Annual Issue

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India's automobile and EVs revolution to create huge demand for castings

Vinit Jain
President
The Institute of Indian Foundrymen (IIF)

India's infra projects with galvanised steel will spur the zinc demand

Dr. Rahul Sharma,
Director-India,
International Zinc Association

- **National Institute of Advanced Manufacturing Technology (NIAMT), Ranchi: The Vanguard of Manufacturing Excellence for India**
- **"ALUCAST 2022 concludes with "Green and smart die casting solutions for sustainability"**
- **Global Lead & Zinc Scenario**

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D. A. Chandekar
Editor

Dear Readers,

Though the pandemic changed the face and the thought process of the industry world over, it can hardly change the basics of a manufacturing industry. Though the basics of metal manufacturing and processing remains the same, there are many changes happened post covid. Apart from countless negatives of covid, one positive thing is that it taught us the importance of digitalization. Many plants are now implementing Industry 4.0 (or smart manufacturing as they call it) modules in the manufacturing and processing of metals. The fabrication industry has also followed this way and now almost all the equipment / machinery is studded with smart electronic gadgets facilitating smart processing. A lot of robotics has entered the industry and many of the processes would now be entirely carried out and monitored by robots.

Another subject which has gained prominence in recent years is 'Green Manufacturing'. We all know that the resources on our mother earth are depleting very fast and one has to use them carefully in the production processes. Also it is a fact that global metallurgical industry is the biggest contributor to the carbon footprint in the environment. Experiments are being conducted, research is being carried out to replace carbon by the other reducing agent (say hydrogen) in the metal production process.

Editorial Desk

Metallurgists and scientific community is hopeful of the commercial viability of this new process and it may be established in the years to come.

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. This is especially true in case of India where the projected GDP growth rate is around 6.5 %. This is the highest one in the large economies and certainly a heartening news for the metal technology and equipment companies and the investor community all over the globe.

Indian government's emphasis on infrastructure projects and the development of railway network (including metro) is certainly going to translate into a huge demand for metals and will certainly give a big boost to the metals manufacturing as well as processing industry in the country.

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India's automobile and EVs revolution to create huge demand for castings

Vinit Jain
President, IIF

Vinit Jain is a president of The Indian Institute of Foundrymen (IIF) was set up in 1950 to promote education, research, training and development to Indian Foundrymen and to serve as a nodal point of reference between the customers and suppliers of the Indian foundry industry on a global scale. He is the Chief Financial Officer (CFO) of Universal Autofoundry Limited which is a BSE listed Company. Under his leadership, IIF is organising the 71st Indian Foundry Congress (IFC) & International Foundry & Equipment Exhibition (IFEX) 2023 is slated to be held on Feb 8-9- 10, 2023 at India Expo Mart, Greater Noida (Delhi NCR). The grand occurrence will bring together foundry fraternity from around the world to focus on latest trends, technologies & markets for the foundry sector and explore & forge new business alliances & opportunities.

In ahead of 71st Indian Foundry Congress (IFC) & International Foundry & Equipment Exhibition (IFEX) 2023, D A Chandekar, Editor & CEO of Metalworld had an exclusive interaction with Vinit Jain, President, IIF to understand the present situation in the foundry sector, prospects of foundry industry and expectations from the policy makers etc.

Excerpts :

Q1. How is the present situation in the Indian Foundry sector?

A: India is the second largest producer of castings, globally. The Indian foundry industry produces various types of metal castings and cast components for application in the power, automotive, defense, railways, machine tools, agro machinery, tractor, earth-moving and mining machinery, electrical machinery, and oil and natural gas industries. The automobile sector is a major consumer of castings produced in the country. Currently, there are around 5000 foundry units in the small, medium and large-scale sector. Out of these, 1500 units have international quality accreditation.

Casting production in India reached a value of 11 Mn tonnes in 2018, and is expected to expand at a compound annual growth rate (CAGR) of ~12.7% from 2018 until 2023. The automobile sector consumes around 40% of castings produced in India. As of 2018, aluminum castings contributed around 15% of the total castings production in the country. The share is expected to increase considerably by the end of 2023, owing to a shift in demand from iron to lighter

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castings materials for manufacturing fuel-efficient automobiles and electric vehicles (EVs). Expansion of infrastructure by the government is expected to generate demand for a wide variety of machinery and equipment such as cranes,

fans, motors, appliances, pumps, conveyor equipment, etc. which, in turn, will create fresh demand for metal castings.

The major foundry clusters are located in Kolhapur, Belgaum, Coimbatore, Sholapur, Rajkot, Mumbai, and Chennai among other Indian cities. Each of these foundry units caters to some specific end-use market. The Coimbatore cluster is famous for pump-set castings, the clusters in Kolhapur and Belgaum are known for automotive castings, and the Rajkot cluster is famous for diesel engine castings.

Q2. How has fluctuations in raw material prices affected the bottom - line? What is the solution?

A: Foundries usually absorb commodity price rises of 2-3% every year. But in the past one year, prices of several commodities rose 60-150%

The current conflict between Russia and Ukraine has led to a surge in raw material prices by more than 50% compared to the earlier three-to-five percent surge. Companies are having difficulty obtaining quotes for raw materials since the cost of raw materials is changing by the day Three important centres for the foundry industries, including Kolhapur, Belgaum and Rajkot have cut production by 50%.

Measures to minimize the impact:

1. Track Prices. Prices change with some level of predictability.
2. Comparison Shop.
3. Seek Alternatives.
4. Change Designs to Reduce Raw Materials.
5. Avoid Producers Who Pay Tariffs.
6. Design Customized Plans.
7. Make Sure You Don't Price Too Low.
8. Reduce Other Costs.

Q3. How do you see the short term & the long term prospects for the Indian Foundry sector? How can India be the 'Casting Hub' of the world?

A: By 2030, India could possibly become a worldwide manufacturing hub. It can add more than $500 billion a year to the global economy. As indicated by the Department for Promotion of Industry and Internal Trade (DPIIT), India has become one of the most alluring destinations for investment in the manufacturing area.

Over the last few decades, China has been the de-facto factory of the world. From industrial raw materials to chemicals to finished building materials, they are all sourced from China. But the pandemic has made businesses realise that they cannot just rely on a single manufacturing hub.

The export sector has been supported in successive budgets through a number of schemes.

With impetus on a trade deal with the UK, EU, US and other like-minded countries in the Asia-Pacific region, renewed focus on the promotion of industrial clusters, promotion of industrial corridors along the Delhi-Mumbai, Chennai-Bangalore, Vizag-Chennai, and other corridors are poised to put India on the world map as a manufacturing centre and give worldwide recognition to the Indian economy

End-user segment growth

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- Aluminium alloys
- Semi-products and half made alloys, such as aluminium profiles, sheets, belts, foils, aluminium-plastics, casting, and forge
- Deep processed products, covering construction, transportation, machinery, packaging, electronics, photo-voltaic industries

Equipment

- Primary aluminium processing equipment
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- Heat processing
- Extrusion and rolling equipment
- Surface processing equipment
- Test and measurement
- Deep processing equipment
- Auxiliary materials and other equipment
- Environmental protection and energy efficient equipment

Concurrent Events

Lightweight Asia 2023 2023亚洲汽车轻量化展览会 Asia's Lightweight Automotive Trade Fair

上海国际车轮工业展 2023 Shanghai International Wheel Industry Exhibition

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insights:

● Automotive: The foundry market is linked directly with the development of the overall automotive sector. Growth of the automobile industry is expected to generate huge demand for castings producers. Based on volume, India is currently the fourth largest automobile industry, globally. With the country preparing for an automobile revolution with electric vehicles (EVs) , rapid growth of the automotive sector has also led to the steady development of other subsidiary industries like the auto component industry, indicating huge demand for castings.

● Pipes and fittings: The pipe sector in India is poised for steady growth due to substantial investments and capacity additions. Companies produce a wide range of steel, cement and PVC pipes, which are used in various industries. Demand for castings is expected to expand with the growth of the pipes and fittings market in India.

· Power: Consistent power supply and availability of quality electrical equipment are necessary for the growth of the Indian economy from a global perspective. As of December 2018, India had a power generating capacity of ~349.28 GW. The Government of India has targeted an addition of ~88.5 GW under the 12th Five-Year Plan (2012–2017), and another ~100 GW under the 13th Five-Year Plan (2017–2022). The foundry industry is expected to benefit from such power generation installations.

Q4. How do you perceive the need of technological up gradation & digitalization in the Foundry sector?

A: Foundry industry in the country should focus on upgrading technology to meet the expected demand given the increased focus of the government on manufacturing.

The most significant and critical problems faced by the micro, small and medium (MSME) foundries in the country is the fact that a majority of them are still running on highly outmoded technologies and are operating at uneconomic scales of production.

Innovation and technology upgradation are a continuous process. Foundries should collaborate with research and development agencies and make available technologies to the units in the MSME sector.

Domestic companies should upgrade their production facilities as it is an imperative of the economy changing over to a new technological mode right now. Industrial companies use more automation and robotization of production, and the level of digital intellectualization is growing.

Several iron and steel foundries still run-on old technologies that are inefficient and cause pollution which could have been prevented or at least minimized by up-grading of production and process technologies. For example, improved induction furnaces with higher energy efficiency and an integrated hood system for collecting atmospheric emissions exist; however, several industries still use old induction furnaces that do not even have proper hood systems for air pollutants. Similarly, cupola furnaces have pollution problems such as flue gas emissions, disposal of ash from coke and so on.

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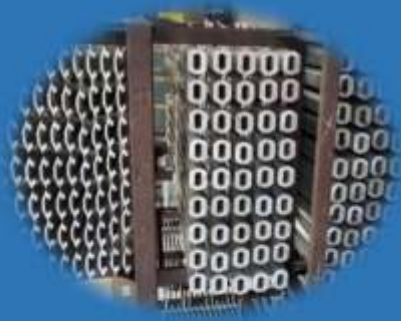

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Investments in market development have to be complemented by Investments in technology development.

A foundry is a complex of technological processes that involve many workers of various professions with their skill having a direct effect on the final casting product quality. Digital technologies introduced in the production processes are designed to create the potential for increasing the profitability of production, including foundry.

Up-to-date computer technology and its elements can be effectively used at various stages of foundry production. Need is to continuously adapt to develop new features and technologies, delivering valuable cost, energy and materials savings. By making these new features available for retrofit, every foundry can keep improving, always and save on operational costs adding to its profitability.

The digital transformation will strengthen existing supply chains. Customers with digital requirements for casting products will have a look at geographical proximity.

Q5. What are the present activities of IIF? What value addition are you proposing during your tenure as the President?

A: The Institute of Indian Foundrymen (IIF) is an apex National Industry body for Indian Foundry Industry (Metal Castings Industry) founded in 1950 with Head Quartered at Kolkata.

