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April 2022

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Sakuntala, Editor & Publisher

The goods of today are the resources of tomorrow at yesterday's resource prices

Biodiversity is our natural circular economy engine that promotes a balanced economic system. The balance of the natural world, however, is threatened by unsustainable, linear economic patterns, which imperil our biodiversity.

The global market for steel scrap is expected to reach almost 630 million tonnes by the end of the year, growing to around 750 million tonnes by 2026. The volatility in ferrous scrap markets is tied to Russia's invasion of Ukraine and subsequent sanctions, which continue to create direct effects and side effects still rippling into new parts of the global pond.

India's new scrap policy has raised several market concerns ranging from a surge of mixed metal (unprocessed) scrap flowing into the country to challenges of setting up recycling centers. The scrapping facilities that the policy aims to build could increase India's capacity to process mixed metal

scrap and lead to greater flows of mixed metal imports into the country. The policy projected that India will need to set up about 70 scrap processing centers in the country to meet a current deficit of about 7 million mt. Each center should have a processing capacity of about 100,000 mt/year, which will require about 300 collection and dismantling centers on the presumption of the four collecting and dismantling centers. The country's scrap sector should be considered an essential industry. The non-essential category afforded to the recycling sector has resulted in scrap collection being badly affected during India's Covid-19 lockdown. There are around 20,000 enterprises involved in India's recycling sector, directly and indirectly employing 250,000 people. Indian steel scrap supply amounted to 25 million tonnes in the country's 2018-2019 fiscal year, according to its Ministry of Steel. The ministry expects supply to rise to 38-39 million tonnes by 2024-2025. In 2024-2025, India hopes to import just 1 million tonnes of steel scrap.

The flagship recycling policy seeks to give far greater organization to India's scrap collection sector, which until now lacks uniform standards in both collection and quality matters. Boosting scrap based steel production is a global trend. Incidentally, EAFs have a share of 70% in the US steel production. Scrap use is also very high by steelmakers in Turkey and the European Union. The practice of recycling is fast catching up with steelmakers in Japan and South Korea.

What about China which plans to bring its greenhouse gas emissions to a peak in 2030 and then become carbon neutral by 2060? The country's National Development and Reforms Commission has said EAF use of steel scrap will rise to 320 MT by 2025 from 260 MT in 2020 that curbed use of 410 MT of iron ore.

TERI has given the warning that unless corrective measures, including use of scrap are taken on an urgent basis, CO₂ emissions by the Indian steel industry will rise to dangerously high 837 MT from the present 242 MT.

Our country desperately needs a development model that ensures optimum utilization of resources. With an ever-rising population, swift urbanization, environmental pollution and climate change, India must speed up its effort to adopt a circular economy. The scope of the Circular economy is not only confined to reversing environmental crisis; it also seeks to create job opportunities across key sectors, thereby imparting more value to the economy. There is concern among the OEMs and manufacturers that adopting a Circular economy may lead to compromised ROI. However, that is not the case as the government strives to help companies with tax incentives promote a circular economy. Since the Circular economy revolves around the notion of expired recycling products, it held manufacturers accountable for accumulating waste generated by their products.

Sustainable development seeks disruptive transformations in the way our businesses and societies are organized. The circular economy model facilitates an opportunity for innovation and synchronization between natural ecosystems, businesses, our lifestyle, and waste management. Though the circular economy in our nation is at a nascent phase yet, most industries have stepped forward to expedite their effort in adopting the same. This is helping the government to create Social Innovation in the way we reuse and recycle our precious resources.

S. Chanda

Sakuntala Chanda

Metals recycling: The way forward

By Ritwik Mukherjee

The global metal recycling market is heading northward. It is expected to reach \$88.18 billion by 2028, at a CAGR of 10.72% from 2021 to 2028, according to Reports and Data, the US-based market research and consulting company. A report by MarketsandMarkets, another US-based research and market intelligence consultancy, suggests that the metal recycling market is projected to grow from \$52.1 billion in 2019 to \$76.1 billion by 2025, at a CAGR of 7.8% from 2020 to 2025. Some other industry analysts project even higher growth figures. For instance, according to Valuates Reports, the global metal recycling market size was \$217 billion in 2020 and is expected to reach \$368.7 billion by 2030, registering a CAGR of 5.2% from 2021 to 2030.

Whatever may be the actual size of the market in 2028 or 2030, what is clearly foreseen is steady and substantial growth in the medium term. Growing urban population and infrastructure creation for their requirements and for industrial purposes are the key factors that have propelled the growth of the metal recycling market globally. The high, strong growth projected can also be attributed to increasing awareness of the importance of resource conservation and waste management. Metal recycling actually is one of the fastest-growing industries in the world and one of the most important ways to preserve the environment.

Importance of metals

Metals are natural resources that can be put to several uses. Metals may be used for industrial purposes such as the manufacture of vehicles, airplanes, ships and railways, factories and machinery, construction, packaging and storage, and even to produce domestic-use items such as cutlery, refrigerators and washing machines. The most important benefit of metals is that, without altering its characteristics, they can be recycled again and again.

Metals are of two types – ferrous and non-ferrous. As the nomenclature suggests, ferrous metals are those that contain iron (Fe). Cast iron, stainless steel, carbon steel, engineering steel, wrought iron, etc., fall into this category. Non-ferrous metals – that do not contain Fe – include the likes of aluminium, copper, lead, nickel, tin,

titanium and zinc, as well as copper alloys like brass and bronze. The end use of a metal is determined by the ability of its properties to suit the application.

However, historically, man discovered non-ferrous metals before the use of iron. In the chronicle of human development, the Copper Age follows the Stone Age. Then came the Bronze Age. The Iron Age, resulting from the use of iron, is dated around 1200 BC.

Metal scrap

As per industrial terminology, 'Scrap metal is the combination of waste metal, metallic material and any product that contains metal that is capable of being recycled from previous consumption or product manufacturing.' Large scrap markets exist all over the world feeding hundreds of industries using metal scrap as input material for manufacturing different products. Steel is the most recycled material in terms of tonnage in the world, since it is 100% recyclable. Considering the magnetic properties of steels, the sorting of ferrous metals from non-ferrous metals is often simpler and less expensive than sorting various plastics.

Some non-ferrous metal products that contain a component of iron or steel are considered as scrap steel. This material comes from various sources – manufacturing waste or defectives that cannot be sold as products by steelworks, old cars, end-of-life ships or containers, and even buildings that have been demolished. Another source of steel scrap is used steel cans that may have contained food, drinks, paint, aerosols, etc.

Recycling methods

Mind you that metal recycling is a method as well as the foundation for a strong industry. Recycling of scrap metal includes the recovery and processing of scrap metal from end-of-life products or structures as well as from manufacturing scrap, so that it can be used as a raw material in the manufacture of new goods. With no loss in its properties, it can be recycled repeatedly. Since the early ages of metalworking, scrap metal has been salvaged and reused. Metal recycling is extremely useful from both an environmental and an economical point of view.

The metal recycling process goes through a number of stages. The process can be an integrated one or involve

a whole supply chain.

First is collection, which differs from that of other materials because of the higher scrap value of metals. Material that cannot be recycled is mostly sent for landfilling. Next comes the task of sorting, involving separation of metals of value from the mixed scrap. For this operation, automated recycling systems often use magnets or sensors that identify materials by colour or weight.

Once the separation is complete, the metals are shredded and then melted in furnaces. To the melted metal recyclers add chemicals or minerals to free the material from impurities and contaminants. This purification is often commonly done through electrolysis.

The purified, melted metal is then cooled and solidified into various forms such as sheets, blocks or ingots and bars that can be easily transported for sale to producers of metal goods.

Metal recycling has assumed a significant role in industrial development today due to its dual core benefits of reducing environmental degradation and energy conservation.

Sectors driving growth

Metals have been a ubiquitous presence in our lives for long, and despite the equally speedy rise of plastics as a popular-use material for modern lifestyle needs, metals continue to rule our lives mainly due to the properties of durability, strength, and of course recyclability that they possess. Today, there are several sectors that are paving the way for rapid growth in the demand for recycled metals. The construction industry, for one, is booming, driving the demand for metal recycling.

Construction industry: The construction industry (buildings and infrastructure) requires huge amounts of metal. This creates a constant need for recycled metals, which helps sustain the recycling industry. It is estimated that the construction industry is responsible for 40% of the world's consumption of iron, steel and aluminium. There are more than 1 million active construction sites in India alone. This number has been growing steadily since 2010, which means that more metals will be required to keep up with this growth.

Auto sector: Then there is the automobile industry, which is also a huge consumer of metal. It takes a lot of metal to build the frames, engines, chassis and other parts of both passenger cars and heavy vehicles like trucks, trailers, etc. This means the automotive industry is one of the biggest drivers of demand for recycled metals. In fact, going by a recent study, a vehicle today is reused and recycled at an average rate

of 80% by weight. Of that, 65% to 70% corresponds to its metallic components while the rest (10% to 15%) corresponds to the parts that are dismantled and reused or recycled. Aluminium prices are up nearly 50% since 2009, while steel prices are up about 25%. This has helped increase profits for recyclers, as well.

Defence sector: Recycling of metals is becoming more and more important for the defence and aerospace industries as they work to reduce their environmental impact and high costs of production. The defence and aerospace sector is finding new ways to use recycled metal in its airplanes, jets and other products. The demand for recycled metals in the aerospace sector is increasing at a rapid pace due to a rise in global air traffic, a growing focus on reducing carbon footprints and stringent government regulations.

According to recent reports, more than 40% of new aircraft models are designed with at least 50% secondary aluminium content. This helps manufacturers reduce costs, as well as their environmental footprint. It is estimated that if all aircraft built in 2020 used 50% secondary aluminium content, it would have saved over 320,000 metric tons of carbon dioxide from entering the atmosphere. With continued innovation and growth in this sector, we can expect to see even more benefits in the years to come.

Consumer electronics sector: With demand for consumer electronics growing continuously, recycling of high-value and rare-earth metals has also grown apace. Most people are unaware of the number of metals that are used in electronic devices and the volume of discarded materials they produce. Cell phones, laptops, tablets and other gadgets contain a variety of metals, including gold, silver, copper and aluminium. When these devices reach the end of their life cycle, it is important to recycle them properly to avoid harming the environment. Specifically designed recycling centres process electronic scrap by breaking it down into component parts. Perhaps only 12.5% of e-scrap is currently recycled globally. For every 1 million cell phones that are recycled, more than 35,000 pounds of copper, 772 pounds of silver, 75 pounds of gold and 33 pounds of palladium can be recovered.

Metal recycling industry segments

It is pertinent to mention here that the global metal recycling market has been segmented based on type, equipment, end-use sector and regions. The type segment is divided into non-ferrous and ferrous. The ferrous segment held the largest market share of around 58.5% in 2020 owing to high use of scraps and their recycling rate.

The equipment segment includes shredders, shears,

granulating machines and briquetting machines. The shredders segment held the largest market share of around 27.6% in 2020 because they are widely used for reducing waste to standard shapes and sizes to separate and process further.

The end-use sector segment includes building & construction, automotive, equipment manufacturing, shipbuilding, packaging, consumer appliances and others. The building & construction segment is anticipated to grow at the highest CAGR of around 11.5% over the forecast period because the need to reduce the effect of mining metals on the environment has promoted the usage of recycled metals in the building & construction sector.

Green initiatives propelling growth

We also have to give a lot of credit to the various green energy initiatives being taken worldwide and the thrust being laid on policy formulation by international forums and blocs to reduce use of fossil fuels for energy consumption, for pushing up the demand for recycled metals. With the growing demand for green energy, recycling companies can actually boost their bottomlines by selling metal and other materials to local and global markets. There are many benefits associated with recycling old products, such as reducing waste, saving space in landfills, reducing air pollution from incinerators and providing jobs for people who would otherwise be unemployed due to lack of work opportunities or poor economic conditions. There's also an environmental benefit because less raw material needs to be extracted, which means fewer trees need to be cut down or virgin minerals and metals to be excavated. By using recycled materials, industries can help keep valuable resources out of landfills while also reducing their emissions.

Bottlenecks

While it is true that growing concern about the increasing depletion of natural resources has prompted governments in many countries to introduce favourable policies for the metal recycling industry – which is further propelling the demand for metal recycling – the high process cost is acting as a key restraint for global market growth in this industry. Costs are rising, right from collection and sorting of scrap which still remain highly labour-intensive operations in many countries, to slow supply of raw material to transportation – blunting the edge of a high potential industry. In a study released by the UN Environmental Programme in 2019, it was found that “less than a third of the crucial 60 metals studied in the report have an end-of-life recycling rate above 50%, and 34 of them have a recycling rate of below 1%”.

Steel recycling in India

While in the US, it is lead that is the most recycled metal, in India the focus of recycling remains on iron & steel since it appears to have the strongest potential for growth, given that the country is the second largest producer of steel in the world. In 2021, India produced over 118 million tonnes (mt) using a total crude steel production capacity (2020-21) of 143.91 mt. The government is providing a host of incentives and has taken a lot of initiatives to increase the level of steel consumption in India. The National Steel Policy itself sets a target of achieving 300 mt of steel production by 2030-31, and use of steel scrap is expected to play a big role in the fulfilment of this goal as well as reduce CO₂ emissions.

However, available data suggests that use of scrap for steel production in India is presently limited to only around 30 mt. Despite there being a plethora of sources for metal scrap – including end-of-life vehicles and consumer goods along with discarded construction material – to feed electric arc furnaces (EAFs) that are crying for want of cheap raw material, India still imports millions of tonnes of steel scrap!

The Indian government has already, however, formulated a steel scrap recycling policy, which is expected to raise the availability of scrap from domestic sources substantially, if implemented in the right spirit. Some units to process steel scrap from old vehicles have been announced as well as a steel recycling plant by renowned companies, but these are operationally not yet gung-ho.

