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Devoted to Foundry & Non-Ferrous Metals Industry

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Bibhu Mishra
President and Head of the
Manufacturing Centre
of Excellence
Hindalco

- **The future of aluminium metal depends on the way it gets recycled**
- **AiRC-1000 sets a new standard for aluminium smelters with laser technology and robotic automation**
- **Automotive Scrapping Policy: Plethora of opportunities**
- **New aluminium capacity to eventually tame rampant prices**

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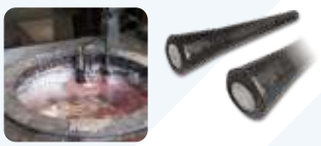

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Editorial Desk

D. A. Chandekar
Editor

Dear Readers,

As we all know, metals industry is one of the core industries and it is the input for many industry verticals. Thus if the economic wheel has to move, the furnaces have to blast and the rolling mills have to run. This was once again proved in the post second wave industry scenario.

There are few verticals which suffered heavy losses during this period and are still struggling to come back on track. Tourism industry is a glaring example. Probably they have to reinvent themselves, completely change their approach and try to redefine the tourism industry. This exercise, I am sure will not only help them to float but also to grow. Though there is no such threat posing the metals industry, and it will continue to operate and produce the required quantity of metals, I am worried about the production and processing technology and cost. Metals being input material for many industries like auto, construction, white goods etc., high metal prices have cascading effect on the prices of finished goods such as automobiles, refrigerators, washing machines and many such products. The customer industries have already started complaining about the high prices. I genuinely feel it is the time for our metallurgists, process experts and technologists have to come out with cost effective technologies, processes of metal manufacturing and processing. We have been hearing a lot about the concepts like 'Green Manufacturing' and 'Eco friendly sustainable growth' but these concepts are not fully exploited on industry platform. Yes, Industry 4.0 can help to increase the efficiency and reduce the per ton production cost, but up to a point. We need a breakthrough technology and process. Can the government, research labs, our ministry put together a development fund and chart a time bound program ? One may feel that I am too much worried about the customers and their costing but mind well, unless our customer industries grow, the metals demand can not grow beyond a point. If we, as a nation want to grow at a reasonable pace, we need exponential growth, not a linear one.

As I am writing this piece, the covid cases in Mumbai are slowly increasing. The doctors and authorities are asking us to get ready and prepared for a third wave. Though I am very sure that we, as a industry are very well prepared for such an eventuality. The first two waves have taught us the proper protocols and behavior during covid. So, let us be ready but not scared for a possible third wave !

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The future of aluminium metal depends on the way it gets recycled

Bibhu Mishra is the President and Head of the Manufacturing Centre of Excellence in Hindalco. He is also responsible for Technology, Projects, Operations and Maintenance, Safety and Sustainability of Hindalco Alumina, Aluminium, Power and Copper businesses. In the past, he was the President & COO of Aditya Aluminium, CEO of Balco and have also worked with NALCO, Aluminium Bahrain & BHP Billiton (Mozal) By qualification, he has done MBA from Heriot-Watt Edinburgh Business School, Graduation in Industrial Engineering and Metallurgical Engineering from NIT, Rourkela. During his vast experience, he has handled mega projects in India, Bahrain and Africa that produces 3% of the global aluminium business and technical experience in Alumina, Aluminium, Copper and Power Plants etc.

Bibhu Mishra had an exclusive interaction with D A Chandekar, Editor & CEO, Metalworld to understand more about the role of technology in the Indian Aluminium Industry.

Many thanks for granting us an interview to be published in the forthcoming issue of 'Metalworld' magazine. Here are few suggestive questions :

What is the status of the Indian aluminium industry with respect to technology adoption as compared with the global norms?

The aluminium industry is very energy-intensive as one ton of aluminium production requires 14000 to 16000 units of electricity. Though aluminium reduces carbon dioxide emission in its application in transportation whereas its production is a carbon-intensive process. Global efforts are continuing in the development of appropriate technologies to improve the situation.

I am happy to inform you that the Indian aluminium industry is continuously transforming and adaptive to new technologies. About a decade back, aluminium industries major smelters have switched over to prebaked anode technology that has less emission and more efficient use of energy.

The pots are the aluminium production units in an aluminium smelter. All the Indian smelters use a high level of automation and digital data analysis at the pot level to control emission by reducing the events of anode effects.

Eventually, we have adopted technologies that use high-quality cathodes that reduce energy, operate the pots more efficiently and last for a longer duration.

In Hindalco, we have two potlines where the technology supplier is RioTinto. We have the advantage of comparing our data with twenty smelters in the Western world. We are leaders in some of the aspects like metal purity and energy consumption.

What are the new technology trends in the Indian aluminium industry?

Indian aluminium industry is steadily going for holistic digitalisation. From logistics to reaching customers, there are various processes involved and service steps where all are adopting digital systems. This provides more visibility and better control of the process, inventory management and improves customer satisfaction.

From bauxite and coal handling to generation of power and alumina production, there is always scope of improvement in quality and reliability.

Hindalco has developed a technology at Aditya Birla Science and Technology Centre (ABSTC) that reduces energy consumption while producing aluminium and manages heat loss when the smelters are without power for long periods. The Indian power supply is not reliable. A smelter cannot survive more than 3 to 4 hours of power interruption. So our technology is relevant to our needs. With right modelling and testing tools, we are capable of deploying our technology in any smelter.

What steps are being taken to achieve long term, environmentally friendly and sustainable growth in the aluminium sector?

In order to achieve the long-term environmental goals, we are focusing on technology to manage our waste material is another key area to remain sustainable in the sector. We generate fly ash and bauxite residues while producing aluminium. Half of the Indian coal is fly ash and as an energy-intensive industry operating its own captive power plants, we face the challenge of the appropriate fly ash disposal.

The aluminium industry works with the cement industry, railways, road construction etc to consume its industrial wastes like fly ash and bauxite residues. At some of the Hindalco plants, we are utilising 100 per cent of its waste material being generated to remain the zero-waste material.