IIF is an active member of World Foundry Organization, CII, EEPC, BRICS Foundry Forum, Asian Foundry Forum & represents Indian Foundry industry in various international events & forums. IIF is actively engaged in dissemination of knowledge & promotion of latest productive & greener technology, skill development, business & export promotion & policy advocacy for the foundry sector.

The Presidential Theme for 2022-23 is "Sustainability Roadmap –Automation, Environment and Information"; and the theme of our flagship event IFC/IFEX is "Arise, Automate, and Atmanirbhar".

My long term vision plan - Vision -2030 also covers a wide spectrum of activities like Technology (layouts), buyer seller meets, skill development and capacity building, Entrepreneur skill development like training on Costing, cost reduction, profitability, etc., standardisation of processes, systems and exploitation of digital platforms for wide circulation of data and information. These training and capacity building programmes will also focus on safety and risk management of the entire foundry ecosystem.

I want to create standard templates to help small foundries to automate some of their processes and help them see their monthly production increase with the same amount of manpower.

The standards advisory committee of IIF and various other committees of IIF should work more closely with their respective ministries/ stakeholders for standardisation of Foundry equipment and Consumables. These are some of my ideas to take IIF forward.

Q6. What does the Foundry industry expect from the policy makers ?

A: Most of the foundries in India don't have large capacities for manufacturing as compared to international standards. It is challenging for them to sustain their position in the global marketplace. The limitations in meeting the domestic demand for castings and supply quality products to the global market needs urgent attention for the industry to grow faster. Foundries across India are presently upgrading facilities and technologies in a bid to improve their productivity and increase their capacity.

The sectors need more schemes like the Production Linked Incentive (PLI) Scheme of Government of India which aims to help them become globally adoptable. Tax and duties should be imposed with a view to boaster the industry.

To encourage the foundry sector, the policies should be made keeping in mind the requirements of sectors like us. Initiatives like Make in India" and "Aatmanirbhar Bharat" should have more supportive to bring the foundry industry achieve new heights.

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India's infra projects with galvanised steel will spur the zinc demand

Dr. Rahul Sharma,
Director-India,
International Zinc Association

Dr. Rahul Sharma is a Post graduate Mechanical Engineer of the Maulana Azad National Institute of Technology Bhopal , where he majored in Thermal Engineering before undertaking Management Program from Indian Institute of Foreign Trade, New Delhi. He has done his PhD. In "Distributional effectiveness of Non Ferrous metals in India ".During the past25 years, he has worked in Sales and Marketing department at Aluminium major Hindalco Industries Limited, Corus Steel (Tata Steel International) and as Director of International Zinc Association, he is involved in transferring technology to galvanizing sector, Zinc Die Casting, Sheet Galvanizing and assisting them technically in order to improve product quality and cost.

Dr. Rahul Sharma is a recipient of " Hindustan Zinc Ltd Gold medal award" given by Indian Institute of Metal in 2015 for advancing the art and science relating to Non-Ferrous Metallurgical Industries. Dr. Sharma has made significant contribution for better life of coatings onsteel. He took major initiative to set up Indian Steel Building Group thus expanding Zinc usage and also helping technically in specifying right coatings on structures and sheet buildings. His contributions, as a member of sectional committee in the Bureau of Indian Standards in the zinc.

On the occasion of Metalworld Annual Issues, D A Chandekar, Editor & CEO had an exclusive interaction with Dr Rahul Sharma, Director, International Zinc Association to understand the IZA present market about zinc and expectation from policy makers.

Excerpts :

How is the present situation in the global and Indian Zinc market ?

After pandemic , global economic activities are coming back to normalcy , Presently Zinc metal is in surplus, stocks are high and continue to build but access across globe is limited. Recent zinc demand-related data readings have been seasonally strong and leading economic indicators are mainly positive, except in Europe due to high energy prices . Reported zinc mine output rising strongly while refined zinc production has

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dipped on China downturn but remains high . Outlook for zinc demand in medium-to-long remains robust. The developing economies, may witness a high growth in the per capita zinc consumption and thereby global Zinc demand in future

India along with South East Asia would witness a boom in zinc demand , which would drive the consumption of Zinc. The major demand drivers in these nations being the infrastructure growth and industrial growth. China was the major producer of the primary zinc, China zinc supply is highly fragmented with many smelters producing small volumes of zinc because of Pandemic situation still existing in China.

How do you see the future of zinc market in India ?

India is the third largest zinc producer, while the secondary zinc producers in India remains highly fragmented. India is slowly catching up in terms of zinc demand in compare to developed nations. Globally per capita zinc consumption is approximately 3.2 Kg whereas in India it is only 0.55 Kg . This means we have lot to do when it comes to infrastructure development in our country. Government of India has ambitious plans to upgrade infrastructure by ways of various projects like Smart city mission, National Highways project , Pradhan Mantri Gramin SadakYojana, Modernization of national power Grid , Modernization of Railways etc. All these sectors will require lot of Galvanised steel which in turn will spur the demand of zinc in the country.

Recently Indian Railways have start using Zinc Thermal Sprayed Rails for its track infrastructure. Also new applications of zinc like zinc energy storage systems will further add to the existing demand thus placing zinc as a material of choice for its construction and infrastructure sector.

Tell us about International Zinc Association, its activities globally as well as in India.

IZA's main programs are Sustainability & Environment, Technology & Market Development and Communications.. IZA helps sustain the long-term global demand for zinc and its markets by promoting such key end uses as corrosion protection for steel and the essentiality of zinc in human health and crop nutrition. IZA was founded way back in 19990 , but we started our India program in 2010 and there after we have undertaken many activities like Technology transfer to Zinc first users , Educating specifier's and decision makers regarding benefits of zinc for sustainable development . Recently we concluded two projects funded by United Nation's Common fund for commodities for Hot Dip Galvanizing and Zinc Die Casting units of India. Under this program our International experts like Dr. Frank Goodwin , Joseph Annetts and Mike Ainsley trained engineers and technicians working in production facilities and familiarized them with world's latest technology in order to increase productivity and world class quality. Also we are working very closely with Fertilizers association of India (FAI) for micronutrient fertilizers. "Zinc saves kids " is an initiative to improve the survival , growth and development of undernourished children by funding UNICEF supported programs around the world. We are also working very closely with CHAI and Bill and Melinda Gates foundation for eradicating malnutrition among children which is predominantly because of zinc deficiency/

What does the Zinc producing industry expect from the policy makers?

As a common citizen, I expect that our infrastructure should last for atleast 100 years without any maintenance . The money saved from maintenance expenses can be used in building new schools, hospitals, highways etc. Also India looses almost 4to 5% of GDP on account of corrosion losses alone. While it is prudent to say that project selection criterion needs debate . Currently we have adopted Lowest One (L-1) criterion for selection of contractor, whereas in the interest of long term benefit, I will prefer to adopt life cycle assessment criterion for selection of any contractor for the project.

Zinc industry also thinks that policy makers will look into serious issue of corrosion and as we all know that lot of money goes waste in maintenance of corroded steel. Instead like developed nations , our government should also make it mandatory to use Galvanised steel for infrastructure projects .

National Institute of Advanced Manufacturing Technology (NIAMT), Ranchi: The Vanguard of Manufacturing Excellence for India

Manufacturing competence is the only single activity that equally contributes in the Global competitiveness and Human Development Index. Besides its role in global competitiveness and employment generation, the manufacturing capability of the country also plays a significant role in dealing with the event of unforeseen crises, like, natural calamities, pandemics, and external threats. During the last decade, the manufacturing sector in India is immensely boosted by the clarion call of "Make India" and "*Atmanirbhar Bharat*".

Historically, for many of the developed countries, the period of sharpest economic growth has been found to coincide with the period of demographic dividend. For India, the period of demographic dividend spans from 2018 to 2053. In the efforts of leveraging the demographic dividend, the Government is putting its best efforts into aligning incentives with industry interests, developing infrastructure, generating skilled manpower, and introducing flexibility in business and labor regulations. Coincidentally, the realignment of supply chains away from China in the post-pandemic scenario offers an opportunity for India, to enhance its share in the global market.

While the futuristic manufacturing excellence in India is pivoted on the smart use of digital tools in a wider spectrum of manufacturing sectors like defence, automobile and capital goods, electronics and semi conductors, pharmaceuticals and healthcare, etc., engagement of the youth workforce in modern manufacturing activities poses a challenge. It has also been established that all the past waves of economic prosperity were powered by the overexploitation of resources and have left behind shaper inequalities and enormous burden of waste. Here, the Government finds its role to steer the 4th industrial revolution in India with due emphasis on employment, self-reliance, and sustainability. It is, thus, very important for our country to excel in all aspects of 'manufacturing' with due

emphasis on skill, education, and research.

National Institute of Foundry and Forge Technology (NIFFT) was established by the Government of India in 1966, under the aegis of UNESCO, as the only institution in the country to pursue training and education in manufacturing. Since its inception, the Institute is funded by the Ministry of Education and is governed by the Board of Governors constituted by leaders from Industries, eminent scholars from academia, and Government representatives. The Institute is dedicated to the pursuit of training and education in the domain of manufacturing in general, and Foundry and Forge technologies in particular. These two technologies have been contributing significantly to industrial growth, employment generation, and export over the years. Unarguably, alumni of the Institute have played a key role in the growth of this sector in securing 3rd position in the global ranking.

To cope with the rapidly transforming scenario in the era of globalization, during the 1980s and early 90s, Indian industries realised the urgency to elevate their operational standard by engaging manpower having a higher level of skill and knowledge. In consonance with the demand, the Institute launched an initiative, to elevate and expand the academic framework by introducing B. Tech, M. Tech, and doctoral programs in the core and allied domains of manufacturing technology.

The students are admitted to the undergraduate and postgraduate courses, run by the Institute, through JEE mains and CCMT platforms, respectively. Its unique pedagogical focus on metal manufacturing has always been the attraction of core manufacturing industries in the recruitment of students of NIAMT across the country. Besides successful careers in industries, a good number of pass-out graduates join postgraduate programs in IITs, IISc, and IIMs. The completely residential campus encourages the students to take up various extra-curricular activities, throughout the year, like sports and cultural performance, building scientific models and racing cars for national and international events, promoting education among the less-privileged children of the locality through 'Kartavya', an NGO run by students and alumni of the Institute.

The faculty of the Institute are recruited with high eligibility standards, at par with INIs. The consistent passion and effort of faculty members in education, research, and industry-specific training and skill development, over the years, has created the brand of the Institute in the niche domain of manufacturing Technology.

The academic and administrative endeavours of the Institute is efficiently supported by highly experienced technical staff in conducting training and research at laboratories and workshop as well as conducting the activities at different administrative sections.