Making steel scrap available from readily available sources within the country by putting together required infrastructure and supply chains would not only cut India's import bill but, in fact, prepare the ground for the country to become a net exporter in a not-too-distant future, besides contributing to greening the environment. Not only would there be energy savings, steel production through the EAF route using scrap would significantly reduce the use of iron ore, metcoke and other minerals, all of which are high-cost items today, with global supply lines knotted due to the war in the European theatre. In fact, steel production through the EAF route using scrap as input material is becoming increasingly popular across the world with an aim to reduce emission of greenhouse gases and use of water.

It remains to be seen how quickly recycling becomes the process of choice in India for the benefit of industry and the common man and, of course, our long-term sustenance.

MRAI envisions India as a green superpower by 2030

9th IMRC held in New Delhi discusses future roadmap

By Steel Scenario Bureau

India currently imports six million tonnes of scrap steel due to a domestic demand-supply gap. Organised metal recycling is one direct solution that would to a great extent address the issues of metals scarcity, cost pressure, and logistical constraints that are the main cause of the inadequate local availability of steel scrap.

As the nomenclature suggests, metal recycling is the process of extracting different kinds of metals of value from waste metal products for reuse as input material for new products. Waste metal sources could range from a small can of cola to a scrapped motor vehicle as big as a trailer truck that has reached its end of life. Precious and even rare-earth metals are often extracted from as mundane objects as used electric batteries, old engines, or even broken rear-view mirrors of cars. There are many advantages to recycling metal, including environmental benefits as well as energy savings. Metal recycling is an established industry globally.

The Material Recycling Association of India (MRAI) organised its 9th IMRC conference in New Delhi in the first weekend of May 2022 to address the growing concerns relating to the existing steel scrap demand-supply gap, the huge future recycling potential of batteries of electric vehicles, investment opportunities, and to discuss the roadmap for making India a green superpower by 2030. Steel Scenario journal was the official Media Partner of the event.

The conference was held at a key juncture when the Indian eco-system is turning towards e-mobility and people are looking for answers about battery recycling or the correct way to dispose of e-waste. It was also an initiative to create awareness and spread knowledge about recycling various materials and its benefits.

'Making India a Global Recycling Hub' was the key issue at the event. "Recycling remains at a low while waste products are growing in volumes. The business prospects for the future are correspondingly high. As of now, only select items like batteries, metals, plastics are being recycled, but with changes in policies and regulations, India can create ample opportunities for India to be a hub for recycling. Eleven committees have already been formed by the Niti Aayog in this regard. And the Steel Ministry has asked steel blast furnace makers, primary producers like Tata, Jindals, SAIL, AMNS, etc. to use more scrap. So, we are looking at a positive future," informed Mr. Sanjay Mehta, MRAI President, in his address at the conference.

At the conference, industry experts explored various topics in panel discussion sessions such as Indian E-waste Industry – Time to Synergise; Circular Economy – The way

forward; ELVs – The road ahead; Decoding the Secondary Steel Market; A Paradigm Shift: BIS Standards; and many others related to recycling of non-ferrous and non-metals like plastic, paper and e-waste. Secondary steel manufacturers are playing a vital role in making India *atma nirbhar* in the steel sector. The secondary steel industry uses environment-friendly raw materials such as recycled scraps and can be a key initiator in achieving the stated goal of a Net Zero Carbon producing manufacturing sector.

Shri Nitin Gadkari, Union Minister for Road Transport and Highways, participated in the plenary session of the conference as Chief Guest through video-conferencing. "The Government is ensuring lesser compliance and a simplified process to set-up scrap recycling centres through single-window clearance centres," said Shri Gadkari. "Setting up scrapping centres will help in import substitution. Recycling industry will also generate huge employment opportunities in India. There is a shortage of semiconductors in India, which can also be addressed by scrap processing. The scrapping policy is designed in a way to invite investment from small or big automobile companies to be a part of this industry."

Dr. Bhagwat Karad, MoS, Ministry of Finance, stated that 150 PSUs are involved in recycling activities today. "Recycling plays a significant role in protecting environment and also grow India sustainably," he remarked. He also assured the gathering that the demand for revision of GST from 18% to 5% on raw materials for the recycling industry was being considered for implementation.

The recycling industry in India is growing at 8-9% CAGR. Facilitating the formalisation of waste and scrap collectors into a structured sector will help in improving scrap collection and improving the potential of this sector. The presently unorganised scrap collectors require proper training in segregation of scrap and using it as raw material for a circular economy. It is important that society as a whole along with the manufacturing units unite to omit the "use and throw" concept goods and also recycle the used goods to promote a structured circular economy leading to lower carbon emissions.

MRAI also flagged off the Recovery and Reuse of Waste campaign aimed to sensitise students in schools and colleges to create mass awareness about the advantages and environment benefits of recycling waste. "There is a need to develop recycling parks and recycling hubs across the country. Most of the developed countries have banned cash transaction of scrap. We can adopt the same as India has its own UPI ecosystem," concluded Mr. Sanjay Mehta.

Snapshots from MRAI 9th IMRC 2022



Ms. Sakuntala, Editor & Publisher, Steel Scenario Journal in a discussion with Mr. Sanjay Mehta, President, MRAI



Shri Nitin Gadkari, Union Minister, Road Transport & Highways addressing the 9th IMRC



Dr. Bhagwat Karad, MoS, Ministry of Finance being felicitated by MRAI Board of Directors



Session on Secondary Steel in progress



In conversation with Mr. Paresh Kumar Goel, Director, Ministry of Road Transport & Highway, GOI



In discussion with Mr. Prashant K. Banerjee, Executive Director (Technical), SIAM



Board of Directors - MRAI 2022



Session on BIS

'To save the environment, certain costs need to be incurred'

Mr. Denis Reuter, newly-appointed President of BIR's Ferrous Division, spoke to Steel Scenario at length on what he foresees in the global recycling industry, vis-à-vis steel production, amidst the backdrop of the need for decarbonisation.



Mr. Denis Reuter
President of BIR's Ferrous Division

Steel Scenario: The prices of coal and iron ore are at their highest and pushing steel prices to an all-time high. How do you think using recycled steel and scrap will benefit steel production resulting in keeping control over the price hike that it is experiencing right now?

Denis Reuter: In my humble opinion, I think that we will see high prices in the future also for recycled raw materials. I would even expect in the medium to long term, higher prices than what we see today, with a shift we see in Europe but also worldwide from BOF's to EAF's. In view of all the decarbonisation efforts we see worldwide, the need for recycled raw materials is urgent. That is, need for scrap metals will increase in the future and that will have an impact on prices of those recycled raw materials. So, making steel might become more expensive in my opinion though others might have a different view.

SS: So in your opinion how will steel compete with other competitive building materials? As it is, especially in India, steel-centric structures are very rare.

DR: This is probably something that we will see still getting more expensive and challenging. With alternatives like wood even, prices skyrocketed just recently. If you take the automotive industry that is trying to use more and more other metals in the production of cars, like aluminium, and aluminium is facing more or less the same issue. Making primary aluminium through the electrolysis process is still very costly, at least in Europe. It consumes so much energy that the cost will probably increase even in the future. So also, there will be a need for much more recycled raw materials of better qualities. Of course, our industry will have to implement new separation techniques but at the end, costs will be higher not only for steel but also for other raw materials and finished materials. So, at the end, we might have to get used to the fact that decarbonisation does cost money and to what extent the end consumer is willing to absorb the cost is something which we have to understand.

SS: Developed nations have reduced usage of coal for steel production drastically, due to various reasons, of which one is definitely its reduced availability. But India has plenty of coal in reserve for the next 5 decades at least. Do you think the Indian steel producers should shift more to coal-based steel production?

DR: When I consider what your Prime Minister Narendra Modi just said, I think he laid out ambitious goals for India in terms of decarbonisation. He said India wants to become a net zero carbon emitter by the year 2070, but what is more remarkable is that by 2030 he wants to decrease the carbon intensity of the Indian economy by 45%. So those goals, let alone the percentage of non-fossil energies... I think he said something about 50% and 1 billion tonnes less CO2 emissions by 2030... all this sounds really ambitious, and I assume the Prime Minister knows what he is saying and this is a very strong and ambitious stand. So, if he is looking at attaining those figures then how long does he think he can go on with using coal in the present scenario? So, yes, India has a lot of coal. It's a very coal rich country, but will it use coal in the future to the same extent that it uses it now, I would have my

doubts, on the basis of the Prime Minister's goals on CO₂ emissions.

SS: As recycling has a major impact on preserving the environment, saving energy, and reducing pollution, why do you think it is not receiving attention and interest among the industrialists?

DR: Well, this has been really true right up until this point. The recycling industry maybe could have done a better job in promoting our industry's activities. However, presently we are talking to a lot of steel producers here in Europe, and worldwide on recycling steel and using recycled steel as a raw material. Things have started to change and the steel industry is taking us as a partner in achieving their goals of reducing carbon emission. Decarbonisation is a huge challenge for the steel industry and an enormous effort is necessary to make that a success. The steel industry has realised that they will not be able to accomplish their goals without taking the recycling industry as a real partner.

We started a project with one of the biggest flat producers in Germany for a totally new factory in which we want to produce a very high-quality product, which in turn, the steel mill can use in their steel production processes, and that will help them to bring down their carbon footprint substantially. Discussions like this would have not been possible a couple of years ago, but in the light of everything that's changing around us, all of a sudden those discussions are possible and are fruitful. We feel that we have a common goal with the steel industry, and change in perception has led to possibilities of discussion and implementation, which was not possible in the past.

SS: In India there is a huge dearth of quality scrap and especially eastern India, where several steel manufacturing units are located, faces absence of quality steel scrap for usage. How do you think this gap can be filled up?

DR: It's a very interesting situation you are mentioning of India, because to some extent we here in Europe have the same issue. This trend of seeking better quality raw materials, especially scrap, will only intensify when BOFs here will first shut down and the flat steel producers will try to produce very high-quality steel through the EAF route. This is what a lot of the flat steel producers have already announced in Europe that they will scrap their BOFs and they want to build with new EAFs, so together with DRI on the one side and scrap on the other side, they need to produce high quality.

Also, here the question is how can you push the move towards better qualities? What we are starting to see in Europe may be of some interest to India in this regard.

The trend in Europe is they get a bonus for better qualities. So, it's really an economic factor, where the companies feel it is worth investing in technology to produce better qualities. I am 100% convinced that better qualities will be even more sought after in the future when scrap consumption increases almost naturally by the shift in technology from BOFs to EAFs. As the demand for better qualities rise, there will also be a premium for better qualities. So, in the end, it is the market that regulates supply and demand, and if steel mills are willing to pay a better price for better qualities, the recycling industry will produce better qualities.

SS: India being a country with a huge population, products of poor quality also sell. In this scenario of consumption of any type of quality, how can steel producers be encouraged to maintain quality of the goods they produce?

DR: I agree with what you're saying but if you look at it from a little broader scale, let's say at some point of time, not India, but the Indian steel mills have to take up the cudgels. It's not the government that will decide; it's the producers who have to decide to scrap their BOFs due to CO₂ pressure, rising costs of CO₂ emissions, for meeting the goals laid out by the government. So let's assume that they would decide to scrap the BOFs and build EAFs then the rise in demand for scrap will be huge. In BoF, you use 20% scrap but in EAF 100% even considering more if we include slag. So there will be a natural increase in demand for scrap. But the issue is, will there be enough scrap in the end? That's a question being asked all over the world, it's not only in India... If we look at the US, they want to add another 17 million tonnes of EAF-led steel capacity to the market in short to medium term, that translates into 7 million tonnes more demand in scrap.

Now they have to ask the question, where is the scrap going to come from? It's not going to come from the US because everything that is there is already used. It's not going to come from Canada or Mexico, so they will have to import it. Same situation is with Europe. So if the demand for scrap worldwide rises, along with India, I think those who are able to afford to pay a higher price for scrap because the product they are producing justifies a higher price or the margin they are making they can afford to pay a higher price, is to where the scrap will flow to in the first place. So, it'll be really interesting to see how this development will play out eventually. I completely understand that there's at the moment, a need for low quality scrap. The more CO₂ becomes an issue, the more problematic this will get because with low quality, you use too much energy in relation to your output because you produce too much slag.

This is what steel mills will have to think about also as a hard economic factor. So I'm really of the opinion and it might take a little longer in one region than in the other. But in the long term, I am convinced that there will probably not be a market for low quality scrap anymore.

SS: Is BIR together with its Indian counterpart ready to work for the zero-carbon stage? How optimistic are you that waste will soon become an asset for the steel industry and how can we move forward towards a zero-carbon world?

DR: First we need a change in paradigms. In Germany, we really want to avoid the word scrap because it has a very negative sound, as is the word waste. Using of terminologies with negative connotation has an impact. So if we are talking about recycled raw materials and this is not only ferrous or non-ferrous metals, say also about plastic, paper or wood, if we do not find a way to bring all those raw materials back to life, by giving them a new life, society as a whole will have a problem because primary resources are not unlimited. So eventually we will have to use recycled raw materials for everything we want to produce. And this is really where I see the steel industry and also other industries along with the recycling industry working together for the same goals. Because if we are serious about net zero at the end, whether it's 2045, 2060 or 2070 we have to find ways as

to how to decarbonise production and how to bring back the material that gets released back into the product cycle and keep it in the product cycle. At the moment, we still lose way too much raw materials in the process. So it goes much beyond designing the product, making products easy to recycle... Of course the R&D will be expensive and the products might be premier, but to save the environment certain costs need to be incurred.

Mr. Denis Reuter is COO at TSR Recycling GmbH & Co. KG (DEU), a long-standing member of the Bureau of International Recycling (BIR), and has been active on the Ferrous divisional board since 2019. He joined TSR in 2010 and today is responsible for all the trading activities for both ferrous and non-ferrous metals of the whole group.

TSR Recycling GmbH & Co. KG with its headquarters in Lünen, Germany, is a major European scrap trading and processing company and has 160 locations, mainly in Germany, the Czech Republic, the Netherlands and Poland. The company provides services for the metalworking trade, large industries and municipalities.

