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Copper recycling to play an important role in India's Circular Economy

MAYUR KAMERKAR,
Managing Director, International Copper
Association, India
International Copper Association,
India (ICA)



■ **BALCO's journey : A story of growth, determination and transformation**

■ **Driving Sustainability Change in the Aluminium Value Chain**

■ **Zinc battery made with crab shells is safe to degrade and recycle**

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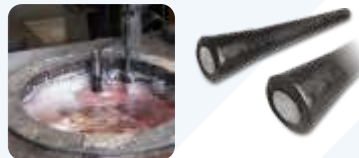
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D. A. Chandekar Editor

Dear Readers,

The metals industry in India now seems to have well settled in terms of logistic linkages, raw materials availability & pricing and also the growing domestic markets. What more can you expect in today's uncertain environment prevailing in most parts of the globe ? Falling currency values is one of the prime indicators of the economic condition and fortunately, Indian currency value depreciated less compared to the currencies of most of the countries. In fact, many countries, including few in the developed world, are fearing of a big depression round the corner where as experts are quite convinced that India is surely not heading towards any depression. Indian economy is driven by domestic consumption and this ensures a continuous forward pull and keeps running the economy wheel. If the economy is doing well and is growing, the core sectors including ours, have to be performing well. In today's era of communication, this positive industry sentiment can't be restricted by the political boundaries and will surely influence the neighboring and nearby economies. Thus I see very good prospects for the metals sector not only in India but in

Editorial Desk



the Asian region as such. Even if the above is true, please to not assume that the metals sector in India is free of any problems. Growth itself comes with so many inherent problems but apart from those, in my opinion, technology adoption is a major problem in Indian metallurgical sector. Barring few top players, majority of casting, rolling and processing units in the country employ primitive outdated technology and processes making inferior quality products, that too at a higher cost and also following wrong shop floor practices and compromising on plant safety parameters. Effect of all this is manifold. Firstly, due to higher cost and inferior quality, one can't compete in the global marketplace, losing the cream business. Higher cost affects the bottomline adversely and prevents the management from doing any developmental and up gradation work. Unsafe environment brings the worker's morale down and affects the overall efficiency of the plant. Slowly good professional employees start leaving such organization and the closure becomes an inevitable consequence, sooner or later. Friends, what I want to say is one should take actions before it is too late. In today's globalised business environment, there is no alternative for technology and process up gradation. Do it in time and you will ride on the growth curve, delay it and get ready to be perished. Choice is yours !

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Copper recycling to play an important role in India's Circular Economy

Copper has emerged as an energy material which will help in reducing the import of fossil fuel in the country. However today, copper is not in the agenda of the government as it is hidden in end use. Hence, there is a need to improve visibility for copper and should have a copper resource security strategy in place contributing to India@2047 vision.

MAYUR KAMERKAR, Managing Director, International Copper Association, India
International Copper Association, India (ICA) is fully committed to improving the quality of life through better Electrical Safety, Energy Efficiency, Clean Energy and Sustainability. ICA India's efforts have been pivotal to advancing better standards, across various products, applications and industries, by leveraging upon the superior technical performance of copper.

However, limited awareness of this element's role in sustainable development crucially affects its application, undermining its importance. Globally, economic growth is contributing to the growth of the copper industry.

Moreover, as the Indian economy grows, increasing disposable income, urbanization, large young working class, formation of large megacities and new cities, and infrastructural push led by the government through various plans and policies, would lead to rise in copper demand across businesses verticals. This surge in demand will witness innovation that will push the industry to adopt energy efficient copper alternatives.



What is the present status of copper industry in India?

As India recovers from the impact of COVID 19 and the economic growth starts to gather momentum, the demand for copper – a key metal with wide industry applications – is bound to see a quantum jump, surpassing pre-COVID 19 levels. Post COVID 19, the key drivers for copper growth are Government's commitment to climate change, clean energy transition and infrastructure push keeping copper demand robust for longer period. The demand for copper in India is largely met through

domestic production (37%), imports (23%) and copper scrap (40%).

What are the prospects?

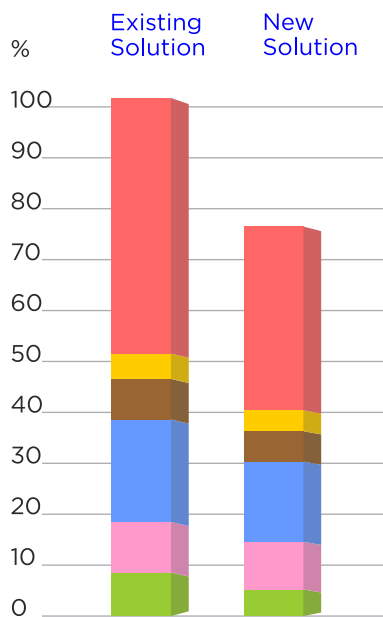
Government of India's clean energy transition, climate change and infrastructure push agenda will lead to robust copper growth in the future. Overall, the growth for copper demand is supported by growth in industrialization, urbanization, infrastructure development, improvement in living conditions, and disposable income of citizens. This can be explained using the S-curve of wealth creation. History has shown that as countries become richer, their

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Face to Face

commodity consumption rises at an increasing rate before eventually stabilizing at much higher levels.

Once the country's GDP per capita crosses the flex point, its commodity consumption begins to rise faster over the following years. Simply put, as more and more people join the middle class, their consumption rises, they tend to use more energy, electricity, automobiles, appliances, etc.

India is at the first stage of S curve and have copper usage per capita of 0.89 kg. In contrast, countries like China and the US consume 8.9 and 5.6 kilograms per capita. However, India is nearing the flex point on the wealth S-curve.

Its GDP per capita soon will be similar where China's was in 2001, right before the last commodity bull market began. Hence, we expect a better future for the Indian copper industry as the bulging middle class will push the demand for copper.

Further, Government's focus on circular economy, making India a developed nation by 2047 and become net zero by 2070 is going to create larger focus on copper metal recycling.

What are the objectives and the activities of ICA India?

International Copper Association India (ICA India) is strengthening the partnerships with local copper industry to participate in India's growth story. ICA India's objective is to support Government in

clean energy transition, climate change agenda and circular economy objectives. ICA India, as part of various technical committees of BIS, is supporting government in formulating and revising various standards, codes and policies related to energy efficiency, electrical safety, and clean energy products based on copper's superiority on environmental and techno-economic performance. ICA India is partnering with various industry and government stakeholders to accelerate implementation of various Government initiatives on clean energy transition.

How is ICA India helping the industry to form safety, recycling norms as well as



develop other specifications?

ICA India is working with air conditioner industry to adopt smaller diameter copper tubes to make cooling systems energy efficient, environment friendly, and economical to meet targets set in India Cooling Action

Plan.

To address the issue of fire safety in the country, ICA India has trained and certified more than 90,000 electricians in past five years. An electrician is a key influencer for selecting the right quality, brand, and size of building wire during the renovation and other minor electrical installations in a house. ICA India is also playing a pivotal role in formulating and revising various codes and standard related to fire & electrical safety such as National Building Code of India, National Electrical Code of India, standard for electrical wiring installations, and fire survival cable.

ICA India is partnering with Energy Efficiency Services Ltd. to develop and implement National Motor Replacement Program (NMRP). This program has not only created large scale awareness in industries to shift from lower efficiency (IE1 & below) electric motors to premium efficiency (IE3) motors but has also helped industries by providing easy finance at affordable prices through the bulk procurement model.

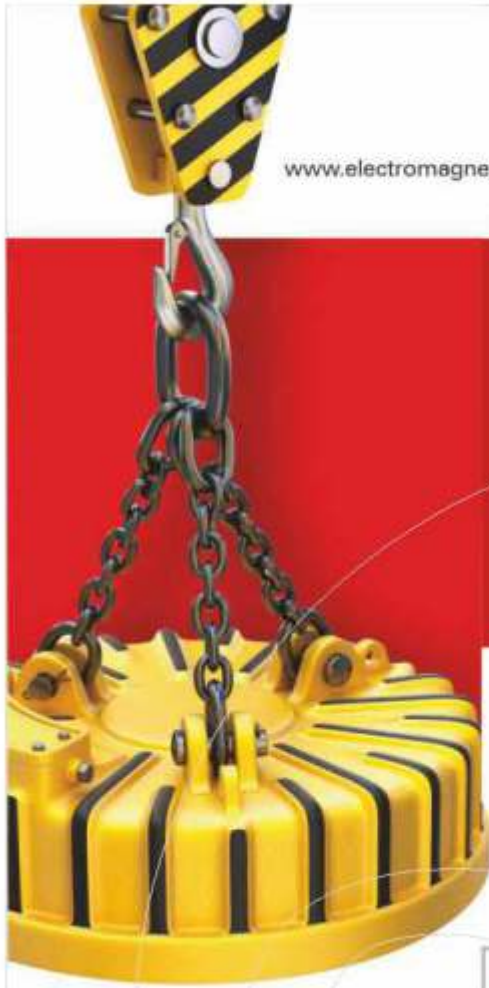
To help decarbonise the road transport sector, ICA India is working with various partners to accelerate the penetration of EVs by addressing barriers like safety and high initial cost through standard, codes, and policy development and large-scale awareness campaign. ICA India has been working with Convergence Energy Services Ltd. (CESL) to aggregate the demand of electric two and three wheelers through an online platform (myev.org.in). Further, in

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Face to Face

collaboration with Power Sector Skill Council, ICA India has developed a comprehensive training module for the technicians who will be operating and maintaining the EV charging stations across India.

To reduce the reliance on fossil fuels and lessen the burden of power subsidy in agriculture sector, ICA has formed an 'Alliance for Solarised Irrigation' (ASI) to serve as a coalition where organizations and individuals can work together to enable and promote increased and sustainable use of solar powered irrigation systems in India. ASI will help in policy advocacy and handhold the state nodal agencies for better implementation of the government schemes.

ICA India is collaborating with primary and secondary copper industry to improve the quality of copper used on various end-use products. ICA India is contributing to develop India's non-ferrous recycling policy to formalise the copper recycling sector and meet government's larger objective of circular economy.

What are the expectations of ICA India from the policy makers with respect to the copper industry?