Concomitantly with the clarion call of Make in India, by Hon'ble Prime Minister Shri Narendra Modi, in 2014, the Ministry of Education (erstwhile MHRD) GoI, constituted a committee, with eminent industrialists of the country, to review the functioning of the Institute. Subsequently, in 2017, another committee was constituted with eminent academic leaders of the country to assess the Up-gradation of the infrastructure for elevating the Institute to the level of Institute of National Importance. As a follow-up of the recommendations of these committees, the Institute was renamed as National Institute of Advanced Manufacturing Technology (NIAMT) in 2021 with the approval of the Ministry of Education, GoI.

Contrary to the popular belief, the knowledge framework of NIAMT is conceived, not as a restricted domain of traditional manufacturing processes and machine tools, but rather as the super set of multiple engineering disciplines (like materials engineering, mechanical, electronics, computer), science, and humanities. The four-tier academic framework is uniquely designed to produce a new breed of next-generation

engineers of India who will inherit the capability to translate the rapid transformation of knowledge and technology intovalue-added products.

The Institute also realized the need to cultivate indigenous competence in manufacturing by embracing the potential of applied science and the competitive edge of digital technology. All these efforts have elevated the academic framework of NIAMT to the level of a full-fledged knowledge centre in Advanced Manufacturing Technology.

From the beginning of this century, a new leap of transformation in manufacturing technology appeared in the horizon. The transition was formally introduced as Industry 4.0, in 2011, from a project in the high-tech strategy of the German government. In the Industry 4.0 paradigm, enterprises aim to create global networks in the form of cyber-physical systems (CPS), which include intelligent machines, storage systems, production capacity, and products for the autonomous exchange of information. In India, Industry 4.0 has been envisioned as the confluence of 'Make in India', '*Atmanirbhar Bharat*', and 'Digital India' missions.

Keeping the emerging need for digital competence in the manufacturing sector in view, the Institute has established the Centre of Excellence in Industry 4.0, under a partnership with the Software Technology Park of India, Ministry of Electronics and Information Technology, GoI, to produce the vanguards in achieving self-reliance in digital manufacturing, as well as to promote incubation of start-ups and entrepreneurship in the domain of digital manufacturing. (e.g., big data, ML, AI, IoT, etc.).

NIAMT is also building up a multi-institutional research consortium to develop innovative and translational capabilities in emerging technologies like additive manufacturing, re manufacturing, etc., which are most important for India for the development of sustainable and competitive manufacturing eco-system and promoting employment and self-reliance in the manufacturing sector.

In the other extreme of emerging technologies, the Institute finds plenty of untapped opportunities in small and micro scale rural artisan ship and organic resource-based livelihood practices. With an aim to elevate the skill and practices in this segment of the economy, the Institute has established the MSME incubation centre, under the aegis of the Jharkhand Government. Moreover, to encourage equity and self-reliance, NIAMT has established the 'women technology park' under the funding of the Department of Science and Technology, GoI.

In summary, NIAMT, is poised to exert its all-out endeavor in paving the sustainable, inclusive, and competitive track for Advanced Manufacturing Technology, in line with Industry 4.0.In this pursuit, the Institute aims to adapt the translational competence, for the rapid conversion of emerging technology to value-added products, as an enabler of the global manufacturing leadership for India. ■

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ALUCAST 2022 concludes with 'Green and smart die casting solutions for sustainability'

ALUCAST 2022 attracts a record number of Delegates, Exhibitors and Visitors

Sustainability Pavilion highlights innovations in Castings for the EV Industry

Leading National and International Brands from 13 countries congregate at India's Premier Exhibition for the Aluminium Die Casting Industry after 4 years

The Aluminium Casters' Association (ALUCAST)®, India hosted the 9th edition of its biennial International Mega Event – ALUCAST 2022 on the theme ***GREEN & SMART DIE CASTING SOLUTIONS FOR SUSTAINABILITY*** on the 1st – 2nd – 3rd December 2022 at the Chennai Trade Centre in Chennai.

It was organized by Aluminium Casters' Association (ALUCAST)®, India and produced by NuernbergMesse India, the three-day International Mega Event attracted a record number of Delegates, Exhibitors, and Visitors.

ALUCAST 2022 was inaugurated by Dr. Lakshmi Venu, MD, Sundaram Clayton Ltd., one of India's largest auto components manufacturing and distribution groups in the presence of Mr. Prasan Firodia, President ALUCAST & MD, Force Motors & Jaya Hind Industries Pvt. Ltd., Ms Michaela Kuchler, Consul General at the German Consulate in Chennai, Mr. Christopher Boss, Executive Director, Euroguss, NuernbergMesse, Mr Jeffry Jacob, Industry Group Leader for Automotive and a Partner with KPMG Business Consulting in India, Mr. Bharat

Agarwal Trustee Alucast and President of Vishwakarma Group of Industries and Managing Director of Aakar Foundry, Mr. T. Parabrahman & Mr. Niranjan Toraskar, Trustees ALUCAST, Ms. Kirti Ramdasi, Secretary ALUCAST & several top executives & delegates from the various die casting & the allied industries.

During her inaugural address, Dr. Lakshami reiterated India's position as the largest two-wheeler manufacturer in the world and a leading automobile exporter and its ascent towards becoming a global manufacturing hub. She further added, "ALUCAST 2022 is a fantastic forum which has brought together members across the die casting value chain - be it die casters, tools manufacturers – the entire ecosystem, after the pandemic. We have become leaner, and more productive, and have invested in future-looking technologies, hence we have come out stronger than ever. The theme of the event "Green and smart die casting solutions for sustainability" is pertinent and well chosen. In today's uncertain world, the one certainty is that we all are working to move towards a more sustainable future and aluminium die casting plays a very central role in it."

In his presidential address, Mr Prasan Firodia said, "I am very happy to see the wholehearted participation of both domestic and international players at ALUCAST 2022. The Die casting industry is going through challenging times with increasing energy costs, supply disruptions and the rising cost of logistics. In comparison, the Indian die-casting industry is in a much better situation and poised for robust growth on account of the positive economic outlook projected for India in the next few years. The current global geo-political situation brings with it the strong possibility of many global customers moving business to India and the question for our die-casting industry is how well can we leverage this situation."

Mr. Jeffry Jacob presented the Key-Note Address on the Topic - "Global Economy - Impact on India & the Die Casting Industry in India".

The ALUCAST International Mega Event was organized after a gap of four years due to Covid-19 that pushed the event from December 2020 to December 2022. ALUCAST 2022 received an overwhelming response with participation from more than five thousand five hundred participants in the Conference & Exhibition combined together. Authors, Speakers, Presenters, Delegates & Exhibitors from India, China, Bahrain, Turkey, Singapore, Switzerland, Spain, UK, USA, Italy, the Netherlands, Denmark and Germany participated in ALUCAST 2022.

The focus of ALUCAST 2022 was to help steer the Die

Casting & the Allied Industry towards more environment-friendly, intelligent solutions to create a viable ecosystem for sustainable growth & development of the industry through innovation & use of the latest tools & technology.

The Mega Event comprised of the 3-day Technical Conference & Exhibition.

The Technical Conference had thirty-two Research Paper Presentations & Technical Presentations from the leading Die Casting Experts around the globe on Smart & Green Die Casting Solutions and state-of-the-art developments & improvements in Aluminium Casting Technology. More than two hundred delegates from the die-casting industry & the allied industry attended the Conference. The Conference was inaugurated with the Key-Note Address on the topic - of Green & Smart Die Casting Solutions for Sustainability by Mr. Vivek Joshi, President & CEO, Sundaram Clayton Ltd.

The Exhibition had several leading global Aluminium Castings manufacturers, equipment & allied product manufacturers who showcased their latest, technically advanced products, tools, equipment and consumables. The Exhibition was the most coveted opportunity for the Die Casters and the manufacturers and the suppliers from the Allied Industry to showcase their products and services and connect with their prospective clients and customers to revive and enhance business opportunities at the local as well as global level. ALUCAST 2022 had more than 148 companies and 175 brands for display at the Exhibition. More than five thousand visitors visited the Exhibition.

The special highlight at the event was the "SUSTAINABILITY PAVILION" aptly supported by the expertise of Tata Motors and Fraunhofer Institute for Manufacturing Technology and Advanced Materials, which highlighted the latest trends and developments in the realm of green, advanced and sustainable die-casting solutions.

The ALUCAST 2022 Technical Volume, ALUCAST Technical Journal December 2022 Special Issue & the ALUCAST 2022 Exhibitors Directory were released during the inaugural.

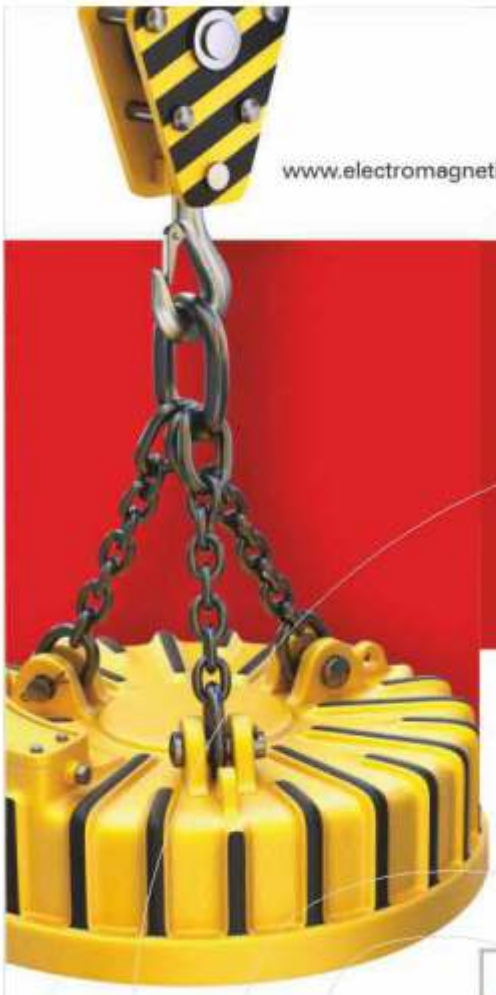
The Best Foundry and the Best Casting Awards honoured the best in the business.

The Best Foundry Award was bagged by MAP ALLOYS, Pune (small-scale category), ALUBEE Die Casters, Hosur, Tamil Nadu & Dimo Castings, Bengaluru, Karnataka (medium-scale category) and Jaya Hind Industries Private Limited, Pune & Sundaram Clayton Ltd., Chennai (large scale category).

UNO Minda, Hosur & Sundaram Clayton Ltd., Chennai, bagged the BEST CASTING AWARD. Appreciation & motivation was accorded to the casting from Shagun Industries, Pune.

Special Appreciation & Recognition for their Long & Outstanding Contribution to The Field of Die Casting was accorded to Mr. S. Sivalingam, Founder & Promotor, of Dolphin Die Casting, Bangalore.

ALUCAST 2022 – the biennial International Conference and Exhibition on Die Casting Technology, concluded on a successful note on 3rd December 2022.