In his capacity as Ferrous Division President, Mr Reuter is a member of the BIR Executive Committee and serves as Vice-President of the organisation.

'We are presently in expansion mode'

Mr. Vivek Adukia, helming the AIC group of companies headquartered in Kolkata, shares the conglomerate's remarkable growth story as well as the opportunities and challenges facing the Indian secondary steel sector with Steel Scenario.



Mr. Vivek Adukia
Director, AIC Group

Steel Scenario: The Adukia group has been in business for decades. How did the business evolve into the huge conglomerate that it is today?

Vivek Adukia: The company was started by my father Bajranglal Adukia, in 1972, 50 years ago. He had started operations by processing CI Skulls procured from Durgapur Steel Plant. Since there was not much scrap usage in DSP in those days, they used to dispose of 10-20 tonnes and my father used to bring that to our warehouse and get it processed manually for conversion into small pieces of 100-250 kgs for further usage by foundry units. So, we started from there, but continued to grow big. Now we have two large warehouses at Howrah.

In 1994, we took over a sick unit called Hindustan Casting at Liluah. We had turned around the unit and converted it into a private limited company named AIC Casting. And today we are doing casting manufacturing and exporting to the US and Middle East countries. We also cater to multinational clients here in India like Siemens, Marathon Electric, and so on.

We entered the steel space in 2008, when we acquired a sick unit with 1,000-tonne manufacturing capacity at

Purulia. We turned around this unit too. Right now the manufacturing capacity of that unit, known as AIC Iron Industries, is around 240,000 tonnes.

Another acquisition we had made in 2008 was NN Ispat Pvt Ltd at Mirzapur near Katwa in Purba Bardhaman district. The unit had been closed for about a year. We revived this unit too, converted it into an integrated plant, and now it has a monthly TMT bar manufacturing capacity of 30,000 tonnes.

In 2011 there was another acquisition – Bhagwati Sponge Pvt Ltd, having a capacity of 100 tonnes per day of sponge iron, at Jamuriahat, Asansol. Presently it is an integrated steel plant having daily production capacity of 750 tonnes of sponge iron. It has a 18.5 MW captive power plant and 5.5 MVA submerged arc furnace making silico-manganese. The plant also has billet capacity along with automatic rolling mill manufacturing TMT bars.

Presently we are once again in expansion mode, with plans to add more sponge iron capacities and more power plants, one of which is of 25 MW capacity, are coming up. Setting up a captive pellet plant is also under implementation, with availability of iron ore lumps becoming scarce and expensive.

SS: Are you looking for any kind of support from the state or central government for your business expansion in the coming years?

VA: We have undertaken backward integration of our three steel units and most probably this expansion work will be completed by March 2024. With this, we will have totally integrated production centres, by which I mean iron ore fines to finished steel, and we will be into the whole process of business. Iron ore we will buy from Jharkhand and Odisha. Fines are robustly available because the number of buyers is very large in India.

There is no iron ore available in West Bengal so we have to depend on Jharkhand and Odisha. But we are blessed with good quality steam coal, that is non-coking coal, required for sponge iron production. So, through the West Bengal government we are requesting Coal India, to provide long-term support to the sponge iron units, because for this industry, like for

power producers, coal is not a fuel, but a raw material. As most of the units are around the Eastern Coalfield area, we are requesting Coal India through the state government to extend coal supply to the sponge iron producers.

From the Central government, we are seeking at least a policy for securing raw material supply for the secondary steel producers. We have requested the government to open some more mines as the availability of iron ore is a problem area. We also seek a policy on how to secure our raw materials and export value-added products. On behalf of the steel rerollers' association, we have repeatedly approached and requested the Central government regarding this and we hope they will take a positive step in this regard to help take Indian steel production to a level of 300 million tonnes by 2030, as envisaged.

SS: What role do you think will the secondary steel producers from eastern India play in reaching this 300 mt figure?

VA: With numerous secondary steel producers present in eastern India and especially in West Bengal, the assurance of raw materials will be vital for them in extending adequate production support for reaching this target. Secondary steel producers are striving hard to improve quality and volumes but logistically things are very difficult and we need the support to give 100% output.

SS: Your group has numerous products. Production of which product has been most challenging as well as rewarding?

VA: Casting is the most challenging side we feel, as high-quality engineering is required. We can say the foundry industry is the mother of all industries. Whatever is required from a client's side, we cast that in our foundries. So, there are castings which are very critical and require a lot of engineering. Developing a client's specific casting requires a lot of R&D and sometimes it takes as long as six to nine months to prepare a casting. After meeting all these challenges when the casting is on, there is an immense pleasure like giving birth to your creativity.

SS: Do you have your own R&D division?

VA: Yes, we have our own division and in that we are continuously endeavouring to find ways to improve customer satisfaction like how to reduce weight of a casting, or how to have prominent fins so as to maintain international standards for export. Our castings are made both for the domestic and international markets. We already export to the USA and after completing our new foundry plant in a year's time we will be exporting to Europe also.

SS: How are you managing the problem of raw

material scarcity which is being faced by other secondary steel producers as well?

VA: In the DRI route, 20% pig iron is required and in the last 12 months a vacuum has been created as Nilachal Ispat and other Odisha-based pig iron producers have ceased to work. With scarcity of pig iron, prices of pig iron are making secondary steel producers suffer. Also, for the foundry industry it has been a big challenge with prices increasing from Rs. 28,000 to as much as Rs. 63,000.

The other issue is with coal. Sponge iron units should be treated with similar preference like power as it is the most important raw material for sponge iron producers. We have even sent written requests to the Chairman of Coal India and are hopeful that something will come out of it soon.

SS: How challenging was the pandemic period? Did you stop your production or had to cut down the labour force?

VA: The main challenge was to keep the manpower available in the production unit, so we did not let them move out and made all facilities available for them in the factory itself. Nearly 80% of the workers were retained at the factory with facilities for food and stay during the first lockdown so that production does not get affected.

SS: Have you taken any measures to upgrade production technologies for reducing usage of raw materials and power, and to reduce pollution as well, which is the need of the hour?

VA: We had a meeting with the Gas Authority of India (GAIL) at the association level. They are planning to have a pipeline so that natural gas can be used for production of sponge iron. If that happens, then the consumption of coal-carbon emission will be reduced to almost zero.

Also, we are working along with CII in understanding how carbon emission can be reduced following our Hon'ble Prime Minister's commitment that India will be a zero-carbon country by 2050.

In our company, we have a captive power plant. We are using the waste heat generated from the DRI kilns and we are making power out of that. Our sponge iron unit will become zero-carbon because we will be using all the waste material in the construction of roads in our factory's periphery. We have started a pilot project and from next month onward we will start using slag-based cement for metalling roads within the plant and periphery areas. This will also reduce our carbon footprint.

SS: Is the Russia-Ukraine war having any impact on Indian secondary steel producers?

VA: Ukraine and Russia together were exporting 45

million tonnes of steel to European countries which has stopped. This has come as an opportunity for us. India has opened windows to supply steel to the European countries. It is not a direct opportunity for us, but primary producers taking more interest in the export market will create a domestic market for secondary steel producers.

On the other hand, we are facing a big challenge on the raw material side, especially in coking coal, because Russia and Ukraine were big suppliers of both coking as well as non-coking coal, and prices of this commodity have shot through the roof.

Mr. Vivek Adukia, 49, a Commerce graduate from Calcutta University, joined his family business at the age of 17 and rose to become the CEO of what is now a group of companies running successfully with an employee strength of over 4,000 and revenues exceeding Rs. 2,500 crore. He also heads the Steel Re-Rolling Mills Association of India and is Vice-President of West Bengal Sponge Iron Manufacturers' Association. Earlier he has also served as Vice-Chairman of the Indian Foundry Association. Mr Adukia is also actively engaged in many social services

Steel prices to fall by end of this fiscal

Steel prices is set to fall to Rs. 60,000 per tonne by the end of current fiscal, after a two years. Prices have scaled a peak of Rs. 76,000 per tonne last month, which is 95% over March 2020 levels, following Covid-19 pandemic.

“Domestic steel prices are showing signs of fatigue following supply disruptions, decarbonisation measures globally, especially in China and geopolitical risks stemming from the Russia-Ukraine war, which has driven up raw material costs. While prices have defied correction predictions because of continuing uncertainties, some moderation is on the cards with the onset of monsoon,” stated Crisil.

Heightened geopolitical risks have limited the correction in prices, which had started to moderate early this year. But the Russia-Ukraine conflict, which began in late February, cranked it up again on supply-disruption fears. In Europe and the US, where the impact was greater, prices crossed the \$1,600 per tonne mark.

“Then rising input costs added to the pain. Prices of international coking coal (f.o.b. Australia) rose 47% to \$670 per tonne in three weeks from \$455 per tonne in late February, due to the flooding of mines amid high demand from countries that traditionally imported from Russia. While coking coal prices have eased from their peaks, they continue to get support from strong demand at \$500 per tonne,” the report added.

Despite a moderation in demand in January-March, steel prices have marked up owing to higher input costs and buoyant exports. Also, domestic supply stayed tight, eliminating the differential between global landed and domestic prices, which was once nearly ₹15,000 per tonne. On the other hand, export realization premiums have surged to \$75 per tonne in early May.

While steel mills made the best use of elevated global prices, domestic demand began to waver. Rising construction costs, and multiple price hikes by makers of automobiles, consumer appliances and durables drove down demand in the last quarter of fiscal 2022.

“In the first quarter of the current fiscal, domestic demand could see an optical recovery because of a low-base effect, but consumer sentiment remains sluggish with higher input costs leading to postponement of purchases and construction decisions,” the report said.

While exports to these markets from India will remain high in the first quarter of this fiscal, retreating prices will narrow the arbitrage for domestic mills. To sum- up, exports out of India will remain range bound at 13-14 million tonne this fiscal on the back of revised quota to Europe and supply constraints in south-east Asia.

BSE SUFI

steel billets futures contract gets good response

By **Mr. Sameer Patil**, Chief Business Officer, BSE

Steel is one of the most widely used and largest physical commodity markets in the world. Steel is now widely used in sectors such as construction, automotive transport, packaging, and appliances. The demand for steel is likely to take a quantum leap ahead with government effort to make India a \$5-trillion economy in the coming years. In view of this, having a steel futures contract at this point of time has a tremendous utility for producers as well as consumers to manage their price risks.

Need for a Steel Contract

As the price of steel is a major component of total cost in many infra projects, physical market participants find it difficult to manage the volatility in steel prices in absence of an appropriate hedging platform. The logistical and supply inefficiencies have made steel and its raw material prices extremely volatile, posing challenges to the entire value chain participants. For instance, the annualised volatility of domestic steel spot prices was 23.52% in the last year. Similarly, the global annualised volatility (LME Steel) is 25.16% over the last three years.

BSE moved forward by partnering with the leading steel trader association Steel Users Federation of India (SUFI), to enable trade in steel futures on the trading platform. SUFI, with over 8,000 members from across India, has achieved remarkable success in bringing various stakeholders of the steel industry on a common platform and is determined to achieve the stated objective of the Government – enhancing per capita consumption of steel by supporting 'Make in India' and 'Invest India'.

So, after a detailed study and stakeholder outreach jointly with SUFI, BSE launched SUFI Steel billets futures contracts on July 22, 2021. Mr Sajjan Jindal, Chairman and Managing Director of the JSW Group, did the honours. Steel billets are the second-stage product produced during the time process of making steel bars. They are additionally known for their flexibility and malleability, particularly when presented to differing temperatures during forming, shaping, and moulding. This offered BSE a chance for a standardised and an acceptable product which is widely in use in the steel ecosystem.

The SUFI Steel billets futures contract offers market participants an additional avenue to all stakeholders' effective risk hedging instruments using the latest technology and risk management framework. The underlying prices are as of Raipur, where the delivery centre is based. The trading and delivery unit are 10 MT. The tick size is Rs. 10.00, which gives traders enough movement for bid and offer prices.

Performance so far

The total turnover so far on the BSE platform is Rs. 563 crore, with average open interest of 9 lots. So far, a total of 360 MT has been delivered on the exchange platform. Infact, BSE facilitated the delivery to the tune of 90 MT in the first full expiry cycle at the exchange designated delivery centre in Raipur. BSE SUFI Steel futures products have been growing steadily since launch.

The appeal of BSE's product portfolio and liquidity continues to attract new users. By trading Steel futures contract at BSE, users can enjoy benefits such as market transparency, increasing liquidity and the security of knowing every Steel futures contract is cleared through Indian Clearing Corporation Ltd (ICCL).

The various stakeholders such as producers, processors, exporters, importers, etc., can use various risk management techniques and strategies to mitigate adverse price fluctuations. Steel prices can be very volatile, so investors looking to hedge on short-term bottlenecks in supply might see steel as an attractive investment.

BSE is confident that with this contract, the industry can avail a more structured and healthier price discovery platform as well as a national level benchmark price as a ready reference for the participants, enabling them to mitigate price risk. Effectively, given the price volatility and uncertainty across the global steel supply chain recently due to the covid and the Ukraine war, there has been a growing demand for Steel futures to help our clients more precisely manage their risk. BSE's open interest continues to grow, and we look forward to introducing options, which should complement our clients' existing strategies and help them minimise risk.

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THE WORLD'S FASTEST EXCHANGE WITH A SPEED OF 6 MICROSECONDS

Gainwell Engineering partners World Coal Association to promote sustainable coal mining in India

To set up mining equipment manufacturing unit in West Bengal

By Steel Scenario Bureau

Gainwell Engineering, the manufacturing venture of Gainwell Commosales Private Limited (formerly Tractors India Private Limited), has partnered World Coal Association to promote sustainable coal mining in India.