Copper has emerged as an energy material which will help in reducing the import of fossil fuel in the country. However today, copper is not in the agenda of the government as it is hidden in end use. Hence, there is a



need to improve visibility for copper and should have a copper resource security strategy in place contributing to India@2047 vision. India's annual growth for copper is expected to be around six per cent to support the clean energy transition agenda; and growth in sectors like electric vehicle; infrastructure and housing. These mega trends will need large amounts of copper — right from electrical wires to tubes in the air conditioners — with different intensity. There is an urgent need to develop the Indian copper industry and make it more an organised sector.

Government data on copper talks only about refined data from suppliers like Hindalco,

Vedanta, and Hindustan Copper. This data is much smaller and incomplete without including recycled copper or scrap, which is nearly 40 per cent of the total volume. The biggest challenge facing the copper industry is how the unorganised and recycled data gets organised. Government's recycling policy for all metals — both ferrous and non-ferrous — is to make the recycling industry a visible sector. It will also promote the government's larger objective of a circular economy. The copper quality from recycling is not that good. Overcoming these challenges will take some time and the government is taking steps to overcome these.



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BALCO's journey : A story of growth, determination and transformation

"BALCO is committed to maximizing its efforts towards the advancement of society and environment. Through our continuous endeavors, we aim to achieve the larger goal of creating a sustainable future for generations to come and contribute to the expeditious development of the nation"

Abhijit Pati, Director and CEO of Bharat Aluminium Company Limited.



The past year has been an extended celebration of India's 'Azadi ka Amrit Mahotsav', commemorating the completion of 75 years of its independence. This milestone in our national history paved the way for an Industrial Revolution within our nation, founded on the dreams of the architects of independent India to make it one of the leading countries in the field of science and technology. This resulted in the establishment of numerous industrial units

through the support and partnership of different countries. The genesis of BALCO is written in this journey of India's Industrial Revolution. BALCO is one of the earliest industries which was conceived as an agent of change in making India self-reliant by the country's first Prime Minister, Pandit Jawaharlal Nehru. Bharat Aluminium Company Limited (BALCO), India's iconic aluminium producer and a subsidiary of Vedanta Aluminium has contributed

significantly to empowering the state and country throughout its 58-year journey.

Establishing a new benchmark in industrial excellence within the country, the organization has contributed to the nation's self-reliance by setting milestones in several parameters such as production, productivity, quality, research and development, customer satisfaction, innovation, human resource management and community development.

The company operates a 5.70 lakh tonne per annum aluminium smelter in Korba, Chhattisgarh. It has established itself as a leader in value-added aluminium products that find critical applications in core industries. In its journey of more than half



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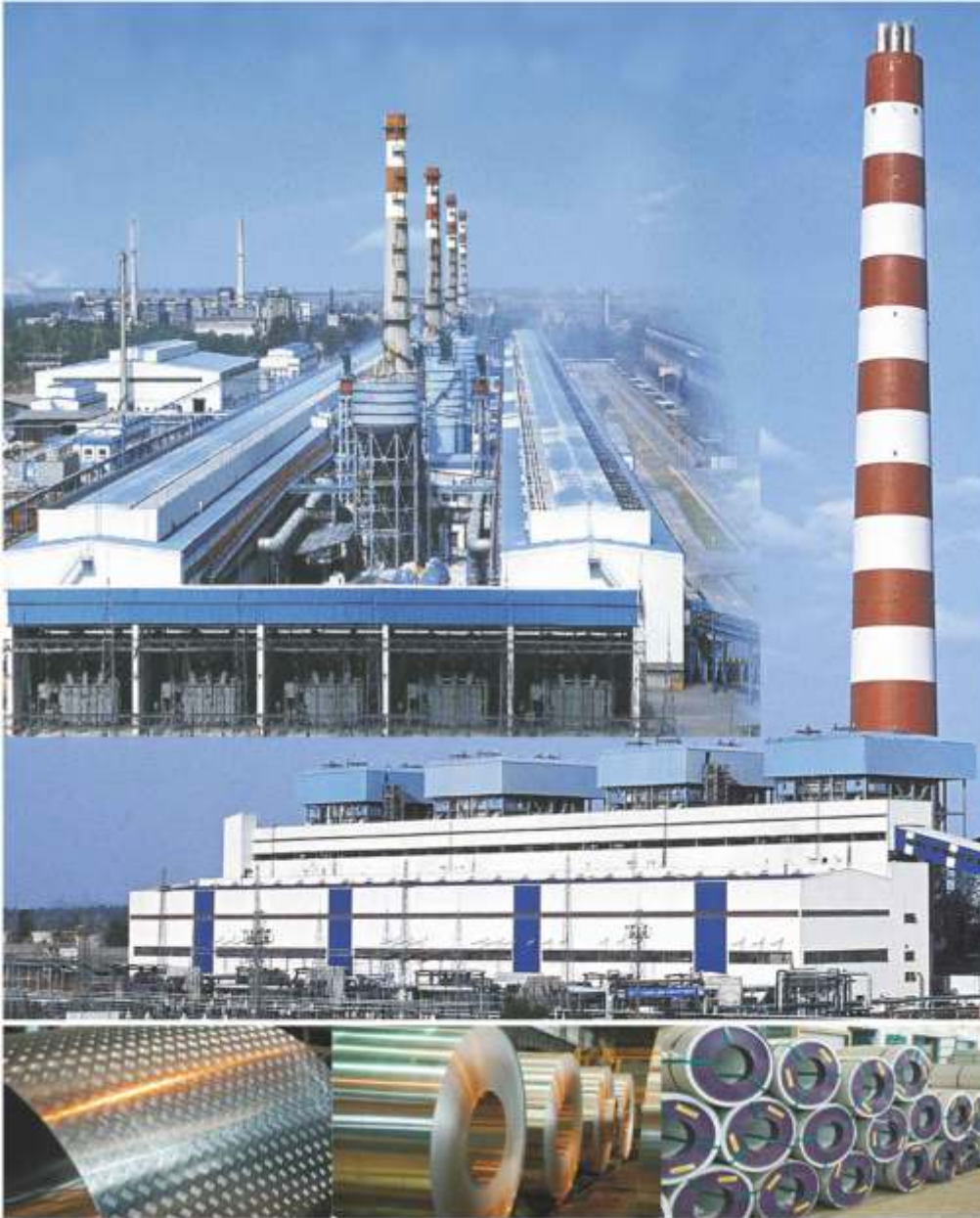


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Feature



a century, BALCO has not only ensured sufficient supply of metal for the critical needs of the country but has also made a significant contribution in projects of scientific and strategic importance. BALCO's aluminium has also been used in many long-range missiles manufactured in the country along with numerous space related equipment.

Transforming Communities
BALCO is actively empowering and supporting

its partner communities in achieving greater economic and social well-being. The organization firmly believes that the socio-economic development of communities is paramount and an integral part of its business operations. The company has a rich legacy and commitment to reinvesting in the development of its communities and nation at large, contributing through focused interventions in different domains of growth. The company touches the

lives of about 1.5 lakh people annually through focused interventions in education, sustainable livelihoods, women empowerment, health & sanitation, sports & culture, and infrastructure development. BALCO's social endeavors reach over 123 villages, and its CSR policies and systems are framed and implemented in such manner so as to deliver sustainable impact on the ground, making these communities equal participants in the progress of the nation.

Fostering Diversity

With a strong resolve to foster a culture of diversity and inclusivity at the workplace, BALCO has become one of the few manufacturing companies in India and the first industry in Chhattisgarh to welcome members of the LGBTQIA+ community. A milestone in BALCO's journey of diversity & inclusivity, the induction of transgender employees has been preceded by gender-sensitization workshops for the entire workforce of the company, with respect to their social and psychological challenges, proper code of conduct and ways of working to build a cohesive and encouraging environment for all. Apart from this, the company has also carried out required infrastructural augmentation to ensure that the new hires feel comfortable, welcomed and have a sense of belongingness within the team.

Committed to Environment Protection
BALCO's sustainable manufacturing practices focus on the economic, environmental, and social



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- ▶ Coatings
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Feature

aspects of manufacturing activities. Aligned to its vision of zero harm, zero waste and conservation of natural resources, BALCO has planted approximately 43.5 lakh saplings till date in the vicinity of its operations. The company is exploring several sustainable options for diversifying its energy sources. BALCO is also the national benchmark in delivering the highest energy efficiency in smelter operations. The company is greenifying its fuel mix for thermal power generation with biomass briquettes, which has the potential of decreasing its GHG emissions by 0.43 million tonnes of CO₂ equivalent annually. Over the years, BALCO has been proactively working for environmental protection and energy conservation, which has today resulted in BALCO's current efficiency as per global benchmarks and lowest total DC & AC power consumption in potline among its peers in the Aluminium sector of India.