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Copper is essential for India's transition to a develop sustainable economy by 2047

A comprehensive copper resource strategy to ensure an adequate supply of the metal to meet 'Amrit Kaal' objectives is a must

Mayur Karmarkar

The demand for copper is directly related to the economic growth of a country. Megatrends like urbanisation, industrialisation, infrastructure developments and changing lifestyles of people further augment the demand for copper. In recent years, copper has emerged as a critical element in India's journey towards a clean energy transition. Properties like high conductivity, ductility, and temperature tolerance of copper, make it the best material for use in high-temperature green energy applications. Further, copper can be infinitely recycled retaining 95% of the value of the primary metal from newly mined ore, making it truly a green metal.

In terms of copper demand in the country, the electricity sector accounts for almost 60% of the copper demand, followed by 12% in consumer durables, 10% in transportation, and 18% in diverse applications such as defence, general engineering, bathroom fittings, and other non-electrical applications. Further, clean energy technologies consume 8% of the total demand for copper in India. As these technologies take centre stage based on the Government of India's Amrit Kaal vision for 2047, the demand for copper from these applications is poised to grow.

Mayur Karmarkar
Managing Director
International Copper Association (ICA), India

Global Clean Energy Transition Goals:

The goal of the Paris Agreement, as adopted by 196 countries at COP21 in 2015, is to limit global warming to well below 2, and preferably to 1.5 degrees Celsius as compared to the pre-industrial levels. The signatory countries are required to curb their emissions as quickly as possible to achieve net-zero emissions by 2050, and this

objective is being reinforced in various subsequent COP meetings.

To meet the target transition ambition -- deployment of new technologies, which include EVs, renewables, solar PV, and wind turbines -- that rely on electrification and not fossil fuels are required on a global scale. Another easiest and cost-effective way to mitigate climate risks and reduce energy costs while improving business competitiveness is energy efficiency, which essentially means using less energy to produce a given output.

Clean Energy Targets in India:

The scale at which India is set to grow is stunning. Its economic growth has been among the highest in the world over the past two decades, lifting millions of people out of poverty. As per an International Energy Agency (IEA) report, India adds a city the size of London to its urban population every year, involving the vast construction of new buildings, factories and transportation networks.

Heavy dependency on fossil fuels has made India the third highest CO_2 emitter in the world. However, India's CO_2 emission per person is still one of the lowest in the world.

India's sheer size and projected economic growth would lead to energy demand growth which will be more than that of any other country in the coming decades. Prime Minister Narendra Modi has announced ambitious targets for 2030 to set India on the path to becoming net zero by 2070. This includes

installing 500 gigawatts of renewable energy capacity; reducing the emissions intensity of its economy by 45%, reducing a billion tonnes of CO_2 and ensuring 30% of all passenger vehicles are electric by 2030.

Copper's Role in Clean Energy Transition:

As all the countries evaluate ways to reduce dependence on fossil fuels, it is crucial to highlight the role of copper as a metal in achieving the targets of reducing carbon footprints. Copper is nearly unrivalled as an efficient electrical and thermal conductor, and as such will be one of the most important minerals for the energy transition. Copper content is particularly high in several key technologies required for decarbonization, such as solar PV, wind, batteries, and EVs. As per our study, incorporating 1 kg of copper in electrical systems can save 100 to 3750 kgs of greenhouse gas emissions.

Further, as per ICA estimates, renewable energy (Solar and Wind) has 3 to 4 times more copper density as compared to thermal. Improving the energy efficiency of transformers, motors and air conditioners

requires more copper and can contribute immensely to this effort.

It is estimated that the Government of India's vision of Amrit Kaal and its supporting policies will lead to per capita copper usage of 3 kg by 2047 from the current average of less than 1 kg per capita. This will require a comprehensive national strategy to boost supply. As of this year, India's copper demand was 13 lakh tons (4% of world demand) as compared to 140 lakh tons demand in China (48% of world demand).

The demand for copper in India is poised to grow to around 45 lakh tons by 2047 whereas the installed capacity is expected to be just around 15 lakh tons.

Need for Copper Resource Strategy:

Copper has emerged as an energy material that will help in reducing the import of fossil fuels in the country. As the estimates suggest, 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 EVs, infrastructure, and housing. These megatrends will need large amounts of copper — right from electrical wires to tubes in the air conditioners — with different intensities.

However, it seems, copper is not at the forefront of the government agenda today as it is hidden in the end-use. Hence, there is a need to improve visibility for copper and we should have a copper resource security policy in place to contribute to the India@2047 vision.

The copper resource strategy would need to be an integrated approach including updating a geological map, deployment of cost-efficient copper deposits exploration technologies, commercialization of potential mines, encouraging and building our own primary smelting industry and long-term metal diplomacy with various partners economies, investment roadmap in copper refining & fabrication technologies (domestic value add strategy), building functional reserves, investments in responsible recycling technologies of the metal promoting circular economy.

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. The 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 currently.

The copper resource strategy would help in overcoming these challenges and while it is getting formulated, the government is taking steps to ensure that the work is in progress.

(The author is MD, ICA India)

About International Copper Association India:

International Copper Association India (ICA India) a member of the Copper Alliance and the Indian arm of the International Copper Association Limited (ICA) a leading advocate for the copper industry in India. ICA India a non-profit organization bringing together the copper industry and its partners to make a positive contribution to the UN Sustainable Development Goals and support markets for copper in India. ICA strives to contribute to all 17 of the SDGs for addressing humanity's most critical issues, however to support clean energy transition ICA's major focus is on 5 SDGs (SDG-7,8,9,11,13). ICA India was set up in 2001 and has been working with the objective to grow the markets for copper based on its superior technical properties.

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11th Asian Metallurgy
Future of Copper Business in India

Metalworld magazine successfully concluded Asian Metallurgy which was a 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 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.

During Asian Metallurgy conference, we concluded the panel discussion on Challenges faced by the copper industry and expectation from the policy changes are required from the government and it was moderated by D A Chandekar, Editor & CEO of Metalworld.

This session was started with ***S.K. Karn (Industry expert)*** – We will discuss about challenges the copper industry faces & also what policy changes the government can actually do to accelerate the copper industry in India.

Tell us about the world copper scenario, Which countries are the power

house? How much they are producing? What is the position of refined copper's demand & supply in the world ?

Rohit Pathak (CEO, Birla Copper Hindalco) – The

refined copper market globally about 23 to 24 million tons. In addition to this, there is recycled copper (which today is primarily remelted and not refined) which gets used for different applications. From an industry structure perspective, the copper ore & copper concentrate market, which is the primary form of trade for copper, is well distributed across multiple geographies. South America accounts for ~30-40% of copper concentrates whereas Australia, Africa and Canada account for another ~30% and Russia along with some parts of Eastern Europe has about ~15%. Given the variation in quality of copper ore in each mine, copper smelting technology has evolved to a model where the smelters blend concentrate from multiple mines to create a consistent blend to get the right output in a smelter. Therefore, there is natural break in the structure of the copper market between the mining/concentrate and smelting/refining parts. While the mining and concentrate market is quite well diversified as shared above, the smelting/refining has over the years become very concentrated in China with over 40% of the global capacity there. In fact, in the early 2000s' when Sterlite & Hindalco started Copper smelting in India, China was one of the big markets for us as India was not consuming enough copper. Even today, China is a large net importer of Copper Cathodes. Therefore, as one starts to look at the downstream or end product manufacturing industry, while they would like to have duty free imports of cathode or wire rod, there is no country that is a big enough exporter basis which India can build a thriving downstream industry. Like China did, we will need to build our own, strong smelting/refining capacity to support the downstream sector. Indian copper demand will increase from ~1 million tonnes to 4-5 million tonnes during this Amrit Kaal period. That will position us as the 2nd largest consumer of copper, larger than Europe today and thrice that of Japan/South Korea. The only country that could supply us enough Copper cathodes then, if we do not build our own capacity, will be China which is itself a net importer! Therefore, as a

country our focus should be to encourage building of new copper smelters in India to ensure raw material security and also begin to create the secondary smelting industry to get the right quality of copper from recycling process. Copper will be a strategic metal for India's urbanisation and Net Zero commitments, and India must build the entire value chain here starting with smelting, taking a longer term view to encourage the capital investment in the sector.

Puneet Khurana (CEO, Fujairah Gold)- Copper is

going to be the future due to its growing demand in clean energy technologies. At present, global consumption of copper is around 24 million tonnes. Of this 24 million, China is producing close to 12 million tons of refined copper which is close to 50% of global consumption. China is able to produce 50% of global refined copper despite lacking sufficient domestic production of blister copper and copper concentrate (raw material for the copper industry). This is despite the domestic production of copper concentrate in China satisfies only 15% of China's copper demand. Japan also faces the same challenge of securing supply of blister copper and copper concentrate. At present, Japan is producing close to 1.6 million tons of copper though their demand is only 1 million ton. So, on the issue of domestic non-availability of blister copper and copper concentrate, we are all on the same page. As a country we have to respond to this challenge by seeing how we can-do long-term contracts with all the mines in countries producing raw material. At the same time, we have to support the present ecosystem of copper production in India via growth of copper smelters. Every country you talk about either China, Japan Taiwan or Indonesia wants to produce refined copper and make value added products. They want India to be a market for their copper products. So, we have to rethink our strategy for the copper industry. First, we need to further strengthen the upstream copper manufacturing units copper smelters and refineries. Copper smelters have played a pivotal role in making India a Atmanirbhar over the past 25 years. However, the smelting business also needs a stable ecosystem along with a stable duty differential between raw material imports and finished good imports. This will provide confidence to the industry and the industry will expand its capacity which is in the interest of India's long term energy security.

Mr. Prasad did you face any challenges when you started putting up your smelters or building your concentrate ?

Prasad Suryarao (Director & Senior VP Kutch copper Limited.) – I think it is

important to note that, the two private copper smelters which have come up in the year 1996, during that time the duty was 35% on the copper which was basically providing a lot of leverage for the new upcoming industry to come & set up the facility. From the raw material & sustainable continuity of the business perspective, it is important that we need to have the right duty structure in place, which will ensure the sustainability of the existing player as well as new comer who will be coming forward to set the facility. The world is looking at India as an alternative option to China, so it is a wakeup call for us as a country to look into it, how India can become a manufacturing hub for the world market. No doubt, Government of India is putting certain schemes such as 'Make in India' & 'Atmanirbhar Bharat' to encourage the industries to increase their capacities and build economies of scale. However these schemes have to go a long way which need to be further incentivize the companies, to support industries to enter into this business. This will truly bring economic and inclusive development to the country

How will India ensure that the India for its economic growth continues to get copper ?