The mining major will set up a mining equipment manufacturing factory in Panagarh, West Bengal catering to domestic demand as well as exports with an investment of Rs. 500 crore in the first phase. With this facility, Gainwell Engineering will help India and other global geographies, not only mine their underground mineral resources far more sustainably but will also represent the end of India's dependence on imported equipment for underground mining.

“Initially, the plant will focus on underground mining equipment like continuous miners, roof-support carriers

or high-wall miners, which will also be exported across global markets. We already have an order book of about Rs. 450 crore, of which half are exports. Construction of the factory has also started on 35 acres of land and commercial production is expected in the first quarter of the 2023. In the first phase, 300-350 engineers will be directly employed in the factory, which will be fully automated,” stated Mr. Sunil Kumar Chaturvedi, Chairman and Managing Director, Gainwell Engineering.

Commenting on the association, Ms. Michelle Manook, CEO, World Coal Association said, “It is critical that countries like India and companies like Gainwell Engineering are leading the discussion on coal's sustainable journey. We welcome the Gainwell Engineering management team who understand that as a cohesive coal value chain across multiple jurisdictions (including Australia, China, Russia, South Africa, United States), we will have the best chance to deliver on our global community's collective economic development and environmental goals.”

Gainwell Engineering and World Coal Association believes India has already made a positive impact in resetting the climate change agenda and it has the capacity to truly revolutionise coal's future.



Bengal foundries gasping for survival

Price volatility of inputs severely impacting 'Sheffield of the East'

By Steel Scenario Bureau

The foundry industry – the key component feeder of metal castings to almost all heavy industries and engineering segments – is facing an existential crisis in West Bengal and is almost on the verge of collapse. It is ironical that the country's foundry industry was born in this state itself.

Ninety-five per cent of the 800-odd foundries existing in Bengal are located in Howrah district, considered the hub of the foundry industry in the state and known as the 'Sheffield of the East'. Nearabout 95% of the Bengal foundry units are MSMEs, considered a special-focus and high priority sector of the Centre as well as state government.

The new manufacturing policy of the government envisages the share of manufacturing in India's GDP to increase to 25% from the current 15% and to create 100 million additional jobs in the next 10 years. Since all engineering and some other sectors use metal castings for their manufacturing needs, it is more than obvious that the manufacturing sector cannot possibly achieve the government's goal without corresponding sustainable growth of the labour- and power-intensive foundry sector, feels the Bengal-based Indian Foundry Association (IFA). According to the IFA, it should be the responsibility of the governments at both the Centre and state to provide sufficient support and protection to the foundry industry for achievement of the official targets set. Unfortunately, the reality is totally different and, at present, worryingly grim.

As per the 55th World Casting Census published by Modern Castings USA in December 2021, government-mandated lockdowns – affecting movement of labour and vital raw materials – along with work stoppages and restrictions, during the Covid pandemic significantly affected casting production globally. Total casting production worldwide dropped 3.25% in comparison to 2019. India, which is second only to China in global ranking of casting production, also felt the heat in a big way because of the various demand-supply imbalances caused during the pandemic. And the Bengal foundries suffered doubly, since they were already burdened with high power costs which they continued to absorb. Cost of power is as high as 20% of the Bengal foundries' manufacturing cost.

"Already 30% of foundry units in Bengal are closed. Several others are expected to follow suit. Foundries currently running are operating at around 50% per cent of their capacity," said IFA vice-chairman and MD, Vikas Castings Akash Madhogia.

However, says the IFA, the final blow that has broken the back of the foundry industry in the state is the unprecedented rise in the prices of key raw materials, viz. pig iron, refractories, foundry flux and chemicals. "No amount of budgeting, using any costing jugglery whatsoever, can absorb such price hikes and still be competitive," the IFA points out. In support of its viewpoint, the association provided the following comparative price chart:

(Prices in INR per metric ton)			
Commodity	Jan, 2021	Jan, 2022	April 05, 2022
Pig Iron	36,000	40,000	59,000
Ferro Silicon	115,000	159,500	181,000
Ferro Manganese	70,000	98,500	1,11,600
Silico Manganese	68,250	97,000	1,08,200
Melting Scrap	31,000	38,500	46,500
Non-coking Coal	5,800	11,500	19,500
Metcoke	29,500	40,000	54,000

From the above, it is quite clear that the prices of all raw materials have gone up and are continuing to rise further. With buyers mostly not agreeable to accepting price escalation, the burden of rising supplier prices is completely on foundries. This is not only eating into their bottomlines, but also making several units unviable. "Needless to mention, mere survival has become really tough," said Mr Dinesh Seksaria, IFA chairman and MD, Govind Steel Co. Ltd, adding that the repeated hikes in cost of raw materials have come as a crippling blow to the Bengal foundries, which were just recovering from the setbacks caused by the pandemic during the last two years.

At a recent press conference held at Kolkata Press Club, the IFA placed a charter of demands to the government seeking support on various production-related issues. For some issues it demands immediate action to be taken, while other issues have been listed with intermediate / long-term timelines. Among immediately-sought support factors are:



1. Temporary suspension of export of pig iron and iron ore. Though there is shortage of iron ore in the domestic market, export of iron ore has gone up by more than 250% during the last three financial years. Pig iron is also being exported in substantial quantity, and the foundry industry is finding it really difficult to procure pig iron at competitive rates.

“Exports of value-added castings are being severely hampered as a result of production cuts being faced due to the continuing hikes in domestic raw material prices,” said Mr Madhogaria. He added that unless the government deters exports of pig iron and iron ore by significantly raising their export duties, not only will the death knell sound soon for the Bengal foundry industry, but the government too will stand to lose out on earnings made through exports of steel and metal castings.



2. Reduction in import duties on pig iron, metal scrap, metcoke and chemicals.

The issues for which the IFA sought intermediate / long-term support from the government are as follows:

- Due to meagre margin, the foundries are unable to invest in new technologies, which is very vital for global competitiveness. Schemes like CLCSS, meant only for MSMEs, are quite old and the incentives need upward revision to augment investments for modernisation. The current cap of investment under the scheme is Rs. 100 lakhs, which needs to be revised to Rs. 200 lakhs.

- The Production Linked Incentive (PLI) Scheme introduced by the GoI in March, 2020 was aimed at boosting domestic manufacturing under the 'Atmanirbhar Bharat' initiative to encompass the foundry industry. PLIs are incentives to companies to boost production. They can be in the form of tax rebates, import /export duty concessions, or easier land acquisition terms. Generally, the benefits of PLI Schemes are passed on to the final consumers of the goods in terms of lower prices.

- MSME payments: The payments by most buyers are not made as per contract, including PSUs. The Facilitation Councils created by the Ministry are not effective and the claims are not settled timely – even takes several years at times. There are incidents when the buyers become bankrupt and the dues of MSMEs are stuck. The MSMEs must be allowed to be treated as other lenders such as bankers for the purpose of recovery of their dues in case the buyers go bankrupt.

- Performance Bank Guarantee and Earnest Money Deposit: The EMD exemption and 15% Price Preference, given to MSME Units, should be extended to medium category units also. Security amount for MSMEs was 5% earlier for Railway orders, which has been increased to 10%; resulting in blockage of funds. This needs to be reverted to 5% as before and may be allowed to be adjusted from bills.

- Export promotion: Merchandise Exports from Indian Scheme (MEIS) has been replaced by Refund of Duties and Taxes on Exported Products (RoDTEP), a new scheme with added benefits. This is very crucial as many foreign buyers are considering shifting from China to India and discontinuation of MEIS will lead to needless disruption at this opportune time and result in loss of price competitiveness with respect to Chinese foundries.

- The 'Sabka Vishwas Scheme, 2019' for settlement of pending cases under Central Excise and Service Tax was a great success, giving a big relief to medium and small enterprises. A similar scheme may be planned to settlement of Custom Duty matters including the settlement of non-fulfillment of obligations against EPCG.

- Promoting Recycling

- Promoting investment in sand reclamation plant by suitable investment linked incentive mechanism is urgently required. A subsidy of 50% is proposed to promote investments in sand reclamation equipment. This will help conserve natural resource and environment too.

- Special status for the 'Foundry Park' project, an SPV initiative taken by the IFA with the aim of facilitating modernisation and expansion of the local foundries. The IFA seeks supply of electricity to this project at the same

rate as DVC is supplying to Asansol Industrial area.

According to Mr Ajoy Madhogaria, IFA vice-chairman and MD, NSI (India) Ltd, the distressing situation caused due to the unprecedented raw material price hikes has forced nearly 20% of the Howrah units to shut operations. The remaining units are operating at 20% to 50% of their capacities. "We hope the government will realise the extent of our misery and take appropriate action to help us," he said.

BOX ITEM

Indian foundry industry is 2nd largest global producer of castings

The Indian foundry industry, with a turnover of around US\$ 19 billion, is the second largest global producer of value-added cast metal components used for various applications in industry segments such as Auto, Railways, Machine tools, Sanitaryware, Pipe fittings, Defence,

Aerospace, Earthmoving machinery, Textile, Cement, Electrical, Power machinery, Pumps & Valves, Wind turbine generators, etc. Grey iron castings form the major share – around 68% – of the total castings produced in the country. Total castings production is to the tune of 12 million tonnes.

The industry also annually exports metal castings valued at billions of US dollars. A good number among the large Indian foundries are equipped with modern manufacturing facilities and are globally competitive. With growing awareness about environment protection, foundries using cupolas and LAM coke are gradually shifting to the induction furnaces or cokeless cupolas.

An estimated 90% of the units are MSMEs. The highly labour-intensive industry, comprising 4,500-odd units spread across the country in clusters, provides employment directly to around 5 lakh persons and indirectly to triple that figure.

Indian Ferrous Scrap Market Overview

India is an excellent market for US exporters of ferrous scrap metal. The Government of India (GoI) is taking measures to make India the global hub for manufacturing and to become the world's largest producer of steel by increasing production capacity to 300 million tonnes (mt) annually by 2030.

India is the second largest producer of steel in the world after China, with a production capacity of approximately 110 mt per annum. An ambitious 'self-reliant India' plan to make India a global manufacturing hub for the automobile, defence, aviation, pharmaceutical, and other industries has been initiated. The Atma-Nirbhar Bharat plan amplifies demand for ferrous scrap to produce steel and other metals.

Currently, India's scrap market is highly unorganised. Most operations are manual and carry major safety and environmental concerns. In 2019, primary and secondary steel producers used approximately 32 mt of ferrous scrap, an increase of 11.4% over the previous year. Around 25 mt were sourced through the local scrap dealers, and the remaining 7 mt were imported from China, United States, United Arab Emirates, Saudi Arabia, Iraq, and other markets.

Despite the huge demand for steel in early 2020, the Covid 19 pandemic initially impacted the Indian steel industry and production plans were hit. More than 60,000 containers of imported scrap also accumulated at Indian ports during the first and second total lockdown phases (starting mid-March and then May 2020). As there was no demand for steel from user sectors, steel manufacturers hesitated to clear these shipments from the ports. Moreover, the shortage of labour and inter-state restrictions halted the collection and supply of household and industrial scrap.

This resulted in the increase of finished goods prices in India. To overcome this situation, the GoI permitted secondary sector steel producers to use directly reduced iron (DRI, a.k.a. sponge iron) as input material in place of scrap. This not only managed to meet the interim demand for steel in the country, but also helped other industries to revive faster than expected.

The GoI also took some major steps in the FY21 budget to boost the production of steel in India, such as removing duties on imports of scrap and clearing the Voluntary Vehicle Scrappage policy. As a result, scrap of steel, aluminium and other ferrous/non-ferrous metals can be used again in the manufacturing of new products.

It is expected that, with the GoI going full throttle to make Atma Nirbhar Bharat a success and extending avenues such as the PLI (production linked incentive) Scheme to enhance production of special steels in the country, the consumption of ferrous scrap will increase in both the primary and secondary steel manufacturing segments, and is projected to reach approximately 75 mt per annum by 2030.

This is, indeed, one goal that is cheering up the metal scrap industry in India.

Source: International Trade Administration

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Construction equipment industry sees 8% volume de-growth in FY22

By Steel Scenario Bureau

The Indian construction equipment (CE) industry witnessed an 8% de-growth in financial year 2021-22, with sales dropping to 85,385 units during the year from 92,470 units in FY21. As per the annual industry data released by Indian Construction Equipment Manufacturers Association (ICEMA), the earthmoving equipment segment, which accounts for nearly 75% of the total construction equipment sales in India, experienced 14% decline in growth during FY22, while road construction equipment sales were lower by 10%. However, the other three segments-material handling, material processing and concrete equipment – registered positive growth during the year. Exports of construction equipment also increased significantly by 60% in FY22 over FY21.

The CE industry experienced a number of challenges which adversely impacted the growth of the sector during the last fiscal. Mr Dimitrov Krishnan, ICEMA president and MD of Volvo CE India Pvt Ltd, said, “The 8% volume de-growth registered in FY22 is largely owing to the second and third waves of COVID-19 pandemic, which adversely impacted the pace of construction activity in the country on the one hand, and continued to bring supply chain disruptions on the other, thereby constraining the industry's ability to cater to the emerging demand”.

There was significant slowdown in the speed of construction of roads & highways in FY22 to 28.64 km/day compared to a much higher pace of 36.5 km/day at which roads were constructed in FY21. This was a major factor for CE industry de-growth, as 40% of the total demand for construction equipment originates from the road sector in India.

Unprecedented natural calamities like cyclones and heavy rains also affected construction activity, particularly in the southern part of the country, further affecting the demand for construction equipment. Sharp increase in input costs due to rising steel and other commodity prices created margin pressures for the CE manufacturers as well. The industry's concerns have been further accentuated on account of the ongoing Russia-Ukraine conflict.

Sharing deeper insights from the report, Mr V.G. Sakthikumar, Convener, Industry Analysis & Insights

Panel, ICEMA, said: “Though the y-o-y growth of the industry remained subdued, it is heartening to note that there has been a steady increase in the sales numbers during the four quarters of the current fiscal. Results in Q4 in particular have been much better, with the sales volume having increased by 12% from the previous quarter. This has brought back much-needed growth momentum which when seen together with the recent government announcements on infrastructure investments puts forward a very strong pipeline and growth avenues for the Indian CE industry.”