Healthcare accessible to all

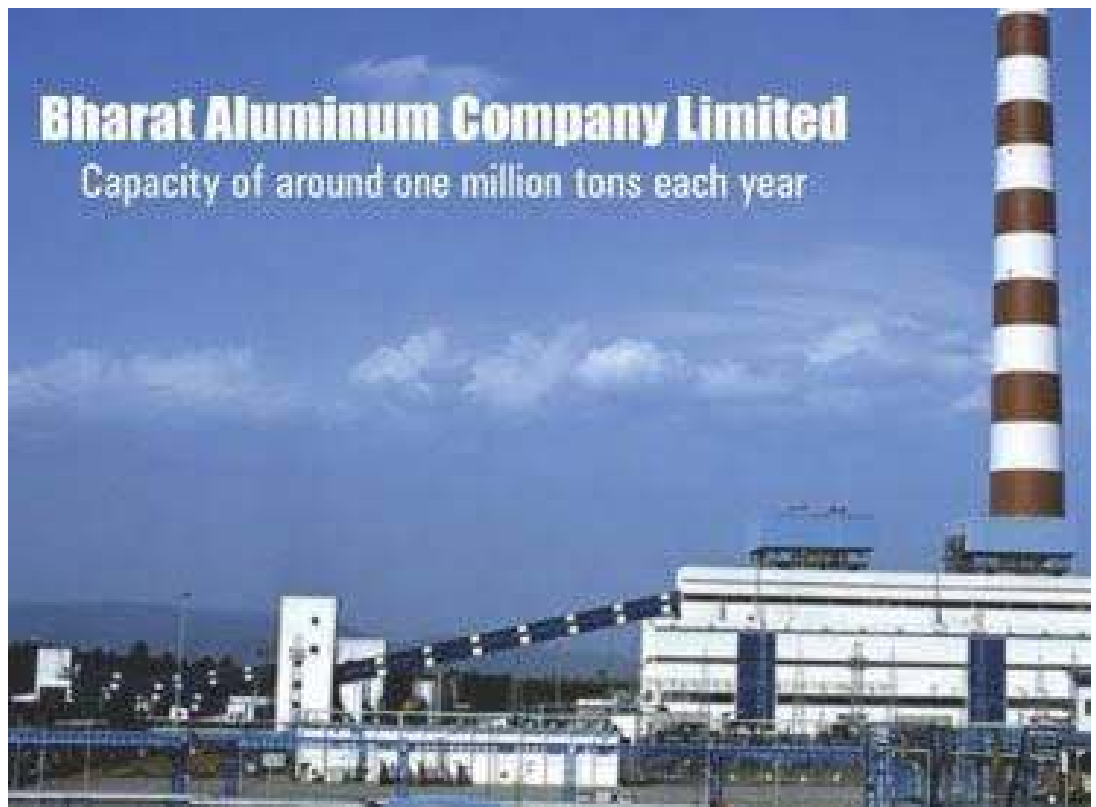
With the objective of making healthcare accessible to all, the multispecialty BALCO Hospital offers comprehensive patient care and the highest standard of medical services through its team of highly trained and specialized medical personnel. The Hospital is manned by paramedical,

nursing, administrative and other supporting personnel to deliver the right healthcare to each individual visiting the hospital.

Providing quality education
Aimed at ensuring access to quality education for the children living in and around BALCO Township, the company-supported Delhi Public School BALCO, Korba (C.G.) established in the year 2012 has been rendering commendable service to society in the form of nurturing global citizens since inception. Within a short span of time, the

benefitting around 5000 students currently.

CEO Quote: "BALCO is committed to maximizing its efforts towards the advancement of society and environment. Through our continuous endeavors, we aim to achieve the larger goal of creating a sustainable future for generations to come and contribute to the expeditious development of the nation. BALCO has been an early adopter of smart technologies for heightened operational efficiencies, which further bolsters the culture of energy optimization, safety, and



school has distinguished itself in the field of education as well as in various cultural and sports activities. Apart from this, BALCO supports 15 schools in the vicinity of its operations which are making education accessible for all in the region,

productivity that we have meticulously fostered across the organization. We are actively exploring innovations that can help reduce our carbon footprint as early as possible in the creation process and deliver sooner on our sustainability goals. ■



Driving Sustainability Change in the Aluminium Value Chain

Who we are

The Aluminium Stewardship Initiative (ASI) is a global non-profit standards setting and certification organisation, formed as a multi-stakeholder initiative to drive a global, sector-wide transformation for aluminium.

ASI is the only voluntary standards system focused on the entire global aluminium value chain, from bauxite mines and recycled aluminium, right through to downstream use sectors.

Why we are

We bring together producers, users and stakeholders in the aluminium value chain with a commitment to maximise the contribution of aluminium to a sustainable society. Working together, we aim to drive change and collaboratively foster responsible production, sourcing and stewardship of aluminium.

Our flagship is an independent third-party certification program that covers both performance and chain of custody. Our certification standards are designed to help the aluminium sector deliver on the 1.5 degree climate scenario and covers a full range of ESG issues while aiming to keep pace with evolving expectations. Beyond the standards, we

engage directly with affected communities and collaborate with partners on data, research and other activities.



issues in the aluminium value chain.

The Performance Standard supports responsible supply chains by:

- Providing a common standard for the aluminium value chain on environmental, social and governance performance
- Establishing requirements that can be independently audited to provide objective evidence for the granting of ASI Certification
- Reinforcing and promoting consumer and stakeholder confidence in the aluminium sector and its products
- Serving as a broader reference for the establishment and improvement of responsible production, sourcing and material stewardship initiatives in metals and minerals supply chains.



What we do

ASI has two Certification Standards:

ASI Performance Standard - defines environmental, social and governance principles and criteria, which address a broad range of sustainability

ASI Chain of Custody Standard - sets out requirements for the flow of Chain of Custody (CoC) Material, including ASI Aluminium, through the value chain (from mining or recycling through to final products), with assurance of sustainable production at each link in the



Analysis

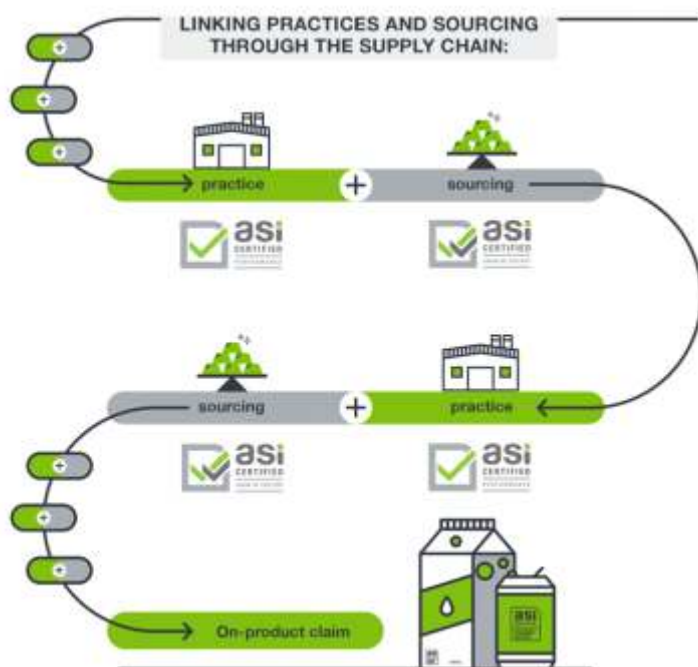
chain. The standard creates a link from company practices to responsible sourcing of products, by connecting Certified suppliers and customers and accounting for material flow.

The implementation of ASI's CoC Standard enables a link between verified practices at successive steps of the supply chain under the ASI Performance Standard, to the products produced by ASI Certified Entities.

requirements that can be independently audited to provide objective evidence for the granting of ASI CoC Certification

- Serving as a broader reference for the establishment and improvement of responsible production, sourcing and stewardship initiatives in metals and minerals supply chains.

The ASI Chain of Custody (CoC) Standard



The CoC Standard supports responsible supply chains by:

- Providing a common standard for ASI Members in the Production and Transformation and Industrial Users membership classes, who wish to implement a chain of custody system for their aluminium supply chains
- Establishing

complements the ASI Performance Standard, and certification against it is voluntary for ASI Members, though is encouraged.

How we help

We aim to drive change by building capacity to understand, agree and deliver measurable and continual improvements in the global aluminium chain. Our standards are open source and publicly available to interested parties who want to participate in this

global movement for change. We have developed online tools for member and auditor training and ASI certification workflows, as well as sharing data and research.

Joining ASI

By joining ASI, companies demonstrate leadership on key sustainability issues within the aluminium supply chain. They also become part of the global effort to drive positive change through collective action.

How to Join

- Apply - Complete the ASI membership information and application form and submit it along with any further supporting documents to info@aluminium-stewardship.org.
- Review - As part of our due diligence, we will contact applicants by email once we receive the application to address any points that need further clarification.
- Approval and Invoicing - Once the application is reviewed and approved, the membership fee invoice will be sent by email.
- Payment and Confirmation - When payment is received, membership is confirmed and the new membership details are published on the ASI website to evidence the new membership status.

Achieving ASI certification

ASI members in the Production & Transformation and Industrial Users membership classes are required to achieve certification against the applicable requirements of the



ASI Performance Standard for at least one facility or product line within the first two years of membership.

The certification process involves:

- conducting a self-assessment against the standards criteria: members are given access to elementAI, ASI's assurance platform and entry point to a wide range of resources to support the certification process
- booking a certification audit and getting audited by an independent ASI-

Learning and Development

- Access ASI's learning program, education AL, and expertise for implementation support
- Strengthen internal capacity as part of continual improvement efforts
- Free or discounted member registration for ASI events
- Member newsletter subscription

Community

- Participate in multi-stakeholder dialogues on responsible production



Value of ASI Membership and Certification

Depending on your goals, ASI membership and certification delivers value in:

Performance

- Improve performance and scale up progress on key environmental, social and governance issues
- Identify and manage current and emerging supply chain risks
- Align practices with relevant regulatory, customer or stakeholder requirements
- Make credible claims which are backed by an independent assurance mechanism

and sourcing

- Network with a community that is passionate about addressing sustainability issues
- Participate in ASI governance, including Working Groups (All members), Committees and/or the ASI Board (Full members)
- Access ASI's member logo, member listing and an exclusive profile page on ASI's website.

