more needs to be done by employers and sector associations, to retain and support young women in the waste sector, given the unique set of skills that they bring. This includes creating opportunities to build their experience through on-the-job training, working with mentors and as part of teams. More needs to be done to attract large number of women in recycling. There are huge opportunities where a women’s touch can do wonders for the sector.

(Director of Rudra Environmental Solution (India) Ltd, Dr Tadpatrikar is a serial entrepreneur)

When primary goes PREMIER

Designed for ideal industrial applications, the new shredder from Fornnax Technology is suitable for high-volume municipal solid waste, wood pallets, industrial and commercial waste, besides tyre shredding





Fornnax, the global leader in recycling machinery, has added another innovation to its kitty with the launch of SR-200 HD Dual-Shaft Primary Shredder, at India Rubber Expo, held recently in Mumbai.

The launch at the hands of Ajay Shah, the President of Reliance Industries Limited, and Vishnu Bhimrajka, Chairman and Chief Convenor of Expo, marked a significant leap in recycling technology, demonstrating Fornnax's dedication to engineering excellence and sustainability.

As a company, Fornnax has always been aggressive in new product development and the new wonder machine is based on growing customer demand for high-capacity pre-shredders.

The SR-200 HD, the new HD model of the SR series replaces the standard SR200 model. The Primary Shredder SR-200 HD is more powerful and has the highest input capacity model in the SR series of machines.

SALIENT FEATURES

- Provides a low cost-per-tonne with high reliability, ease of operation, and more flexibility for various types of tyres
- Provides higher capacity due to its high RPM and torque, resulting in less manpower, electricity, and wear costs.
- Designed to focus on the Tyre Derived Fuel TDF application. The single-line system delivers a high output equivalent to 3-4 smaller lines.
- Comes with various knives developed by Fornnax to accommodate customers' needs and with robust cutting chamber design.
- Shaft speeds allow the SR-200HD to work with the most challenging materials, besides its shafts change system enables faster switching from one application to another
- Has more discharge space to process bulky and high-thickness materials such as truck tyres and OTR tyres

The SR-200 HD is primarily designed for tyre shredding applications. It can also be utilized for other applications, including high-volume municipal solid waste, wood pallets, industrial and commercial waste, and many more.

"As a result of the stringent waste treatment policies in place, there is a growing global demand for competitive pre-shredders," informed Jignesh Kundaria, Director, Fornnax Technology Pvt Ltd.

According to him, the introduction of the SR-200 HD presents significant opportunities for industries in the Middle East, Australia (due to full-tyre export bans from Australia and steel export bans from the Middle East) and Europe, where an increasing need for advanced recycling solutions is evident.

The machine primarily targets large-scale recyclers and cement plants that require high-capacity machinery. "We have secured six pre-launch orders from India, Australia, the Middle East, and Europe, reflecting the trust built in the global market over the years. Industries are seeking machinery with enhanced output capabilities that comply with industry-leading standards to meet their recycling needs effectively," added Mr Kundaria.

The new addition perfectly fits into the Fornnax's objective of becoming a leader in recycling technology. Of late, Fornnax Technology is focusing more on designing and developing new products that suit specific input tyre types that increase efficiency instead of providing standard models suitable for all tyre types.

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Recycling aluminium scrap

AN EXPLORATION WORTH ITS EFFORT



DR C BHAGYANATHAN

Recovery of high-pollutant powdered aluminium scrap presents both a challenge and an opportunity for the aluminium industry. **Dr C Bhagyanathan** gives an overview of the innovations driving the recovery, revolutionizing the recycling landscape and paving the way for a more sustainable future

Aluminium, hailed for its versatility and sustainability, has become a cornerstone of modern industries. The quest for sustainability has brought to light the pressing need to tackle pollution and promote recycling across various industries. Among the key players in this movement is the aluminium sector, which grapples with the challenge of handling high-pollutant powdered aluminium scrap. This scrap, often laden with contaminants, presents a significant hurdle in the recycling process, hindering the extraction of pure aluminium and increasing environmental degradation.

The high-pollutant aluminium scrap, abounding with organic contaminants and alloying elements, has long stymied conventional recycling methods. Traditional recycling methods struggle to efficiently separate high-pollutant powdered aluminium scrap from contaminants. The inefficiency of traditional sorting and separation techniques often results in compromised quality and diminished recyclability.

The journey towards enhanced aluminium scrap recovery is a collaborative endeavour, uniting industry stakeholders, research institutions, and regulatory bodies. The aluminium recycling incubation facility at DST SREC Centre for Aluminum Recycling (SREC) has made collective efforts to disseminate knowledge, foster research and development to enhance the recovery of such low-yielding aluminium scraps. The research team at the Centre is working on developing innovative methodologies that promise to revolutionize the recycling process, aimed at extracting aluminium with an expected recovery of minimum 10% higher than the existing techniques. maximum value from scrap materials while minimizing environmental impact. Through collaborative efforts with industry and government agencies.

The key phases of the research conducted at the lab scale include the pyrolysis and chemical treatments for organic contaminant removal. Pyrolysis, a thermochemical decomposition process, subjects aluminium scrap to elevated temperatures in an oxygen-starved environment, facilitating the breakdown of organic pollutants into residues. Concurrently, chemical treatments harness the solubility of organic compounds in selective solvents and surfactants, effectively purging contaminants from the aluminium matrix.

Furthermore, consumer demand for eco-conscious products serves as a catalyst for

industry-wide adoption of sustainable recycling processes, incentivizing manufacturers to prioritize recycled aluminium in their supply chains.

The adoption of these innovative approaches for enhancing the recovery of high-pollutant powdered aluminium scrap brings forth significant environmental and economic benefits. By reducing the reliance on primary aluminium production, recycling conserves natural resources and mitigates the environmental impact associated with mining and extraction. Moreover, the reduction in pollutants in the recycling stream contributes to cleaner air and water, safeguarding both human health and ecosystems.

From an economic standpoint, efficient recycling of high-pollutant powdered aluminium scrap reduces production costs and enhances competitiveness within the aluminium industry. By extracting more value from scrap materials, manufacturers can optimize their resource utilization and improve overall profitability. Furthermore, the growth of a robust recycling infrastructure fosters job creation and stimulates economic growth in communities reliant on the aluminium sector.



Efficient recycling of high-pollutant powdered aluminium scrap reduces production costs and enhances competitiveness within the aluminium industry



The recovery of high-pollutant powdered aluminium scrap presents both a challenge and an opportunity for the aluminium industry. Through innovative technologies and methodologies, stakeholders can overcome barriers to recycling, paving the way for a more sustainable and prosperous future. By embracing these advancements, the industry can achieve its dual objectives of environmental stewardship and economic viability, driving towards a circular economy built on the principles of resource efficiency and conservation.

(Leading specialist and researcher, Dr Bhagyanathan is Associate Professor at Sri Ramakrishna Engineering College, Coimbatore)

FORM IV

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I, Amar Singh, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd/.

Date 10 / March / 2024

Signature of Publisher



From Left to right: Sanchit Jain (Director) Kamlesh Jain, (Chairman) Mayank Pareek (Managing Director)

JAIN METAL GROUP

Making sustainable growth future-proof

In its endeavour to broaden the scope of its metal recycling business, the Chennai-based Group expanded its canvas of operations. Eventually the dynamic group found itself not only at the forefront of the unfolding sustainability revolution, but also giving the Indian recycling industry the much-needed impetus, writes Ayyappan V.

Seeing is believing. It was during the visit of the Akam (Azadi Ka Amrit Mahotsav) delegation to the three plants of the Jain Metal Group in Chennai that one got to see the depth and breadth of the operations of the 75 decade old pioneer in non-ferrous metal recycling of the country.

Over the years the company that got started off as copper and brass utensils manufacturer had shed the trappings of a traditional family owned business stand metamorphosed into a sprawling business spread across happening recycling sectors of copper, lead and plastics. Today it is a professionally run and technologically advanced conglomerate that is married to sustainability and circular economy principles where zero waste, net zero etc are important indices of growth and well-being.

When asked about the challenges faced by the Group during its transformative journey, Group Chairman Kamlesh Jain said: "One of the major challenges was changing the mindset of quick returns from investments. But we had quickly realised that investments in environment friendly technologies might not give monetary returns, however, sustainability of industry lies in them. We also realised that investment in technology to enhance product quality and branding pays in the long run but make business robust for decades."

"The second challenge," added Mr Jain, who is the entrepreneur belonging to the third generation in lineage, "was to create an organisation with self-motivated team members and self-propelling systems and procedures."

Today, the Group stands tall and robust with three companies - Jain Resource Recycling Private Limited (JRR), Jain Recycling Private Limited (JRPL) and Jain Green Technologies Private Limited (JGT) - each with own claims to fame as a global supplier of recyclables, ever ready to feed the increasing appetite of development and growth in many of leading economies of the world.

The JRR, the flagship company of the Group, holds the position as India's leading producer of recycled lead ingots with an annual capacity of 150,000 tonnes. What needs highlighted here is that these ingots are listed on the London Metal Exchange.

Operating two plants, Jain Recycling Private Limited (JRPL) is another prominent division of the Group. While the one has emerged as the country's foremost producer of recycled copper products with an annual production capacity of 40,000 tonnes, the other focuses on recycling Polypropylene and Polyvinyl Chloride plastics, churning out more than 12,000 tonnes of plastic granules per year. It also helps the

JAIN RECYCLING PVT LTD

The Copper unit is located at Gummidipoondi, Chennai

CAPACITY: 42,000 MT / Annum

AREA : 10 Acres

Production of High-Quality Copper Raw Materials by Recycling Cable Scrap Production of Refined Copper Billets & Brass Billets from Copper Scrap

JAIN RECYCLING PVT LTD

The Plastic unit is located at Gummidipoondi, Chennai

CAPACITY: 12000 MT / Annum

AREA: 6 Acres

Production of Polyvinyl Chloride Pellets (PVC), Polypropylene Pellets (PP) by Recycling Plastic Scrap

JAIN RESOURCE RECYCLING PVT LTD

The Lead unit located at Gummidipoondi, Chennai

CAPACITY: 150,000 MT / Annum

AREA: 18 Acres

Production of Refined Lead & Lead Alloy Ingots by Recycling Battery Scrap & Lead Scrap

JAIN GREEN TECHNOLOGIES PVT LTD

The Alluminium unit located at Gummidipoondi, Chennai

CAPACITY: 36,000 MT / Annum

AREA: 4 Acres

Production of Alluminium Alloys in molten and ingot forms



As a pioneer in metal recycling in south India, how do you find the sectoral growth in the country over the years?

The growth of recycling industry in the country has been consistent over the past few decades. This is a natural growth which would always happen if economy is growing. However, I would not rate the growth of recycling sector in India to be phenomenal. In countries like China, recycling grew exponentially because of pragmatic Government policies to promote and nurture recycling industry fortified with effective implementation of such policies. We can see recycling industries booming in countries like Malaysia and Thailand over the past few years.

India has many positive factors for recycling such as cheap labour, well connected seaports, increasing generation of domestic scrap, etc. With right Government policies, recycling sector can grow tremendously contributing not only to the economy of the country but also to the environment.

Jain Group is one of the largest importers of scrap in the country. How has the art of procurement changed over the years? What are the important issues that you face on this front today?

I would say, it is not the change but adhering to the practices like highest degree of financial commitments and honest dealings with suppliers that have heled us buy large volumes of scrap from all the corners of the world. However, establishing overseas procurement offices surely contributed to strengthening of procurements.

The recent global trend about the scrap is that countries have started treating scrap as strategic resource and they do not wish to part with it. This approach is leading to export ban on scrap by many countries. The other issue is evolution of technologies which are reducing human dependence on scrap processing. This is giving an edge to opulent economies, who have traditionally been exporters of scrap, for processing the scrap inhouse rather than exporting.

Do these increasing legislative interventions and controls play spoilsport to serious recycling operations, which are already running on low margins?