Looking ahead, the industry is hopeful of a strong recovery during FY23 on the back of an enhanced export potential and the government's continued thrust on infrastructure development through announcement of mega plans, including National Infrastructure Pipeline, Gati Shakti Masterplan, National Monetisation Plan, constitution of National Bank for Financing Infrastructure and Development (NaBFID) which is expected to be operational by the first quarter of the current fiscal, and will be scaled up further through the year. Several infrastructure projects that have made substantial progress but are facing delays due to financing issues are likely to be given funding priority by the Bank, which in turn would help in revival of these projects, boost construction activity and create growth opportunities for the CE industry. The sharp increase in budget outlay on capital expenditure for FY23 by more than 35%, from INR 5.54 lakh crore to INR 7.50 lakh has also given the industry confidence of a quick turnaround and delivering a strong growth during the current fiscal.

The industry expects a significant increase in award of contracts for highway construction, new railway lines, water management, development of ports and others in the current year, while demand for mining equipment which has been quite robust in the last 2-3 years is expected to continue its strong trajectory, aided by favourable global demand for commodities. The industry leaders feel that the overall future prospect of the industry is positive, as India is entering an exciting era of infrastructure led growth, supported by the Government's vision of an 'Atmanirbhar Bharat'

and strong exports push on the back of 'Make in India for the World'.

Commenting on the export potential of the industry, Mr Krishnan pointed out, "The phenomenal exports growth witnessed by the Indian CE Industry in FY22 augurs well for its future sustained growth. With new CEV-IV emission standards now completely adopted by the industry, there are significant opportunities for Indian CE manufacturers to tap into developed markets."

The ICEMA Industry Report is prepared with the help of inputs from member companies which represent about 95% of the OEMs operating in the Indian CE industry. ICEMA represents over 80 leading companies that manufacture, trade and finance a wide range of construction, earthmoving, mining and mineral processing equipment. India's CE industry currently stands at USD 6.5 billion and employs approximately 3 million people.

Metal recycling can lead to lower price of EVs

Rajesh Gupta, Founder, Nupur Recyclers, says organised metal recycling is the only way to address metal scarcity, cost pressure and supply chain constraints in a country that imports six million tonnes of scrap metal every year.

The last decade has been a fascinating one for the global automobile industry. In progressive leaps, the electric vehicle (EV) industry has been giving the world hope of a future with environmentally sustainable mobility. Even in the traditional internal combustion engine (ICE) space, enhanced emission control standards put in place now aim to reduce the carbon footprint for millions of on-road vehicles.

However, the automobile industry still has to go many, many miles to achieve the basic holistic structure of sustainable transport. A vehicle's carbon footprint is not only about its emission when it runs on the road. The journey starts at the very production stage, where electric circuits made of several precious and rare earth metals, and body sheets and interior parts made of alloys, etc., are assembled. Needless to say, like any other natural resource, we have limited availability of metals, and sourcing every ounce is costly as well as time-consuming. Moreover, continuous depletion of natural minerals and metals has a slow but profound impact on the environment. In addition, once the vehicle completes its life-cycle and goes for scrapping, these metals are often rendered useless or reach scrap dealers who often use unsafe and not-so-eco-friendly methods to extract the metals to some extent. Moreover, these methods are also inefficient in deriving the scrap's total value.

Currently, India imports six million tonnes of scrap steel annually for a variety of end-uses, due to a domestic demand-supply gap. This gap is strange, because one can see profuse use of metals in various forms in India – mainly in the transport sector, as well as in factories, shops & establishments, low-income housing, storage, etc. More often than not, the metal exists well past its use-by date. Low-cost patchwork repairs are undertaken to cover up damages and life goes on at its usual pace. Though the numbers are gradually dwindling, we still get to see ramshackle, rattling buses plying in small towns and rural India. We also find large numbers of rusted, old or abandoned vehicles in scrap markets – mostly unorganized – in open dumping grounds, police station yards, and even by roadsides. The problem is that there is no easy, quick way to dispose of these old, unused vehicles in the country as yet and the existing process of scrap recycling is neither cost- nor time- nor environment-friendly. This causes the domestic supply of scrap to be both slow and low.

The way to reduce scrap imports and cut our foreign exchange bill is to have a well-planned and structured metal recycling system in the country. Organised metal recycling addresses the problems of metal scarcity, cost pressure and supply chain constraints to a great extent. As the nomenclature suggests, metal recycling is the process of extracting valuable, precious and rare-earth metals from scrapped vehicles. These metals can be found everywhere – not only in the largescale usages but in used electric batteries, old engines, or even rear-view mirrors of vehicles as well. Global as well as domestic automobile manufacturers are therefore now investing in facilities to salvage old parts, and the industry is also looking to recycle the millions of electric batteries which will be used by EVs in the future.

Apart from reducing the cost of manufacturing new vehicles, organised metal recycling also serves as an affordable source of raw materials to many other industries such as the electronics, steel and waste-to-energy sectors. Given the importance of metal recycling, the Ministry of Mines has notified the National Non-Ferrous Metal Scrap Recycling Framework, 2020. The framework aims to nurture a sustainable scrap recycling ecosystem by adopting optimal processes and standards, cutting-edge technology, and environment-friendly measures; and work towards creating economic wealth and a shared national responsibility to safeguard the environment and inter-generational equity. There is also a similar proposed mechanism for steel scrap.

With the systematic implementation of the Government's plans, there is a significant opportunity to recover rare metals and reduce pressure to import scrapped metals. These savings can easily translate into reduced prices of EVs and remove the price disparity between ICE vehicles and EVs. By bridging the price gap between the two, the country can adopt EVs faster and progress towards a sustainable future.

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Worldsteel Short Range Outlook

April 2022

Table 1. Steel Demand Forecasts
SRO April 2022, finished steel products

Regions	million tonnes			y-o-y growth rates, %		
	2021	2022 (f)	2023 (f)	2021	2022 (f)	2023 (f)
European Union (27) & United Kingdom	163.6	161.5	167.9	16.8	-1.3	4.0
Other Europe	40.2	42.3	44.1	12.0	5.2	4.2
Russia & other CIS countries + Ukraine	58.5	44.6	45.1	1.5	-23.6	1.1
USMCA	136.9	141.0	144.7	20.5	2.9	2.7
Central and South America	50.7	48.5	50.3	30.7	-4.4	3.9
Africa	37.4	39.1	40.7	6.4	4.6	4.2
Middle East	48.3	50.2	51.7	2.9	3.8	3.2
Asia and Oceania	1 298.1	1 313.1	1 336.8	-1.4	1.2	1.8
World	1 833.7	1 840.2	1 881.4	2.7	0.4	2.2
World excl. China	881.7	888.2	919.9	13.2	0.7	3.6
Developed Economies	399.4	403.7	413.5	16.5	1.1	2.4
China	952.0	952.0	961.6	-5.4	0.0	1.0
Em. and Dev. Economies excl. China	482.2	484.4	506.4	10.7	0.5	4.5
ASEAN (5)	72.6	76.1	80.8	3.5	4.8	6.1
MENA	65.2	68.0	70.3	3.2	4.3	3.5

f - forecast

ASEAN (5): Indonesia, Malaysia, Philippines, Thailand, Vietnam

Table 2. Top 10 Steel Using Countries 2021
SRO April 2022, finished steel products

Countries	million tonnes			y-o-y growth rates, %		
	2021	2022 (f)	2023 (f)	2021	2022 (f)	2023 (f)
China	952.0	952.0	961.6	-5.4	0.0	1.0
India	106.1	114.1	120.9	18.8	7.5	6.0
United States	97.1	99.8	102.1	21.3	2.8	2.4
Japan	57.5	58.2	58.8	9.3	1.2	1.0
South Korea	55.6	56.2	56.8	13.5	1.2	1.0
Russia	43.9	35.1	35.1	3.8	-20.0	0.0
Germany	35.2	35.0	37.6	12.9	-0.6	7.6
Turkey	33.4	35.5	37.0	13.2	6.4	4.2
Brazil	26.4	24.2	25.4	23.2	-8.5	5.0
Italy	25.9	25.4	26.3	27.1	-2.1	3.5

f - forecast

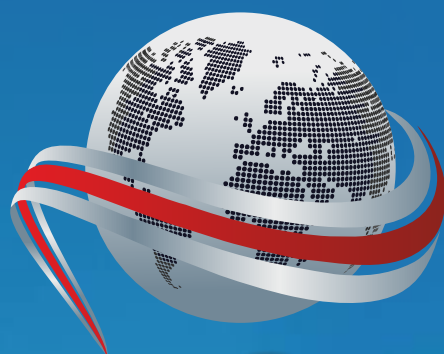
STEEL MARKET PRICE (thousand tonnes)

April 2022

ITEMS	AHMEDABAD	ALANG	BHIWADI	BHAVNAGAR	DURGAPUR	GAZIABAD	INDORE	JAMMU	KANPUR
INGOT				57500	55000	58000	56400	58300	57000
BILLETS			58300	58500					
TMT 12MM				62200	59500	62800	62500		
PIPES					49100				
WIRE					5.5mm-61000/12G HB- 63200				
SCRAP	57500			49200		49000	44000		
COIL/ (CRC-HRC)					79500/73500	88000/76000			
SPONGE IRON					38600				

ITEMS	KOLKATA	LUDHIANA	MANDI GOBINDGARH	MUMBAI	MUZAFARNAGAR	RAIGARH	RAIPUR	ROURKELLA
INGOT	55700	56800	58100	57500	57800	55300		53500
BILLETS		57000	58300	57500	58300		56000	
TMT 12MM	59500			65200	62400	59000		
PIPES			65800	49000		51000	63000	
WIRE							5.5mm-62300/ 12G HB- 64600	
SCRAP		47800					50300	
COIL/ (CRC-HRC)	80000/73000							
SPONGE IRON			42000			36000	38000	37500

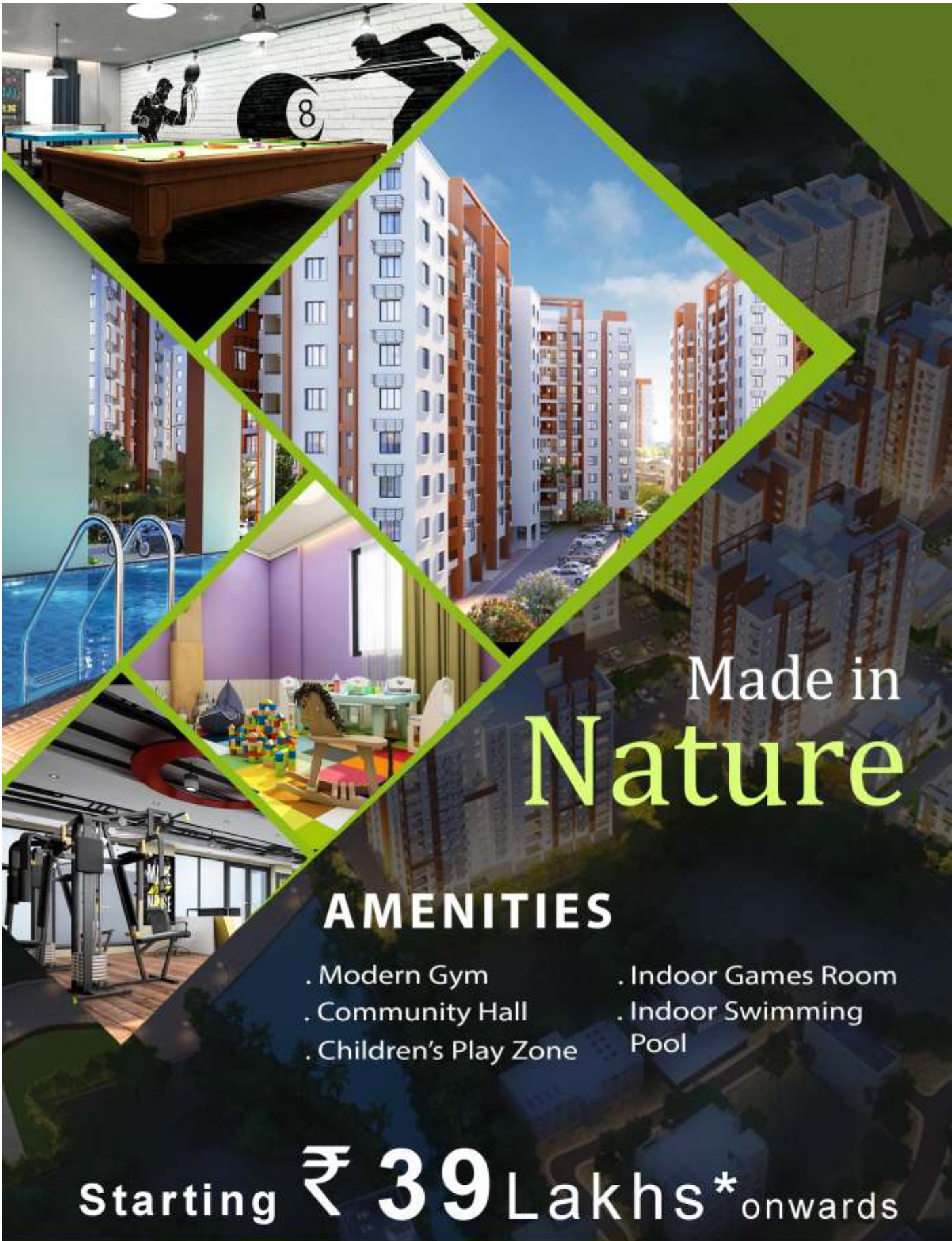
Source: Steel Menu
(Dated 28th Feb. 2022)



Industry **Scenario**

VOL 01 / M09





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With the world's leading market industries rapidly growing, the need for implementing raw materials on a daily basis is more heightened than before. The massive extraction, use, and processing of raw materials is making a huge impact on the environment and is additionally threatened by the increased energy consumption and extensive CO₂ emissions. But, as human consciousness evolves, the world is taking concrete measures to reduce environmental damage on a global scale. The utilization of raw materials and the business implementation of efficient industrial processes, such as the circular economy, can significantly contribute to a visibly positive change within countless industries, ultimately resulting in a more sustainable market and drastically lower CO₂ emissions.