Access more information

For further information on joining ASI, please contact Chinelo Etiaba, ASI Membership Director at

info@aluminium-stewardship.org

Useful Links

- Joining ASI
- ASI Training
- Certification Steps

ASI WORKSHOP IN INDIA

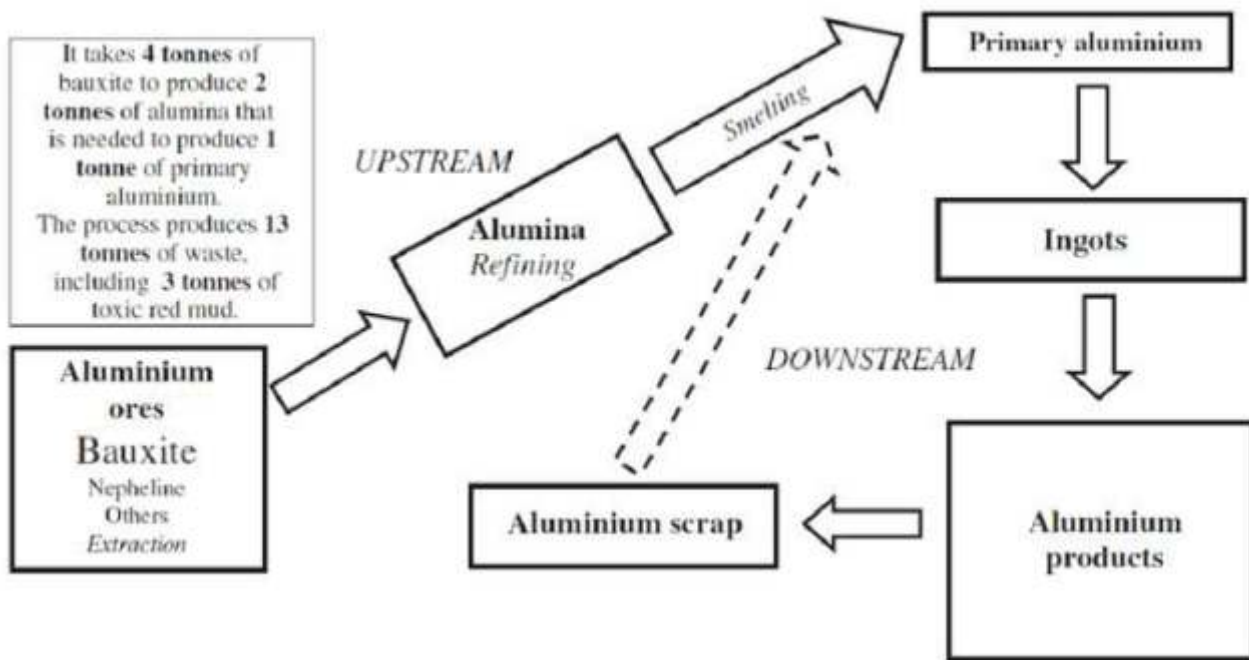
ASI is conducting a one-day special workshop on their certification and standards for primary and secondary aluminium producers of India. This will be held during IBAAS-JNARRDC Aluminium conference and exhibition on 16th September 2022 in Raipur, India. Details of this workshop are available on the event website <http://www.ibaas.info/>

About the IBAAS-JNARRDC Aluminium Conference and Exhibition

International Bauxite, Alumina & Aluminium Society (IBAAS) in association with JNARDDC is holding the Aluminium Conference and Exhibition in Raipur, India during September 14-17, 2022 in Raipur. In this conference, there will be series of papers and presentations on latest developments in the field of bauxite, alumina, aluminium, downstream and non-ferrous metal recycling. About 60 companies / organizations have already confirmed their participation. Organizers are expecting about 250 delegates from all over the world and arrangements are being made at Courtyard Marriott in Raipur for the four-day conference and exhibition. JNARDDC, in association with MRAI and IBAAS, is organizing a one-day brainstorming session on non-ferrous metal recycling in India on the September 17, 2022. JNARDDC is inviting



Analysis



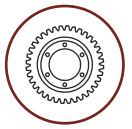
representatives of Ministry of Mines, National Institution for Transforming India (NITI AAYOG) and other policy makers of India for this special program. All secondary metal manufacturers, stakeholders, traders, and businesses that deal with scraps of aluminium, copper, lead, and zinc are invited to participate in this important recycling sessions. On 18th September, a post conference visit to HINDALCO's Lapanga aluminium smelter at Jharsuguda is being organized.



IBAAS-JNARDDC 2022

September 14-17, Raipur, INDIA

Info@IBAAS.INFO www.IBAAS.INFO



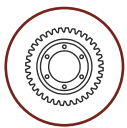
Pragun Jindal Khaitan receives an Young Entrepreneur Innovation Award at SV-TDFS 2022



Pragun Jindal Khaitan, Vice Chairman and Managing Director, Jindal Aluminium has been honoured with the prestigious Young Entrepreneur Innovation Award 2022 at the second International Conference on Startup ventures: Technology Developments and Future Strategies (SV-TDFS 2022) jointly organized by Manipal University Jaipur and Shri Vishwakarma Skill University, Haryana.

The inaugural ceremony graced the presence of Shri Bandaru Dattatreya (Hon'ble Governor, State of Haryana and Chancellor of SVSU), as the chief guest and Shri Raj Nehru (Vice-Chancellor, SVSU) as the guest of honor. The two-day international conference hosted participants from five countries (other than India), including the USA, South Korea, Germany, Taiwan and Denmark.

This prestigious award by SV-TDFS 2022 recognized Pragun Jindal Khaitan's pioneering role and exemplary leadership at Jindal Aluminium. He joined Jindal Aluminium as its director in 2013 and since then, under his able leadership, the company's revenue has multiplied five times to reach an estimate of more than INR 3000 crore. He has also led the flat rolling product division from its inception to make it the second-largest producer in India. His acumen has made



Industry Update

him the driving force behind the transformation, digitalization and success of Jindal Aluminium.

The Young Entrepreneur Innovation Award 2022 was instituted to encourage and recognize innovation and

Director- Jindal Aluminium says, "It was great to witness top universities coming together to promote start-up India, a flagship initiative of the Government of India. Such measures and industry participation is required to

me day in and day out, behind the curtain, to make everything possible. I am sure this initiative will be a stepping stone towards making India the largest start-up hub in the world."

Jindal Aluminium, established in the year 1968 is a market leader in manufacturing aluminum extruded and flat-rolled products. With an even focus on innovation and quality, Jindal Aluminium has always been dedicated to incessant improvement and customer satisfaction. The company is known for its state-of-the-art and world-class facility set up at Bengaluru and aims to exceed customer expectations with its products. Jindal aluminium also has the credit of being one of the first awardees of the HSB certification and ISO 9002 certification in India when it comes to aluminium extrusion companies.

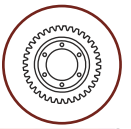


entrepreneurship amongst the youth. The platform provided them with an opportunity to gather a plethora of resources to succeed in their business journey. Pragun Jindal Khaitan, a special invitee to the inaugural event, was also acknowledged as a role model for the youth and society by the esteemed panel which believes that his inspiring story is a source of encouragement and motivation for the upcoming innovators, researchers and entrepreneurs to pursue their entrepreneurial dream.

Pragun Jindal Khaitan, Vice Chairman and Managing

motivate young and budding entrepreneurs and ensure the success of startup India. This event is further testimony to everyone's commitment to making India the world's largest start-up hub. "No matter what, just keep going." This is just a fragment of what I have learned from Dr. Sitaram Jindal, my grandfather and the founder and chairman of Jindal Aluminium that keeps me going against strong headwinds. The Young Entrepreneur Innovation Award 2022, allows me to thank all the people at Jindal Aluminium who work with





Surging Copper demand Will complicate the clean energy boom

The demand for the copper metal used in solar panels, wind turbines and power lines will far outstrip supply, says research firm BloombergNEF.

Copper is one of the essential elements of today's economy, and tomorrow's. It's in the turbines and solar modules that generate electrons, the transmission and distribution lines that carry electricity to consumers, the home wiring that delivers it to dishwashers and iPhones,

and the motors that move everything from elevators to electric bicycles.

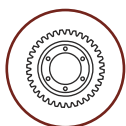
I think of copper as a common carrier, so to speak, of decarbonization. It is literally the wiring that connects the present to the future.

Energy research firm BloombergNEF recently published its first global copper outlook, factoring in demand from the technological changes needed to wean the economy off fossil fuels. Its

Metalworld Research Team

topline finding is striking: Copper demand will increase by more than 50% between now and 2040.

Demand for copper relating to energy transition activities — clean power and electrified transport, and the infrastructure supporting them — will grow about 4% per year between now and 2040. Demand arising from traditional sources like construction and manufacturing of heating and cooling equipment will grow only 1.5% per year over the



Industry Update

same period.

The result of this demand path is that by the end of this decade, transportation will replace construction as the biggest single driver. A decade ago, copper demand for transport applications was less than half of that in construction. By 2040, transportation demand will be one-third greater.

Transportation Overtakes Construction

There is a challenge facing this growth trajectory, and it's not so much acute as it is existential. BloombergNEF expects that primary copper production can increase about 16% by 2040. That increase, needless to say, is rather short of demand. By the early 2030s, copper demand could outstrip supply by more than 6 million tons per year.

Persistent deficit

There will be new primary production, but a copper mine is not quick-ramping. In fact, no new copper discoveries are expected to be operational in the next three years. And while global copper supply is not exactly tapped out, miners now use ore grades of 0.5% copper, a quarter the concentration of a century ago.

But this doesn't mean that the world needs to be structurally short of copper for two decades. For one thing, a shortage leading to high prices could suppress

demand, which would reduce the supply deficit. That would happen, however, at the expense of expansions of clean power and electrified transportation.

Also, copper's very clear demand trajectory should encourage more discovery and exploration. It's not just companies that will be interested — governments will be too, given the possibility of mining royalties. If a government



facilitates mine development with rigorous 'environmental standards, that's encouraging. If their royalty ask is too high, it could dampen investor and developer confidence in new production.

Then there is secondary production, or recycling. At the moment, secondary production meets the entirety of the 4.6 million-ton-per-year gap between primary production and demand. Industrial copper scrap is readily available, but consumer scrap is hard to predict and therefore harder to rely on. Today, the copper

collection rate for consumer and electronic goods is only 53%.

In order to meet the surge in demand, supply from new mines (regardless of ore quality) and recycled sources (regardless of how efficient they might be) will both be needed. The biggest impetus for more supply is demand itself. And the signal from global efforts to decarbonize economic activity is very clear.

Much of the money will go to bringing solar panels, heat pumps and other clean energy infrastructure to communities that traditional investors pass over.

When nearly 2,000 solar panels are installed on top of the Henderson-Hopkins elementary school in east Baltimore next year, they will generate enough carbon-free power for 175 area residents. The project will

reduce greenhouse gas emissions and bring the 'economic benefits of renewable energy to a disadvantaged neighborhood. Yet traditional finance steers clear of ventures like this one, with lenders often wary of the high credit risks, potentially long payoff periods and uncertainty of investing in low-to-moderate-income communities.