Rohit Pathak – Globally, Copper demand will likely touch 40-50 million tons by 2050, which is almost double of where it is today. With Copper grades going down in most mines, new mining projects coming online are just trying to keep the current level steady. For bridging the demand gap, several new large mines need to come up globally, which will require sustained high copper price to justify the investments in mining. Coming to India, as I shared earlier, our demand will grow 4-5x by 2047 from ~1 million tons to 4-5 million tons. To secure this copper, India will need to take a two-pronged approach. Firstly, encourage smelting industry to grow which is very capex intensive, and for that allow copper concentrate to come in at 0

duty (as it does in China, Japan, South Korea). Further, it could explore extending KAABIL construct to take stakes in some large global copper mines with back-to-back guarantee from the Indian smelters to buy that concentrate or encourage Indian miners/smelters to take those stakes. Secondly, India will have to formalize the recycling sector (traceability, part of GST instead of being a cash business, and product standards) and upgrade it from being just remelting to smelting & refining to get the right quality of copper for downstream consumption. I believe, if we focus on both these, we can create a strong copper industry to support the India growth journey.

Mr. Puneet tell us about issues on circular economy and recycling

Puneet Khurana- The gap between copper demand and production of copper from copper mines is growing significantly. In the future, if world is going to consume 40-45 million tonnes of copper and the production from mines will not be more than 20-25 million, then from where will rest of the copper come from?

At present, India is consuming 1 million ton of copper. India is also producing 300 thousand tons of scrap that is generated within India. Thus, the circular economy is going to play a very important role in ensuring that this demand supply deficit is taken care of. The key question remains that processing of copper scrap? The answer lies in what kind of quality standards of the final product we as a country are ready to accept. Everybody has to step up they have to take up ownership of giving the right quality product to the country due to copper predominant use in electrical and thermal applications. BIS is working on the copper scrap standards anything out of scrap can easily move towards non-electrical applications, what are your views on that ?

Prasad Suryarao- Copper is a very good conductor. However, if the copper is not it's purest form such as electrolytic tough pitch or LME Grade A copper and is used in normal electrical applications, the insulation on the copper wire is tend to fail due to high heat generation resulting in fire incidents. High heat generation is taking place due to various impurities available in the copper, produced from melting scrap copper. I think time has come, that every cable produced should have that stamp similar to "Hallmark" stamp on the Gold Jewellery; to confirm that the LME Grade A Copper used for the manufacturing of cable and only such cables are permitted to use for domestic and industrial application. Developing the standard, Adopting the standards, Effective Implementation of the standards, and Monitoring the standard is going to play a key role. This will help to improve the safety standards and reduce the accidents. The free trade agreements with certain countries are opportunities and with others a threat what are your views on this ?

Rohit Pathak – Free trade agreements given the current context of the geopolitics are important. As a country we have to get plugged into the global economies and supply chains a lot more tightly. The government has done extensive conversations this time with every industry association and trade bodies to hear their concerns and aspirations. This is an excellent and positive change in approach. Overall, I believe FTAs can enable us to integrate better with the global supply chains, and create a strong export opportunity for end products too. However, at the same time we need to encourage creation of smelting/refining capacity in the country by creating a level playing field (eg., availability of 0 duty concentrate, competitive energy costs and taxation structure), and in parallel push for the growth in downstream industry.

Puneet Khurana – It is equally important to look at our downstream industry as well. Emerging demand for existing and new segments require copper in value added forms which are currently not manufactured in India. Copper smelters need for booming downstream industry in India to grow. We have to develop a strategy outlining how we as a country want to move forward to meet India's demand for copper in upstream and downstream which will hit 5 million ton by 2047.

Prasad Suryarao – I think that FTAs will also bring competition and build competitiveness within the industries. Having said this, I am sure that government understands the impact of FTAs on domestic manufacturing and will take the necessary actions, when the FTAs are going to be renegotiated or drafted. We as a country are not only aiming to become Self Reliant, but also want to build ourselves as an alternative option for world to China. This will support India to become a manufacturing destination/ hub. I think that Government need to really look into it, that what will be the right format/ template of the FTAs, which will also incentivize or promote the primary producer, is going to be very important in the long run to come."

History and emerging topics in Metals & Material Sciences

A look at the recent history of science, technology & engineering, brings out some interesting trends. Firstly, the demand for specific areas of work goes on changing year on year- Chemical Engineering & technology was at the top of the demand curve in the 80s & 90s, and toppers from CETs and board exams would opt for chemical engineering as their first preference. The focus of chemical engineering education however gradually shifted from classical chemical engineering operations to apply to petroleum and petrochemical processes; to emerging areas like biochemical engineering, pharmaceutical engineering, clean processes & nano-technology etc. Civil engineering has generally remained in average demand, except in recent years, with the focus and investment in infrastructure creation in many developing countries, and the boom in the construction of roads, highways, bridges, and commercial spaces. Not too many seats were allotted normally for Aeronautical or Aerospace Engineering, as the number of job openings was limited to a handful of international giants, and a few openings in space science institutes like NASA or ISRO; in fact, the number reduced with the US space program getting trimmed. It has started climbing up in recent years, with a steep increase in the number of airline services in the developing world, complemented by the privatisation trend in space travel, led by the legendary Elon Musk. Mechanical engineering has generally been steady at number two or three, it started as a classical 'processing technology' to make usable products and gadgets from metals; now however, it is strongly directed by the

Sadguru Kulkarni

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fortunes of the automobile industry leaders like General Motors, Ford, and Volkswagen among others. The automobile industry also has a big impact on its component supply chain, mostly mechanical in nature. Other industries like electrical industries need a supply of metals and materials with ever-

power train, body, etc of the automobile from two wheeler to cars, transport vehicles, boats to aeroplanes! Civil Engineering commands metals for reinforcement, metal structures, fabricated bridges, and Building applications. Thus the metal industry has always been in the background but strongly

registered then, for the option of an elective in Metallurgy. A separate 'Department of Metallurgy' was formed in 1887, and provided formally trained Metallurgical Engineers to the then-growing steel, automobile and textile industry in England. IN US, the first separate Metallurgical Engg Department was formed in 1955 at Northwestern

demanding properties for power transmission, generation, and gadgets; with superior demand coming from the electronic hardware industry. The ranking described above is dynamic and changes with space and time. Metallurgical engineering lies as the supplier industry for the above, and if often B2B in nature- it supplies metal and metal parts which get used, for example by the chemical manufacturing industry for building their plants; by the mechanical industry for fabrication of the components- engine,

linked to the developments in the other engineering areas.

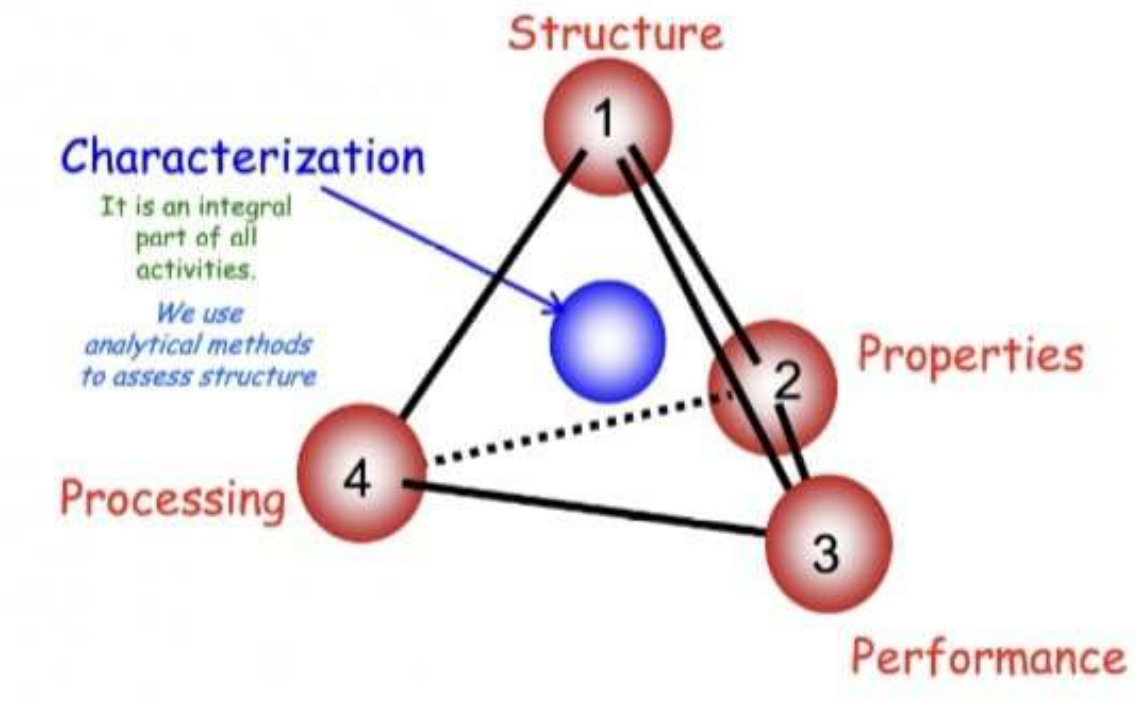
With the external environment changing at an unprecedented pace, the demands from the metal industry have been undergoing rapid change, and metallurgical engineering has adapted to the demanding changes. While the practice of metallurgy has been there for centuries, the first formal course in metallurgy was formed relatively late, in the Mason Science College, Birmingham University in 1881. Interestingly, thirty students of *chemistry* had

University in North Chicago, again to support the steel plants and metal processing industry in South Chicago and the automobile industry hub in Detroit, Michigan State. This was followed by the creation of such Metallurgical engineering departments in many other engineering colleges. In India, the first course in Metallurgical engineering was offered by Banaras Hindu University- BHU back in 1933; followed by Bengal engineering Colleges in 1939; both to build a supply chain of qualified metallurgical engineers to the mining and steel plants and the likes of Tata Steel - earlier called as

The Tata Iron & Steel Company Ltd, in eastern and central India, as well as to the newly formed state-run steel plants like Bhilai, Bokaro, Rourkela and Durgapur in central-eastern India. All these colleges prepared students for work in classical metals technology including process metallurgy, forming technology and associated processes like coal & coke processing, alloy steels, etc. Many of these courses were in fact supported by countries like the then Soviet Union, then leading in the classical metallurgy.