Aluminium plants are also working on having a part of the energy sourced from renewables like solar and wind. In an energy-intensive industry where a steady power supply is crucial for survival, renewable power has its own limitations. In spite of that the progress in this field is worth appreciating.

Bauxite Residue has a very small quantity of rare earth minerals. All primary aluminium producers work with national research laboratories to develop the process for the economic extraction of valuable minerals from this. NITI Aayog works as the catalyst in this project.

Could you please tell us more about Hindalco's future plans in the above areas?

Hindalco has embarked on a plan to remain sustainable for aluminium production with a steady reduction in landfills. Our work is globally appreciated by independent organisations.

Last year, we were recognised as the best aluminium producer with sustainability practice by Dow Jones Sustainability Index. We are also active in shaping the global industry by actively working with International Aluminium Institute. Our work on bauxite residue management and mine backfilling are clear and bold steps.

We are having a clear path for digitalisation where we are working with some of the global players. In certain niche areas, we are working with

start-ups.

Indian downstream aluminium industry has a huge potential to offer world-class products to local customers. It can also be a global player. We are working in this area with several major projects in extrusion and flat-rolled products.

this.

What support does the industry need from the policymakers as regards technology transfer, adoption and graduation?

As a country, we are blessed with some of the best resources of bauxite and coal. If these resources are properly explored, we can be as good as China in aluminium production. We have challenges in sourcing reliable and low-cost power. Right now we are the third-highest producer of aluminium globally. The Eastern part of India, especially the state of Odisha has done well in supporting the aluminium industries where most of the primary aluminium producers are having their factories. With focused problem solving, we can increase aluminium production by two to three times in a decade. Over the years the policy issues are being addressed by various policymakers. We work with them through the Indian Aluminium Association and various bodies that represent industries.

The future of many metals depends on the way they are recycled. Aluminium being a metal of infinite recycling capability needs the right ecosystem in the country. We have access to world-class technology in this field. We are ready to work on

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AiRC-1000 Laser Anode Rod Cleaner.

AiRC-1000 sets a new standard for aluminium smelters with laser technology and robotic automation

Automation Innovation based in Victoria, Australia, has designed and engineered the new AiRC-1000. The system features robotic automation and a high-intensity laser to clean anode rods used in aluminium smelters

Aluminium is one of the world's most abundant metals and is found naturally in bauxite. Whilst Australia is the world's largest producer of bauxite; China is the leading producer of aluminium. Aluminium is highly sought-afterin transportation; construction; electrical engineering; and machinery manufacturing sectors due to its low weight, durable, highly malleable, corrosion-resistant, conductive, affordable, and recyclable nature.

China, United States, Germany, India and Japan have the highest demand for aluminium. However, demand has dropped due to COVID-19 and industry revenue is expected to fall by 3.0% this

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year. Due to economic pressures and a need to remain competitive today and into the future, aluminium smelters face an unavoidable need to reduce energy costs and improve operational and production efficiencies. Smelters are turning to futuristic technologies to meet these


Aluminium cans

Hall-Héroultis the primary method of smelting aluminium today and consists of five process steps: adding bath and alumina; placing the anode rod; electrolysis; tapping;

and primary casting. During the electrolysis stage, a high-energy electric current is passed through the pots via the anode. The current flows continuously from the anode rod(positive) through the alumina/cryolite mix to the lining of the pot (negative) and then onto the next pot. Electricity maintains the temperature of the process at ~950 °C and enables alumina to split into aluminium and oxygen.


Industrial brushes attempting to clean anode rods.

To ensure optimum conductivity of the anode rods; smelters must regularly clean the rod surface. Currently, brushes attempt to clean the rods' surface with inconsistent results; allowing contamination to build up and reduce the rod's conductivity. On top of this, contact with the rods destroys the brushes causing a need for frequent replacement. These outdated cleaning methods result in increased electricity usage and higher operational costs.

Automation Innovation's in-depth knowledge of the challenges the aluminium industry face led them to start their research so that smelters can utilise new technology to reduce electricity costs and improve production efficiencies.


Laser cleaning in action.

Laser cleaning for a greener, intelligent and cost-efficient alternative

Automation Innovation's AiRC-1000 machine offers aluminium manufacturers a new, cost-effective, and progressive alternative by combining high powered laser cleaning technology and

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robotic automation, that facilitates optimum rod surface conductivity.

Automation Innovation's AiRC-1000 machine offers aluminium manufacturers a new, cost-effective, and progressive alternative by combining high powered laser cleaning technology and robotic automation, that facilitates optimum rod surface conductivity.

High-intensity laser light is used to clean the anode rod surface, removing only the contaminant without damaging the rod. Laser cleaning provides consistent cleaning results, major quality improvements and flexibility for different rod surface conditions.

Estimated return on investment of 12 and 18 months. *

The AiRC-1000 delivers significant savings in power cost. The reduced resistance from laser cleaned rods lowers the voltage requirements in the smelting process through increased anode rod conductivity. Manufacturers will also benefit from eliminating premature wearing down of parts, no ongoing consumables, and no additional materials or chemicals required for a greener and safer preferred cleaning solution. The superior non-contact cleaning system requires less maintenance and substantially increases the lifespan of the anode rods.

Inside AiRC-1000 Laser Rod Cleaner.

AiRC-1000 HMI touch screen and monitor with a live camera infeed from inside the cell.

Advanced Controls System and Robotic Automation.

Aluminium smelters can now have an autonomous cleaning system that is future proof with Industry 4.0 integrations and reporting. The advanced controls system has an intuitive user interface for operator ease of use. The system also allows for remote support and machine monitoring.The robotic cell automation enables operation in a 24/7 environment and is fully integrated into existing rodding lines. AiRC-1000 has flexibility for different rod geometries with the ability to clean symmetrical or asymmetrical rods. The system can also be tailored for single- or double-sided cleaning.

Laser manipulation is achieved with industrial robots that have been optimised to increase production output demands. The overhead conveyor input type of the AiRC-1000 can allow for a throughput of up to 500 anode rods per day*. The process ensures cleaning consistency and repeatability.