For charts

:<https://www.bloomberg.com/news/articles/2022-09-01/copper-demand-to-rise-50-by-2040-as-clean-energy-takes-hold>



Zinc battery made with crab shells is safe to degrade and recycle



Liangbing Hu, Director of the University of Maryland's Center for Materials Innovation

Zinc-based batteries are one of a number of more cost effective, and potentially safer alternatives, and a new breakthrough shows how crab shells might make them a whole lot more sustainable as well.

The demand for energy storage is only expected to grow as we lean more on renewables and electric vehicles for transport, and while the lithium-ion batteries in widespread use today serve us well, there are other architectures with more long-term promise. Mining lithium is expensive and comes with environmental costs, and the batteries that use them don't lend themselves too well to recycling processes. "Vast quantities of batteries are being produced and consumed, raising the possibility of environmental problems," said lead author

**Metalworld
Research Team**

Liangbing Hu, director of the University of Maryland's Center for Materials Innovation.

"For example, polypropylene and polycarbonate separators, which are widely used in lithium-ion batteries, take hundreds or thousands of years to degrade and add to environmental burden."

Scientists are exploring many possible alternatives to the tried and trusted lithium-ion architecture, and zinc-based batteries are an option that could be safer, more cost effective and friendlier to the environment. We've seen scientists demonstrate versions of these batteries that offer high power density and can be produced as cheaply as a lead-acid car battery, for



Technology

example.

"Zinc is more abundant in Earth's crust than lithium," said Hu. "Generally speaking, well-developed zinc batteries are cheaper and safer."

A major hurdle in this field, however, is the short lifespan suffered by zinc-based batteries, and scientists have placed a big emphasis on developing versions that can be recharged reliably. This might involve chemistry tweaks that prevent water damage, or new electrocatalysts that help

same time.

A zinc battery sends ions traveling back and forth between a zinc anode and cathode in an electrolyte solution as it cycled.

Conventional electrolyte solutions in lithium batteries carry flammable and corrosive chemicals, but the authors of this new study developed a gel electrolyte for use with a zinc anode that is made from a natural material called chitosan.

"Chitosan is a derivative product of chitin," said Hu. "Chitin has a lot of sources,

obtained from seafood waste. You can find it on your table."

In their testing, the team showed a zinc battery using their new electrolyte performed impressively. It prevented the formation of tentacle-like growths that can hamper battery performance and demonstrated "exceptional cycling stability," maintaining an efficiency of 99.7% over 1,000 cycles when operating at a high current density of 50 mAh per square cm.

And because of its eco-friendly design, around two thirds of the battery can be broken



maintain their efficiency across repeated cycling. Hu and his team have put another solution on the table which may address the rechargeability issue, and make the devices much more sustainable at the

including the cell walls of fungi, the exoskeletons of crustaceans, and squid pens. The most abundant source of chitosan is the exoskeletons of crustaceans, including crabs, shrimps and lobsters, which can be easily

down by microbes, while the chitosan electrolyte could be completely broken down within five months. The zinc that is left over can then be recycled. "In the future, I hope all components in batteries are biodegradable," said Hu. ■



MoRTH amends battery safety norms, to come into effect from Oct 1



The amendments include additional safety requirements related to battery cells, on-board charger, design of battery pack, and thermal propagation due to internal cell short circuit leading to fire.

Concerned over cases of fire incidents observed in electric two-wheelers, the road transport ministry has introduced additional safety provisions in the battery safety standards which will come into effect from October 1, according to an official release.

The amendments include additional safety requirements related to battery cells, on-board charger, design of battery pack, and thermal propagation due to internal cell short circuit leading to fire.

The notification to mandate amended standards for the respective categories of electric vehicles with effect from October 1, 2022, is in progress, the release said. In April this year, cases of

electric two-wheelers of manufacturers such as Ola Electric, Okinawa Autotech and PureEV catching fire were reported. It prompted the government to form a panel to examine.

"Based on the recommendations of the expert committee report, the ministry on August 29, 2022, has issued amendment to AIS 156- Specific requirements for motor vehicles of L category with electric power train, and amendment 2 to AIS 038 Rev. 2 - Specific requirements for Electric Power Train of motor vehicles of M category and N category (motor vehicle with at least four wheels used for carrying goods which may also carry persons in addition to the goods)," the release said.

L category motor vehicles are those with less than four wheels and is a quadricycle while M category vehicles are at least four wheels used for carrying passengers.

"The notification to mandate amended AIS 156 and AIS 038 Rev.2 standards for the respective categories of electric vehicles with effect from October 1, 2022 is in progress," it said.

The release said the ministry also has issued a draft notification on August 25,

Metalworld Research Team

2022, to amend Sub-rule 4 of Rule 124 of Central Motor Vehicles Rule (CMVR) 1989, for mandating Conformity of Production (COP) for traction batteries used in electric power train vehicles.

The MoRTH had constituted an expert committee, chaired by ARCI Hyderabad director Tata Narsingh Rao, Centre for Fire, Explosive & Environment Safety (CFEES) scientist M K Jain, Indian Institute of Science principal research scientist Subba Reddy and IIT Madras professor Devendra Jalihal as members to recommend additional safety requirements in the existing battery safety standards notified under CMV Rules. Taking the EV fire accidents into consideration, road transport and highways minister Nitin Gadkari in April warned companies of penalties if they were found to be negligent and said they would be ordered to recall the defective vehicles.

Subsequently, Ola Electric recalled 1,441 units of its electric two-wheelers. Okinawa also announced its recall of 3,215 units of its Praise Pro electric scooter to fix any issue related to batteries. Similarly, Pure EV recalled 2,000 units of its ETrance+ and EPluto 7G models.



Hindalco reports highest ever quarterly profit in Q1 at Rs 4,119 cr, up 48%



Hindalco Industries Ltd.'s quarterly profit jumped by almost half from a year earlier, underpinned by strong US sales and higher revenue that cushioned the impact of pricier raw

materials.

Hindalco on Wednesday reported a 47.7% rise in consolidated profit after tax (PAT) at Rs 4,119 crore for the quarter ended June 30, on the back of strong operational efficiencies. That beat analysts' estimates for a profit of Rs 2,850 crore. The company had posted a consolidated PAT of Rs 2,787 crore in the year-ago period, Hindalco Industries, the metals flagship of Aditya Birla Group, said in a regulatory filing. Sales climbed 40% from a year earlier to Rs 58,020 crore.

The performance of Hindalco, controlled by billionaire Kumar Mangalam Birla, was aided by aluminum prices that, while falling over the period, were higher than last year. Global supply chain problems persist, including lower output in Europe, where mills are grappling with soaring energy costs.

"Our performance was backed by strong operational

efficiencies and pre-emptive sourcing of critical raw material, thus ensuring stable operations and higher margins," company's Managing Director Satish Pai said. Pai said that the company delivered a stronger first quarter in spite of rising input costs and inflationary pressures.

The company's revenue from the copper business in the first quarter increased by 48% to Rs 10,529 crore mainly on account of higher global prices of copper and higher volumes.

Hindalco's US unit Novelis Inc. reported a 32% year-on-year increase in sales and \$307 million in net income from continuing operations, it reported last week. The company saw record shipments in North America on strong demand from can manufactures and the automotive sector, although the favorable pricing environment was partly offset by inflationary pressures.

Aluminum consumption in India rose 11% in April-June from a year earlier, led by improved demand from sectors like packaging, automotive, building & construction, consumer durables, and electrical, Hindalco said. Copper demand grew by about 47%, it said.

The company's net debt fell 19% from a year earlier to Rs 42,193 crore at the end of June, it said in the earnings presentation.

Naveen Jindal group weighs aluminium foray, plans depend on mine

Naveen Jindal, Group Chairman, Jindal Steel & Power

The Naveen Jindal group is exploring opportunities in aluminium, but its plans depend on getting a bauxite mine in a business dominated by three large companies.



Vedanta-Lanjigarh bags awards for various social initiatives

Vedanta Limited-Lanjigarh, country's premier producer of metallurgical grade alumina, has bagged multiple awards for its initiatives in the field of environment, healthcare, and education, the company said in a statement on Friday.

The company bagged the first prize for 'Environmental Protection' at the 22nd Greentech Environment Awards-2022, and also stood first with its impactful initiatives in the 'Promotion of Healthcare' and 'Promotion of Education' at the 9th Annual CSR India Award 2022.

"Sustainable development through excellence in Environmental, Social and Governance practices is central to the way we run our operations at Vedanta Limited,



"Sustainable development through excellence in Environmental, Social and Governance practices is central to the way we run our operations at Vedanta Limited, Lanjigarh. We believe that our progress as an organization should create a long-term positive impact on the environment and the community,"

Lanjigarh. We believe that our progress as an organization should create a long-term positive impact on the environment and the community," said GG Pal, Deputy CEO, Vedanta Limited, Lanjigarh.

"Therefore, guided by our ethos of 'Zero Harm, Zero Waste and Zero Discharge', as we strive for operational excellence, we also continue to enable our neighbouring communities with deep interventions in livelihood, skill development, healthcare, education and women and child development, for improving their quality of life," he added.

Vedanta-Lanjigarh's environment-first policy was appreciated by the jury at Greentech Awards. The company's endeavours echo the sustainability targets of Vedanta's aluminium business, which includes best-in-class ESG practices and initiatives, added the statement.



Hindalco Industries earmarks about \$8-bn capex over next 5 yrs: K M Birla



Birla further said that 70 per cent of the company's consolidated cash flows will be allocated towards high-growth downstream segments, including EVs, mobility, batteries and

Consumer durables.

Hindalco Industries Chairman Kumar Mangalam Birla on Tuesday said the company has earmarked a total capital expenditure of about USD 8 billion over the next five years in its arm Novelis and India.

Novelis has found potential investment opportunities of USD 4.5 billion. Birla was speaking at the Hindalco's AGM. He said the company has identified potential investment opportunities of nearly USD 3 billion in India.

Birla further said that 70 per cent of the company's consolidated cash flows will be allocated towards high-growth downstream segments, including EVs, mobility, batteries and Consumer durables.

"On the back of solid financial performance and a strong balance sheet, your company is well-positioned to drive a new wave of transformational growth fuelled by organic expansion."

The company plans to achieve a renewable capacity of 300 MW by FY'25, including 100 mw solar power capacity with hybrid storage.