However, the nature of the user industry and customers of the metal industry went on to change over the years. It followed multiple directions. Firstly, the users started looking beyond steel, or for that matter beyond metals. They required performance at a cost; that could be available from non-ferrous metals, as well as from the upcoming polymer technology. Early plants for large-scale polymer production started with thermosetting resins in 1947, followed by polystyrenes in 1957, and later by LDPE(1957), PVC (1961), HDPE (1968) and PP (1978). The need for materials with superior properties at lower cost by the construction and automobile industry soon led to the development of composites, which consisted of a blend of disparate materials, like the RCC, SMC-DMC etc. Three internationally unsupported science & technology programs viz. The start of atomic energy in 1954, and defence r&d-DRDO in 1958, space science program at ISRO in 1969, led to a different type of metal requirement that would work at extreme conditions, not quite familiar to the classical metallurgical engineers. This led to significant indigenisation for the production of novel materials, which would work at extreme temperatures, tolerate radioactivity or hard water, metals for cryogenic conditions, metals which could stand the impacts which are encountered in defence applications, and mineral processing technologies for uranium, thorium etc. One major understanding was that metals alone cannot meet these demands and that we need to work on a comprehensive range of material science to address these opportunities. Academics were the first to realise this need; thus it was from the world of academics that the merging of the classical discipline of material science, which is an extension of physical chemistry, with classical metallurgy which is a practical engineering discipline, started. Northwestern University became the first to form the Department of Material Science & Engineering in 1955; MIT's classical Department of Metallurgy with a focus on Mining and metallurgy, reamed itself to the Department of Metallurgy & Material Science, as late as 1967; and further modified to the Department of Material Science & Engineering as late as 1974, reflecting on the evolution of the technical understanding of the subject. The most important asset that Material science brought to the subject was modern tools of measurement. Metals and minerals, which consisted primarily of practices and empirical tools & techniques, got subjected to the rigour of the recently developed instrumental analysis. These included X-Ray, Spectrophotometry, Optical, scanning electron microscopy and tunnelling electron microscopy, Instrumental techniques for property measurement, (such as Instron), dynamic matrix analyser, structure measurements for micro/meso/micro/nanostructures, providing insights at magnification levels of 1, 100, 1000, 1000000!; crystallography, scattering techniques, etc.

This also exposed materials to the demands of the external environment, which was changing rapidly. New materials were researched to address the needs and opportunities of these new areas of work. e.g. biomedical processes and products- such as materials compatible with the human body for artificial inserts like pacemakers, man-made heart valves, inserts for body monitoring, artificial kidneys, etc. The evolution of clean-energy technologies led to hitherto known, but less focussed-on metals like silicon, gallium, lithium, rare earth, and cobalt for applications like solar cells, often leading to geopolitical issues among countries. Clean energy storage cannot be addressed by conventional technologies and requires newer concepts for storage batteries, with higher storage density, quicker



changing time, extended number of cycles, environment-friendly and recyclable disposal methods etc. Non-Ferrous metals like aluminium alloys for the growing light-weighting applications in automobiles. The age-old practices of ceramic engineering evolved to accommodate newer materials and processes. Photonic materials came into demand with fibre optics for signal transmission and photonic computing. Bio-inspired materials and processes led to newer ways of making materials, and green technologies and green materials demanded near 100% recycling of materials with appropriately modified materials. Evolved forms of carbon like graphene, graphenylene, amorphous carbon, nano-carbon, glassy carbon and others provided a newer understanding of this classical material. The new Material Science departments had to address the science and engineering needs of such demands.

With computational power becoming affordable, a new discipline of Computational material science and engineering evolved. This facilitated the first principle design of materials, based on molecular fundamentals, and theories connecting molecular structure to macrostructure. Properties of materials can be nearly predicted from the chemistry and structures and complemented by the efforts of combinatorial chemistry / combinatorial material science to design newer materials with desired properties, minimising the experimental efforts. Computational Material science targets to offer the potential to fully integrate the structure, properties, processing and performance of materials so as to enable materials by design.

Classical material processing techniques were thermal, hydrothermal and mechanical forming of materials. New techniques such as 3D printing, laser-aided processing, and bio-inspired processes have the potential to facilitate newer ways of making products.

This has now reinspired the interest of engineering students and scientists alike to the age-old discipline of materials, and Materials Science & Engineering is now an exciting and vibrant interdisciplinary research field.

Global Lead & Zinc Scenarios

(Source: ILZSG)

The International Lead and Zinc Study Group (ILZSG) released preliminary data for world lead and zinc supply and demand during the first ten months of 2022. A brief summary is listed in the tables below. Full details are available in the December 2022 edition of the Group's 44 page 'Lead and Zinc Statistics' Bulletin.

Thailand that were largely offset by rises in Europe, India, Japan and the United States.

- Chinese imports of lead contained in lead concentrates decreased by 17% to 462kt. Net exports of refined lead metal totalled 93kt, an increase of 62kt compared to the first ten months of 2021.

L. Pugazhenthy
Executive Director, ILZDA

impacted by the sharp rise in the price of electricity, was the main driver behind an overall decrease worldwide of 3.2%. Production also fell in China, Canada, Kazakhstan and Mexico but rose in India.

- A 3.2% decrease in global usage of refined zinc metal was primarily a consequence of a significant reduction in China and further falls in France, Japan, the Russian Federation and Ukraine. These declines, however, were partially balanced by rises in India, Saudi Arabia and Türkiye.

	2018	2019	2020	2021	Jan-Oct 2021	Jan-Oct 2022	Jul	Aug	Sep	Oct
World Refined Production	4,571	4,678	4,474	4,561	3,743	3,665	376.1	376.6	379.9	389.3
World Refined Consumption	12,301	12,342	11,961	12,382	10,131					
World Balance	12,346	12,299	11,778	12,326	10,177				1,025.8	1,028.8 1,029.8

Provisional data reported to the ILZSG indicate that world refined lead metal demand exceeded supply by 46kt during the first ten months of 2022 with total reported stock levels decreasing by 62kt.

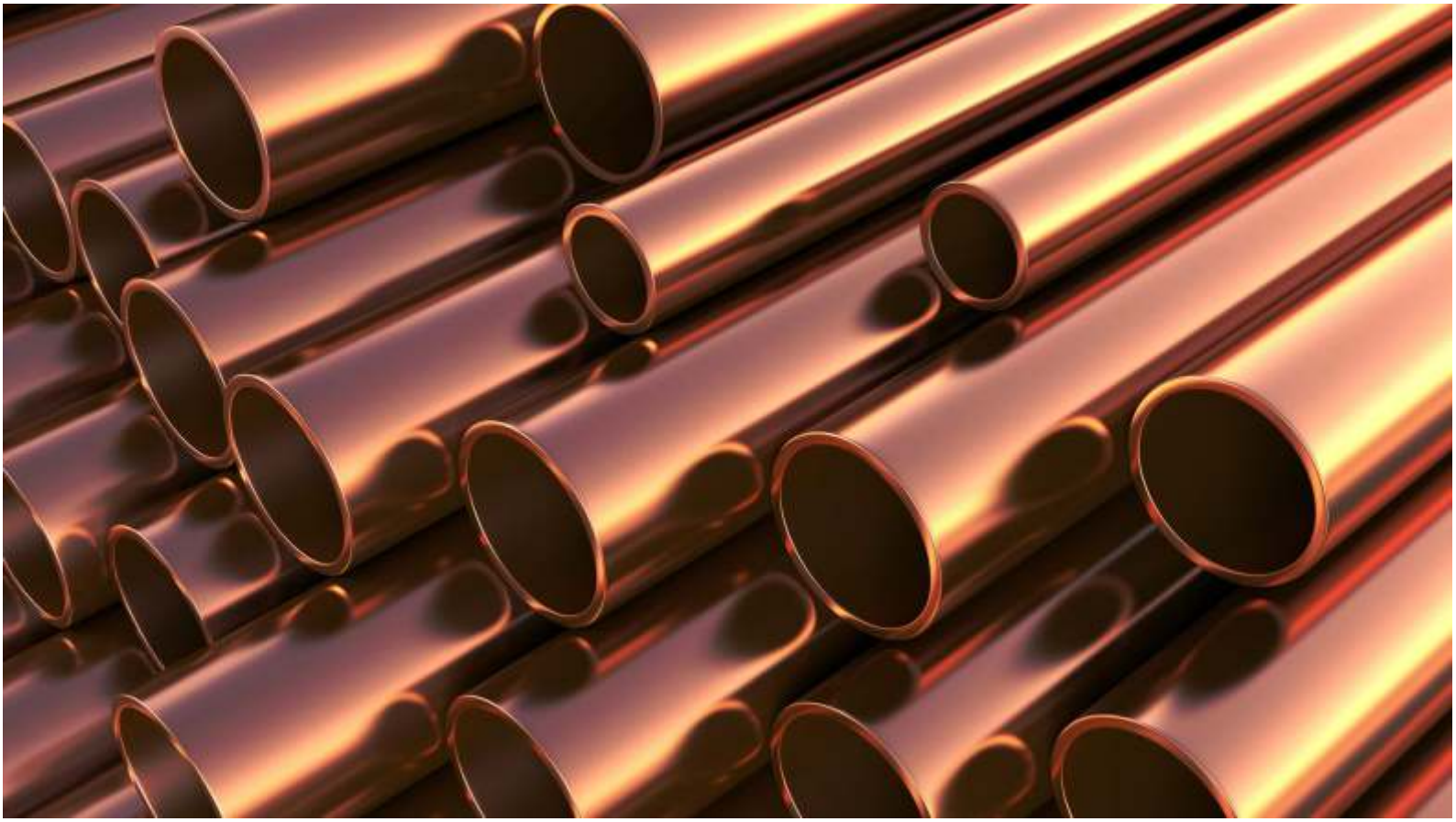
- Global lead mine production fell by 2.1%. This was primarily a consequence of reductions in Australia, Bolivia, China, Greece, Peru, Türkiye and the United States.
- Lower refined lead metal output in China, Germany, Italy, the Republic of Korea, the Russian Federation, Türkiye, Ukraine and the United States was partially balanced by rises in India and Japan, resulting in an overall decrease globally of 1.3%.
- Refined global lead metal usage fell by 0.4%, primarily influenced by reductions in the Republic of Korea, Mexico, Taiwan (China) and

	2018	2019	2020	2021	Jan-Oct 2021	Jan-Oct 2022	Jul	Aug	Sep	Oct
World Refined Production	12,723	12,799	12,253	12,798	10,243					
World Refined Consumption	13,142	13,546	13,780	13,858	11,125					
World Balance	13,722	13,788	13,286	14,048	11,242					

According to preliminary data recently compiled by the ILZSG the global market for refined zinc metal was in deficit by 118kt over the first ten months of 2022 with total reported inventories decreasing by 125kt.

- World zinc mine production fell by 3.1%, mainly as a result of reductions in Australia, Burkina Faso, Canada, China, Ireland and Peru that more than offset by rises in India, Portugal, South Africa and the United States.
- Lower refined zinc metal production in Europe, where output at a number of smelters has been negatively

- Chinese imports of zinc contained in zinc concentrates rose by 7.5% to 1558kt. Net exports of refined zinc metal totalled 19kt compared to net imports of 398kt in the first ten months of 2021.



Non-ferrous update: brighter market on the horizon

According to US Commerce Department data, US exports of stainless steel scrap increased 32% year-on-year during Jan-Nov 2022 to 358 000 tonnes on improved demand from Mexico, Taiwan, Canada, and India.

An upbeat survey of European traders suggests a better year for the industry than some observers had been expecting in late 2022.

The year started with something of a surprise. The Association of German Metal Dealers and Recyclers (VDM) conducted a survey of European dealers on the situation in the secondary metal industry. The result was pleasing: the VDM business climate index may have fallen slightly again but the change was significantly smaller compared to 2022.