Aluminium smelters can now be at the forefront of the aluminium industry with an autonomous cleaning system that utilises the latest technology in laser cleaning and robotic automation. They can also benefit from the substantial cost savings thanks to power usage reductions in the smelting process, and the convenience of the AiRC-1000's ability to operate autonomously 24/7.

Automation Innovation is preparing to export the AiRC-1000 internationally. The rapid installation and commissioning of AiRC-1000 means that aluminium smelters globally will not have to wait long to benefit from this technology. ■

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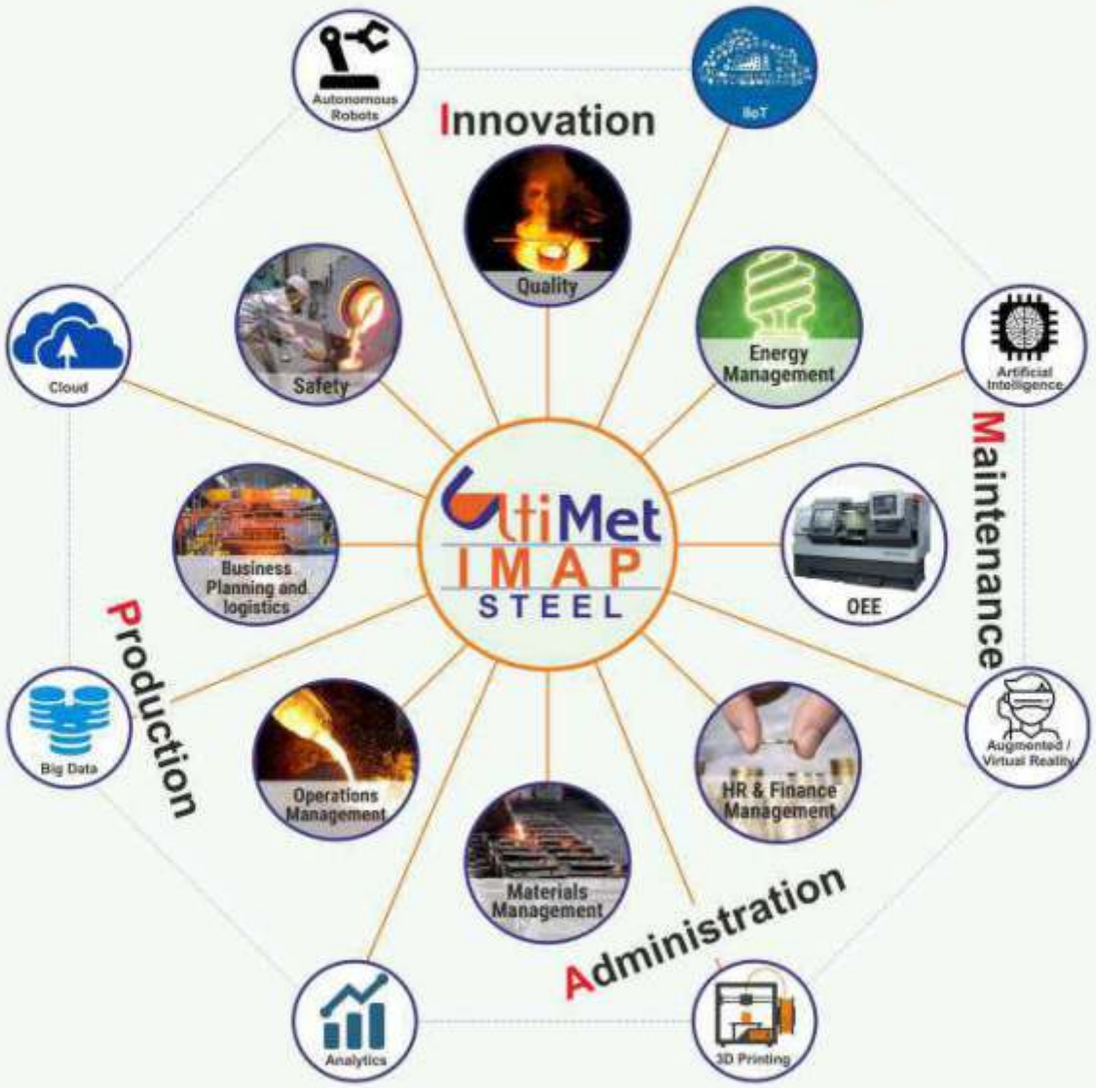

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Vedanta Aluminium shines at the Perform, Achieve & Trade (PAT) Cycle-II scheme by Power Ministry

Vedanta Aluminium Business, India's largest producer of the aluminium and value-added products, has bagged top spots at Perform, Achieve and Trade (PAT) Cycle-II among the Indian aluminium industry.

Perform Achieve and Trade (PAT) scheme is a regulatory instrument deployed by the Ministry of Power, to reduce specific energy consumption in energy intensive industries with an associated market-based mechanism to enhance cost effectiveness through certification of excess energy savings, which can be traded.

Among aluminium smelters in India, Vedanta's subsidiary Bharat Aluminium Company (BALCO) secured the coveted top spot with the highest Energy Saving Certificates, followed by Vedanta Jharsuguda's Smelter I. Vedanta's alumina Refinery at Lanjigarh, ranked highest among peer alumina producers. An alumina refinery is a plant where bauxite is refined into aluminium oxide or alumina, and an aluminium smelter is a plant where aluminium is produced from alumina. These achievements bear testimony to Vedanta Aluminium's robust endeavours towards energy conservation for business and environment sustainability.

L&T completes Hindalco expansion project

The alumina production capacity of the refinery has been upgraded from 1.5 MTPA to 2 MTPA

The metallurgical and material Handling business of Larsen & Toubro has commissioned the 0.5 mtpa expansion project of Utkal Alumina International, a wholly-owned subsidiary of Aditya Birla Group company Hindalco Industries.

With this expansion, the alumina production capacity of the refinery has been upgraded from 1.5 mtpa to 2 mtpa.