Legislative controls and interventions are always not counter productive. They may contribute for growth of recycling industry and their right conduct. In India, unduly stringent rules for import of scrap disallowing imports of many types of scrap e.g. e-scrap, penalising a genuine recycler for GST evasion by previous sellers in the chain, etc. are discouraging.

> **With right government policies, recycling can grow tremendously in India**
>
> KAMLESH JAIN, Chairman

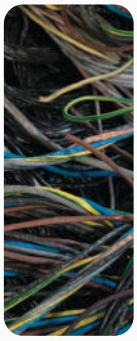
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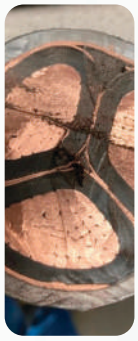
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Jain Metal Group is India's one of the most diversified business houses in the non-ferrous recycling domain. Founded more than 75 years ago, the group has interests in Lead, Copper, Aluminium and Plastics and is operating through 5 plants processing more than 200,000 MT scrap annually. All the group plants are ISO 9001, 14001 and 45001 certified.



ICW Cables



Lead Copper Cable



Al Copper Cable

- Marine Cable
- ICW Cables
- Steel/Al BX Cables
- Lead Copper Cables
- Al/Cu Cables
- Harness Cable
- Copper Negative Foil



Batteries



Soft Lead



Remelted Lead Ingots

- Battery Plates
- Car Batteries
- Soft Lead
- Wheel Weights
- Lead Shots
- Lead Strips
- Terminals
- Remelted Lead Ingots
- Shredded Range Lead



Zorba



Tense



Extrusion

- Al Tense
- Al Zorba
- Al Extrusion
- Al Taint/Tabor
- Alternators & Stators
- Small Motors
- Mixed Motors

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India has seen the entry of some big names into lead manufacturing through the recycling route. What is your reading into the development?

There are multiple factors contributing to new organised players coming into lead recycling. First, availability of lead scrap and lead acid battery scrap from both indigenous and international sources is growing consistently. Second, dominant presence of unorganised recyclers of domestically available lead acid battery scrap has been gradually receding and being taken over by organised sector. Third, recently promulgated Battery Waste Management Rule, extending producer's responsibility for safe recycling is also promoting organised recycling.

How do you plan to take on the competition in the market?

In growing economy, we would always have new players getting into the foray and peers growing. However, our own strengths pave way for the consistent growth.

Jain Resource Recycling (JRR) has its certain strengths which make it a strong player in lead recycling. Even with new players coming into lead recycling domain, JRR has constantly been growing at a CAGR of 40% over the past five year. It has very strong sourcing team including dedicated sourcing offices overseas. JRR has consistently been investing in technology focussed at environment friendly recycling and high quality products.

Are incentives a bane or curse for the sustainable growth of recycling?

Target driven incentives would, of course be a boon for recycling industry in the country. Incentives in the form of tradeable EPR points have already been introduced by the Government in the country. The need is to increase the horizon of EPR schemes and ensure strict enforcement. The Government should extend incentives on new capex in recycling sector. Incentives to recycling equipment and machine manufacturing companies too has a great potential for growth of recycling sector.

> **Our own strengths pave way for consistent growth**
>
> **MAYANK PAREEK,** Managing Director

Group to carry out end-to-end recycling of various types of plastic and waste generated as bye-product by group companies.

The third company, Jain Technologies Private Limited (JGT) specialises in the production of die cast aluminium alloys and is one of its leading exporters in India. JGT also supplies the product in hot molten form to the consumers, helping the Group to consolidate its foothold in industries such as automotive, aerospace, and manufacturing.

All the plants are ISO9001, ISO14001 and ISO45001 certified. The JGT plant is also ISO 14021 certified, white its Aluminum ingots are certified by the Bureau of Indian Standards (BIS).

"All our plants deploy the best of the available technology enabling it for recycling with minimum emissions. We carry out end-to-end recycling with zero landfill", informs the Group Chairman proudly.

Through the operations of the three distinct companies the Group has not only diversified its operation, each handling a specific type of metal to promote efficient and compliant processing and recycling, but also mitigated the risks associated with holding on to one large company.

The topline of the Group is over Rs. 4000 crores per annum. With all the plants equipped with advanced technology, the Group is highly focused on producing world class quality products through continuous improvements. The group's facilities including the country's largest



WHAT JAINS BUY

01 LEAD ACID BATTERY
02 BATTERY PLATES
03 PROCESSOR | SMELTER REFINER
04 LEAD PASTE
05 TERMINALS
06 SOFT LEAD
07 LED STRIPS
08 BOAT KEELS
09 WHEEL WEIGHTS
10 RANGE LEAD
11 LEAD SHOTS

automatic scrap battery breaker and cable scrap granulation machines, as well as specialized technology for recycling mixed plastic regrind. The Group has a large pool of employees, including over 800 women gainfully employed.

EXPANSIVE GROWTH

The Group is focused on expansion and growth based on strategies aimed at increasing production capacities and diversifying the range of metals recycled. It could be said that a key force behind the Group's continued success has been its foresight behind every expansion.

Since long, it has been regularly adding new scrap recycling lines, and adding up new verticals. The Group is aiming to expand its existing capacity of producing 12000 tonnes of lead ingots per month. To achieve this, the firm is set to enhance the integrated technological innovations to include high-end furnaces as well as processing equipment that would make the processes more efficient.

Presently, it is exploring and working on new projects such as producing copper cathodes through recycling, recycling copper from EV batteries, gold recycling, heavy mineral processing, and e-waste recycling.

Currently, the Group is venturing into a few recycling projects with the aim of both expansion and diversification. On the expansion side, the group is delving into recycling of copper from EV batteries and also manufacturing copper cathodes through the electrolytic recycling of copper scrap.

On the diversification side, the Group is entering to tin production, gold recycling and heavy mineral processing. The company is also involved in e-waste recycling projects. Some of these projects are being set up overseas to expand the presence of the Group globally.

According to the director, Jain Jr, the Group is also working on its next project of refining and recycling of precious metals. "Our precious metal refinery at UAE would be operational by May 2024. We are also working on an e-waste recycling plant. We are also pursuing another project of heavy mineral separation plant," he said without giving details.

The diversified and strategic approach to business of the Group is seen operationalized through the three companies, ensuring efficient and compliant processing of the metals.

By following zero landfill norms through comprehensive end-to-end recycling practices, it has also put into perfection a holistic approach to waste management.

In addition to its tech-led production capabilities, the Group given great importance to supply chain side of the business. It has deployed dedicated sourc-



After aluminium, copper, lead and plastics which is the commodity that the Group is setting its sights for expansion?

The Group is working on its next project of refining and recycling of precious metals. Our precious metal refinery at UAE would be operational by May 2024. We are also working on an e-waste recycling plant. We are also pursuing another project of heavy mineral separation plant.

You have a large supplier network with over 100 locations globally. In a such a context, how do you look at the emerging regulatory constraints?

Protectionist measures are posing challenges in sourcing the scrap. Such challenges can be overcome only by substitute sourcing from domestic sources. And this requires tremendous focus from the Government to promote purchase and recycling of domestic scrap by organised players and to eradicate the unethical low-cost unorganised sector.

As for CBAM and Carbon Tax mechanism are concerned, such measures have the potential to be a blessing in disguise for the recycling industry. Such mechanisms give credit and liberties to the industries which produce through environment friendly recycling and export to such regions.

Local recyclers are finding domestic collection a callenge. Do you feel the same?

There are three concerns we do face in the local market. We find it difficult to buy materials locally because the suppliers want to sell their scrap by waving the GST. Such a practice causes makes players to explore scrap from other regions.

The Indian market is known for reuse rather than recycling. Reusing old vehicles reduces the supply scrap in market... Our government did implement the ELV policy, however the implementation is not being done right. This has resulted in reusing scrap instead if recycling. This doesn't lead to building the circular economy.

Recycling in an organised way help generate green metal and it protects the environment. India needs to develop a policy around it. We need focus on making centralised units across the nation to collect scrap.

> **"Our precious metal refinery at UAE would be operational by May 2024"**
>
> SANCHIT JAIN, Director

ing teams in India and the USA, with a comprehensive supplier network spread across the globe in over 100 locations, to guarantee meeting the needs of the industry effectively and efficiently.

At Jain Metal Group, one could decipher a set of values that got validated over the years defining its every action. It is steadfast in its commitment to quality, innovation, sustainability, and ensuring customer satisfaction.

With a broad spectrum of input scrap, the Group is the largest processor of scrap in India and is producing more than 200,000 tonnes of world quality recycled products per annum. Presently, the Group is producing more than 150000 tonnes of lead ingots, the highest in India, most of which is exported.

"Adhering to the practices like having the highest degree of financial commitments and honest dealings with suppliers have helped us buy large volumes of scrap from all the corners of the world," he claimed.

Referring to the increasing competition in the market place, Mr Pareek is not worried, he said on a note of confidence: "In growing economy, we would always have new players getting into the foray and peers growing. However, our own strengths pave way for the consistent growth."



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A4 Mercantiles DIAL AAKRI FOR WASTE MANAGEMENT

Kerala based A4 Mercantiles's successful app is a talking point across the country for its effective implementation of all waste management

India, the IT powerhouse of the world, is home to the largest number of start-ups in the world. And the surprising fact is that there are a sizable number in Waste Management and Recycling related activities & projects.

Founded by G Chandrashekhar alias Shekhar in 2019, A4 Mercantiles has been successful in execution of waste management projects in the state of Kerala. It is a bootstrapped company which is backed by the Kerala Startup Mission. The company which started with an initial investment of Rs 30 lakh recorded a turnover of Rs 2.8Cr last year. This fiscal, it is set to clock a turnover of over Rs 3Cr. At present, the firm is engaged by five local bodies, including Kochi Corporation.

The app, Aakri, has become so popular that it overshadowed A4 Mercantile, the company it was born from. In actuality, the firm is presently referred to as or synonymous with Aakri, which meaning rubbish in the local Malayalam language.

According to Mr Shekhar, "I always wanted to do something which would improve the society. Our vision is to become the ultimate destination for the disposal of all types of waste, making it easier for everyone to contribute to a cleaner, greener future. Besides waste, our app is extensively used for collection of bio-medical waste in many municipal corporations in Kerala. States like Goa, Chandigarh are in discussions with a view to start operations shortly."

Since its inception, the start-up has consistently led the charge by developing sustainable waste management solutions,

earning a reputation for the pioneering work in environmental management, exceptional customer service, and unwavering commitment to sustainability. With a satisfied customer base over 1 lakh, the company stands as a prominent player in Kerala's waste management sector.

SUSTAINABLE GOALS

The United Nat`ions introduced 17 Sustainable Development Goals (SDGs) in 2015 to provide targets and indicators for broad global sustainability achievements. Aakri has been contributing to each of these goals since 2022 as it has refined its approach by aligning the goals with ten SDGs targeted.

Through responsible collection & disposal, Aakri reduces pollution, eliminates hazardous dumping, and minimizes the release of harmful chemicals into water. In the wake of the disastrous fire at Brahmapuram dump yard last March, Kochi Corporation is all praise for A4's services. The company has also been given permission by the city government to gather bio-waste from the 74 wards that fall under its purview. To establish sustainable recycling procedures, the Kochi Corporation is now evaluating Aakri's diaper recycling operation.

Besides Kochi Corporation, civic bodies of Thrissur, Calicut and Trivandrum have also issued work-orders for collection of bio medical waste in their wards. On an average, it collects 2 to 2.5 tonnes of biomedical waste from the Kochi corporation limits and another two tonnes from other corporations on a daily basis.

Three of Kerala's six municipal corporations — Kozhikode, Thrissur, and Kochi—have the Aakri application active.



MR. CHANDRASHEKHAR

> "On an average, we collect 2 to 2.5 tonnes of biomedical waste from the Kochi Corporation limits and another 2 tonnes from others on a dai-ly basis"

It will shortly begin operating in Kannur. By 2025, Aakri, which employs close to 60 people, hopes to generate 5000 job opportunities nationwide and 500 jobs in Kerala state.