Implementing the circular economy in businesses puts a special emphasis on the way both products and materials are used in a particular industry. As the entire concept of using products and materials is circular, the traditionally rooted linear economy concept is extracted in efforts to ultimately minimize waste, reduce CO₂ emissions and maintain economic sustainability. In only 50 years, global use of materials has nearly quadrupled—outpacing population growth. In 1972, as the Club of Rome's report *Limits to Growth* was published, the world consumed 28.6 billion tonnes. By 2000, this had gone up to 54.9 billion tonnes and as of 2019, it surpassed 100 billion tonnes. Between the 'COP25 in Paris', 2015, where the Paris Agreement was formed and COP26 in Glasgow, 2021, 70% more virgin materials were extracted than what the Earth can safely replenish. Rising waste levels are accompanying the rapid acceleration of consumption: ultimately, over 90% of all materials extracted and used are wasted. Or, on the flip side, only 8.6% make it back into our economy. And it's getting worse: in only two years, global circularity wilted from 9.1% in 2018 to 8.6% in 2020.

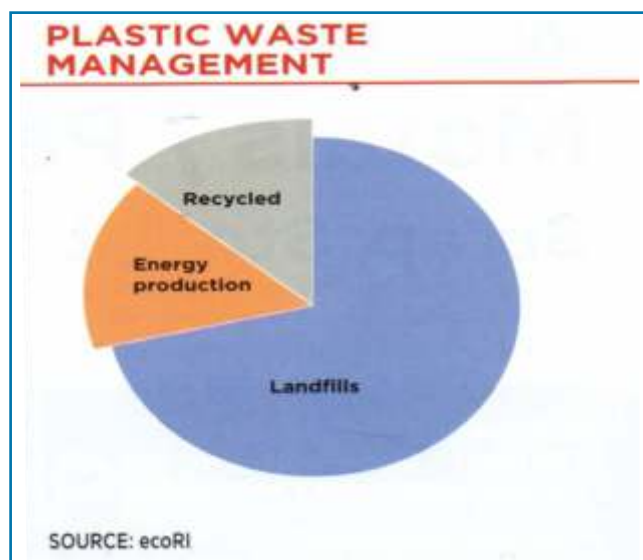
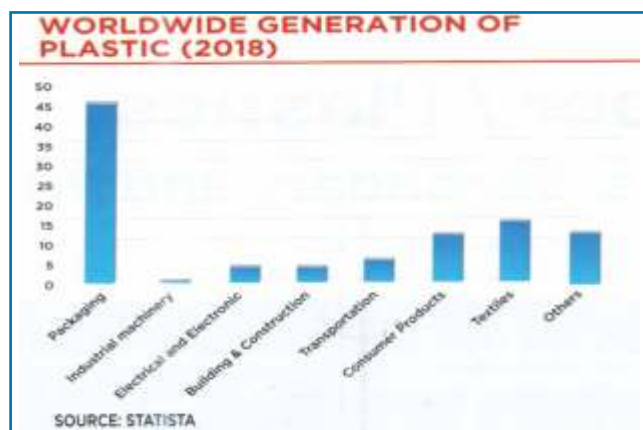
The impact of our throwaway culture on the planet and societies is clear: it's destructive. We are living in a time of rampant pollution and waste, resource scarcity, biodiversity loss and warming global temperatures: all of which are linked in some way to our rising levels of consumption. In the past year alone, a cascade of alarming environmental events swept the globe, from wildfires and storms to floods and droughts. Without action, climate breakdown could displace hundreds of million people by 2050 and result in a catastrophic loss of biodiversity. As industrialisation spread, colonies overseas became the markets for new products—but were also heavily exploited for raw materials to feed further production. Economic growth in such countries was also impeded as imperial powers stifled competition; Portugal, for example, banned most cloth manufacturing in colonial Brazil for decades in the late 18th century—just one of many examples of how social inequalities grew in tandem with environmental degradation. Over this period, the use of natural resources, including fossil fuels, increased tremendously and has continued to increase at an exponential rate. Now and for the past 200 years, the hallmark of global consumption and resource-use can be aptly described as 'take-make-waste': a linear economy.

Cities are responsible for 60% of resource consumption, 70% of global waste and 70% of global GHG emissions. They are also hubs of infrastructure, innovation, manufacturing and business, and are thus crucial locations in which circular economy actions must take place. Even in cases where national governments may not provide suitable enabling conditions for circularity, there are a number of ways in which city governments can integrate and support it through their policies and day-to-day decisions and operations (public procurement, for example). Local governments often have jurisdiction over waste collection, public transport networks, urban planning and local economic development, and are in many cases able to implement impactful changes more rapidly than national governments can.

Circular Economy is Key

*While the whole world is determined to find an environment friendly solution for handling and managing plastic waste, a circular economy approach would have immense benefits, suggest **Dr. Rakesh Kumar Jain** and **Prof. Abhishek Sharma**. While giving an overview of the plastics waste management conundrum, they suggest that all stakeholders need to come together for coordinated action.*

A world without plastics is unimaginable! Plastic waste is flooding our planet. Since the late 20th century, dependency on plastic products is considerably on the rise. About 50% of the total plastic used worldwide is single use plastic, which is disposed by the consumer in an open environment. Consequently, about 389 million tonnes of plastic waste is generated world wide every year and more than 65% of it ends up in landfill. Asia alone contributes to 51% of the total plastic waste generated throughout the world. In India, about 25940 tonnes per day of plastic waste is generated out of which 40% remains uncollected. The increase in plastic waste and its associated hazards have raised an alarm. The quantity of plastic waste generated has almost doubled in the past 5 years.



The problem of plastic waste has further intensified due to the ongoing COVID 19 pandemic, as it has tremendously increased the demand of single use plastic. In many countries, single use plastic legislation has been either withdrawn or postponed given the increasing demand of PPE kits, medical gloves, and face shields. A major portion of this waste is dumped into the environment. The severity of the adverse impact on the environment caused by such disposal is compounded by the fact that unprocessed plastic waste continues to accumulate and takes years to degrade into smaller fragments. The process of polymer degradation is associated with the release of harmful gases and toxic chemicals that may eventually cause other types of soil, water and air pollution.

It is well-established that plastic has an adverse impact on the environment. However, it is difficult to find eco-friendly alternatives to all plastic products. Therefore, a complete ban on plastic products would be a major challenge till an alternative viable solution is invented and made available.

To reduce pollution caused by plastic, India has taken the significant step of prohibiting six different types of single-use plastics (plastic bags, cups, plates, small bottles, straws, and certain types of sachets). The decision has been well received, yet efforts are required to further develop guidelines related to the grades of plastics available and standard operating procedures (SOPs) for handling plastics and their effective disposal; as well as facilitating the availability of alternative materials. Alternatives to plastics are emerging and being explored, but the cost of their widespread usage is still prohibitive. Efforts are focused towards adopting packaging designs / materials that can potentially replace or phase out the applications of various forms of plastics with ecofriendly options.

The ban imposed on plastic materials offers a tremendous opportunity to the paper industry with a potential to shift from plastics to paper and board for packaging applications. To position paper and board as viable alternatives, the industry must ensure that the developed materials are not only cost effective but also as functionally effective as plastics.

The major consumers of packaging plastics are the food, pharma and health sectors. Packaging material used for wrapping or protecting products from such sectors must primarily possess good strength and impermeability, along with other properties. For example, to replace single use plastic disposables intended to wrap food items, cups and containers, any alternative materials (such as paper or paper boards) must be oil resistant (oleophobic). This can be achieved by LDPE poly extrusion on one or both sides of the paper/board depending on its end use. However, the total LDPE coating (which forms only 6-7 percent of the total weight) is prohibited as it results in the generation of significant quantities of plastic waste when the coated paper waste is recycled. R&D is underway to explore emulsion-based surface coatings for water proofing or simultaneous resistance to water and oil. However, the feasibility of such potential options is still being explored, given also the fact that the cost of applying such options is higher than using LDPE coating.

PLASTICS IN PAPER RECYCLING PROCESS

As discussed earlier, the restriction on single use plastics presents an immense opportunity for the paper and board industry in India to diversify into packaging applications.



Recycled wastepaper has emerged as one of the major raw materials for paper and board production. Approximately 73% of India's total production (around 15 million tonnes/annum) of paper and board is based on recycled waste paper as the raw material. In terms of product segments, the packaging segments represents more than 55% of the total paper/board production. The usage of recycled wastepaper as a raw material provides immense economic and environmental benefits to the paper and board production process, and enables the industry to meet the ever-increasing demand for pulp and paper, both, in India and globally.

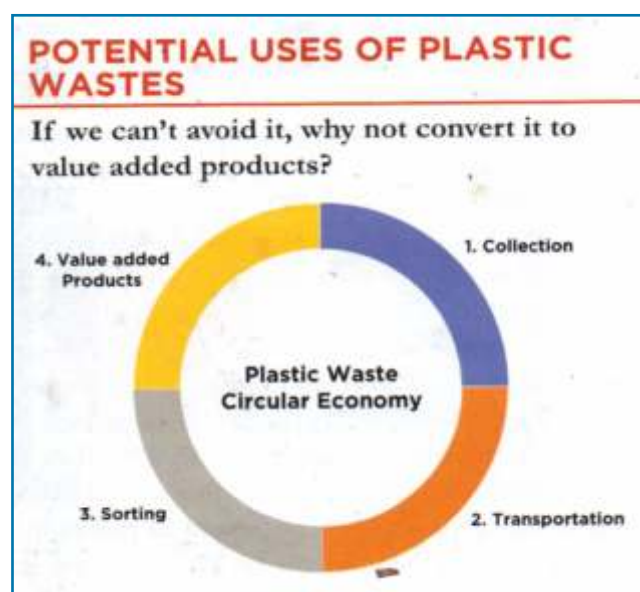
Recycled waste paper-based mills are faced with an issue of unseparated plastics in the incoming recycled

waste paper they use for production. The raw material contains significant quantities of impurities in the form of plastics, besides other impurities like pins, staples, non-metals, stones, etc. Moreover, the plastic waste does not have any defined characteristics. When paper mills use such plastic-containing raw materials, large quantities of plastic waste are generated (around 2-3% Of the paper produced), which can amount to as much as approximately 10 tonnes of plastic per day from a large paper mill and around 1-2 tonnes per day from a small paper mill. Thus, the plastic in the incoming raw material (recycled waste paper) becomes an issue during the disposal of waste after the paper production process. Paper mills therefore face challenges related to disposal, owing to the regulations and cost involved.

A conventional approach and commonly used method for disposal/ management for such plastic wastes include coprocessing in the cement production:

A conventional approach and commonly used method for disposal/ management for such plastic wastes include coprocessing in the cement production. However, such options are not entirely feasible from an economic and logistical point of view.

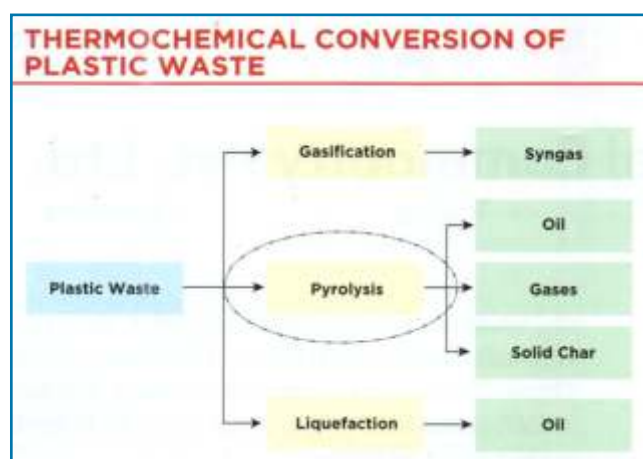
The United Nations Industrial Development Organization (UNIDO), under a project titled 'Development and adoption of appropriate technologies for enhancing productivity in the pulp and paper sector' (2015-2018), supported by the Department for Promotion of Industry and Internal Trade (DPIIT), Government of India, carried out a diagnostic assessment of the Indian paper industry. Among other key challenges, the assessment also highlighted the issue of generation of high quantities of plastic waste in recycled waste paper-based paper mills in India.



UNIDO's recommendation was to encourage mills to sort incoming raw material for removal of plastic at source, i.e., either at the collection site or through segregation of material before the recycled waste paper is used in the production process at paper mills. This would further help in improving the process efficiency and product quality of the paper board being produced, beyond the fact that the paper production process would no longer generate plastic waste. Such plastic waste segregated and collected in bulk quantities at source or at the paper mill sites may be redirected for its utilization/ recycling as input to allied industries. Such a coordinated approach would contribute to a circular economy, narrowing the flows within paper production, but also encouraging extraction and reuse of plastics at appropriate points in the value chain.

BIODEGRADABLE OR COMPOSTABLE PLASTICS

It is also interesting to note that in an effort to reduce the generation of plastic waste, environment regulatory bodies are also promoting biodegradable or compostable plastic as a green alternative. These are the polymers which are degraded under aerobic or anaerobic conditions by microorganisms. Such plastics, as claimed by the producers, may be broken down in smaller fragments (biomass) by microbial activity in few months. In the process, water and carbon dioxide or methane would be generated. However, these engineered bioplastics are not degradable in every condition. They need to be put under specific conditions to enhance their decomposition. Extensive research is required to gain insights about their degradation kinetics, intermediates, and the by-products formed during decomposition before putting them in the market for consumer use.