L&T MMH has executed this project in a time-bound manner ensuring the most critical process units of the refinery are ready.

The company overcame many difficulties at the remote location of the project including limited material availability, inadequate local skilled workmen, hilly terrain, and heavy rainfall with a prolonged rainy season.

Moreover, the challenging work was completed during the outbreak of Covid pandemic, with 2,000 workmen working at the site with precautions and safety measures.

L&T ensured utmost care for the workmen by providing not only basic amenities but also requisite medical facilities and timely payment of wages to maintain high morale of the workmen and to protect them from infections during this period.

We plan to expand our renewable energy mix further: Rahul Sharma, CEO – Aluminium Business, Vedanta

New Delhi: Vedanta Aluminium has plans to expand its renewable energy mix and is evaluating on-site generation and use of clean energy at their alumina refinery and smelter operations, Rahul Sharma, chief executive officer, Aluminium Business, Vedanta, told recently.

Vedanta Aluminium had recently procured 354 million units of solar and non-solar renewable energy primarily at the Indian Energy ExchangeGreen Market, for its facility at Jharsuguda, in Odisha. This purchase resulted in the reduction of about 0.28 million metric tonnes of carbon dioxide equivalent for the firm.

Dixon, Hindalco, Daikin and 49 others apply for PLI scheme for white goods

Vedanta Aluminium becomes India's largest green power purchaser

Vedanta Aluminium on Monday said it has become India's largest green power purchaser on the Green Term-Ahead Market (GTAM) at the Indian Energy Exchange (IEX) platform in the first quarter (Q1) of financial year 2021-22 (FY22).

The company said that it procured 354 million units of renewable energy primarily from GTAM -- it supports buyers in procuring green energy -- at IEX for its largest integrated aluminium production facility in Odisha.

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Birla Carbon enters energy systems market: Launches lithium-ion, lead acid battery applications

As auto manufacturers strive to meet more stringent CO2 emission requirements, the demand for higher performance lead acid batteries is growing, particularly for start-stop or micro-hybrid vehicles.

Birla Carbon, a carbon black manufacturer, has announced its entry into the energy systems market. Making the announcement at The Battery Show 2021 to be held in Novi, Michigan from 14-16 September 2021, Birla Carbon will present a portfolio of conductive carbon solutions with its Conductex i and Conductex e series of products at the show, along with its forthcoming array of carbon solutions for the battery industry.

Birla Carbon's new portfolio of conductive carbons is designed for the lithium-ion and lead-acid battery markets enabling customisation in formulation and performance in a variety of segments, including automotive, telecoms, motive power, energy storage systems, and e-bikes. The manufacturer states that these products leverage Birla Carbon's unique Ultra process to ensure the highest levels of purity and conductivity, enabling increased charge acceptance, particularly under partial state-of-charge operation.

As auto manufacturers strive to meet more stringent CO2 emission requirements, the demand for higher performance lead acid batteries is growing, particularly for start-stop or micro-hybrid vehicles. These high-performance batteries can unlock 5-15% energy savings enabled by highly engineered conductive carbon additives such as Conductex e carbon black.

The development of the portfolio of conductive carbons tailored specifically for the battery market demonstrates the commitment to the growth of Birla Carbon in the rapidly expanding energy storage arena," John Davidson, Chief Sales and Marketing Officer, Birla Carbon, said. "This is the first example of many high-performance products in our pipeline."

"The Conductex e product portfolio demonstrates Birla Carbon's commitment to the energy storage market and is the first of many new developments that are being launched into the battery application segment," Dr Ann Schoeb, Chief R&D Officer and Business Head, Energy Systems, Birla Carbon, says.

Hindalco's earnings outlook improves with rising aluminium prices

The stable rise in aluminium prices and disruption in global supply of bauxite have kept investor interest in integrated manufacturers such as Hindalco Ltd high.

The recent rally in aluminium prices has lifted earnings outlook for Hindalco, said analysts at Jefferies India Pvt Ltd in their note. Any supply disruptions in bauxite due to political issues in Guinea will further benefit Hindalco as it has captive bauxite mines, they added.

Meanwhile, as Indian operations of Hindalco benefit, the prospects for its US subsidiary Novelis also remain strong. The rise in demand for cans, packaging material, and auto sheets keeps the outlook firm. The demand from the auto sector is surging as companies replace steel with aluminium.

Novelis is also benefitting from rising capacities and the acquisition of Aleris. Novelis, which now contributes almost two-third to Hindalco's consolidated operating profits, is seeing a rise in profitability too.

Novelis Q1FY22 adjusted Ebitda margin (Ebitda per tonne) had risen to $522 per tonne (up 60% year-on-year). The company has raised its Ebitda margin guidance to more than $500 per tonne in FY22, higher than $480-500 per tonne guided earlier.

Aluminium hits 10-year high as demand roars, China supply curbed

Aluminium charged to a 10-year high in London, extending a year-long rebound as demand surges and supply of the usually abundant metal comes under pressure.

Prices rallied as much as 2.9% to $2,726.50 on the London Metal Exchange, hitting the highest since 2011 and moving closer to an all-time high above $3,300 a ton. That's fueling wider inflation concerns with Goldman Sachs Group Inc, Citigroup Inc. and Trafigura Group among those forecasting further gains as the industry braces for a potentially seismic shift into deepening deficits.

Supply is increasingly challenged, particularly in top producer China. The energy-intensive aluminium come into Beijing's crosshairs during a crackdown on pollution, while a seasonal power crunch has also dented output. That drive continued this week as Guangxi province, an aluminum hub in the southwest, moved to cut production.

Fill level Inspection of Molten Aluminium Using AI-Based Machine Vision System

Without a doubt, metals are indispensable to today's thriving industrial landscape. From automobiles and aerospace to construction and packaging, nearly all the industries rely on metals one way or the other. Given its innumerable use-cases, any compromise to its quality or consistency could lead to serious damage.