Significant amount of waste has been diverted from landfills, recycled and channeled back into production systems, contributing to the principles of a circular economy.

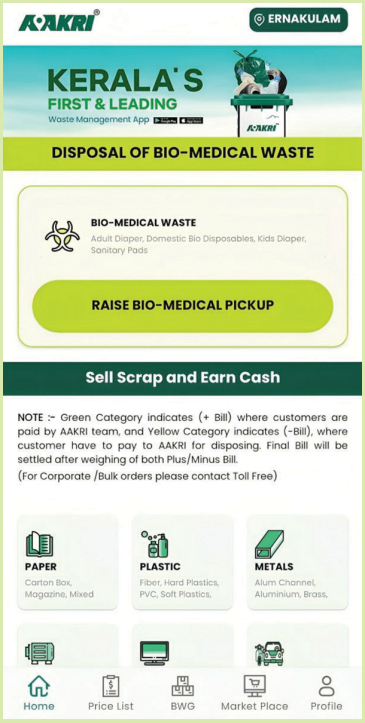
Aakri is a one-stop solution for all the pressing challenges of waste management today. Through its user-friendly app, Aakri helps to efficiently collect waste and biomedical waste from households, and transports it to collaborators like Kerala Enviro Infrastructure Limited (KEIL) for scientific processing.

It has plans to expand its biomedical waste collection services to the entire state of Kerala, and scale up the deployment of smart bins in the region. The firm has also planned to kick-off pan-India operations and get into B2B & B2C segments. The startup is also targeting

biomedical waste management sector has been a major concern in recent years, and that he had been working on developing a solution to address this issue. Mr Shekhar asserted, "Improper handling and disposal of waste can pose significant risks to public health and the environment. Unfortunately, unscientific methods



AAKRI: THE APP



Through the user-friendly app, Aakri helps to efficiently collect waste and biomedical waste from households and transports it to collaborators like Kerala Enviro Infrastructure Limited (KEIL) for its scientific processing.

"Aakri's EPR loop will allow industries to check whether their products have been channeled back into recycling or upcycling streams helping them to reduce their carbon footprint. Its innovative process will allow the companies to earn green credits," he informed.

Shekar has many plans to leverage the full potential of the app. "What we are using today is only a small percentile of its inherent potential for waste management. Going forward, Aakri will become a marketplace where bulk sellers can join hands with bulk buyers. It can help manufacturers meet their EPR targets through sustainable solutions, incentives from brands, and it could also sell eco- friendly products. "Marketplace by Aakri will be an online platform where buyers and sellers in the scrap industry can connect and trade. It will work like a platform to maximize the value of scrap materials, fostering reuse and recycling to enhance efficiency," said Shekar, adding "By transforming one company's waste into another's resource, we create economic opportunities for both parties."



are still followed in India, which can have severe consequences. These include open burning releasing toxic fumes in the air, harming human and animal health and environment; dumping in the open like landfills without proper segregation or treatment which can cause spreading of infectious diseases; and reuse of waste like gloves, syringes and needles which is illegal and can cause diseases."

The collection of biomedical waste will be facilitated through various online services, including a customer care toll-free number, a WhatsApp-based messaging service, and the My Kochi mobile application.

"As of today, Aakri's helps to collect approximately 4 tonnes daily, scaling up to an impressive 100 plus tonnes per month. This hazardous waste is meticulously managed by our well-trained staff, which employ yellow barcoded bags (compliant with Biomedical Waste Management Rules 2016) and utilize CNG and EV vehicles, adding a touch of sustainability to our operations," said Mr Shekar.

HOW AAKRI SUPPORTS SDGS

Aakri has been contributing to UN Sustainable Development Goals (SDGs). The start up is committed to action that provides the greatest contributions locally to affect positive change globally.

- Aakri's Zero hunger in association with FSSAI's (Govt of Kerala) 'Save Food, Share Food, Share Joy' initiative addresses the surplus food by channeling them from restaurants to the needy, thus combating hunger.
- Aakri's hazardous waste management enhances public health.
- Through responsible collection and disposal, Aakri reduces pollution, eliminates hazardous dumping, and minimizes the release of harmful chemicals into water.
- Aakri is expanding across Kerala, aiming to create 500 jobs within the state, and 10,000 job opportunities across India by 2025, catalyzing the transformation of a substantial informal sector into a formal one.
- Aakri plays a vital role in managing waste from domestic households and contributes to maintaining clean and hygienic urban spaces.
- Significant amount of waste has been diverted from landfills, recycled and channeled back into production systems, contributing to the principles of a circular economy.
- Its operations have led to a noteworthy reduction in greenhouse gas emissions and methane emissions from landfills.
- Through its clean beach campaigns, plastic recycling drives in coastal regions, Aakri has diverted substantial amount of plastic that would otherwise end up in the Arabian Sea.
- Aakri maintains soil health, reduces landfill impact, and promotes ecological restoration through responsible hazardous waste management.

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‘India cannot become the third biggest economy in the world without recycling’

At the just concluded 11th International Material Recycling Conference, **Amitabh Kant**, G20 Sherpa, got standing ovation for the spell-binding speech he delivered at the plenary session. We reproduce the relevant portion in order to underline its importance for those who might have missed it

India is the fastest growing large economy in the world today. We are growing at about 7.5%. We are a $4 trillion economy and according to the International Monetary Fund (IMF), by 2031 India will be a $ 10 trillion economy and it will be the third largest economy in the world surpassing Japan and Germany.

The government of India has initiated a vast number of structural reforms, from the Goods & Services Tax (GST) to the Insolvency & Bankruptcy Code, to the Real Estate Regulation Act, to the ease of doing business, to a whole range of digitisation measures. India has driven digitisation of its economy by providing a digital identity to every Indian, ensuring that we opened 550 million bank accounts and today India drives 46% of the real time fast payment transactions in the world. We do 120 billion fast payment transactions. China is next, with only 25 billion fast payment transactions. So you see the difference between what India has done in terms of digitisation. We are the number one in terms of smartphones. We are the number one in terms of data usage. We are the number one in terms of app downloads. But as we grow and advance, ladies and gentlemen, as we become the third largest economy, it's important that India becomes the first country in the world to grow and expand, not by polluting the world, but by being the first country in the world to make decarbonisation a reality.

When the Western world was industrialising and urbanising, they occupied the carbon space. Out of the 2800 giga tonnes of carbon space available at 1.5 degree centigrade, and 1.5 degree centigrade is necessary by 2050, because if we are not able to achieve this, the earth may survive, but the but we as human beings will go extinct.

Therefore, out of the 2800 gigatonnes of carbon space available, 2400 gigatonnes have already been occupied by the developed countries. In other words, 89% of the carbon space has already been occupied. There are only 400 gigatonnes of carbon space available for developing countries like India. Therefore, my view is that India must become a champion of the green economy. India must lead the world in growth, in prosperity and in decarbonisation.

When the issue came up for discussion during the G20 meet, India took the lead and became the driver of the Green Development Pact. The developed G7 countries of the world accepted Prime Minister Modi's leadership of the Green Development Pact which envisages the transition to renewables. However, even if we do generate all our electricity through renewables, that would still be only 20% of the energy. The rest of the 80% of the energy would be used in making steel, cement, long distance transport, refineries which are all energy consuming, but they all fossil fuel. Therefore, India needs to decarbonise these sectors.

The challenge before India is to produce renewables to green hydrogen and decarbonise sectors like steel, cement, fertiliser, long distance transport and refineries. We spend 200 billion dollars importing fossil fuel.

The Prime Minister spoke about two things in his Independence Day address. One is that India must become an exporter of green energy by 2047 instead of importing 200 billion worth of fossil fuel. Secondly, he said that India must drive the circular economy. Everything he has done, from Swachch Bharat to the Life Mission is all about the circular economy.

What has India done? In the last nine years, India has made 40 million houses. Making 40 million houses is like making a house for every citizen of Australia. We made 110 million toilets. It's like making a toilet for every citizen of Germany. We provided 243 million piped water connections to 243 millions citizens. It's like providing water connections to every citizen of Brazil. India has also made 88000 km of roads in the last nine years. It's important that all this is aimed at recycling.

We use the principles of Life, which is nudge behavioural change towards a circular economy. The Life principle is based on the philosophy of 'One Earth One Planet One Future' of 'Vasudaiva Kutumbakam'.

The International Energy Agency (IEA) based in Paris said that if India adopts circular economy and live up to the principles of Life, the world will save 21% of Green House Gas economy. Therefore it is very necessary that we drive India towards a circular economy.

To our mind, a circular economy is critical because if we look at India, in half a



century, since 1970 to 2020, India has witnessed a six-fold increase in its annual material consumption from 1.18 billion tonnes to 7 billion tonnes. This is expected to rise to 14.2 billion tonnes. By 2030, India will become the most populous country and its per capita income will probably be one of the largest.

India's resource extraction is 1580 tonnes per acre which is 251% higher than the global average of 450 tonnes per acre. The goods recycled in India is a mere 20% while in Europe it is 70% . With rising consumption there will be a huge material consumption and waste since India recycles very little. Therefore, transitioning towards a circular economy is the need of the hour. Without a circular economy, there is no growth.

If India will be a 10-trillion economy, one trillion dollar must come from the circular economy. Each one of you from the recycling industry must become a billionaire. The recycling industry cannot be driven by the government alone. It has to be driven by private enterprise. It needs many more people like Mr Sanjay Mehta (of MRAI), Mr Patwari (of Gemini Corporation) and Mr Bagaria (of GDB). Many of those who have done great work in Europe and the USA must come back and drive the circular economy mission in India.

This is necessary because we have over 400 million people residing in urban areas. We generate more than 62 million tonnes of municipal solid waste of which only 43 million tonnes get collected and only 12 million tonnes are treated. The rest of 31 million tonnes are dumped in landfills. This is expected to increase to 165 million tonnes by 2036.

"The biggest business opportunity for India is in recycling. The biggest opportunity for India is in circular economy. It's a trillion-dollar business and each one of you must aim to drive it and become the ambassador and champions of recycling"

So, imagine what will happen to these landfills in Mumbai, Delhi and Kolkata. We will have bad quality of air, adversely affecting the quality of life. Therefore, we need to invest in waste collection and recycling facilities.

I am truly delighted that there are a number of battery and e-waste recycling start-ups in India. Even though the Indian circular economy has grown and expanded because of the MRAI, it has attracted investment in several areas. My view is that there is a huge opportunity.

There are two critical sectors where we need a circular economy in a very big way -- one is the FMCG and the other is the automotive sector. They are vital for sustainable transformation because an alarming 70% of plastic packaging swiftly transforms into waste from the FMCG sector. Around 35 lakh tonnes per annum of plastic waste was generated in India in 2020 and this has only grown in the last three years. The auto sector which contributes 8% to India's GDP, generates 8 million tonnes of waste in the form of end-of-life vehicles per annum. Circularity in these two sectors could bring a huge opportunity for potential value of almost 65 billion dollars in the FMCG sector and 385 billion dollars in the automobile sector by 2030.

There are huge business opportunities and easy acceptance of circular products in the auto sector like vehicle over utilization and repair or extensive recovery and recycling of post-use material is critical. The average length of car ownership in India is 9 to 12 years compared to 7 years in the US. Thus India has a large market place.