Nalco's Q1 net profit rises 61% to Rs 558 crore, revenue jumps 53%



National Aluminium Company Ltd (Nalco) on Monday reported a 60.5 per cent rise in consolidated profit at Rs 557.91 crore for the

quarter ended June on the back of higher revenue from operations.

The company had posted a consolidated profit of Rs 347.48 crore in the year-ago period, Nalco said in a regulatory filing. The PSU's consolidated revenue from operations increased to Rs 3,783.32 crore, over Rs 2,474.55 crore last year.

World's most prestigious Half Marathon is now Vedanta Delhi Half Marathon



Vedanta to be title partner of the marathon for next 5 years; #RunForZeroHunger movement aims to make India malnutrition free.

Indian conglomerate Vedanta Limited announced its support for distance running as it inked a five-year deal as the title sponsor for the world's prestigious Delhi Half Marathon, promoted by Procam International. The World Athletics Elite Label Race will now be known as Vedanta Delhi Half Marathon. Along with this, the natural resources major will also be a Social Connect Partner to the Mumbai Marathon and the Bengaluru marathon.

With transformation for a sustainable future at the heart of its business operations, Vedanta's commitment to giving back to society has been a part of its core ethos.

Vedanta's flagship social impact initiative NandGhar, a modernized Anganwadi program, is fast transforming the lives of women and children across the country. Aimed at eradicating malnutrition from the country, Vedanta's #RunForZeroHunger is a mass movement to create awareness to make sure that no child goes to bed hungry.

Vedanta Delhi Half Marathon has been a catalyst for transformation. The event is cemented on five key pillars — health & fitness, communal harmony, philanthropy, a boost to Indian athletics, and pride & prestige to the host city. Each of these pillars has grown into testimonies of success with tangible results. Be it encouraging an active lifestyle, women empowerment, harnessing an entire ecosystem around running, to creating a springboard for Indian middle and long-distance runners with representation and laurels at the international level. Vedanta Delhi Half Marathon is one of the largest sporting platforms for philanthropy and inclusivity that brings together the community at large.

The union of Vedanta and the Delhi Half Marathon accelerates the ability of both to be a catalyst for change and positive impact.

Priya Agarwal Hebbar, Non-Executive Director, Vedanta



News Update

Limited, said, "It's a matter of great pride for us to be a partner for Vedanta Delhi Half Marathon. We strongly believe that India's rise will be fueled by our strong and healthy countrymen. The prestigious marathon celebrates the spirit of communities coming together for catalyzing social impact. As part of our commitment to create a malnutrition-free India, our NandGhars are working towards impacting lives of 7 crore children and 2 crore women across the country. To further this mission, we are calling each one to #RunForZeroHunger – Together we can make it happen."

Over the past 5 years, Vedanta through its various social impact initiatives has touched the lives of around 42.3 million people across close to 1300 villages in the country, spending around Rs. 2000 crores towards socio-economic development in India. The Anil Agarwal Foundation, philanthropic arm of Vedanta, has pledged Rs 5,000 crore over next 5 years to strengthen the rural communities through a sustainable and inclusive growth model.

Anil & Vivek Singh, Promoters, Procam International, said: "It gives us immense pleasure to welcome on board Vedanta as our Title Sponsor for the Delhi Half Marathon. The natural resources major has chosen distance running to make its mark on our country's sporting landscape. Vedanta has been at the forefront of social initiatives and paved the way for the development of our nation. Now with the addition of sport, together we will continue to strengthen the legacy of this event as a harbinger of change."

The 17th edition of the Vedanta Delhi Half Marathon will be held in the Indian capital on 16th October 2022. The event will be flagged off from the iconic Jawaharlal Nehru Stadium and registration for both the physical and virtual races opened on Friday, 2nd September 2022. For more details, please log onto vedantadelhihalfmarathon.procam.in

Sterlite copper plant receives multiple bidders: Anil Agarwal

The Vedanta Group has received 'multiple expressions of interest' for the controversial Sterlite plant in Tamil Nadu and the group will take a call on the bids, Anil Agarwal, Chairman of the Group told *BusinessLine*.

"I have trust in the judiciary. I have no doubt, whether we open it or somebody else does, the plant is a national asset. We have received multiple expressions of interest," said Agarwal. The company is seeking to divest the plant located at Thoothukudi in Tamil Nadu, which has been shut since 2018 after protests on alleged environment norm violation.

Semiconductor unit



Vedanta Group is also evaluating competing offers from Karnataka, Maharashtra and Gujarat for setting up a semiconductor manufacturing plant, jointly with their partner Foxconn. "By the end of this month, we will be able to pin down which State we are going to set up the plant in," said Agarwal, adding that consulting firm BCG is aiding the group in the process.

The overall investment in setting up the semicon plant is close to \$20 billion. "We should be the leader in supplying, not only to our country but also to other countries. It is not about setting up one unit but creating an ecosystem," he said, adding that the initial investment is expected to be about \$8-10 billion dollars.

The new plant is expected to cut imports worth about \$30 billion of semiconductors and display glass. "India imports semiconductors and display glass worth about \$16 billion each. So, with the production of both the products, we could (potentially) reduce \$30 billion of imports."

Alleging that some non-governmental organisations (NGOs) are working to setback India's development agenda, Agrawal said, "Foreign NGOs like Greenpeace or Amnesty use the judiciary, politics and media in a democratic country to push back the development agenda. They want India to just import and consume, not produce and export. They want India to be dependent."

Focus on mining

He further added that along with advanced technology, the country needs a more liberalised mining policy to explore available minerals below the ground. "Whatever a country generates, 70 per cent goes for input — be it oil and gas, gold, copper, or minerals below the ground. We must address below the ground (mining policies) as priority."

The Group, Agarwal said, generated close to \$30-billion revenue across all its businesses in FY22 and expects to reach \$50 billion in two years with additional investments.



Codelco's copper output to fall further in 2023



Chile's Codelco, the world's largest copper producer, expects its output of the red metal to fall further next year amid project delays, local newspaper El Mercurio reported on Wednesday, citing the chairman of the state-owned miner's board.

Codelco lowered its copper production outlook for 2022 to about 1.5 million tonnes last week, blaming lower recovery levels at some of its mines and ore grades at the Chuquibambilla site.

The company previously had expected to produce 1.61 million tonnes of copper this year.

"The production outlook for 2023 is 1.45 million tonnes. For the five-year period between 2023 and 2027, the best forecast we have is 1.5 million tonnes on average," Codelco Chairman Maximo Pacheco told El Mercurio.

Pacheco, who has been the miner's chairman since March, said it was necessary to increase investments in "structural projects" that could offset the natural reduction in the mineral grades.

"To sustain future output, we have to develop projects that maintain that level of production and we're facing difficulties in doing that," he said.

"Structural projects are effectively behind schedule and over budget," said Pacheco, describing discussions over the projects as a priority for Codelco's board of directors. He did not provide further details.

Pacheco also said lithium exploration in the Salar de Maricunga has been slower than expected due to adverse weather conditions this year, but better results are expected during the first quarter of 2023.

Codelco started exploring for the ultra-light metal, which is key for the production of electric vehicle batteries, in Maricunga earlier this year. That location features high-grade deposits, though it is less than 5% the size of Chile's vast Salar de Atacama, one of the world's top regions for lithium production.

Metso Outotec expands minerals processing testing capabilities

Metso Outotec has consolidated its minerals testing services in the USA into a single 5500 m² facility located in York, Pennsylvania. The Test Centre capabilities will be continuously developed with the goal of covering the full minerals value chain to support the mining industry worldwide.



"The volume of testing activity has increased significantly during the last year. With more space and operations in one place, we can do a lot more linked and pilot-scale testing.

The test centre in York specialises in standard and proprietary grinding tests in both laboratory and pilot scale, focusing also on grinding R&D in close co-operation with our office in York. The addition of pyro testing capabilities allows us to run calcining, induration, and drying tests, too. Currently, we are also building new capabilities for bench and laboratory scale thickening and filtration tests," explains Alan Boylston, Director, Process Engineering at Metso Outotec.

"Accurate equipment selection with the appropriate process guarantees requires us to focus in on the details of each customer test program. With the expanded equipment and automation capabilities, we can now do, for example, Planet Positive flowsheet tests with pilot-scale HRC™800e high pressure grinding roll (HPGR) and follow immediately with Vertimill® grinding and filtration testing. The test centre is equipped to find the most suitable and energy efficient solution for any project by performing comparative tests between Metso Outotec's comprehensive range of fine grinding mills including Vertimill, HiGmill™ and Stirred Media Detritor (SMD) grinding mills," says Test Centre Manager Mike Price.

Metso Outotec offers a unique portfolio of testing expertise and circuit simulation to the mining industry. The recently introduced GeminexT digital twin allows Metso Outotec to effectively simulate and test alternative operational scenarios and parameters based on accurate process models and real data. Combined with the extensive testing capabilities provided by the company's global network of minerals test facilities, this allows mining customers to make sound investment decisions as well as use their resources in an optimal way.

The Metso Outotec global network of minerals test facilities covers the whole process from comminution through separation to filtration, refining, and pyroprocessing. The main test centres are in the US, Brazil, Chile, Peru, Finland, and Australia. In addition, Metso Outotec carries out individual tests at several other locations.



Epiroc to acquire AARD Mining Equipment



Epiroc, a leading productivity and sustainability partner for the mining and infrastructure industries, has signed an agreement to acquire AARD Mining Equipment, a South African mining equipment manufacturer.

AARD, based near Johannesburg, South Africa, designs, manufactures, services and supports a wide range of mining equipment, specialising in low-profile underground machines for mines with low mining heights. The high-quality products include drill rigs, bolters, loaders, scalers, and more. The company's customers are mainly in the Southern Africa region. AARD has approximately 200 employees and had revenues in the fiscal year ending 30 June 2022 of approximately SEK 650 million.

"AARD has reputable and reliable products that complement our underground product portfolio well," said Helena Hedblom, Epiroc's President and CEO. "This acquisition will further strengthen our growth ambitions in

Africa and beyond. We are looking forward to welcoming the great team at AARD to Epiroc."