Traditionally, metal production industries relied on manual inspectors and operators to perform the involved repetitive tasks. Unfortunately, the nature of tasks in metal production poses a threat to these operators' safety. For example, contact with molten metal could lead to severe burns. Not to mention other issues such as higher costs, slower production and lesser accuracy. Thanks to machine vision, we now have a much superior way to automate these hazardous and repetitive tasks.

Record Copper Prices Are Threatening The Global Energy Transition

The supply chain disruptions which marked the early months of the coronavirus pandemic have cast a long shadow. Once economies around the globe began to reopen in the second half of 2020, numerous shortages cropped up across a variety of industries.

Commodity prices skyrocketed. Crude oil, lumber, and important metals like copper and aluminum all saw prices surge to multi-year highs, sending negative effects rippling across the wide range of sectors that depend on these commodities.

The clean energy sector, in particular, has seen its margins squeezed. While renewable energy technologies become more competitive when oil prices are high, the sector is also highly dependent on base metals—including copper, which hit record high prices earlier this year.

Copper, one of the best conductors of electricity, is extensively used in the production of electric vehicles, wind turbines, and solar panels. Offshore wind farms, due to their extensive cabling, are particularly copper-intensive, requiring 9.6 metric tons of copper per megawatt (MW) of energy capacity. Onshore wind farms and solar photovoltaics (PV) are also highly copper-intensive, requiring 4.3 tons and 5 tons of copper per MW, respectively.

The copper market will come under increased pressure as each of these renewable energy technologies is projected to grow rapidly over the next three decades, with knock-on effects for investors in the renewables sector. Indeed, the surge in copper prices is already eroding margins on many clean energy projects.

Norwegian oil and gas company Equinor (formerly Statoil)—now a major developer of wind farms— has begun lowering investor expectations on its renewable projects. The company recently dropped its guidance from 6-10% returns in 2020 to 4-8% this year. Denmark's Ørsted A/S (formerly DONG Energy), the world's largest offshore wind farm developer, said returns on capital employed fell from 11% in the first quarter of 2020 to 7.5% a year later. Danish competitor Vestas Wind Systems saw returns fall from 17.4% to 12.2% over the same period.

If this trend continues unchecked, many renewable projects might become financially unfeasible for all but the biggest companies with the deepest pockets.

Feature

Automotive Scrapping Policy: Plethora of opportunities

Ministry of Road Transport and Highways (MORTH) launched Vehicle Scrappage Policy by amending Automotive Industry Standard -129 (AIS – 219) related to End of Life of Vehicle (ELV) on 13th August 2021. The policy will be effective from 1st October 2021.

The launch of the Vehicle Scrappage Policy is a significant milestone in India's development journey. Vehicle scrapping will help phase out unfit and polluting vehicles in an environment-friendly manner. This will create a viable circular economy and bring value for all stakeholders while being environmentally responsible. Indian ELV policy is based on the twin focus of viable circular economy and reducing polluting vehicles and minimize our metal scrap imports as well. Most of the ELV programs adopted by the US & Europe were designed as stimulus & to give boost Vehicle sales with exception of Germany and Canada. Germany launched ELV with a focus on reducing polluting vehicles from pre-Euro 1 Emission norms adopted in July 1993. Canada targeted vehicles manufactured up to 1995 (accounting for just 27% of all on-road vehicles at that point but two-thirds of vehicular pollution). The government stayed away from providing purchase incentives, with program benefits limited to a choice between C$300 in cash and a public transit pass or car-sharing membership program.

Globally, Mexico was the first country to introduce the ELV policy which was launched in 2003. In the year 20009 many countries adopted End of Life of Vehicle ELV policy under the name Car Allowance Rebate System (CARS). Though globally, CARS is the more well-known program, Germany's 'Umweltpramie' or ' Abwrackpramie' scheme (launched in January 2009) worth € 5 billion, is the largest of its kind to date. US version of CARS adopted in July 2009 was based upon this program. USA made provision of US $ 3 Billion, for this program.

China rolled out CARS policy with the provision of US $ 1 Billion. Canada's voluntary 'Retire Your Ride' launched in January 2009 was focussed on reducing polluting vehicles with the grand success of retiring 1.2 Lac Vehicles against 50,000 vehicles planned originally.

Table 1 below gives an overview of Vehicle Scrappage Policies adopted globally.

Overview of important scrappage policies around the globe

Country	Year	Max incentive offered per vehicle (US$)	Age criteria	Emissions target	Total cost to govt. (US$)
USA	2009	4,500	Under 25	No	3 billion
Germany	2009	5,552	Over 9	No	7 billion
UK	2009	3,336 (split between government and OEM)	Over 10	Yes	500 million
France	2009	1,421	Over 10	Yes	554 million
Italy	2009	5,024	Over 10	Yes	-
Japan	2009	2,500	Over 13	Yes	-
China	2009	2,440	-	Yes	1 billion (2010)
Mexico	2003	Lower of old vehicle value, 15% of replacement vehicle cost or US$ 12,400 (trucks)	Over 10	No	188 million (2004-10)
Chile	2009	24000 (trucks)	Over 25	No	-

Source: Various media articles, International Council on Clean Transportation, Climate and Clean Air Coalition, ICICI Securities

Udayan Pathak, FIE, FASM

CARS program eventually boosted vehicle sales in US as shown in Fig 1, table 2 gives top 10 vehicles which were scrapped & purchased, as an outcome of CARS

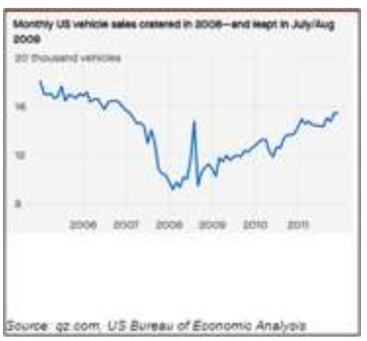

Fig. 1

	Top 10 New Vehicles Purchased		Top 10 Traded-In Vehicles
1	Toyota Corolla	1	Ford Explorer FWD
2	Honda Civic	2	Ford F150 Pickup 2WD
3	Toyota Camry	3	Jeep Grand Cherokee 4WD
4	Ford Focus FWD	4	Ford Explorer 2WD
5	Hyundai Elantra	5	Dodge Caravan/Grand Caravan 2WD
6	Nissan Versa	6	Jeep Cherokee 4WD
7	Toyota Prius	7	Chevrolet Blazer 4WD
8	Honda Accord	8	Chevrolet C1500 Pickup 2WD
9	Honda Fit	9	Ford F150 Pickup 4WD
10	Ford Escape FWD	10	Ford Windstar FWD Van

Source: US Department of Transport, ICICI Securities

In India, ELV policy is focussing on the CV segment. There is a huge fleet of old, polluting vehicles thus boosting fleet modernization in a struggling segment. In India,

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one of the key economic barometers of overall economic activity and freight movement is CV sales.