I have been a great believer in the circular economy and my view is that it is multi-disciplinary in character. Therefore as CEO of NITI Aayog, on the direction of the Prime Minister, we had identified 11 areas to facilitate transition from a linear to a circular economy and give a huge impetus to India's AtmaNirbhar Bharat Abhiyan. We had identified 11 areas of municipal solid waste which was being led by the Ministry of Housing. We had identified scrap metal, ferrous and non-ferrous, to be driven by Ministry of Steel which I believe Mr Jyotiraditya Scindia has driven with great passion. We had identified electronic waste to be driven by the Ministry of Electronics and Information Technology, lithium-ion batteries to be driven by NITI Aayog itself, solar panels to be driven by MNRE, gypsum by the Department of Industrial (DPIIT), toxic and hazardous industrial waste by Department of Chemicals and Petrochemicals, used oil waste by the Ministry of Petroleum and Natural Gas, agriculture waste by Minis-

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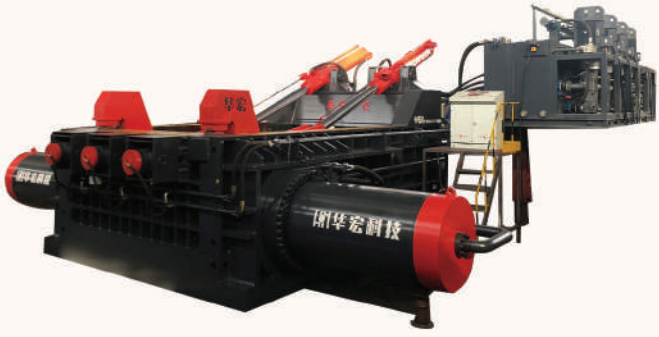
Q91 Hydraulic Scrap shear (400T~2000T)



QW hydraulic scrap shear (400T~1250T)



Y81 Hydraulic scrap baler (125T~3000T)



Q43 hydraulic metal shear (63T~600T)



PSX Scrap steel shredder line (600HP~6000HP)



Y83 Hydraulic briquetting press (250T~1600T)



BIR BMR ISRI MEMBER MRAI

try of Agriculture and Farmers Welfare, tyre and rubber recycling by DPIIT and the Ministry of Environment and end-of-life vehicles by the Ministry of Road Transport and Highways.

My view is that the MRAI should get after these ministries to ensure that these become fully circular because the Prime Minister's own will is behind this. In addition, we need to identify 10 more sectors in new areas. I was delighted that MoEFCC in 2022 introduced extended producers' responsibility for used tyres and batteries, and revised the rules for e-waste and plastics. The scrapping policy for end-of-life vehicles was also announced. Some of these policies may have short comings but we need to constantly improve them.

The BIS has developed standards for more than 25 secondary materials. The Jawaharlal Nehru Aluminium Research Development and Design Centre took forward the work in waste utilization in the non-ferrous sector.

The oil sector has been mandated to blend regenerated oil in lubricants and promote a circular economy. I totally agree that 30 to 35 percent of everything that the government purchases must be recycled material. Not only the government of India but also the state governments should take the lead.

I am delighted that states like Karnataka, Gujarat, Himachal Pradesh etc have adopted intense inclusive circular economy policies that actively involved industries, local bodies and communities. I am also delighted that Kerala took up the initiative to embrace a zero-waste model that involved decentralized waste management. Tamil Nadu's e-waste management collaboration with private sector for effective e-waste management has been very good and that Rajasthan set up its first of its kind integrated resource recovery park in Jaipur with technical support of GIZ.

Ladies and gentlemen, this is a huge opportunity. This is a huge sector for growth. This is a sector which is bound to grow and expand in the years to come. But what is important is that we must think of transition. This is not a purely environmental issue. This is a business opportunity. This is an economic opportunity for industrial and socio-economic transformation. This is an opportunity to provide jobs for millions of Indians. India cannot grow without jobs and recycling will give people jobs. I think you should keep telling every single ministry that if their aim is to create jobs, then recycling will provide the jobs.

“This is a huge sector for growth. This is a sector which is bound to grow and expand in the years to come. But what is important is that we must think of transition. This is not a purely environmental issue. This is a business opportunity”



According to me, there is no such thing called waste. All end-of-life products are actually raw materials. They are raw material for something else. There is no such thing called as waste. Therefore, resource efficiency and circular economy are mainstream to India's development. India cannot grow at high rates without recycling. India cannot progress without recycling. India cannot advance and create jobs without recycling. India cannot become the third biggest economy in the world without recycling. All this is important because the circular economy encourages us to move from linear to multi-lifecycle circle of the value chain.

Our past models of development have all been based on waste. Our future models must be on treating all waste as an input, as a raw material. This, to my mind, is the biggest opportunity for India. Our biggest opportunity does not, to my mind, does not lie in just producing mobile phones. It does not lie in producing vehicles. It does not lie in food processing. The biggest business opportunity for India is in recycling. The biggest opportunity for India is in circular economy.

It's a trillion-dollar business and each one of you must aim to drive it and become the ambassador and champion of recycling and help us in government to collaborate and partner with you to make India the world leader, the number one leader in recycling and of circular economy. I will be your champion, I will work with you, I will assist you, I will support you but list down 10 issues which must be taken forward and we must make India the No 1 country in the world in circular economy and recycling.

(Mr Kant is G20 Sherpa, Government of India during its Presidency year. He was the CEO of Niti Aayog and prior to that Secretary, Dept of Industrial Policy & Promotion)

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There has been a huge impact due to His Majesty King Charles' presence in UK's Circularity Task Force, which is visible with the kind of members who have joined it

There is an American environmental law called the US President's Inflation Reduction Act (IRA) of 2022, which has made it possible for American companies to sell their future credits to receive immediate funds.

Under the IRA, direct tax credits have been given to American companies ignoring World Trade Organization (WTO) rules, in the name of saving the environment. The amount which is expected to be invested under the President's Inflation Reduction Act (IRA) of 2022 is the single largest investment in climate and energy in American history, enabling the United States to tackle the climate crisis, advancing environmental justice and securing America's position as a world leader in domestic clean energy manufacturing.

The United States has come out with such a generous arrangement under the IRA that even if American businesses make losses, they are still eligible to get such tax credits and encash these into their bank accounts.

In the name of saving the environment, outdated WTO rules, rich countries to enact laws which protect their own trade and industry. They leverage green transitions as an excuse to boost their economies to hold back the growth of developing nations.

Notably, the USA is going to attract $1000 billion worth of investments through the IRA since this law allows substantial tax credits in the form of Investment Tax Credit and Production Tax Credit, which as high as 30% in some cases. This enables American businesses to not only receive tax credits when they execute projects, but also take loans against their future tax credits, since these credits are transferable.

As a matter of faith, a deal was recently closed by an American company called First Solar which sold its future tax credits called IRA Advanced Manufacturing Production tax credits worth $700 million, to a large listed fintech company called Fiserve Inc.

I recall very well how Amitabh Kantji had very rightly predicted that green hydrogen made in India would be available for one dollar per kilo. Just last week, I read that the Reliance group's green hydrogen cost is already in the range of one and a half dollars per kilo of green hydrogen. However, with the American tax credit of three dollar per kg, I wonder if India's existing Production Linked Incentive (PLI) would be able compete with our expectation of one kilo of green hydrogen for one dollar.

The USA's tax laws allow for substantial tax credits for waste. Can you imagine the impact the Indian waste industry will have on its growth if there is, for example, a 30% tax credit on all investment activities emanating from the waste industry? Can you imagine a situation if there is no GST on scrap similar to what is practiced in the European Union?

There are three million waste-pickers in India. How about no GST on waste collected by these waste-pickers, provided the payment is made by UPI? How about providing such huge tax credits for goods produced from waste? Why can't India enact such investment and production tax laws? Again, if India provides for such 30% tax credits or subsidies, our exports of goods produced from waste will increase many times over.

It would help India meet its national decarbonization target. It is worth remembering that India is committed to achieve a Net Zero emission target by 2070. Not only are such incentives essential for the growth of Indian industry but India is also under an obligation to use recycled products in ex-

‘For a ministry for scrap and resources’

The impassioned plea to introduce much needed support to the emerging recycling eco system in India by Surendra Borad Patawari received rousing welcome at IMRC 2024 Kolkata. Here are excerpts



ports to the European Union (EU) and the United Kingdom (UK), as per the Carbon Border Adjustment Mechanism (CBAM).

For instance, the plastic content of every article exported to the UK must have 30% recycled content. In the absence of such recycled content, importers will have to pay $250 per metric tonne.

As per the CBAM mechanism introduced by both Europe and the UK, importers will have to pay a carbon tax if they import into the EU and UK a product which is not subject to similar environmental regulations. The UK's implementation of the CBAM itself will result in an extra tax burden of 14% to 24% on exported materials worth Rs 7,000 crore.

The issue of carbon tax has had a huge impact on trade and industry. Under the Paris Climate Agreement, every country is obliged to make a time-bound commitment to the objective of net zero emissions.

Here, the point I want to make is that the recycling industry is one of the lowest hanging fruits for carbon reduction. This is why we have to guide, steer and cajole our Indian leaders and leading decision makers. I would recommend that the MRAI must form a very high impact task force similar to the Circularity Task Force (CTF) formed in the UK.

The idea of circularity has had a large impact on COP28 at Dubai. Out of the 391 C0P28 events, 70 events were focused on the circular economy.

Since the initiator of the CTF formed in the UK was somebody as influential as King Charles, the world has taken such an initiative very seriously. Due to His Majesty's support there has been a huge impact which is visible with the kind of members who have joined this task force.

I would like to say in the presence of Amitabh Kantji that it's the power of having such a godfather which gave us a lot of new ideas at COP28. Just because King Charles is associated with the UK's circular task force, the UK could manage a very highlevel meeting at COP 28's highest level and meet very influential people at Davos.

Such things give visibility and we must also have such an influential godfather. So how about having stalwarts like Ratan Tata as the godfather of a similar task force in India? Something like that would certainly have a huge impact on Indian industry.



Having stalwarts like Ratan Tata as the godfather of a similar task force in India would certainly have a huge impact on Indian recycling industry

The prime objective of MRAI's task force should be to persuade the government to designate a Ministry for Scrap Resources in India, just like the UK has done.

Conducting a Life Cycle Analysis (LCA) is essential to establish the credibility of recycling as a method to save CO2 emissions. This is because, in Europe, the Extended Producer Responsibility (EPR) price varies from $45 to $200. In the UK, it is around $60-$200. However, in contrast, the EPR price in India is almost single digit, which is less than $10.

The Indian government has very rightly rolled out EPR, but the price of EPR, particularly in plastic, is so low that the spirit of EPR has been defeated.

At the moment, EPR for plastic is $10 per tonne in India and I believe that EPR must at least cover the cost of external cost, which is the cost of collection. After all, how can you collect mixed plastics for just ten dollars?

Several times, at the World Economic Forum (WEF) at Davos and on other occasions, I had raised this point with global CEOs of brand owners like Coca-Cola, Pepsi and P&G. I told them that they must instruct their people to raise the EPR price because ten dollars is not a realistic price.

I learnt at Davos that the United Arab Emirates (UAE) is so forward looking that they have specifically created a Ministry for Artificial Intelligence. So we must appeal to Prime Minister Modiji to create a dedicated Ministry for Scrap and Resources in the same way the UK has done.

My appeal does not stop there. Are you ready for the next piece of my appeal? How about all of us requesting Modiji to appoint honorable Amitabh Kantji as India's Minister for Scrap and Resources? I personally guarantee and make a commitment that I will bring more than one million dollars from abroad if he is appointed to that post.

I would also like to repeat my appeal to do whatever it takes to get subsidies from the Indian government, similar to what American and European industries have received. India cannot allow itself to be overpowered by rich countries.