"We are excited about the prospect of continuing to grow the business within the Epiroc Group," added Mike Adendorff, AARD's CEO.

The acquisition is expected to be completed in the next few months.

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Aluminium prices set to rebound as global deficit looms: Report

Aluminium prices have plunged around 45 per cent from March 2022 peak to around \$2,400 per tonne now, driven by Chinese lockdowns and easing supply concerns.

Aluminium prices have likely bottomed out and should rise over the medium term, supported by two structural drivers: limited smelter capacity additions and an uptick in demand, as per a CRISIL Research report.

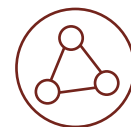
Aluminium prices have plunged around 45 per cent from March 2022 peak to around \$2,400 per tonne now, driven by Chinese lockdowns and easing supply concerns. This followed a stupendous rally over the past two years, driven by strong global economic recovery after COVID-19 abated, and concerns about supply from China and Europe.

Despite the correction, prices are 40-45 per cent higher than the average of \$1,925 seen between 2010 and 2021. Limited capacity additions over the next five years will be

the key to the rebound in aluminium prices. Pertinently, China, which added over 16 million tonne (MT) of capacity over the past decade, is likely to take a pause to reduce



emissions. Aluminium smelting is highly energy-intensive, requiring 13,500-15,000 kWh per tonne.



"Green investments across major economies will lead to a strong uptick in demand for aluminium, but global capacity addition is expected to fall from 20 MT during the past decade to just 3-4 MT over the next five years. The robust demand growth, rationalised supply addition and healthy utilisation levels point to multi-year deficits of 0.5-1.2 MTPA in the global primary aluminium market post-2023," said Hetal Gandhi, Director, CRISIL Research.

Koustav Mazumdar, Associate Director, CRISIL Research, said "Despite the large share of exports, domestic primary aluminium manufacturers are expected to add only 1.4 MT of smelting capacity, goaded by the looming global deficit. Investments in upstream alumina expansions to add over 6.4 MT of refinery capacity will lead to better cost control translating into higher profits. All these capacity expansions over the next five fiscals will cost ₹ 45,000 crore."

Global aluminium output rises 2.1% year-on-year in July



Global primary aluminium output in July rose 2.06 per cent year-on-year to 5.848 million tonnes, data from the International Aluminium Institute (IAI) reported on 22nd August 2022. The estimated Chinese

production was 3.468 million tonnes in July, the IAI said.

Emirates Global Aluminium delivers net profit of \$1.60bln in first half

Emirates Global Aluminium (EGA) reported its best ever half-year earnings as strong operational performance throughout the value chain enabled the company to capitalise on favourable market conditions. EGA's net profit for the first half of 2022 exceeded net profit for the entirety of 2021, itself a record year for the company.

The company's net profit was AED5.9 billion, compared to AED1.7 billion in H1 2021.

EGA's adjusted Earnings Before Interest, Taxes, Depreciation, and Amortisation (adjusted EBITDA) was a record AED7.6 billion in the first half of 2022, compared to AED3.5 billion, in the same period last year.

Sales of cast metal increased by 11 percent to 1.31 million tonnes, compared to 1.18 million tonnes in the first half of 2021.

EGA implemented production creep plans and mitigation measures for global logistics challenges. It supplied more than 400 customers with metal in over 50 countries.

Sales of value-added products or 'premium aluminium'

increased five percent to 1.07 million tonnes from 1.02 million tonnes in H1 2021.

Premium aluminium accounted for 82 percent of total



metal sales, compared to 86 percent in H1 2021, with the company focusing on optimising EBITDA contribution from sales amid the high volatility of alloy metal prices.

EGA's aluminium segment EBITDA margin was 41 percent, compared to 32 percent in H1 2021, leading major global peers.

Al Taweelah alumina refinery's production increased to 1.15 million tonnes of alumina from 1.09 million tonnes in H1 2021, despite a planned maintenance shutdown. EGA sourced around 45 percent of the company's total alumina needs from its own alumina refinery during the period.

Exports of bauxite ore from Guinea increased 11 percent to 6.49 million tonnes from 5.85 million tonnes in H1 2021.

Aluminium prices reached a decade-high during the first half of 2022. While the benchmark London Metal Exchange price declined later in the period, EGA's average realised price for the half-year was \$3,063 per tonne.

Abdulnasser bin Kalban, Chief Executive Officer of EGA, said, "After our record performance in 2021, I noted that EGA could still do better, and indeed we improved our operational performance throughout the value chain from mining to outbound logistics for finished metal. This enabled us to capitalise on strong market conditions. Our net profit for the first half exceeded net profit for the entirety of last year.

"During the first half we worked to debottleneck our operations, optimise our customer and product mix to maximise our revenue, robustly control our costs, and set the course for future growth. We will continue to focus on delivering competitive returns for our sector, however, the global aluminium market develops."



News Update

ZouhirRegragui, Chief Financial Officer of EGA, said, "Our success meant we were highly cash-generative in strong market conditions, enabling us to deliver exceptional returns to our shareholders with an interim dividend of \$600 million and continue to strengthen our balance sheet for the next stage in our corporate journey.

After the end of the first half of 2022, EGA made an AED2.9 billion corporate debt pre-payment. Since January 2021, EGA has pre-paid AED6.5 billion in total while making AED968 million in scheduled payments.

After the end of the half-year, EGA paid an interim dividend of AED2.2 billion to shareholders.

EGA supplied 141 thousand tonnes of metal to UAE customers, enabling the continuing success of one of the UAE's most important industrial sectors and a champion of "Make it in the Emirates" producing everything from car parts to window frames for local use and global export. This was 11 percent of total metal sales.

Researchers propose new Aluminium – Sulfur Battery with Molten-Salt Electrolyte

An international team of researchers led by Quanguan Pang at Peking University and Donald Sadoway at MIT reports a bidirectional, rapidly charging aluminum–chalcogen battery operating with a molten-salt electrolyte composed of NaCl–KCl–AlCl₃. This differs from other aluminum batteries in the choice of a positive elemental-chalcogen electrode as opposed to various low-capacity compound formulations and in the choice of a molten-salt electrolyte as opposed to room-temperature ionic liquids that induce high polarization.

The multi-step conversion pathway between aluminium and chalcogen allows rapid charging at up to 200C, and the battery endures hundreds of cycles at very high charging rates without aluminum dendrite formation. A paper on the work is published in *Nature*.

The researchers showed that the charging rate was highly dependent on the working temperature, with 110 degrees Celsius (230 degrees Fahrenheit) showing 25 times faster rates than 25 C (77 F).

The molten salt the team chose as an electrolyte simply because of its low melting point turned out to have a fortuitous advantage. One of the biggest problems in battery reliability is the formation of dendrites, which are narrow spikes of metal that build up on one electrode and eventually grow across to contact the other electrode, causing a short-circuit and hampering efficiency. But this particular salt, it happens, is very good at preventing that malfunction.

The battery requires no external heat source to maintain its operating temperature. The heat is naturally produced

electrochemically by the charging and discharging of the battery.

This new battery formulation, Sadoway says, would be ideal for installations of about the size needed to power a single home or small to medium business, producing on the order of a few tens of kilowatt-hours of storage capacity.

For larger installations, up to utility scale of tens to hundreds of megawatt hours, other technologies might be more effective, including the liquid metal batteries Sadoway and his students developed several years ago and which formed the basis for a spinoff company called Ambri, which hopes to deliver its first products within the next year.

The smaller scale of the aluminum-sulfur batteries would also make them practical for uses such as electric vehicle charging stations, Sadoway says. He points out that when electric vehicles become common enough on the roads that several cars want to charge up at once, as happens today with gasoline fuel pumps, "if you try to do that with batteries and you want rapid charging, the amperages are just so high that we don't have that amount of amperage in the line that feeds the facility." Having a battery system such as this to store power and then release it quickly when needed could eliminate the need for installing expensive new power lines to serve these chargers.

The new technology is already the basis for a new spinoff company called Avanti, which has licensed the patents to the system, co-founded by Sadoway and Luis Ortiz '96 ScD '00, who was also a co-founder of Ambri. Sadoway is formally the Chief Scientific Advisor.

The research team included members from Peking University, Yunnan University and the Wuhan University of Technology, in China; the University of Louisville, in Kentucky; the University of Waterloo, in Canada; Oak Ridge National Laboratory, in Tennessee; and MIT. The work was supported by the MIT Energy Initiative, the MIT Deshpande Center for Technological Innovation, and ENN Group.

Europe's Energy crisis deepens after Russia keeps pipeline shut

Europe was plunged deeper into crisis as Russia's Gazprom PJSC again halted its key gas pipeline indefinitely, a move decried by European politicians as an attempt to use energy as a weapon

<https://www.bloomberg.com/news/articles/2022-09-02/gazprom-says-nord-stream-to-remain-shut-after-technical-issue#xj4y7vzkg>

OPEC+ to weigh rollover or small cut at Monday meeting
OPEC+ is likely to keep oil output quotas unchanged for October at a meeting on Monday

<https://www.reuters.com/business/energy/opec-weigh-rollover-or-small-cut-monday-meeting-sources-say-2022-09-04/>



Through thick and thin: EMG iTiM high-precision thickness measurement now part of the EMG portfolio

In May of this year, EMG Automation GmbH took over MESACON Messelektronik GmbH in Dresden and integrated the company's versatile thickness measurement solutions into the product portfolio of the "Business Unit Metals". This is an important step towards completing EMG's range of quality assurance systems for the manufacturing of metallic flat products. In addition to various width measurement solutions and the online geometry measurement of slabs, EMG now offers the complete spectrum of thickness measurement systems required for almost every manufacturing and processing step.

The expansion of the product portfolio by the thickness measurement - under the product name EMG iTiM - means for the quality management the availability of a wide range of sensor and automation solutions from one source!

EMG iTiM solutions are characterised by the combination respectively use of a wide variety of physical measuring methods, a high degree of flexibility in design and easy integration into the user's automation environment. The new systems ideally complement the solutions for online oil film thickness measurement already known under the product name EMG SOLID®, which can now also be used for measuring the layer thickness of insulating coatings on electrical sheet.