Unfortunately, the last couple of years it was affected badly for various reasons like the implementation of pollution norms BS-IV in 2017 & BS-VI in April 2020, Covid-19 Pandemic, etc.

Fig 2 gives Vehicle Sales data for the last five Financial Years. The decline or marginal growth in sales is due to various reasons like idle fleet capacity, economic slowdown, and very high installed capacity. Government focus on infrastructure development even during the Covid-19 pandemic (barring the first few weeks) came as a solace.

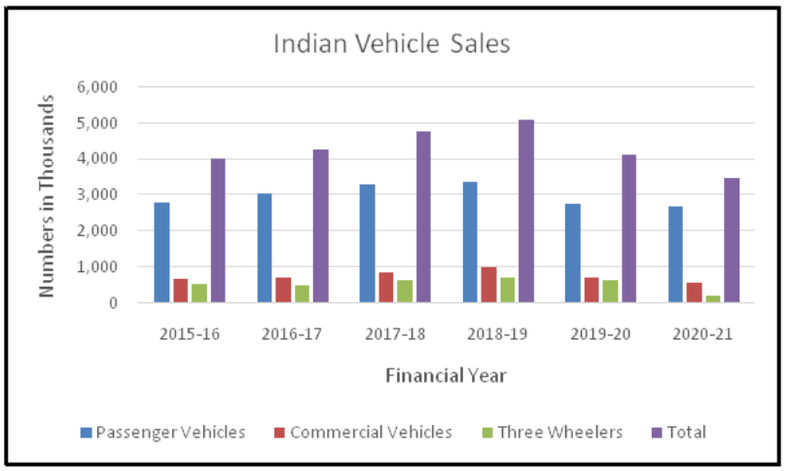


Fig 2 (Source: SIAM)

Steep hike in Re-registration, Periodic Renewal, Transfer of ownership fees clubbed with the networking of online e-challans, handheld devices with identifying defaulter vehicles, system locks for online PUC Certificates and integration of Vahan and Sarathi Portal will bring tighter controls on usage of old vehicles, as well as ownership transfer of older vehicles to rural India.

Fis and Banking sector experts are projecting business opportunities worth Rs 1.3 Lac Crores, leading to healthy, sustained growth of about 8 – 9% in the next three to four years.

Table 4 Estimated vehicle Scrapping (derived from ICICI Securities estimates)

Vehicle Category	Vehicles due for ELV (in Lacks)	Actual Vehicle scrappage (in Lacs, assuming 35% response)
2- Wheeler	148.1	51.8
3-Wheeler	13.8	4.8
4-Wheeler	27	9.5
CV	12	4.2
Total	**200.9**	**70.3**

Apart from direct business opportunities to Automotive OEMs, this scrapping policy will have an impact on all peripheral industries in the eco-system, even a new set of industries will have to be established. Dismantling units will be at the forefront. Tata Nexon is the first Indian car to upload its dismantling information on International Dismantling Information System. There will be a need for systems capable of handling Hazmat like Oils and Greases, Functional Fluids, undeployed airbags that will create huge employment. From these scrap vehicles, an Additional lot of recyclable materials will be segregated. Major materials will be Steel & Aluminium.

It will boost the turnover of the Indian Automobile industry by 30% from the current level of Rs.4.4 lakh to Rs.10 lakh crore over the coming years. and also minimize India's huge import of crude oil bill Rs.10 lakh crore. Attract new investments of Rs.10,000 crore and create as many as 35,000 jobs.

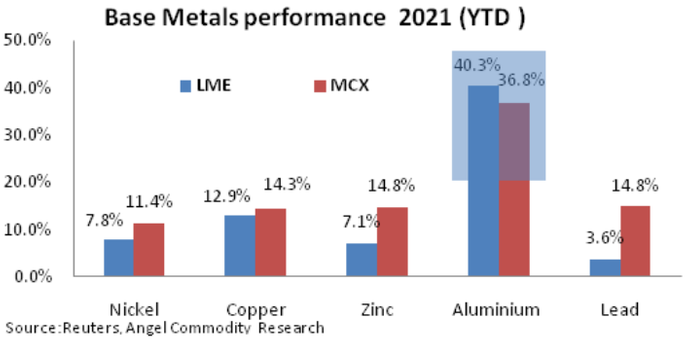
This is an opportunity which Steel and Aluminium industry can leverage. Additional availability of approximately 3 Million Tons of shredded scrap steel and 0.2 Million Tons of Aluminium Scrap is estimated for the next three years. This will not only reduce the current rate of Rs 43,500/ton of shredded scrap but also will also foreign exchange.

Currently, our annual spend for shredded steel scrap is approximately 10 Million US $. This will booster for the steel industry. However, the availability of Aluminium scrap will also increase. This will also give a boost to the Aluminium casting industry. Due to the availability of scrap demand for primary Aluminium ingots will reduce and more and more secondary Aluminium will be used for PDC & GDC. This will also reduce the Carbon footprint of Aluminium parts.

This high Carbon footprint in the virgin Aluminium route is one of the most important factors affecting the Aluminium Casting Industry adversely. Availability of scrapped materials such as steel, plastic, rubber, and aluminum will increase. This will be used in manufacturing automobile parts, which will reduce cost by 30-40%.