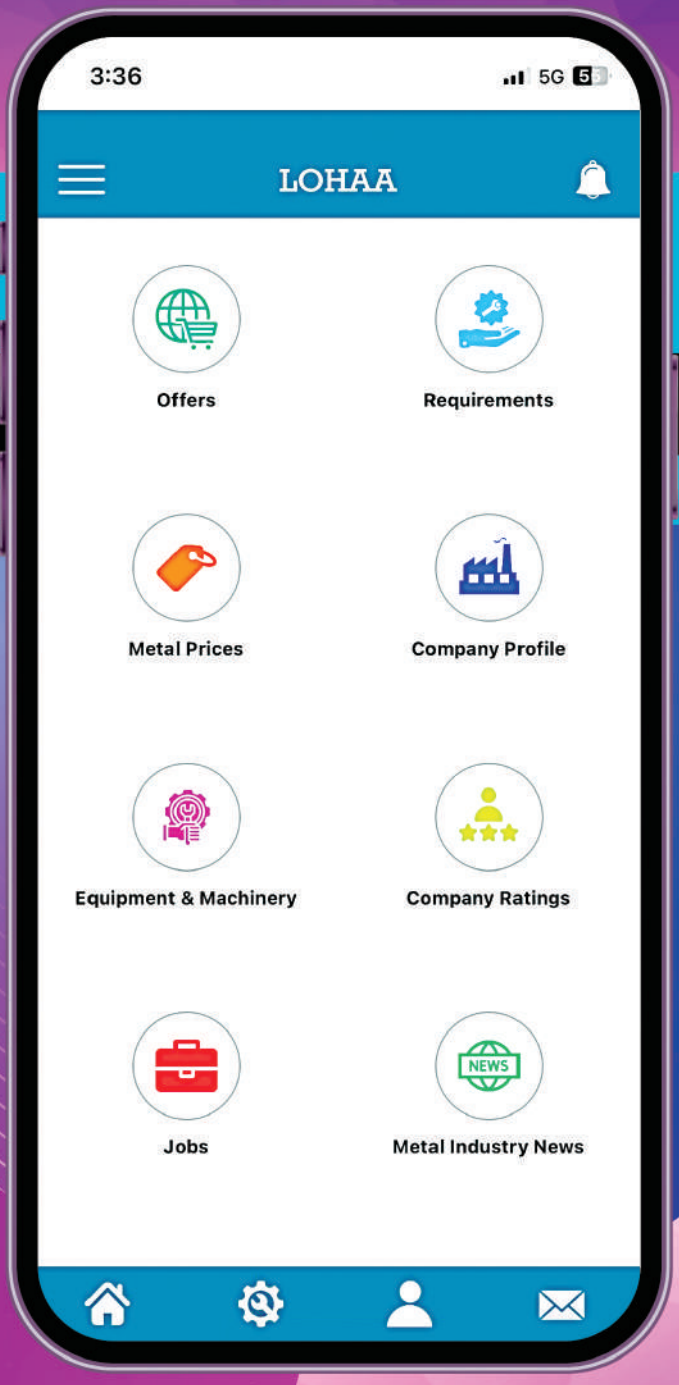
(An authority on plastic recycling, Mr Patawari is the founder and chairman of Gemini Corporation NV, Belgium)

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Given the importance of what Mr Patawari suggested, we invited stakeholder communities to respond to understand their take on the subject. Here we reproduce the thoughts of two leading industry players, an industry analyst and an academician



MIRIAM FALK
Principal Analyst, Fastmarkets

'Subsidies could also lead to trade tensions'

"While subsidies might offer temporary relief from CBAM and IRA, they could also lead to trade tensions and retaliation from other nations. Instead, a more sustainable approach that focuses on enhancing competitiveness and decarbonization would be prudent for the long-term health of the industry. Despite some progress, significant challenges persist for India's steel industry, especially in shifting away from traditional coal-based processes. The global steel raw material market is evolving with the adoption of alternative technologies like direct reduced iron (DRI) and hydrogen-based processes, changing demand for iron ore and coal. Additionally, a focus on recycling and scrap-based production to reduce emissions will increase demand for scrap steel.

To avoid locking in high-emission coal-based steelmaking for decades, it will be essential to retire old blast furnaces. However, the pace of decarbonization in the steel sector lags, with planned blast furnace capacity in China and India risking prolonged high emissions. Beyond subsidies, focusing on competitiveness and decarbonization will be key for continued growth in the Indian steel sector."



DR. SANDEEP VAKHARIA
Director, Aashumi Chemicals P. Ltd.
Hon. Secretary, Bombay Non Ferrous Metals Assn Ltd

'Subsidy will make the industry dependent'

The concept of subsidy is a failure which we must learn from the farm subsidies. If the subsidies never go away, the participants become too dependent on them and their aspirations increase so the demand for subsidies will also increases over time.

The recyclers in India have existed for generations and have never taken a subsidy to do what they do. The passion for their work in them is immense and they have always managed their affairs reasonably well.

If any encouragement to environment friendly recycling should be there, it should be through EPR – Extended producer responsibility and MRC (Minimum recycled content, which is an impetus for the recycling industry.

Giving cash incentive in the form of a subsidy would be detrimental



JAYANT JAIN

Director, Guru Rajendra Metalloys India Pvt Ltd and G.R. Metalloys Pvt Ltd

'Support and subsidies are required'

First of all, India is a growing country. The consumption of all materials been low as compared to the other developed countries of Europe, USA and China. So due to low consumption, the Recycling Industry had not matured in India as in the above countries. The new technologies which had been invented for processing of secondary materials are very expensive. European countries give hefty subsidies on buying the same. So when it comes to Indian recyclers, there is a set back because of it. It's the urgent need of hour that the Governmnet of India provide the following, in addition to take certain other policy decisions to boost the Recycling Industry.

1. Subsidies on purchase of recycling machinery around 30 to 50% of total cost (domestic / international)
2. Subsidies on cost incurred for setting of recyling plant and secondary production plant
3. Removal of Custom Duty on all scrap materials forever
4. Review the Free Trade Agreements with other countries and ensure that finished goods don't come to India duty free
5. The Govt should give incentives to the owner of end of life goods when he gives his scrap to a recycling yard. This will help boost local recycling also.

to the cause of recycling, as the industry is prone to manipulations and adjustments for monetary benefits and it would damage the basic fabric of the industry. Besides, it would be a burden on the national economy.

The Indian government has taken the necessary steps in both cases of EPR and MRC. But it needs to be preceded with a comprehensive policy for recycling in all commodities which will enhance the industry which is employing so many people. As the basic infrastructure and manpower are in place, it need support and a proper policy.

I think the doctrine recommended subsidy, as a counter to the IRA 2022 will not be successful here. The best way to encourage environment friendly recycling is through EPR and MRC as outlined earlier. The government is on the right track but only it need more practical resolve than theoretical knowledge in their policies. India will rightfully gain its position as the most accomplished recycler in the world.

'Have both challenges and opportunities'



GOTTMYERS MJ

Research Scholar

One immediate effect of subsidies would likely be an increase in domestic production. For example, aluminium. The lower production costs would make India more competitive in both domestic and international markets, potentially leading to an expansion of capacity and increased market share. This could boost employment and contribute to economic growth.

However, the 'Patawari Doctrine' has the following challenges and potential drawbacks.

- Sustainability of such subsidies in the long term.
- Subsidies could also strain public finances, aggravate budget deficits, and distort market dynamics.
- Prolonged reliance on subsidies could foster a culture of dependency among industries, stifling innovation and productivity in the long run.
- Implementation of the subsidies could invite backlash from international community.

To overcome these problems, adept diplomacy and strategic engagement are necessary to protect India's interests.



Bankey Goenka, managing director at Pashupati Group and Sanjay Mishra, general manager, engineering thermoplastics & performance polymers at SABIC, exchange the documents after signing the MoU

PASHUPATI JOINS HANDS WITH SABIC TO AUGMENT PLASTICS RECYCLING

LEADING plastics recycling Pashupati Group has signed a Memorandum of Understanding (MoU) with Sabic, a global chemical industry player to bolster recycling initiatives in India. The pact signifies a concerted effort to enhance local recycling prospects and broaden SABIC's worldwide network of recycling collaborators.

According to pact, both entities will exchange expertise and best practices across diverse stages of plastic material reuse. The collaboration aims to augment processing techniques, leveraging both virgin and recycled polyolefins to create compounded and non-compounded end products. Pashupati Group's proficiency in mechanical and chemical plastic processing will complement SABIC's strengths in marketing and selling recycled goods.

The pact includes an innovative recycling project aimed at converting used plastic into pyrolysis oil. SABIC plans to utilise this oil to produce certified circular polymers, mirroring the performance attributes of virgin plastics. Such initiatives are pivotal in propelling India's plastics economy towards circularity, fostering sustained collaboration to address the escalating demand for recycled polymers.

This partnership follows SABIC's successful collaboration in 2021 with HHI, a Malaysian plastic recycling firm, which yielded polymers used in manufacturing products like the Microsoft Ocean Plastic Mouse.



Shri Scindia flagging off India's transformative journey towards a greener economy through steel

JG CHEMICALS GETS LISTED AT THE STOCK EXCHANGE

MARCH saw another member from the stable of MRAI, got listed at the country's premier exchange, Bombay Stock Exchange.

When the Kolkata-based JG Chemicals offered its shares in its maiden initial public offering (IPO), it got an encouraging response.

Priced in the band of Rs 210-221 apiece, JG Chemicals ended the first day of the bidding with over 2.45 times bidding, while day two with 6.4 times subscription.

According to the data, the investors made bids for 9,09,50,892 equity shares, or 11.13 times, compared to the 81,68,714 equity shares offered for the subscription by 12.45 pm on Thursday, March 07.



Anirudh and Anuj Jhunjhunwala ring the bell at Bombay Stock Exchange, marking the listing of their company shares

Ahead of its IPO, JG Chemicals raised Rs 75.36 crore from anchor investors as it allocated 34,09,818 shares at a price of Rs 221 apiece.

Even though the company shares listed at a discount on the offer prices when it got listed on March 13, industry analysts are confident of its potential in the future.

A NEW DAWN FOR STEEL SECTOR

ON March 4, 2024, Union Minister for Steel and Civil Aviation, Jyotiraditya M. Scindia, inaugurated India's 1st Green Hydrogen Plant in Stainless Steel Sector located at Jindal Stainless Limited, Hisar.

The event marked a milestone that would pave the way for sustainable steel production in the country. The project would be the world's first off-grid Green Hydrogen plant for the stainless steel industry and the world's first Green Hydrogen plant with rooftop and floating solar

The Minister urged stakeholders to enthusiastically adopt clean technologies, and actively participate in India's transformative journey towards a greener economy.

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Landfills
THE HIDDEN CHASM

A recent US study on landfill methane reports significant 'misalignment' between models and real-world conditions

Methane is considered a "superpollutant" because its warming power once emitted to the atmosphere is about 80 times stronger than carbon dioxide over a 20-year time span.

Landfills are currently estimated to be the third largest source of methane emissions in the US, according to the EPA's Inventory of Greenhouse Gas Emissions and Sinks. But that estimate is based on models that take a bottom-up approach to estimating landfill emissions, including studies on the decomposition of various waste streams and the efficiency of landfill gas collection systems.

A recent survey of more than 250 landfills across 18 states in the US has found that 52% of them had detectable methane plumes, thereby casting doubts on existing estimates.

The study, conducted by satellite monitoring nonprofit Carbon Mapper and partner organizations, is "the largest airborne or ground-based survey of U.S. landfills to date," according to its authors.

The emissions were charted via aerial surveys, and flyovers were repeated at the same landfills over the four-year study period. The study adds to the growing list of evidence that current modelling practices for landfill methane may underreport emissions.

"It suggests that there is a misalignment" between the models that underpin governments' understanding of landfill gas emissions today and what their true emissions are, Dan Cusworth, Carbon Mapper program scientist and lead author on the paper, was quoted in an interview.

The U.S. and dozens of other countries have identified methane emissions reduction as a key lever to meet near-term climate goals and prevent tipping points in the earth's climate system.

To achieve that goal, the Biden administration released documents laying out steps regulators and industry players can take across major methane-emitting sectors to reduce emissions 30% by 2030, compared with 2020 levels.