Technological competence paired with application knowledge

High-precision, fully automatic online thickness measurements require a high degree of technological competence, which must relate to a wide range of applications. Only a precise understanding of the specifics of the application and consideration of the accuracy requirements will result in a customised solution for the individual application. Laser measurement systems, for example, are easy to use and comparatively cost-effective to purchase, but have physical limitations in terms of absolute measurement accuracy. Here the comprehensive solution expertise of the extended EMG team, based on decades of experience, comes into play. This is technologically reflected in the application spectrum of the EMG iTiM sensor family.

The EMG iTiM thickness measurement solutions

EMG iTiM iso

The isotope radiation-based measuring system EMG iTiM iso works with different isotopes depending on the field of application and is used in both hot and cold processes.

The flexible system design enables both single-point measurement systems and complex thickness profile measurements.

EMGiTiMxray

EMG iTiMxray uses the high-precision X-ray thickness measurement method. EMG iTiMxray can be used with a wide variety of materials due to the different generator voltages. From wafer-thin foils to thick strips. Here, too, single-point measurements and high-resolution thickness profile measurements are possible.

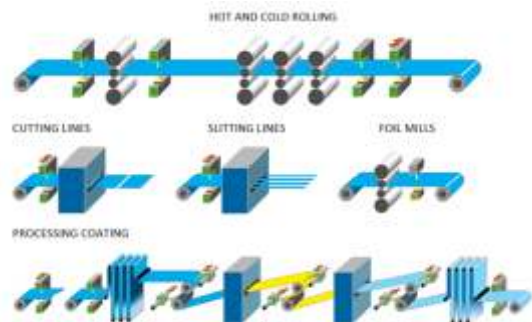
EMG iTiM laser

The EMG iTiM laser optical thickness measurement systems are characterised by low complexity, compact space requirements and flexible integration into the production line, which represents an economical alternative to more complex and costly system solutions, especially for steel and aluminium service centres and automotive lines.

Field of competence: retrofits and modernisations

The broad availability of a wide range of sensor technologies and EMG's extensive integration and application know-how enable the customer to realise a very economical and efficient upgrade of existing systems by reusing system components during retrofitting and modernisation.

By expanding the EMG product portfolio of quality assurance systems with the EMG iTiM thickness measurement solutions, the user receives a proven and reliable solution for precise measurement of strip thickness in a wide range of applications. Each installation is configured line-specifically and equipped with the appropriate combination and design of sensors for the specific application. In addition, customers worldwide benefit from EMG's existing international service network with personal expert advice directly on site.



As single or triple channel measurement: X-ray, isotopes, and laser technology



11th Asian Metallurgy and Steel & Metal Expo 2022 to focus on technology, equipments and products

After successful organisation of past 10th expo, Chandekar Media Publication is organising Asian Metallurgy - mega trade show of metallurgical fraternity, both ferrous as well as non-ferrous sectors. It comprises of 'Steel & Metal Expo', a World Exposition showcasing latest technology, equipment and products.

The other part of the show is specialized seminars debating the prime issues facing the industry. Asian Metallurgy was launched in 1997 and this is its 11th edition.

The world economy has suffered a lot in the year 2020 and 2021 due to the global pandemic of covid-19. The metallurgical industry is no exception. Though the metal production went down in first few months, it increased rapidly afterwards and manifested almost a V shaped recovery for the steel & metals industry. In 2022, the metallurgical industry got a big jolt due to Russia

Ukraine war.

The raw material availability and prices soured, increasing the price of finished metal. Many transport routes were non operative due to war situation bringing the international trade down.

Now after many months, it seems that the world and the metallurgical industry has learnt to live with such challenging situations. We strongly feel that the situation will further improve and the normalcy will be restored in the metallurgical industry as well as the global economy. 11th Asian Metallurgy and Steel & Metal Expo 2022 together will try to bring all the stakeholders of metallurgical sector, ferrous as well as non-ferrous covering the whole process chain.

To get complete details of this mega global B2B digital show, logon to : <https://www.steelmetalexpo.com>

Book your space now

5-11
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Mr. S Sivalingam receives ILZDA's Life Time Award



The Die Casting Society of India (DCSI); an affiliate body of India Lead Zinc Development Association (ILZDA) conferred "Life Time Contributions Award" to a veteran in the Indian Die Casting industry, Mr. S. Sivalingam, Director, Dolphin Die Cast Pvt. Ltd, Bangalore. Mr. Sivalingam has about 60 years experience in leading Die Casting units in India and has also imparted training to technical personnel in India and abroad, besides presenting papers at various technical forums. He has made significant & outstanding contributions for the sustained growth of this industry.

The Award was presented at a seminar organized by ILZDA / DCSI at Bangalore on 26 August 2022.



Automobile dispatches jumped by 10.6% on easing chip supply: SIAM



India's Automobile dispatches to dealers jumped 10.6% in 17,06,545 units in July, aided by increased production following improved semiconductor availability. However, the markets for entry-level passenger cars, two-wheelers and three-wheelers are yet to recover, ahead of the festive season, according to the Society of Indian

Automobile Manufacturers (SIAM).

"In July 2022, sales in the passenger vehicle segment stood at 2.9 lakh units; two-wheelers [clocked] 13.8 lakh units and three-wheeler sales were 31,000 units," Rajesh Menon, director general, SIAM said.

While commenting on the July 2022 sales data, Mr Rajesh Menon, Director General, SIAM said "In July 2022, sales in the Passenger vehicle segment stood at ~2.9 lakh units, in Two-wheeler segment ~13.8 lakh units and in Three-wheeler segment ~31 thousand units. Market for entry level Passenger Cars, Two-Wheelers and Three-Wheelers are yet to recover.

Sales of Two-Wheelers in July 2022 are still below July 2016 numbers and Sales of Three-Wheelers are still below July 2006 numbers. Third hike in a repo-rates in a row, to rein in high inflation, will make Auto loans costlier, making it more difficult for entry level vehicles to recover.

SIAM would also like to whole-heartedly thank the Government of India for the recent decision to allocate higher amount of domestic gas for the CNG segment. This would significantly bring down the input cost of gas companies. We hope, that in line with the Government's intent, the gas companies

would pass on the entire benefit to the end consumers by reducing retail CNG prices."

Domestic Sales: July

Category	Domestic Sales (In Nos.)	
	July-21	July-22
Passenger Vehicles (PVs)*		
Passenger Cars	130,080	143,522
Utility Vehicles (UVs)	124,057	137,104
Vans	10,305	13,239
Total Passenger Vehicles (PVs)	264,442	293,865
Three Wheelers		
Passenger Carrier	10,911	22,427
Goods Carrier	6,832	6,663
E-Rickshaw	366	1,814
E-Cart	23	420
Total Three Wheelers	18,132	31,324
Two Wheelers		
Scooter/ Scooterette	373,695	479,159
Motorcycle/Step-Throughs	837,166	870,028
Mopeds	49,279	32,116
Total Two Wheelers	1,260,140	1,381,303
Quadricycle	2	53
Grand Total	1,542,716	1,706,545

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



Domestic Sales: April-July

Category	Domestic Sales (In Nos)	
	April-July-21	April-July-22
Passenger Vehicles (PVs)**		
Passenger Cars	467,271	554,963
Utility Vehicles (UVs)	410,149	601,662
Vans	33,294	47,671
Total Passenger Vehicles (PVs)	910,714	1,204,296
Three Wheelers		
Passenger Carrier	26,073	73,090
Goods Carrier	15,493	28,013
E-Rickshaw	1,009	5,381
E-Cart	79	1,133
Total Three Wheelers	42,654	107,617
Two Wheelers		
Scooter/ Scooterette	977,986	1,687,062
Motorcycle/Step-Throughs	2,577,474	3,275,256
Mopeds	118,288	143,518
Total Two Wheelers	3,673,748	5,105,836
Quadricycle	2	154
Grand Total	4,627,118	6,417,903

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

SIAM						
Segment wise Comparative Production, Domestic Sales & Exports data for the month of July 2022						
(Number of Vehicles)						
Category	Production		Domestic Sales		Exports	
Segment/Subsegment	July		July		July	
	2021	2022	2021	2022	2021	2022
Passenger Vehicles (PVs)*						
Passenger Cars	175,218	180,069	130,080	143,522	34,933	35,639
Utility Vehicles (UVs)	147,658	165,259	124,057	137,104	17,383	18,269
Vans	10,493	13,560	10,305	13,239	3	165
Total Passenger Vehicles (PVs)	333,369	358,888	264,442	293,865	52,319	54,073
Three Wheelers						
Passenger Carrier	55,423	59,031	10,911	22,427	44,660	37,674
Goods Carrier	7,389	6,953	6,832	6,663	337	407
E-Rickshaw	465	1,831	366	1,814	-	-
E-Cart	23	389	23	420	-	-
Total Three Wheelers	63,300	68,204	18,132	31,324	44,997	38,081
Two Wheelers						
Scooter/ Scooterette	430,867	552,217	373,695	479,159	33,678	50,491
Motorcycle/Step-Throughs	1,223,412	1,183,182	837,166	870,028	343,194	306,305
Mopeds	53,252	35,277	49,279	32,116	326	702
Total Two Wheelers	1,707,531	1,770,676	1,260,140	1,381,303	377,198	357,498
Quadricycle	402	186	2	53	426	144
Grand Total	2,104,602	2,197,954	1,542,716	1,706,545	474,940	449,796
* BMW, Mercedes, Tata Motors and Volvo Auto data is not available						
Society of Indian Automobile Manufacturers (12/08/2022)						

© Society of Indian Automobile Manufacturers (SIAM)

1th International Bauxite, Alumina & Aluminium Conference & Exhibition



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Associated Organizers



Aluminium Stewardship Initiative
(ASI), Australia



Material Recycling Association
of India, India

Special Sessions

Sustainability by Aluminium Stewardship Initiative ASI (September 16)

**One day brainstorming on Non-Ferrous Metal Recycling in India
to be organized by JNARDDC & MRAI (September 17)**

- Participation of more than 60 companies
- Over 250 delegates expected to attend
- About 40 technical papers to be presented
- A post conference plant visit to the HINDALCO Jharsuguda smelter
(Aditya Aluminium at Lapanga)

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