To conclude, the recently launched vehicle scrapping policy as per AIS-219 is a plethora of opportunities beyond reducing highly polluting, less efficient vehicles plying on roads, which includes stimulus to the Automotive Industry, new business and employment opportunities, availability of high-quality Steel & Aluminium scrap.

Analysis



Aluminium: the top performer

Aluminium, the light metal, has recorded the highest gains amongstits peer in 2021(over 40 percent on the LME & about 37 percent on the MCX). Disrupted supply from major producer China amid prospects of increasing demand in the times ahead pushed Aluminium prices to record levels across exchanges in the past few months.

In August'21, China's Aluminum production was down for the fourth consecutive month as increased power usage limitations in major smelting regions took a hit on the operational activities. As per the National Bureau of Statistics, China's primary Aluminium production last month stood at 3.16 million tonnes, down about 3.2 percent in July'21.

China's Yunnan province (accounting for 10 percent of China's Aluminium output) have asked the smelters to keep the production levels in the remainder months of 2021 in line with August'21 output.

Even China's Xinjiang regions have ordered five Aluminium smelters to limit their output from August'21 in order to avoid illegal production. China's Xinjiang region accounts for about one fifth of China's Aluminium output.

The continuous withdrawals of Aluminium inventories from the LME monitored warehouse also signaled towards a tighter supply of the light metal. LME Aluminium inventories are down over 30 percent since Mid-March'21.

Moreover, prices for Aluminium ore bauxite from Guinea (the world's second-biggest producer of Bauxite) hit their highest in almost 18 months following the political uncertainties in the West African country. Bauxite prices in Guinea, a top supplier to China, are up about 16 percent in 2021. Increasing raw material prices further supported prices.

Slow growth in China

Aluminium traded higher across border despite the evident slowdown in China's economy. China's Caixin Manufacturing and Service Purchasing Managers Index slid into contraction in August'21. Covid-19 led restrictions, increasing energy usage limitations and high raw material prices took a hit on China's economic activities.

The private sector survey focuses on the smaller and medium sized firms in China. While China has successfully contained the virus outbreak, an evident slowdown in their economy was a considerable headwind for the industrial metal prices.

Outlook

Expectation of increasing limitation on the production capacities in China in an attempt to curb the country's carbon emissions might keep supply tight and prices elevated in the month ahead.

Also, prospects of rising demand from renewable energy set ups, EV batteries underpinned the demand outlook for industrial metals. Even the shift towards a low carbon environment will also require vast quantities of industrial metals which might further support prices.While the demand prospects for Industrial metals seems to be very promising, it is all in the future.

Near term demand concerns reflecting the weakness in China's economy and widening impact of the pandemic might continue to weigh on industrial metals in the near term.

Markets are expected to remain cautious ahead of the outcome of the two-day Federal Open Market Committee meet scheduled on 21st& 22nd September'21. Any Hawkish comments by the US FED chair Jerome Powell during the meet might strengthen the Dollar and push the Dollar priced base metals lower.

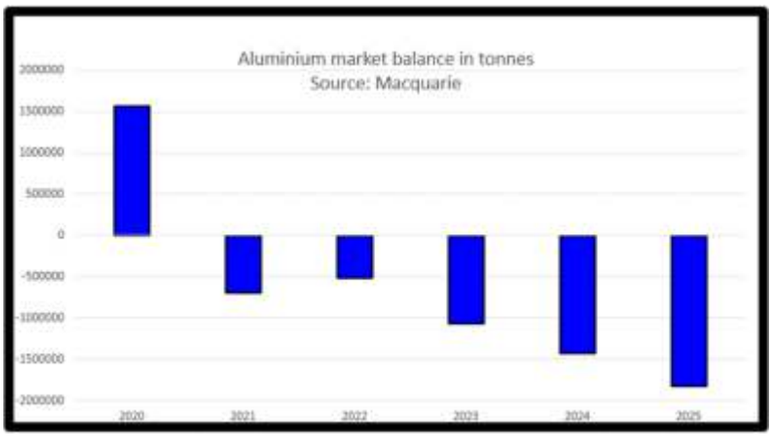
We expect Aluminium prices to trade higher Rs.235 per kg in a months' time. (CMP: Rs 228)

Analysis

New aluminium capacity to eventually tame rampant prices

- A prolonged period of high aluminium prices created partly by output cuts in China is expected to encourage new capacity in other parts of the world, which will eventually weigh on prices trading at 10-year highs as reported by Reuter.

Benchmark aluminium on the London Metal Exchange hit $2,734.5 a tonne on 3rd September, a gain of 37% this year and the highest since May 2011. Aluminium is widely used in the transport, packaging and construction industries.



Robust demand growth, surging freight costs and shortages in Europe and the United States started the rally earlier this year with China picking up the baton in recent months by imposing output cuts to reduce power use and cut emissions.

Deficits and high prices over the next few years will sustain aluminium prices, leading to investment in new capacity in Russia, Malaysia, India and the Middle East, said Macquarie analyst Lynn Zhao.

Zhao estimates nearly 2.35 million tonnes of China's aluminium capacity is currently idled.

“Year-to-date production losses in China have reached 520,000 tonnes. Our 2021 estimate for the market balance has moved from a 530,000 tonne surplus to a 700,000 tonne deficit. We expect persistent deficits through 2025."

Analysts expect global total aluminium demand at around 76 million tonnes in 2025, up 10% from this year, leaving a supply deficit of about two million tonnes.

Aluminium prices are significantly above the marginal costs of production or the 90th percentile on the cost curve, which Macquarie estimates at around $2,100 a tonne on a global basis.

Higher prices could also persuade Chinese companies to build aluminium smelters in places such as Indonesia.

New capacity will have to be supplemented with higher utilisation of scrap, already around 65-70% globally, according to Wood Mackenzie analyst Uday Patel.

"Scrap is the bridge between carbon emissions targets and how we meet them," Patel said. "China is in deficit, it has imported 1.5 million tonnes in the seven months to July after importing two million tonnes last year."