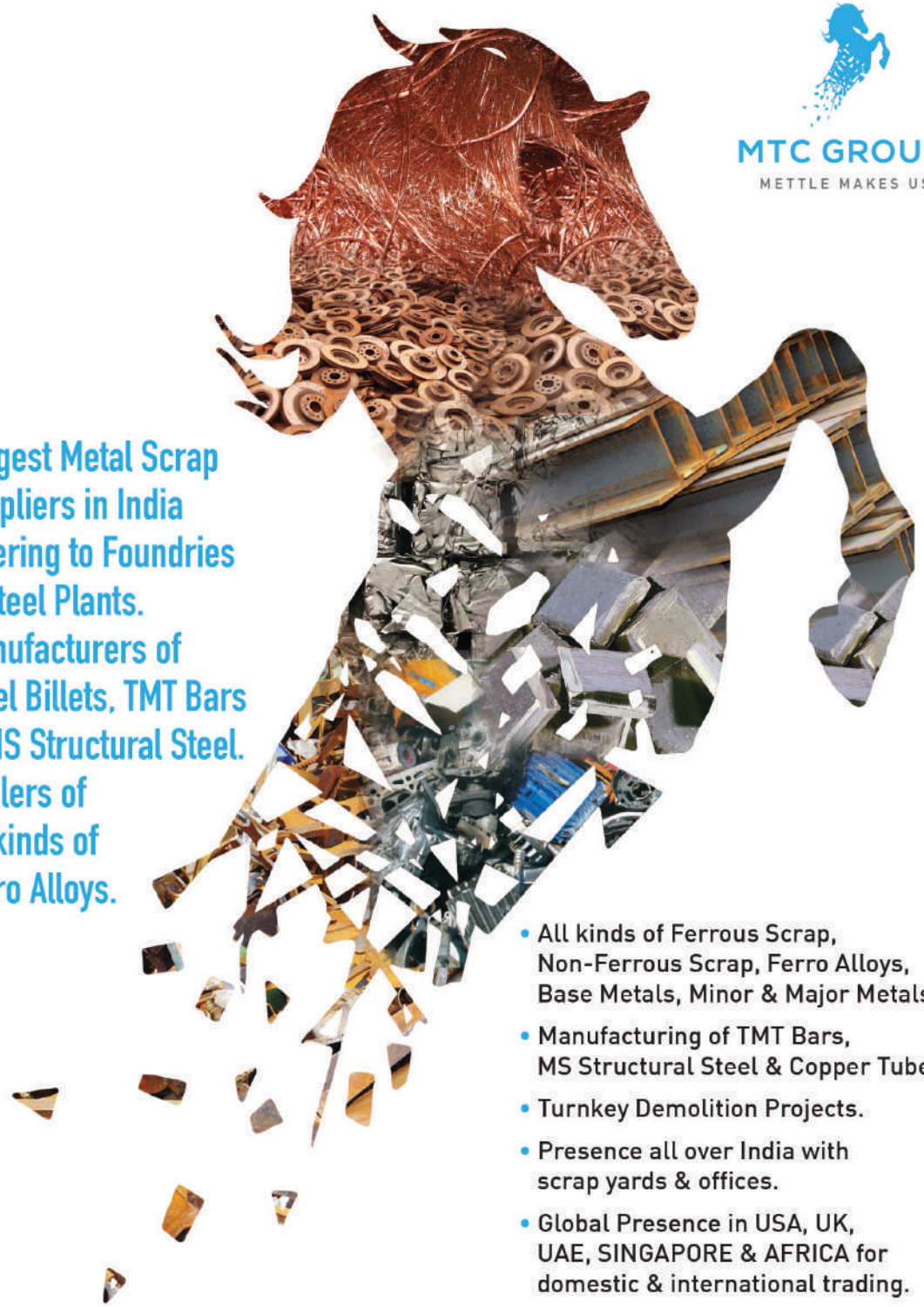
The study determined a "a large discrepancy and generally poor correlation" between what scientists observed and widely used estimates of emissions. The authors note that there could be "systematic issues with the models that underpin reporting programs."

The study presents the case for more aggressively addressing methane plumes in landfills. It noted that the oil and gas sector overall most likely emits more methane and has more infrastructure in the U.S. But the study found that 60% of the methane point sources identified persisted for months or years, which is far more common than typical super-emitting events in the oil and gas sector.

"I certainly am optimistic that there are solutions that exist today that can be implemented to mitigate the issie and to collect the gas," Mr Cusworth said.



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PLASTIC RECYCLING

Gravita India starts plant in Tanzania

Recycling company Gravita India has kicked off the commercial production of recycled polypropylene granules at its new plastic recycling facility operated by its subsidiary in the East African country of Tanzania, the company has officially announced.

Gravita's plastic recycling plant in Tanzania has an annual capacity of nearly 1,800 Million Tonnes Per Annum (MTPA). The company has invested an amount of almost Rs 2.25 crore for the procurement as well as commissioning of the new recycling plant. This investment has been sourced made from the internal accruals of the company, stated Gravita India.



The leading recycling major already has similar plastic recycling facilities across Africa in Ghana, Senegal and Mozambique. For the new plant in Tanzania, Gravita India will obtain domestic plastic scrap for production purposes, and the end products will cater to requirements of plastic manufacturing industries located in Asia and Europe.

The plant in Tanzania will help the company to change its sales mix by increasing the contribution from plastic business, said Gravita in an official release.

E-WASTE RECYCLING

Blue Planet raises $35M for India operations



Blue Planet Environmental Solutions recently secured a 35 million US dollar funding round from the impact investor The Investment Fund for Developing Countries (IFU).

Madhujeet Chimni, Founder and Chairman of Blue Planet, stated that IFU's investment would drive substantial impact in their pursuit of a sustainable and comprehensive waste management platform. The focus would fortify efforts in landfill bio-mining and e-waste recycling in India.

The company aims to reclaim land and resources from garbage dumps, reintroduce materials into the supply chain, and reduce reliance on virgin resources, thereby curbing greenhouse gas emissions.

WASTE TO WEALTH

Oil India, Guwahati Municipality to collaborate to transform MSW into compressed biogas

Oil India Limited (OIL) and Guwahati Municipal Corporation (GMC) have signed a Memorandum of Understanding (MoU) to transform municipal solid waste (MSW) into compressed biogas (CBG).

The MoU has been described as a shared commitment to environmental conservation, efficient waste management and the generation of clean energy.

Leveraging the expertise of both OIL and GMC, this initiative aims to contribute significantly to the reduction of carbon footprint.

Researchers from the Waste Management Research Group (WMRG) at the Indian Institute of Technology - Guwahati have developed a new approach to assist municipal corporations in managing organic waste.

The novel two-stage biodegradation technique, which combines Rotary Drum Composting with Vermicomposting (RDVC), was said to result in an efficient and environmentally friendly process.

It was noted that this technique was also used to produce a nutrient-rich soil conditioner from invasive aquatic weeds like water hyacinth.

The process was explained that municipal solid waste deposited in open dumpsites often contains over 50% organic material, generating substantial heat due to long-term decomposition. This not only poses environmental challenges but also hinders the achievement of sustainable development goals.

Compared to other waste biodegradation techniques that require 2-3 months, RDC can convert diverse organic feedstocks into nutrient-dense compost within just 20 days and significantly reduce the municipal waste volume by 60-70%.

ELV RECYCLING

'Haryana to roll out vehicle recycling incentive policy'

Deputy Chief Minister Dushyant Chautala announced the implementation of the Haryana Registered Vehicle Scrap and Recycling Incentive Policy 2024, aiming to promote recycling and create employment opportunities for the youth.



The policy focuses on retrieving intrinsic value from End-of-Life Vehicles (ELVs) through reuse, recycling, and recovery, contributing to a circular economy. Chautala emphasized the need to remove old and unfit vehicles in an organized and environmentally friendly manner, aligning with the central government's Motor Vehicles (Registration and Functions of Vehicles) initiative.

The policy, aligned with the 2023-24 budget announcement, aims to provide incentives for vehicle scrap recycling and rejuvenation. Chautala highlighted the policy's goal to transition towards electric vehicles, addressing the global need for sustainable transportation and reducing environmental pollution.

PET RECYCLING

Coca-Cola India teams up with Reliance

Coca-Cola India and India's largest retailer, Reliance Retail, have launched a sustainability initiative for PET container recycling through reverse vending machines and collection bins called titled "Bhool Na Jana, Plastic Bottle Lautana," according to a press release.

The project aligns with the government's Swachh Bharat Mission and has been launched in 36 Reliance Retail stores including Smart Bazaar and Sahakari Bhandar stores in Mumbai as well as Delhi. It will be expanded to 200 stores across the country by 2025 with a target of collecting 500,000 PET bottles annually in the pilot phase.

The disposed PET bottles will be collected as well as recycled by Reliance Industries, which recycles polyester and plastics. The collection of PET Coca-Cola bottles will be done using Reverse Vending Machines (RVMs) and collection bins.

As part of the initiative, RVMs and collection bins will be installed at participating stores, providing consumers with a convenient method to deposit used PET bottles.

In return, consumers will receive attractive discounts on Coca-Cola India products. The collected PET bottles will be responsibly managed and recycled by Reliance Industries (RIL), a leader in polyester and plastics recycling.

This initiative aligns with Coca-Cola's global commitment to collect and recycle the equivalent of 100 per cent of the packaging it produces, as part of its 'World Without Waste' strategy.

It builds upon the success of Coca-Cola India's 'Return and Recycle' initiative in collaboration with Zepto, engaging 50,000 households in India and installing RVMs across 75 cities, successfully collecting 1 tonne of PET waste.

The collaborative effort aims to reinforce sustainability practices, encourage responsible waste management, and contribute to a cleaner environment.

CAN RECYCLING

EU aluminium beverage can recycling hits a record level

The total amount of aluminum recycled from cans had reached a record level of 570,000 tonnes, reflecting an increase of 60,000 tonnes compared to the previous year, according to industry figures. This accomplishment represents a significant reduction in Greenhouse Gas (GHG) emissions of 4.7 million tonnes of CO_2eq, equivalent to the annual GHG emissions of a European city with over half a million inhabitants, such as Antwerp or Poznan.

Members of Metal Packaging Europe, representing beverage can manufacturers, and members of European Aluminium, representing aluminum suppliers, expressed satisfaction with the higher recycling rate observed at the European level. They noted that this



reflected continuous efforts across the industry and supply chain to enhance recycling practices. However, it was pointed out that certain EU Member states still face challenges in achieving recycling rates of 90% or higher. The industry advocated for more ambitious separate collection targets for beverage containers, including aluminum beverage cans, as outlined in the proposed EU Packaging Regulation.

Commenting on the industry's progress, Krassimira Kazahska, CEO of Metal Packaging Europe stated that he was proud of the latest achievement since he believed the industry was on the right path towards 100% circularity of aluminum beverage cans by 2050. He emphasized the recyclability of aluminum as a "permanent" material, stating that it was capable of undergoing multiple recycling cycles without compromising its inherent properties.

WATER RECYCLING

California to transform sewage into pure drinking water



California is set to adopt regulations that will allow for sewage to be extensively treated, transformed into pure drinking water and delivered directly to people's taps.

The Metropolitan Water District (MWD) plans to start direct potable reuse as part of its Pure Water Southern California project, building a $6-billion facility in Carson that is slated to become the USA's largest water-recycling project. The regulations will enable what's known as "direct potable reuse," or putting highly treated water straight into the drinking water system.

It's scheduled to deliver its first treated water by 2028. Initially, the supplies will be used largely to replenish groundwater basins for later use. By 2032, MWD officials plan to be producing 115 million gallons of purified water a day. The water will go through various stages of treatment, passing through activated carbon filters and reverse-osmosis membranes, as well as undergoing disinfection with ultraviolet (UV) light, among other treatments.

The technology is similar to the process used for desalinating seawater, but recycling wastewater requires less energy and is less costly than turning saltwater into freshwater. Costs for purifying wastewater will probably be about half those of desalinating ocean water.

Recycling more wastewater brings other environmental benefits, reducing the amount of treated effluent that flows into coastal waters.

Direct potable reuse also is suited to coastal areas, he said, because the reverse-osmosis treatment, like a desalination plant, generates brine that can be discharged offshore.

Building wastewater purification plants is expensive and it's likely to be years before Californians drink the treated water. Yet, Los Angeles, plans to pursue direct potable reuse as part of investments in recycling more wastewater.