Most companies now view the economic situation as rather positive, meaning the business position of most metal recycling companies could well improve in the next three months.

However, the developments of the past few years show that even a slight gust can be enough to make the business climate worse again and there remain plenty of economic, political and geopolitical risks. All the same, the non-ferrous industry in Europe is entering the new year with confidence.

According to those surveyed, the supply of scrap had improved slightly with a quarter rating it as good. Only 29% of companies thought it worse than the previous quarter while 46% see their supply situation as balanced. Metal traders' expectations in the next three months are again better than in the final quarter of 2022.

A total of 15% expect a better supply while more than two-thirds (71%) expect a constant supply of scrap metal. Only 14% of the metal traders anticipate a shortage. Prices for most non-ferrous metals at the LME have picked up in recent weeks, correlating to lower stocks.

Shipping blues

Freight specialist Loadster

reported in mid-January that shipping groups had cancelled 53 westbound sailings from Asia to Europe in the first seven weeks of the year, amounting 27% of their original scheduled capacity.

'Preliminary statistics from Container Trade Statistics for November reveal cargo volumes from Asia to Europe fell 18.4% after a slump of 25.9% in October but there are suggestions that the data for December could turn out to be much worse,' it said.

One of the alliances, Maersk was quoted as saying it expected a normalisation in stock levels, economic outlook and consumer habits but added 'it is uncertain exactly when this will occur'. Meanwhile, freight rates continue to be well below the record levels seen during the height of the pandemic.

Nickel & stainless: rebalancing after hectic 2022

After the tumultuous switchback in LME trading in March, nickel has been the price performer among major base metals as LME nickel stocks have declined further.

LME nickel ended last year 40% higher than the end of 2021 at US$ 30 048 a tonne, easily outperforming the other major nonferrous metals, as stocks in LME warehouses contracted to around 50 000 tonnes, down from more than 90 000 tonnes a year before.

At the same time, investor confidence in the LME's ability to continue being at the centre of nickel trading and price formation has yet to fully recover from the events of March 2022. Andy Home of Reuters reports LME nickel trading volumes were down 28% last year while nickel trading volumes in Shanghai plunged 70% lower.

Confidence in LME

For the LME, the road back to restoring confidence may be longer than previously expected. Although the lawsuit filed by hedge fund AQR Capital Investment and other plaintiffs has reportedly been dismissed, the independent review of nickel market events conducted by

Oliver Wyman and released in January identified significant problems.

In particular, the review recommends new and improved LME rules to prevent risks and strengthen enforcement, including volatility controls to slow down extreme price moves, and new processes to effectively manage client defaults on OTC, as well as centrally cleared positions. In addition, the LME's decision-making and governance are still the subject of separate regulatory reviews being conducted by the Bank of England and the Financial Conduct Authority.

As if that weren't enough, new competition for the LME is taking shape in the form of Global Commodities Holdings' announcement that it will be launch a new physical trading platform for nickel in February. Global Commodities is headed by former LME ceo Martin Abbott.

Mixed outlook

Given the shifting patterns of stainless steel production and ample supply of nickel-bearing material, 2023 got off to a somewhat better start for recyclers than would have otherwise been expected. Stainless steel scrap prices followed carbon steel prices higher in January as steel mills in the West looked to implement price hikes. Overseas demand for scrap has also been healthier than expected. ■

India to explore lithium extraction for EV batteries quest

Base metals producers in India have been facing elevated raw materials shortage and energy costs for the last few quarters. Especially since Russia's invasion of Ukraine that started in February 2022, energy prices have sky rocketed which left Indian non-ferrous metals producers high and dry. Since the Ukraine war is prolonging for over 10 months, these base metals producers are unlikely to get any respite in the visible future unless the global economy recovers which may support prices to move northward.

The war in Ukraine severe disruptions of several key raw materials to the world markets not only from Kyiv but also from Moscow because of sanctions imposed by the western nations, the United States and Australia. Disruptions caused by Russia's invasion of Ukraine, sanctions and retaliation between Russia and the western nations have severely affected global markets. Prices of oil, gas and non-ferrous metals have risen, intensifying inflation pressures and threatening food security in some developing economies. With this, the government's

Dilip Kumar Jha
Editor - Polymer update

measures have also shifted from development to the restoration of food and energy supplies. Uncertainty also struck markets inrelation to metals that are produced in Russia and which are indispensable to supply chains of modern manufacturing production. Aluminium and nickel among the base metals category have also been affected. Price hikes and shortages disrupt several industrial applications and severely affect the green transition.

Russia as a major player

This is worth mentioning here that Russia accounted for 5.5% of world aluminium production

and a similar share of the world aluminium exports until the military offensive on Ukraine started on February 24, 2022, and themilitary

offensive on Ukraine started on February 24, 2022, making it theworld's third-largest producer after China and India. This relatively small figure masks heterogeneity in the dependence of certain countries. Most importantly, Turkey sources 35% of its aluminium imports from Russia, and Japan, Poland and China import more than 10% of their aluminium from Russia. Russian aluminium is also relatively less CO2-intensive than alternatives found in China, India, and the Gulf countries as the country's smelters are largely powered by hydroelectricity.

Additionally, Russia holds 11% of global nickel production and 15%of world nickel exports. It is a major supplier of nickel to Finland with an84% import share. It also exports nickel to the Netherlands, Ukraine, and China, with 34%, 23%, and 13% import shares respectively. Following sanctions from the developed economies, Russia is seen as an offender and hence, the non-ferrous metals supply from Moscow has been disrupted abruptly.

As a consequence, prices of aluminium and nickel reached their 10-year high in February 2022. The market volatility caused by Russia's invasion of Ukraine was vividly seen in their consumption. Both aluminium and nickel prices saw their first signs of volatility on the 22 and 24 February, reached their all-time highs at the end of the first week of March, and then collapsed. Both prices are nevertheless still higher than before the start of the Russian aggression.

The impact of the was clearly felt on demand for these metals. Besides Russia's dominant role as the global supplier of these raw materials, a switch towards alternative sources may be further complicated by export restrictions imposed by other large suppliers China levied export taxes on aluminium and nickel. China's incomplete rebate of value-added tax (VAT) on exports of primary aluminium further discourages exports of aluminium. The export tax and the incomplete VAT rebate combined effectively tax exports to about25-30%. The Philippines, a major producer of nickel, applies non-automaticlicensing and Indonesia imposes an outright export ban.

In addition to imposed sanctions and export restrictions, the availability of the reviewed critical raw materials is affected by significant disruptions in transportation. The transport of these materials relies on rail and container ships. By the beginning of March 2022, the world's largest shipping companies suspended cargo services to and from Russian ports, severely affecting Russia's supplies to many countries. Moreover, in response to the suspension of shipping services, the Russian government has recommended restricting exports of fertilisers, oil, gas and metals to Western countries.

The world's second-largest aluminium producer, United

Company Rusal International, is owned partly by Oleg Deripaska (through holding En+Group International PJSC), who has been on the US sanctions list since 2018.For that reason, Rusal has sought to diversify its ownership structure even before the invasion of Ukraine. On 19 March 2022, Australia imposed a ban on exports of alumina, an essential input into aluminium production, to Russia. This is a loss of a second major supplier for Rusal after its Ukraine suppliers closed due to the invasion. Moreover, western companies such as Rio Tinto have stopped supplying Rusal's third major alumina supplier, its plant in Ireland, with bauxite (the main ingredient for smelting aluminium.

Impact on Indian companies

While put in place to address a variety of important policy objectives, export restrictions had distorting effects on international markets including India by reducing global supply and raising prices, while creating uncertainty for importers. Furthermore, further refining and processing of raw materials are not bound to specific locations like mining and ore extraction but often require specific technologies and know-how. Avoiding trade hampering policies, such as export restrictions, and fostering smooth functioning by reducing the costs of technical barriers to trade will be important for assuring that international supply chains for critical raw materials can work smoothly.

The earnings of the industry declined in the first half of the current financial year with primary producers such as Hindalco Industries, Vedanta, Hindustan Zinc and Hindustan Copper reporting a huge pressure on their margins in the first half of the financial year 2022-23ending September 30, 2022. The pressure on their profit margins is likely to continue in the second half, after a lacklustre performance in the first half. Elevated coal costs along with metal price corrections remain the key head winds affecting the margins, with no immediate relief in sight. Domestic issues a reset to multiply the woos for India's primary metals producers.

Domestic primary manufacturers have been facing a surge in energy costs, post the Russia-Ukraine conflict which, coupled with a shortage in rake and coal linkage availability, have affected their operating performance. Consequently, the industry had to rely on costlier-auction domestic coal, the premia of which almost touched over 400% in May2022. While the premia eased in recent months, it remains high at around 240%compared to the historical average of 50-55%. In the next fiscal, however, some respite is expected from better availability of coal linkages. On the other hand, international prices of base metals have contracted by a steep ~35-50% inFY2023 so far, compared to the record high in March 2022. While prices have improved by 5-10% after October 2022, the same is expected to remain range-bound at the current levels, given the uncertain global economic outlook.

Efficiency counts

Hindalco Industries Limited is the metals flagship company of the Aditya Birla Group. An $18 billion metals powerhouse, Hindalco is the world's largest aluminium company by revenue and a major player in copper. It is also one of Asia's largest producers of primary aluminium. The company's copper facility in India comprises a world-class copper smelter, down stream facilities, and a captive jetty. The copper smelter is among the world's largest custom smelters at a single location. Hindalco's global footprint spans48 manufacturing units across 10 countries.

Its earning margins (earnings before interest, tax, debt and a mortisation (EBITDA) contracted in the July-September 2022 quarter due to a decline in profitability in the aluminium division. Aluminium cost of production was more than 20 per cent in the quarter under review. Aluminium margin suffered a two-fold setback of lower prices and higher costs. Novelis' margins should remain under pressure in the second half of FY 2022-23. Businesses in India and Novelis are well-placed to deliver earnings

growth, led by expansion projects without an increase in leverage. Hindalco Industries operates under three segments — low-costvertically integrated Aluminium segment (1.3mt), the world's largest rolling and recycling Novelis operations (4mt rolling and 2.5mt recycling facility) and custom copper smelting (0.42mt copper cathodes capacity). Aluminium cost of production increased 20 per cent q-o-q in Q2-FY23 due to higher energy costs. The management expects ease in coal prices and supply and has guided on a 2-5per cent reduction in production costs in Q3-FY23.

Billionaire Anil Agarwal-controll ed Vedanta Ltd, the primaryproducer of aluminium, reported its aluminium production increased by 2 per cent to 5,84,000 tonnes in the July –September 2022 quarter from 5,70,000 tonnes shown in the corresponding quarter last year. The mined metal output at Zinc India during the July-Septemberquarter also went up by 3 per cent to 2,55,000 tonnes over 2,48,000 tonnes in the same period of the previous fiscal. The first half of mined metal production at 507,000 tonnes was higher by 8 per cent YoY, on account of an increase in ore production, further supported by better grades and improve dope rational efficiency. Meanwhile, Indian metals producers will have to cope with a slew of unfavourable factors. The industry is bogged down by subdued global demand for zinc and looming uncertainty.