Another emerging line of investigation is the potential to use plastic wastes as a potential input for other products. This could potentially be achieved through thermal treatment of plastic wastes. Previously, incineration of plastic waste was practiced, however,

the toxic gases and chemicals released during this process caused the suspension of this method. A more advanced process, i.e., the thermochemical conversion of plastic waste into value-added products is gaining popularity. This can be achieved through processes such as pyrolysis, liquefaction, and gasification and can potentially provide a viable way forward.

Liquefaction is a process where the polymer is converted to a liquid product. In the process, the polymer is heated to high temperatures and the oil from plastic is recovered. The major product is naphtha which may be used as a raw material for other chemicals. However, the technology is energy intensive and has not yet gained popularity. In gasification, polymer is heated in air or steam to produce synthesis gas (syngas). Syngas is used in the synthesis of gasoline or diesel and directly as a fuel in boilers to generate electricity.

Academicians and scientists across the world are determined to find an environmentally friendly solution for handling and managing plastic waste

Pyrolysis, among these technologies, is gaining worldwide importance. It is a process in which the plastic waste is heated in the absence of oxygen to break it down into its constituent hydrocarbons (monomers). Primarily oil (fuel) is extracted along with non-condensable gases and char. The produced oil has high calorific value and may be used as a fuel in industrial burners and electricity generators. The solid carbonaceous char obtained as a by-product may be used as a substitute to coal. The non-condensable gases will provide heat energy to the endothermic degradation process and makes the technology self-sustainable with respect to energy requirement. Efforts are being made to make the process techno-economically feasible and environmentally sustainable. This option presents a promising option to handle plastic waste and extract useful by-products resources. Academicians and scientists across the world are determined to find an environmentally friendly solution for handling and managing plastic waste. A circular economy approach, to be adopted at different steps of the value stream, including those for allied industries, would have immense benefits. To begin with, exploring alternative products/materials to replace single-use plastics would be important. The pulp and paper industry, producing paper and board for packaging purposes provides one such alternative.

Further, any such industry that either generates plastic waste or deals with plastic wastes (such as the

presence of plastic in incoming raw material in recycled waste paper-based paper mills) requires an optimization/tweaking of processes. This is illustrated by the efficiency and quality benefits that can be realized if plastics are segregated from recycled paper before paper production in paper mills, as also reducing plastic disposal-related issues for mills. Start-of-the-pipe or 'at source' solutions (such as segregation) would 'narrow the flows' involved in paper production. Lastly, upon generation of plastic wastes, from which ever industries, it is important to facilitate the uptake of viable technologies that allow for the break down and reuse of plastic wastes, instead

of incineration or dumping. Each of these options represents the uptake of circular economy, which would provide a multifaceted approach to the issue of plastic wastes. At this stage where different technologies are being developed and worked upon, a variety of stakeholders, including the government, industry and academia would need to come together for coordinated action.

Dr. Jain is a Technical expert at United Nations Industrial Development Organisations (Unido), New Delhi, while Prof. Sharma is attached to Manipal University, Jaipur. Shraddha Srikant of Unido and Manisha Sharma of Manipal University, Jaipur have also contributed to the article

Source: 9th IMRC 2022

GRF announces #RecyclingHeroes of 2022

The Global Recycling Foundation (GRF) announced the 10 winners of their Recycling Heroes 2022 award on Global Recycling Day, 18th March.

The winners:

Schuler Rohstoff GmbH, Germany: Each year recycles about 280,000 tons of scrap. What is remarkable is that half of the administrative staff of the organisation are women – empowering women and promoting their interest in the recycling industry.

Una Mano per la Scuola, Italy: This committee comprising parents of students who are 6 to 14 years old (students of primary and secondary schools in Inveruno, Milan province, Italy), is raising awareness on recycling & sustainability matters by organising, with the support of the Municipality of Inveruno, for students to collect waste in a 'Trash Challenge' contest to promote recycling along with planting of trees by them.

Vintz Plastic, Kenya: "We are the leading plastic recycling company in Kenya, recycling at least 25 tonnes of plastic waste per day. Our business model is unique because we promote a circular manufacturing economy by making storage tanks and household items using the recycled plastics as the raw material," says the company. "We place a strong emphasis of working with and training women in the process of collecting and sorting plastic."

Baby on the Move, New Zealand: An innovative effort to divert expired child restraints from going to landfills. Instead, the organization has created a stewardship solution of recycling car seats used for protection of infants and children, thereby reducing waste products in landfills.

Ecocykle Limited, Nigeria: A youth-led social enterprise that promotes environmental sustainability, ecosystem restoration, a circular economy, and improved public health by providing effective waste management services to low-income communities who lack sustainable waste management options. Over the last two years, the company has overseen the training of more than 2,000 young men and women, helping them to start their own waste recycling enterprises.

Oasis Association, South Africa: Since 1952, the organisation has grown to support over 566 intellectually disabled beneficiaries. The organisation's activities are all supported through the recycling and thrift initiatives that fund 56% of Oasis' annual income providing sustainable employment in recycling.

Brewster Bros, Scotland, UK: A family business centred on the principles of the circular economy, turning CDE (concrete, demolition and excavating waste) into quality recycled products which can be sold back into the construction industries. This initiative helps to divert tons of waste from landfills to create recycled products.

RecycleForce, Indiana, USA: The organisation is committed to reducing crime through employment and job training, while improving the environment through waste electronics recycling. Since 2006, RecycleForce has safely recycled more than 65 million pounds of electronic waste while providing environmental job training to thousands.

Green Club of Lubanga Primary School, Zambia: School children in the Green Club are promoting recycling by collecting waste drink bottles to make litter bins for keeping the school clean. One of the biggest environmental issues in schools is litter. The Green Club members collect used drink bottles littered around the school and community and use them for their 'Green and Clean' school project.

Norwegian Refugee Council, Norway: NRC is working in Bangladesh to address the existing problem of plastic pollution in refugee camps. Its efforts thus pave the way for more efficient solid waste management. NRC initiated the 'Producing Shelter Materials from Recycled Plastic' project in partnership with Field Ready to recycle the waste plastics produced by the Rohingya refugee community and surrounding host community people, to transform them into safe and sustainable shelter protection products.

Source: Bureau of International Recycling

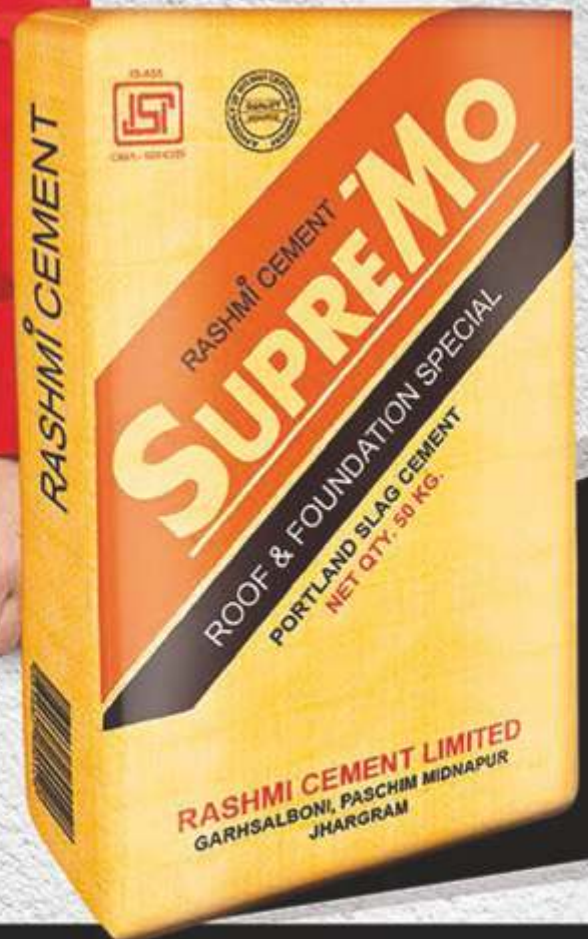


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The Responsible Business Opportunity

Scientific recycling of end of life electrical and electronic equipment is the best way to generate "Resources" rather than mining them, writes B.K. Soni, Chairman & MD of Eco Recycling Ltd., while juxtaposing the present day practices.

The moment we forget our responsibility, the law enters into our lives, then it starts the process of "compliances" for some. Another side of the coin is, we expect doctors, drivers, pilots to do their work with complete accuracy and responsibility but do all professions follow the same standards? This dual standard is based on my simple philosophy, I expect others to do their duty with full responsibility but whatever I do, please consider the same as my obligation!

At this point, I am compelled to reproduce part of a report appeared in Mumbai Mirror on 31st October, 2020:

"Burning of plastic, electronic waste by scrap-pickers along Mahim-Sion Link Rd leaves residents fuming. A fire broke out under the Dharavi bridge, on the Mahim side, on Friday due to scrap burning in the area, with residents claiming they had alerted the authorities to the illegal practice several times.

The burning of plastic and electronic waste by scrap-pickers along the Mahim-Sion Link Road in Mumbai is having a severe impact on the health of people, residents told the reporter, with heavy black smoke hovering over the area for most of the day. Mushtaq Ansari, a social activist and Mahim resident, said repeated warnings have gone unheard. "A big fire broke out today below the Dharavi bridge, and it covered the area in billowing smoke. It was due to scrap burning. I have been raising the issue repeatedly, but no one has paid attention," he said.

A fire brigade official confirmed the cause of the blaze and said: "One fire engine was sent there and the fire was brought under control immediately. There was no major damage." Abdul Wahab Dhoira, an architect, lives on Mori Road, near the Mahim Bus Depot. He said the rag collectors start burning scrap at night and by morning "our locality gets filled with smoke".

"There is no control over the scrap burning. It's mostly plastic and electronic waste, like computers, mobile, etc. The waste comes from the scrap market in Dharavi and unwanted things are thrown here on mangrove land," he said. Mr Dhoira also said that local residents have approached the police several times, but "there is no one to check these illegal activities".

"The entire sky is black. We are not able to breath."

RESPONSIBILITY OR COMPLIANCE

Globally, 50 million tonnes of e-waste gets generated annually and it is increasing rapidly. Interestingly, this so called 'waste' is of great significance and value, commonly termed as urban mine. Broadly, the e-waste consists of 92%-95% recoverable and reusable commodities including precious and rare earth metals, technically the entire 100% is recoverable but because of the higher cost of recovery these elements go for disposal as hazardous substances. In other words, 50 million tonnes of e-waste consists of more or less 15 million tonnes of steel (more than annual production of SAIL), 4 million tonnes of aluminium, 6 million tonnes of copper over and above glass, plastic, silver, gold, palladium, platinum, iridium, etc. In spite of being so resource rich, 70-80% of low value e-scrap goes in landfills because of the high cost of recycling in developed nations and in case of developing nations 95% is treated unscientifically because of lack of willingness to invest in environment friendly practices. Effectively, both the sets of countries are equally harming the environment and polluting the air, water and soil and finally we breathe in polluted air, drink contaminated water and eat polluted food.

To reproduce the above commodities, we need to go deeper into the mines and excavate in multiples to produce required quantities of respective commodities, invest in infrastructure, use billion of units of electricity, millions of man years, which all will generate carbon footprint. The above certainly justifies that scientific recycling of end of life electrical and electronic equipment is the best way to generate "Resources" rather than mining them.

It is evident that demand of such gadgets will continue to increase because of change in technology, status and style. The incremental demand of computing and communication devices are the barometers of socio-economic development. Therefore, I strongly believe that we should not bother about the increase in the quantum of e-waste but focus on the systematic collection till disposal, which does not harm in any way. Man made products have certain life cycle and at the same time natural resources are not available in

proportion to our need and greed. Therefore we must realize that recycling is a parallel industry and we must act faster. It becomes more important if we look at the several other indirect benefits of proper recycling over and above the cleaner and greener environment like better health, lesser medical needs, higher productivity, lesser price, lesser investment in recycling facilities as compared to industry infrastructure required to produce the same commodities, least mining and the least impact on the environment equilibrium.

It is equally visible that the cost of collecting back discarded equipment is always not commercially viable because of the lower recovery value of the commodities and many a time that leads to paper compliance as against Responsible Recycling at higher costs. It is primarily because the majority of the generators of e-waste expects high value of such waste and also expect the recyclers to take away from their door steps and process at their costs and, expenses, barring a few, who loves safer environment.

This attitude gives birth to unorganized dismantlers, who do not care for the environment and openly burn or dilute several items in acids/other hazardous chemicals to recover metals. Here comes the need of stricter implementation of the Environment Protection Act and other relevant Rules. I wish to submit that for the sustainable supply of commodities and greener environment, we have to adopt better practices and should not wait for the Nature to react adversely. For the desired results, the following should be effectively put in place:

1. Liability: GOD (Generator (Producers), Operator (Bulk Consumers) & Destroyer (Recyclers)) has to play the roles as expected.
2. Legislation: Stricter implementation of the Rules to check e-waste reaches for recycling only.
3. Logistic: Shared collection and warehousing network needs to be put in place to control the costs.
4. Liquidity: Monetary support from the Government for reverse logistics and establishment of recycling infrastructure.

To undertake responsible recycling of e-waste, the Recyclers (who are actually the only intermediary between the Regulators & the Producers), the Government must consider a "Package of Incentives" which should include land on long term lease or at a nominal price, subsidy, tax holiday, loan at subsidized rates, infrastructure status to the industry, etc. Also,

the e-waste producers need to follow the global practice of the Polluter Pays. It may sound funny to read but the fact remains, presently many large generators and producers want that the recycling facility must be as per the global standards but rather than paying for such services they look for monetary value as prevailing in Seelampur!