PASTICS RECYCLING

US becomes net importer of plastic scrap

The United States became a net importer of plastic scrap in 2023 for the first time, according to Houston-based commodities consulting company Independent Commodity Intelligence Services (ICIS).

According to ICIS, the USA's recycled-content reprocessors saw a 33 percent increase in imports of polyethylene terephthalate (PET) scrap compared to 2022.

Looking ahead, the ICIS has predicted that the US will increasingly rely on imports of flake feedstock not only due to cost considerations but also to support the expansion of plastic recycling capacities amid stagnant domestic plastic collection rates.

ICIS has noted that while certain relationships in the plastic scrap trade, such as those within North America (Canada, Mexico, and the US), remain robust, other connections, particularly with Asia, notably in PET plastic scrap, are strengthening.

Data from the US Census Bureau for the full year illustrates a continual rise in plastic scrap imports, indicated by the harmonized system (HS) code 3915. In 2023, imports surged by 5 percent year-on-year, totaling over 446,700 metric tonnes.

These plastic scrap imports encompass various forms, including used bottles and other recycled feedstock like purge, leftover pairings, and now flake material.

Despite the significant import volumes, ICIS points out challenges facing recycled-content plastic production in the US. Particularly, many plastic grades used for cost-sensitive applications, such as construction materials or durable goods packaging, are experiencing reduced demand due to the influx of low-cost virgin material flooding the market.



Even grades used in consumer packaging are confronting weakened market conditions, with customers shifting towards imported recycled resin, according to the ICIS.

The ICIS has also observed a trend where recyclers purchase inexpensive spot or imported recycled PET (rPET) flake to produce food-grade pellets, diverting internally produced flakes from high-cost domestic bale feedstock to sell directly to customers.

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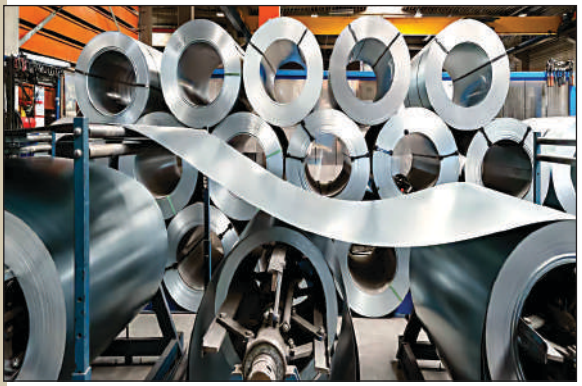
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SCRAP USAGE

Steel majors to ramp up scrap-based steel production



Indian steel companies like JSW, ArcelorMittal Nippon, Tata Steel etc have announced plans to augment prouction. ArcelorMittal Nippon plans to establish steel scrap processing centres across the country, while Tata Steel is setting up electric arc furnace (EAF)-based recycling plants. JSW Steel's plant in Dolvi plant will also use scrap steel as its feed.

As part of Arcelor's plan to reduce emission intensity by 20% by 2030, the global steelmaker aims to increase scrap use to around 10% by 2030 from 3% to 5% currently. The company has also set out plans to establish several steel scrap processing centres across the country to participate in a circular economy for steel.

In September 2023, JSW Steel increased its stake in NSL Green Steel Recycling Ltd to 100%, acquiring joint venture partner New Zealand's metal recycler NSHL's 50% stake. The primary objective of NSL is to establish scrap shredding facilities in India, starting with a plant in Khalapur, Maharashtra, which would supply scrap to JSW Steel's plant in Dolvi in the form of baled or bundled scrap. The project is slated for commissioning in FY25. The steelmaker plans to replicate it at other steel plants.

Tata Steel's first EAF plant is coming up in Ludhiana with a capacity of 0.75 million tonne (MT). The steelmaker will set up similar furnaces in other parts of the country as part of its plan to increase domestic manufacturing capacity to 36 metric tonne a year.

Tata Steel has commissioned its first steel recycling plant of 0.5 metric tonne at Rohtak, Haryana, in collaboration with Aarti Green Tech Ltd, under a build-own-operate partnership. The facility is equipped with a shredder, baler, and material handler among others. The scrap is being procured from various market segments.

TEXTILE RECYCLING

Epson to recycle fabrics with dry fiber technology

Epson and Hong Kong Research Institute of Textile and Apparel Limited (HKRITA) have signed a joint development agreement to create an innovative dry fiber recycling solution. Through this collaboration, textile products that are difficult to recycle will be recycled with special 'dry fiber technology' to extend their lifespan. It is also aimed to meet the increasing global need for recycled fibers with this technology.

Currently, a machine called a garnett is widely used in the textile recycling process to separate the fibers in waste material. However, garnetts cannot effectively separate the fibers of some of the most common textiles in the clothing market, such as tightly woven fabrics used for dress shirts and bed linen, and elastic blended fabrics used for functional garments. Epson aims to solve this problem by using dry fiber technology to create a process to separate the fiber of elastic blended fabrics and tightly woven fabrics.

This solution will help to greatly accelerate the use of recycled fibers by making it possible to separate fibers from challenging textiles such as functional garments, linens and dress shirts, as well as from factory mill ends, unsold pieces of clothing and unwanted fabrics. The company aims to implement this technology as soon as possible.

Independently developed by Epson, the enables the creation of new value from post-consumer paper, wood, clothing and other fibrous wastes and used products.

ALUMINIUM RECYCLING

Novelis signs 100% renewable energy contract for its German plants



Novelis Inc, a leading sustainable aluminum solutions provider and a world leader in aluminum rolling and recycling, has announced that it has signed a green power purchase agreement (PPA) with Statkraft, Europe's largest producer of renewable energy.

The PPA will cover the extensive part of up to 40% of the electricity used at two major Novelis manufacturing plants in Germany, Nachterstedt Recycling and Nachterstedt Rolling, which corresponds to around 16% of the company's total German electricity consumption.

The PPA will run for 10 years and will provide Novelis with renewable electricity of around 58 GWh per year, sourced 100% from German wind and solar installations. Starting delivery on March 1, 2024, the PPA will decrease carbon emissions from Novelis' electricity consumption.

Emilio Braghi, Executive Vice President of Novelis Inc. and President of Novelis Europe, expressed satisfaction with this development, emphasizing its significance in advancing Novelis' sustainability objectives.

He noted that the initiative not only enables the company's plants to power a substantial portion of their production with renewable electricity but also contributes to reducing carbon emissions and conserving natural resources.

TYRE RECYCLING

UK Tyre Recovery Association appreciates Indian EPR norms

The Tyre Recovery Association (TRA) in the UK has expressed approval for the Indian Extended Producer Responsibility (EPR) Controls, according to recent developments. The Automotive Tyre Manufacturers' Association (ATMA) in India has highlighted the substantial environmental challenges posed by the large-scale export of end-of-life tyres (ELTs) from European nations, particularly the surge in waste tyre imports from developed countries to India.

Recent data indicates that India imported approximately 1.3 million tons of waste tyres in the 2023-24 period. Anshuman Singhania, Chairman of ATMA, expressed concern over India's import of around 800,000 tonnes of scrapped tyres between April and November 2023, with the UK identified as one of the major exporters of ELTs to India.

In response to the situation, India's Central Pollution Control Board (CPCB) proposed a categorization system based on color coding to enhance compliance and encourage the adoption of new technology. The pyrolysis sector was categorized as orange, indicating a need for improvement in licensed plants and stricter regulation to curb highly polluting practices.



The TRA has welcomed the collaboration between ATMA, CPCB, and the Ministry of Environment, Forest and Climate Change in India to address these environmental concerns. Peter Taylor OBE, Secretary General of the TRA, highlighted the inadequacy of the UK government's response to calls for tighter export controls. He emphasized the need for the UK to update its regulatory framework and ensure that only shredded tyres are exported, following successful models like Australia's.

Taylor underscored the urgency for action, stating that the UK government has the necessary tools to address the issue under existing rules but lacks the will to do so. He criticized the current practice of exporting waste tyres to India, which undermines domestic recycling efforts and contributes to environmental harm.

Furthermore, Taylor emphasized that the export of tyres to illegal operations constitutes a breach of The Basel Convention, and the UK government should take decisive action to address this issue and support India's efforts to combat environmental abuses.

The TRA has called for stronger measures to control the export of waste tyres and urged the UK government to prioritize environmental responsibility and compliance with existing regulations.

WASTE TO ENERGY

Toyota company converts waste into electricity

Toyota Chemical Engineering, a division of Japanese vehicle maker, Toyota Corporation, has unveiled a recycling method that can transform 'green waste' into energy, without the need for traditional incineration processes that contribute to CO2 emissions.



The process involves combining 'green waste', water, sawdust, and shredded paper in a high-pressure machine. These materials are then liquified and transferred into a "methane fermentation vessel," where microorganisms ferment the mixture, converting it into methane gas. This methane gas is utilised as fuel to power Toyota's chemical plants, demonstrating a closed-loop system that minimizes environmental impact.

To showcase the effectiveness of their process, Toyota Chemical Engineering used expired lunch boxes to demonstrate the technology. The waste, along with sawdust, shredded paper, and other garbage, was processed into a liquid using high-temperature, high-pressure water, resembling a massive pressure cooker.

The resulting liquid was then pumped into the methane fermentation vessel, where microorganisms converted it into methane gas, which served as a sustainable fuel source to generate electricity.

While Toyota acknowledged that some form of incineration is still required in its waste disposal process, the company has ensured that the CO2 emitted during this process was captured and used to power its facilities, effectively reducing its carbon emissions output.

WE WELCOME OUR NEWLY JOINED MEMBERS DURING THE MONTH OF FEB. 2024

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5	Devmeta Industries LLP	Gandhinagar	Gujarat	Mr. Sujitkumar Dineshkumar Patel, Partner
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8	Larush Asia	Gudur	Andhra Pradesh	Mr. Devendra Nandikolla, Managing Partner
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Indian Import of Non-Ferrous Scrap

(Updated on 08/03/2024)

		Quantity in Thousands		Values in Rs. Lacs	
HS Code	Description	DEC 2023 (F)	APR-DEC 2023 (F)	DEC 2023 (F)	APR-DEC 2023 (F)
740400	COPPER WASTE AND SCRAP	26,858.00	2,52,180.71	1,26,541.64	11,05,251.55
760200	ALUMINIUM WASTE AND SCRAP	1,59,654.05	14,17,802.82	2,56,973.13	23,32,029.12
790200	ZINC WASTE AND SCRAP	6,369.40	49,545.70	11,116.20	90,675.55
780200	LEAD WASTE AND SCRAP	9,140.51	72,542.58	15,923.57	1,21,945.37
750300	NICKEL WASTE AND SCRAP	295.82	3,358.08	2,041.38	29,784.66
	TOTAL	**2,02,317.78**	**17,95,429.89**	**4,12,595.92**	**36,79,686.25**



Indian Import of Ferrous Scrap

(Updated on 08/03/2024)

		Quantity in Thousands		Values in Rs. Lacs	
HS CODE	DESCRIPTION	DEC 2023 (F)	APR-DEC 2023 (F)	DEC 2023 (F)	APR-DEC 2023 (F)
720421	WASTE AND SCRAP OF STAINLESS STEEL	1,20,335.01	10,61,350.26	1,34,049.78	13,11,059.13
720410	WASTE AND SCRAP OF CAST IRON	21,108.75	1,41,432.33	7,937.59	53,594.02
720429	WASTE AND SCRAP OF OTHER ALLOY STEEL	22,485.37	1,65,429.36	13,288.68	99,727.38
720430	WASTE AND SCRAP OF TINNED IRON OR STEEL	-	305.21	-	113.55
720449	OTHER WASTE AND SCRAP (HMS,SHREDDED ETC.)	10,96,879.14	69,85,406.69	3,90,769.60	25,67,862.69
720450	REMELTING SCRAP INGOTS	-	-	-	-
	TOTAL	**12,60,808.27**	**83,53,923.85**	**5,46,045.65**	**40,32,356.77**