Wood Mackenzie estimates marginal costs at around $1,900 a tonne for China and just above $1,950 a tonne for the rest of the world.

SIAM Statistic

Auto Industry Sales Performance of August 2021

Monthly Performance: August 2021

Production: The total production of Passenger Vehicles*, Three Wheelers, Two Wheelers and Quadricycle in the month of August 2021 was 19,84,676 units.

Domestic Sales:

- Passenger Vehicles* sales was 2,32,224 units in August 2021.
- Three-wheeler sales was 23,210 units in August 2021.
- Two-wheeler sales was 13,31,436 units in August 2021.

Performance: April - August 2021

Production: Total production of Passenger Vehicles**, Three Wheelers, Two Wheelers and Quadricycle in April-August 2021 was 85,30,295 units.

Domestic Sales:

- Passenger Vehicles** sales was 11,42,938 units in April-August 2021
- Three-wheeler sales was 65,474 units in April-August 2021
- Two-wheeler sales was 49,89,144 units in April-Aug

Commenting on the August 2021 sales data, Mr Rajesh Menon, Director General, SIAM said "Indian Automobile Industry is reeling under pressure due to supply chain challenges. The global semi-conductor shortage continues and now it is having an acute impact on output across the auto industry. In addition, high commodity prices are increasing the cost of production. Against such strong headwinds, SIAM members are working hard to meet customers' demand and expectations, while ensuring safety of its people across the value chain.

Looking at the cumulative sales from April to August 2021, Passenger Vehicle segment is still below the level of 2016-17, Two-wheeler segment is still lower than the level of 2011-12, and Three-wheeler segment is behind by many years.

Sales in August 2021, for Passenger Vehicle segment were around 2.32 lakh units, for Twowheeler segment, around 13.31 lakh units and for Three-wheeler segment, around 23 thousand units in the domestic market."

Auto sales in India declined by 11 per cent in August 2021

The total wholesales across categories, excluding commercial vehicles, declined to 15,86,873 units last month, compared to 17,90,115 units in August 2020.

Automobile wholesales in India declined 11 per cent year-on-year in August, as the semiconductor shortage hit production processes across the industry, SIAM said.

The total wholesales across categories, excluding commercial vehicles, declined to 15,86,873 units last month, compared to 17,90,115 units in August 2020.

According to the latest data by the Society of Indian Automobile Manufacturers (SIAM), two-wheeler dispatches from OEMs to dealers declined last month while passenger vehicle and three-wheeler wholesales witnessed an increase over August 2020. Two-wheeler dispatches from the OEMs to dealerships declined by 15 per cent to 13,31,436 units in August, compared to 15,59,665 units in the year-ago period. Motorcycle sales were at 8,25,849 units last month as against 10,32,476 units in August 2020, down 20 per cent. Similarly, scooter dispatches declined 1 per cent to 4,51,967 units last month from 4,56,848 units a year ago.

The total passenger vehicle sales -- including dispatches of cars, utility vehicles and vans -- from OEMs to dealerships increased by 7 per cent to 2,32,224 units in August compared to 2,15,916 units in the same month last year. Three-wheeler wholesales increased 60 per cent to 23,210 units last month as against 14,534 units a year ago.

Commenting on the August sales, SIAM Director General Rajesh Menon said the Indian automobile industry is reeling under pressure due to supply chain challenges. "The global semiconductor shortage continues and now it is having an acute impact on output across the auto industry," he added.

Domestic Sales: Monthly

Category	Domestic Sales (In numbers)		
Segment/Subsegment	August		
	2019	2020	2021
Passenger Vehicles (PVs)*			
Passenger Cars	1,09,277	1,24,715	1,08,508
Utility Vehicles (UVs)	70,837	81,842	1,12,863
Vans	9,015	9,359	10,853
Total Passenger Vehicles (PVs)	**1,89,129**	**2,15,916**	**2,32,224**
Three Wheelers			
Passenger Carrier	50,431	7,935	15,715
Goods Carrier	8,387	6,599	7,495
Total Three Wheelers	**58,818**	**14,534**	**23,210**
Two Wheelers			
Scooter/ Scooterettee	5,20,898	4,56,848	4,51,967
Motorcycle/Step-Throughs	9,37,486	10,32,476	8,25,849
Mopeds	55,812	70,126	52,607
Electric Two Wheelers	-	215	1,013
Total Two Wheelers	**15,14,196**	**15,59,665**	**13,31,436**
Quadricycle	**58**	-	**3**
Grand Total of All Categories	**17,62,198**	**17,90,115**	**15,86,873**

** BMW, Mercedes, Tata Motors & Volvo Auto data is not available.*

Cumulative Sales: April-August 2021

Category	Domestic Sales (In numbers)		
Segment/Subsegment	April-August		
	2019-2020	2020-2021	2021-2022
Passenger Vehicles (PVs)**			
Passenger Cars	6,73,609	3,07,539	5,75,779
Utility Vehicles (UVs)	3,57,741	2,21,251	5,23,012
Vans	60,578	23,639	44,147
Total Passenger Vehicles (PVs)	**10,91,928**	**5,52,429**	**11,42,938**
Three Wheelers			
Passenger Carrier	2,16,924	21,587	42,665
Goods Carrier	47,410	18,435	22,809
Total Three Wheelers	**2,64,334**	**40,022**	**65,474**
Two Wheelers			
Scooter/ Scooterettee	25,61,604	11,30,144	14,10,704
Motorcycle/Step-Throughs	52,02,375	28,22,739	34,03,323
Mopeds	2,75,001	1,82,237	1,70,895
Electric Two Wheelers	-	408	4,222
Total Two Wheelers	**80,38,980**	**41,35,528**	**49,89,144**
Quadricycle	**756**	**-27**	**5**
Grand Total of All Categories	**93,95,998**	**47,27,952**	**61,97,561**

*** BMW, Mercedes & Volvo Auto data is not available, Tata Motors data is only available for Apr-Jun*

Rajesh Menon, Director General, SIAM

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