IN SERVICE TO THE INDUSTRY

To provide the best assistance to Individual and bulk producers and consumers, Ecoreco Group has put the following services in place:

1. Nation-wide reverse logistic network - having own fleet of vehicles and TPL
2. Data destruction services
3. Refurbishing & remarketing support
4. World-class machineries for recycling of e-waste
5. Lamp Recycling Services
6. Underwriting Extended Producers' Responsibility (EPR) with material trail
7. Assist in meeting Corporate Social Responsibility (CSR)
8. Door to door collection from Individual generators who believes in Citizens Social Responsibility (CSR) and Environment Protection Responsibility (EPR)
9. Skill Development Program (as a NSDC Funded Partner) as per the E-waste Management Rules for the workers who wants to undertake any role in the E-waste management
10. Installation of Eco-bins to enhance awareness & promote collection.

Source: 9th IMRC 2022

Bangladesh: On the path to a vibrant future

Bangladesh has just celebrated the golden jubilee of its independence. Md. Rashed Khan, Member, Federation of Bangladesh Chambers of Commerce & Industry, relates how his country, once among the most underdeveloped nations in the world, succeeded in achieving significant economic growth and is looked upon as the emerging star in South Asia's firmament

In the first quarter of 2019, Bangladesh's was the world's seventh fastest-growing economy with a real GDP annual growth rate of 8.3% – *International Monetary Fund*

The economy of Bangladesh expanded 5.47% in FY2021, following a revised 3.51% growth in the previous period – *Bangladesh Bank*

Had the global pandemic not happened, Bangladesh would today be the toast of South Asia for a sustained economic growth rate of enviable proportions. The pandemic slowed down the pace of growth for the country and the targeted level could not be achieved, but what is remarkable is that the economy did not totter like the many healthy economies in Europe which went into negative growth due to the pandemic. In fact, Bangladesh continued to record positive GDP growth during 2019-21, which is no mean achievement, considering it has the world's 8th largest population base of over 167 million.

According to World Bank, Bangladesh's GDP was US\$ 324.24 billion in 2020. Though the growth graph fell sharply in the first pandemic year 2020, but the following year itself it scored a remarkable recovery. There is no doubt that Bangladesh's economy will throw up many exciting surprises in the coming years. The trend is quite clear. Projections by the World Bank and IMF indicate that Bangladesh will be among the five fastest growing economies of the world and perhaps the leading one in South Asia in this decade.

But one needs to look back to see how the leap of development has taken place in this country, whose people were one of the world's most exploited and poverty-stricken just 50 years ago. In 1971, when Bangladesh became an independent nation, agriculture was the main economic pursuit of its people. Economic growth was (-)5.5% and the majority of the population lived below the poverty line. The labour-intensive agriculture sector contributed to more than half (51%) of the country's GDP but productivity was abysmally low. The service sector's share of GDP was around 41.3% and an underdeveloped industrial sector – mainly jute and textiles, a refinery, a steel mill, and some factories producing chemical fertilisers and newsprint – contributed the balance 7.7%.

The ravages of the nine-month bitterly-fought

Liberation War with Pakistan had left the economy of the already severely underdeveloped country in tatters. With virtually no public infrastructure – railways, roads, bridges, water and power supply lines were badly damaged in the war – Bangladesh had to depend on foreign aid to remain afloat. As a result, GDP growth in the initial years up to 1980 was only around 3.5%, supported by exports of textiles and agricultural products like jute, as well as remittances from citizens settled abroad, but heavily restrained by socialist government policies and repeated political turmoil.

With the government opening up the economy to private sector participation and foreign investment in the 1980s, Bangladesh's readymade garments sector – the largest export earner of the country today – burgeoned and flourished, along with some other sectors like textiles, pharmaceuticals, leather, jute, etc. With sufficient foodgrain production, healthy foreign investments, inflow of modern technologies and thumping exports, economic growth of Bangladesh really took off during the period between the late 1990s and 2010 and the momentum helped sustain growth around 7% quite steadily thereafter, even crossing the 8% level just before Covid struck the world in 2020. Per capita income in Bangladesh recorded in 2020 was 23 times higher than that in 1973!

How did the picture change so drastically? An analysis of government data over the last five years shows that the manufacturing sector has been steadily increasing its contribution to the country's economy. This sector is now playing a vital role in making the economy bigger and more robust than ever before. Bangladesh, which is now categorised as a developing, middle-income nation, has a modern economy in place, growing in tandem with the benefits being realised from the gradually increasing shares of the manufacturing and service sectors in GDP.

Presently, agriculture's share in the country's GDP is only around 13%. This is a drop of nearly 40% in 50 years! However, Bangladesh is close to becoming self-sufficient in food production for its population. This has been made possible by induction of modern management methods and technologies along with training of those engaged in agriculture for higher agricultural production and productivity.

The biggest cause of Bangladesh attracting attention and applause from planners and economists the world over for its successful growth story has been a structural shift in government strategy towards a more manufacturing- and export-based economy. As a result, the industry and services sectors now account for 35% and 52%, respectively, of GDP. The share vacated by agriculture has been gradually filled mainly by the manufacturing & industrial sector and incrementally by the services sector since the 1990s.

The biggest growth has been in the readymade garment manufacturing industry, which has spawned development and growth of related ancillary industries as well. The apparel industry has played a key role in Bangladesh's upward economic mobility. It provides jobs to around 4.5 million people and dominates the country's export economy. A wide range of readymade garments are exported by Bangladesh mostly to [Germany](#), USA, UK, Spain and Poland. In 2020, Bangladesh was the world's biggest exporter of [non-knit men's shirts](#), jute yarn, jute and other textile fibres, and textile scraps.

The propelling force of the Bangladesh government's manufacturing growth strategy is foreign investment, especially in the segments of readymade garments, light manufacturing, energy, power, agribusiness, banking, telecom and infrastructure. For this, the government offers a spectrum of investment incentives.

The pharmaceutical industry is another developed hi-tech sector that has risen sharply since the early 1980s on the strength of foreign investment. The fact that wages in Bangladesh are among the lowest in the world spurred a flurry of FDI in the '80s and '90s, primarily from the US. During the '80s, other sectors like tea manufacturing, leather factories, etc., also gained importance. Ship breaking, steel, cement and construction industries were developed and gained momentum in the 1990s. From 2000 to 2012, several new industries – including electronics, glass, aluminium, plastics, cycle, ceramics, etc. – started contributing to the economic growth of Bangladesh.

The latest thrust by the government is on information & communication technology (ICT) and business outsourcing. A number of high-tech parks and economic zones are coming up on the country's business landscape and there is a buzz in Dhaka's business circles that a new generation of IT entrepreneurs are eager to take this opportunity to develop artificial intelligence, robotics and disruptive technologies for the export market.

Along with higher exports and a more varied export basket, the integration of the country's economy with

the global economy has also seen increasing remittances from the millions of Bangladeshis settled abroad. Higher remittance share in GDP has enabled higher imports of items necessary for infrastructure development and technology upgradation. Higher remittances have also strengthened the scope of domestic funding of development projects and reduced the need for foreign aid, improving Bangladesh's image in the eyes of the world.

Dr K.A.S. Murshid, Director General of Bangladesh Institute of Development Studies, feels that “Bangladesh is now moving forward according to the ‘flying gauge theory’. Countries that have developed before are flying together like many birds under the leadership of Japan. More countries are slowly joining the flock. The latest to join is Vietnam. I think Bangladesh also has grown wings,” he says. “If we look further ahead, we can see that a lot is happening in Bangladesh, which is not visible in the overall data. We already have heavy industries like steel and cement. However, the chemical industry needs to add more capacities for heavy industry to become more widespread. There are indications that this deficit will be cut soon.”

Dr Murshid continued: “The light engineering and electronic industries in Bangladesh have grown proportionately with domestic demand. When per capita income reaches a certain level, internal demand is created for consumer goods and durables. That is why the demand for electronic products in the country has increased at a huge rate. In this case, even though there was import dependence earlier, now production has started at the local level. Very soon, it is also expected that the export of these products will start after meeting the demand of the local market. In the next 5-10 years, such product-based industrialisation will become more dynamic. Discussions on the manufacturing of automobiles in Bangladesh have just begun. If there is no natural catastrophe, we will be able to progress a long way along this path. And this is the traditional classical pattern.”

The classical pattern of the economy refers to the advancement of the industrial sector, which was almost dormant in Bangladesh for long. Now it is happening slowly. Among the countries in East and South Asia that are now considered to be the new industrialised nations, all except Korea have advanced in the classical pattern.

Economists cite the example of neighbouring India when it comes to increasing the contribution of manufacturing industry to Bangladesh's economy. They say that now India's focus is on the service sector, since its manufacturing sector is not able to play a

significant role. The only service sector in India doing well is ICT-reliant. They are moving forward with this strength, but in a country like India where the unemployment rate is so high, this may be good for some people but there is a fear that it will not be good for the whole country. Economists feel that too much focus on ICT may be counter-productive.

Considering its population, Bangladesh has no choice but to focus on productive industries. Only productive industries can create employment. So this is the most important thrust area for the government. Now contribution of the service sector is also more than before and a lot of attention is being paid to this sector as well. Though now everyone is talking about the fourth industrial revolution, where a large part of the industrial and service sectors will be IT-based, there will be little manpower utilisation. For the classical pattern to succeed, we have to focus on employment.

The President of Bangladesh Chamber of Industries Mr Anwar-ul-Alam Chowdhury Parvez, agrees that an industry-dependent economy is most important for the future of economy in a country like Bangladesh. But a suitable balance has to be found between induction of technology and manpower utilisation. “The manufacturing sector will play a vast role in Bangladesh's future growth there is no doubt,” he remarks. “Today industrial growth is technology-driven and the whole world is moving towards technology-dependent industries. We are still far behind because we still have the responsibility of creating employment

for our people. We have to weigh the benefits of technology against the need to increase employment avenues. We still have to nurture labour-intensive industries to take into account our population. The garments and textiles sector, which is our leading export earner, is one of the largest employers in Bangladesh. Employment will shrink if more technology is introduced in this sector. However, there is a lot of potential for use of manpower in the leather and light engineering sectors. We will also have to take advantage of the labour opportunities that the emerging 30-trillion-dollar market for electric cars will bring. Although far away, what is heartening that we are still thinking on those lines.”

If the future lies in labour-intensive growth in all economic sectors, especially in manufacturing and services where value-addition pays a premium, Bangladesh has to carefully plan and prepare for it. Skill development of the existing available workforce is of utmost importance. If necessary, a separate ministry should be formed to ensure skill development so that it is possible to smoothly build the required technical and professional expertise needed to sustain the country's growth momentum in the future.

Bangladesh is now on the brink of another industrial revolution. What is needed now is a comprehensive overhaul of government industrial policy. With adequate and necessary support from the government, the economy of Bangladesh has the potential to grow ten times more than the present.

Md Rashed Khan is Chairman & Managing Director, Modern Structures Ltd. and Director, Bangladesh Indenting Agents' Association, besides being the General Secretary of the Steel Building Manufacturers' Association of Bangladesh

Sankar Foundation's remarkable surgical performance in FY22

- 25,665 surgeries performed
- 1,50,335 out-patients screened

By Industry Scenario Bureau

Sankar Foundation, among the leading community eye care service providers in north coastal Andhra Pradesh, achieved a remarkable surgical performance during the just-concluded financial year of 2021-22. Total number of eye surgeries performed during the year was 25,665 and a total of 1,50,335 out-patients were treated, which is a record for the organisation which provides services in all sub-specialties of ophthalmology.

Total number of eye surgeries performed during the year was 25,665 and a total of 1,50,335 out-patients were treated, which is a record for the organisation which provides services in all sub-specialties of ophthalmology.



Smt Manimala felicitating good performers of the hospital on the occasion of Ugadi.

Smt KBN Mani Mala, Managing Trustee & CEO, Sankar Foundation, has attributed the notable performance to the commitment and dedicated efforts of the entire organisational collective, including the 16 full-time experienced eye specialists and 17 junior medical professionals supported by 260 paramedical and administrative staff, as well as the outreach team. While congratulating their performance at the beginning of the new financial year 2022-23, Smt Mani Mala called upon the employees to sustain the growth tempo and take the hospital to new horizons in clinical

performance as well as patient satisfaction index in eye care services.

Other annual performance highlights of Sankar Foundation included:

- Total of 22,603 cataract surgeries, of which 9,342 were performed under the District Blindness Control Programme, and 7,190 under Dr YSR Aarogyasree
- 3,062 specialty surgeries
- Retinal surgeries and procedures performed for 1,930 patients
- In March '22 alone, the hospital performed 3,000 eye surgeries

In addition, the hospital's Outreach Team conducted several free door-to-door eye camps, aimed to achieve avoidable blindness and make the selected villages/areas totally blindness free. This free eye screening programme was conducted in Mindi, Durga Nagar (Malkapuram), Mulagada and 7 peripheral villages as well as Yarada village. Treatment was extended for identified patients Under the programme. This effort was supported with financial assistance of various corporates, including SALPG, Coromandal International and Andhra Petrochemical Ltd under their CSR programmes and also by the District Blindness Control Society.



Smt Manimala addressing the employees on the occasion.

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INNOVATIVE AND SUPERLATIVE PRODUCTS FROM JSPL
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Electrotherm, the most preferred steel plant maker up to 1 MTPA globally, is now the business partner of Ergolines (Italy), who is manufacturer and market leader of Electromagnetic Stirrers (EMS) for Caster and EAF, non-radioactive automatic mould level controller and powder thickness measurement and control system.



Caster Electromagnetic Stirrer



MFM - Gaussmeter



EAF-EMS Stirrer



Powder Thickness Control



Mould Level Control

PRODUCT RANGE

- Mould Electromagnetic Stirrer (M-EMS)
- Strand & Final Electromagnetic Stirrer (S-EMS & F-EMS)
- Tundish Stirrer
- LF & EAF Stirrer
- Inductive Mould Level Detector (ILD)
- Ultrasonic Mould Level Detector (ULD)
- Optical Powder Profile Detector (OPD)
- Powder Thickness Measurement and Control System (PTC)
- Automatic Mould Powder Feeder (MPF) and Instrumented Powder Diffuser (IPD)
- Vibrational & Optical Slag Detectors (VSD & OSD)
- Mould Oscillation Checker (OPI)