Indian Import of Paper Scrap

(Updated on 08/03/2024)

		Quantity in Thousands		Values in Rs. Lacs	
HS CODE	DESCRIPTION	DEC 2023 (F)	APR-DEC 2023 (F)	DEC 2023 (F)	APR-DEC 2023 (F)
47079000	OTHR INCL UNSORTED WASTE AND SCRAP	3,21,710.28	33,54,639.74	44,861.58	4,74,488.81
47071000	WSTE AND SCRP OF UNBLECHD KRAFT PAPR OR PAPRBORD OR CORGTD PAPR/PAPRBORD	1,85,333.80	17,52,872.30	27,326.28	2,44,509.45
	TOTAL	**5,07,044.08**	**51,07,512.04**	**72,187.86**	**7,18,998.26**

Indian Import of Plastic Scrap

(Updated on 08/03/2024)

		Quantity in Thousands		Values in Rs. Lacs	
HS CODE	DESCRIPTION	DEC 2023 (F)	APR-DEC 2023 (F)	DEC 2023 (F)	APR-DEC 2023 (F)
39011010	LINEAR LOW DENSITY POLYETHYLENE (LLDPE)	18,784.27	3,63,863.80	15,899.82	3,02,181.75
39012000	POLYETHYLENE HVNG A SPCFC GRVTY 0.94 /MORE	1,65,413.15	15,58,392.23	1,43,163.12	13,67,900.30
	TOTAL	**1,84,197.42**	**19,22,256.03**	**1,59,062.94**	**16,70,082.05**

Source: *Ministry of Commerce Export Import Data Bank*



Indian Export of Non-Ferrous Scrap

(Updated on 08/03/2024)

		Quantity in Thousands		Values in Rs. Lacs	
HS CODE	DESCRIPTION	DEC 2023 (F)	APR-DEC 2023 (F)	DEC 2023 (F)	APR-DEC 2023 (F)
740400	COPPER WASTE AND SCRAP	4,076.51	11,350.18	18,486.14	58,034.58
760200	ALUMINIUM WASTE AND SCRAP	1,125.32	6,337.90	1,803.43	10,068.74
790200	ZINC WASTE AND SCRAP	0.00	2.92	1.38	13.70
780200	LEAD WASTE AND SCRAP	-	1.50	-	1.10
750300	NICKEL WASTE AND SCRAP	86.68	1,533.04	1,004.10	18,394.30
	TOTAL	**5,288.51**	**19,225.54**	**21,295.05**	**86,512.42**

Indian Export of Ferrous Scrap

(Updated on 08/03/2024)

			Quantity in Thousands		Values in Rs. Lacs	
HS Code	Description	DEC 2023 (F)	APR-DEC 2023 (F)	DEC 2023 (F)	APR-DEC 2023 (F)	
720421	WASTE AND SCRAP OF STAINLESS STEEL		226.93	2,270.87	706.19	6,557.02
720410	WASTE AND SCRAP OF CAST IRON		55.28	2,604.99	21.83	992.13
720429	WASTE AND SCRAP OF OTHER ALLOY STEEL		76.22	677.80	23.55	481.34
720430	WASTE AND SCRAP OF TINNED IRON OR STEEL		-	37.63	-	14.21
720449	OTHER WASTE AND SCRAP (HMS,SHREDDED ETC.)		116.28	749.03	61.97	497.90
720450	REMELTING SCRAP INGOTS		-	12.18	-	8.27
	TOTAL		**474.71**	**6,352.50**	**813.54**	**8,550.87**

Source: *Ministry of Commerce Export Import Data Bank*

Indian Export of Paper Scrap

(Updated on 08/03/2024)

		Quantity in Thousands		Values in Rs. Lacs	
HS CODE	DESCRIPTION	DEC 2023 (F)	APR-DEC 2023 (F)	DEC 2023 (F)	APR-DEC 2023 (F)
47079000	OTHR INCL UNSORTED WASTE AND SCRAP	-	4.62	-	3.27
47071000	WSTE AND SCRP OF UNBLECHD KRAFT PAPR OR PAPRBORD OR CORGTD PAPR/PAPRBORD	0.50	1.06	0.18	0.45
	TOTAL	**0.50**	**5.68**	**0.18**	**3.72**

Source: *Ministry of Commerce Export Import Data Bank*

Indian Export of Plastic Scrap

(Updated on 08/03/2024)

		Quantity in Thousands		Values in Rs. Lacs	
HS CODE	DESCRIPTION	DEC 2023 (F)	APR-DEC 2023 (F)	DEC 2023 (F)	APR-DEC 2023 (F)
39011010	LINEAR LOW DENSITY POLYETHYLENE (LLDPE)	6,767.51	29,039.66	5,803.36	27,068.17
39012000	POLYETHYLENE HVNG A SPCFC GRVTY 0.94 /MORE	17,903.09	1,17,729.11	14,366.91	97,672.66
	TOTAL	**24,670.60**	**1,46,768.77**	**20,170.27**	**1,24,740.83**

Source: *Ministry of Commerce Export Import Data Bank*

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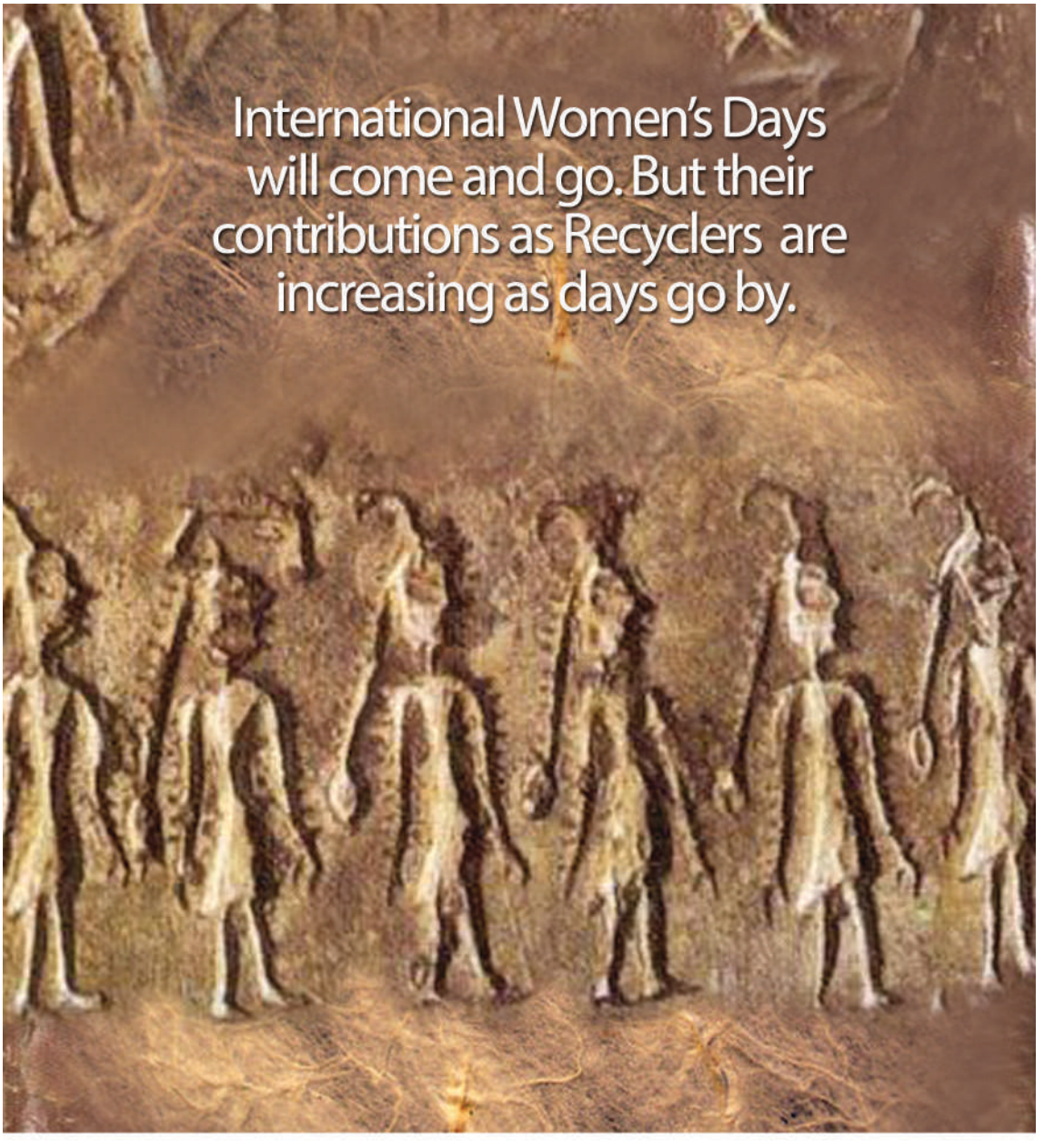
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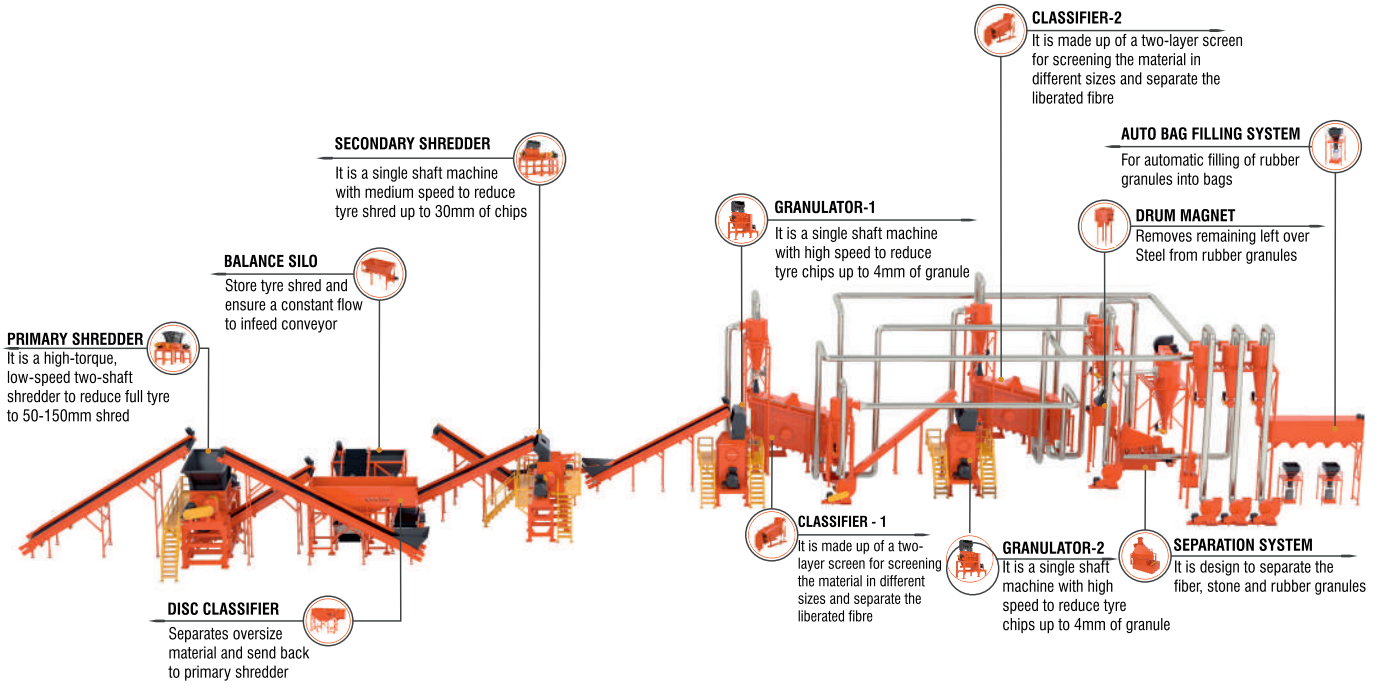
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