Mounting pressure

Given the steep metals price corrections and input cost pressures, analysts have revised their estimates downwards of the operating profitability of domestic players to 18% in FY2023, almost 3percentage points lower than earlier forecasts made in September 2022 and 10 percentage points lower compared to FY2022. In the financial year 2023-24, while some respite is expected from better availability of coal linkages, the profitability is expected to remain range-bound at 19-20%.

At these levels, the industry would still remain resilient to withstand a worsening of the macroeconomic environment in the next fiscal. In addition, the domestic demand growth is expected to remain favourable at 7-10% in the coming two years, given the government's thrust on infrastructure development along with favourable demand from there new ables / electric vehicle (EV) sector. As against the domestic demand, the global apparent consumption of base metals was adversely Impacted in thecalendar year 2022, owing to China's lacklustre performance amid multiple lockdowns and the weak performance of its housing sector. Outside China too, the sentiments remained subdued owing to monetary policy tightening in other major global economies to combat inflation and heightened fears of a global economic slowdown. In the calendar year 2023, demand growth is expected to moderate further with downside risk, particularly from the western economies.

Future outlook

India is exploring ways to secure supplies of metals such as copper and lithium from some of the world's top producers by acquiring overseas mines, as part of efforts to meet rising domestic demand. To start with, India has identified one copper and two in resource long-term leases. While demand slowdown bounces back, the deficit situation is likely to persist in the calendar year 2023, given the supply-sideconstraints. Higher energy prices in Europe knocked off almost 1 million metric tonnes (MMT) of aluminium supply, with another 1-1.5 MMT being at risk of curtailment in coming quarters. Similarly, for zinc, the supply cuts will impact European and Chinese production. Copper supply was also hit owing to geopolitical issues in Peru and the supply is expected to remain tight in the near term. While the likely deficit situation would provide support to base metal prices, heightened fears of weakening global demand would limit upward price movements in the near term.

Domestic Passenger Vehicle Sales rise 23% in December Quarter - SIAM

SIAM

Segment wise Comparative Production, Domestic Sales & Exports data for the month of December 2022

(Number of Vehicles)

Category / Segment/Subsegment	Production December		Domestic Sales December		Exports December	
	2021	2022	2021	2022	2021	2022
Passenger Vehicles (PVs)*						
Passenger Cars	1,55,055	1,41,269	1,12,873	1,04,601	36,850	43,894
Utility Vehicles (UVs)	1,09,784	1,31,435	97,137	1,20,015	17,770	24,033
Vans	9,388	10,324	9,411	10,693	226	2
Total Passenger Vehicles (PVs)	**2,74,227**	**2,83,028**	**2,19,421**	**2,35,309**	**54,846**	**67,929**
Three Wheelers						
Passenger Carrier	58,818	53,932	20,134	28,473	41,534	24,815
Goods Carrier	6,543	7,300	6,617	7,314	1,374	1,410
E-Rickshaw	1,146	2,035	1,144	2,783	-	-
E-Cart	268	103	289	123	-	-
Total Three Wheelers	**66,775**	**63,370**	**28,184**	**38,693**	**42,908**	**26,225**
Two Wheelers						
Scooter/ Scooterettee	2,54,134	2,78,962	2,55,960	2,95,498	21,728	27,146
Motorcycle/Step-Throughs	10,29,054	9,09,694	7,26,587	7,23,593	3,42,698	2,44,777
Mopeds	24,596	21,934	33,395	25,961	744	234
Total Two Wheelers	**13,07,784**	**12,10,590**	**10,15,942**	**10,45,052**	**3,65,170**	**2,72,157**
Quadricycle	**250**	**250**	**10**	**20**	**252**	**240**
Grand Total	**16,49,036**	**15,57,238**	**12,63,557**	**13,19,074**	**4,63,176**	**3,66,551**

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

Society of Indian Automobile Manufacturers (13/01/2023)

SIAM

Summary Report: Cumulative Production, Domestic Sales & Exports data for the period of October - December 2022

(Number of Vehicles)

Category / Segment/Subsegment	Production October-December		Domestic Sales October-December		Exports October-December	
	2021-22	2022-23	2021-22	2022-23	2021-22	2022-23
Passenger Vehicles (PVs)*						
Passenger Cars	4,46,198	5,25,025	3,48,635	4,19,877	93,460	1,14,589
Utility Vehicles (UVs)	4,18,588	5,34,397	3,82,315	4,87,138	45,167	55,890
Vans	30,419	27,308	30,174	27,940	736	52
Total Passenger Vehicles (PVs)	**8,95,205**	**10,86,730**	**7,61,124**	**9,34,955**	**1,39,363**	**1,70,531**
Commercial Vehicles (CVs)**						
M&HCVs						
Passenger Carrier	4,992	11,211	3,615	8,387	1,645	3,035
Goods Carrier	69,563	80,352	60,349	77,291	7,094	2,172
Total M&HCVs	**74,555**	**91,563**	**63,964**	**85,678**	**8,739**	**5,207**
LCVs						
Passenger Carrier	4,421	9,237	3,532	8,093	444	588
Goods Carrier	1,32,420	1,35,929	1,27,213	1,33,340	16,886	12,849
Total LCVs	**1,36,841**	**1,45,166**	**1,30,745**	**1,41,433**	**17,330**	**13,437**
Total Commercial Vehicles (CVs)	**2,11,396**	**2,36,729**	**1,94,709**	**2,27,111**	**26,069**	**18,644**
Three Wheelers						
Passenger Carrier	1,74,454	1,93,525	56,565	1,03,567	1,25,230	89,505
Goods Carrier	22,826	26,311	21,804	26,625	2,805	1,864
E-Rickshaw	3,482	7,594	3,683	7,707	-	-
E-Cart	499	631	495	612	-	-
Total Three Wheelers	**2,01,261**	**2,28,061**	**82,547**	**1,38,511**	**1,28,035**	**91,369**
Two Wheelers						
Scooter/ Scooterettee	10,73,167	12,85,539	10,54,405	12,21,185	84,828	82,756
Motorcycle/Step-Throughs	33,90,098	32,15,352	24,44,410	25,32,781	10,09,471	7,62,797
Mopeds	1,18,312	1,04,068	1,31,309	1,05,064	1,602	960
Total Two Wheelers	**45,81,577**	**46,04,959**	**36,30,124**	**38,59,030**	**10,95,901**	**8,46,513**
Quadricycle	**827**	**534**	**58**	**151**	**810**	**456**
Grand Total	**58,90,266**	**61,57,013**	**46,68,562**	**51,59,758**	**13,90,178**	**11,27,513**

* BMW, Mercedes and Volvo Auto data is not available

** Daimler, JBM Auto & Scania data is not available

Society of Indian Automobile Manufacturers (13/01/2023)

SIAM

Summary Report: Cumulative Production, Domestic Sales & Exports data for the period of January - December 2022

(Number of Vehicles)

Category	Production		Domestic Sales		Exports	
Segment/Subsegment	January -December		January -December		January -December	
	2021	2022	2021	2022	2021	2022
Passenger Vehicles (PVs)*						
Passenger Cars	19,02,075	21,52,365	15,43,530	17,37,122	3,50,024	4,15,566
Utility Vehicles (UVs)	16,07,532	21,54,490	14,19,649	19,22,766	1,84,808	2,28,822
Vans	1,21,488	1,32,184	1,19,242	1,32,468	2,392	527
Total Passenger Vehicles (PVs)	**36,31,095**	**44,39,039**	**30,82,421**	**37,92,356**	**5,37,224**	**6,44,915**
Commercial Vehicles (CVs)**						
M&HCVs						
Passenger Carrier	14,591	33,953	11,186	29,107	5,015	10,101
Goods Carrier	2,46,407	3,27,369	2,15,951	3,05,880	25,149	16,753
Total M&HCVs	**2,60,998**	**3,61,322**	**2,27,137**	**3,34,987**	**30,164**	**26,854**
LCVs						
Passenger Carrier	20,108	39,098	17,677	37,220	1,984	2,024
Goods Carrier	4,86,911	6,17,398	4,32,302	5,60,909	52,834	59,427
Total LCVs	**5,07,019**	**6,56,496**	**4,49,979**	**5,98,129**	**54,818**	**61,451**
Total Commercial Vehicles (CVs)	**7,68,017**	**10,17,818**	**6,77,116**	**9,33,116**	**84,982**	**88,305**
Three Wheelers						
Passenger Carrier	6,62,483	7,22,773	1,74,531	3,05,453	4,97,860	4,10,385
Goods Carrier	92,906	98,313	82,950	92,512	9,794	6,793
E-Rickshaw	6,250	17,749	6,633	18,133	-	-
E-Cart	654	2,270	644	2,243	-	-
Total Three Wheelers	**7,62,293**	**8,41,105**	**2,64,758**	**4,18,341**	**5,07,654**	**4,17,178**
Two Wheelers						
Scooter/ Scooterettee	47,73,005	54,11,610	43,98,229	50,38,235	3,52,767	3,90,421
Motorcycle/Step-Throughs	1,36,59,525	1,36,97,851	96,16,578	1,01,27,790	40,83,907	36,58,543
Mopeds	5,34,205	4,41,831	5,19,008	4,41,966	10,238	4,290
Total Two Wheelers	**1,89,66,735**	**1,95,51,292**	**1,45,33,815**	**1,56,07,991**	**44,46,912**	**40,53,254**
Quadricycle	**5,380**	**1,750**	**79**	**501**	**5,411**	**1,387**
Grand Total	**2,41,33,520**	**2,58,51,004**	**1,85,58,189**	**2,07,52,305**	**55,82,183**	**52,05,039**
* BMW, Mercedes and Volvo Auto data is not available						
** Daimler, JBM Auto & Scania data is not available						
Society of Indian Automobile Manufacturers (13/01/2023)						

SIAM

Category & Company wise Summary Report for the month of December 2022 and Cumulative for April-December 2022

Report II

(Number of Vehicles)

Category	Production				Domestic Sales				Exports			
Segment/Subsegment	December		April-December		December		April-December		December		April-December	
Manufacturer	2021	2022	2021-22	2022-23	2021	2022	2021-22	2022-23	2021	2022	2021-22	2022-23
Three Wheelers												
Atul Auto Ltd	1,906	2,127	11,752	18,364	1,603	2,005	10,408	16,027	80	146	1,091	2,038
Bajaj Auto Ltd	40,705	37,418	3,41,731	3,49,867	18,376	23,010	1,10,604	2,00,260	25,063	11,192	2,39,210	1,48,794
Continental Engines Pvt Ltd	460	460	2,788	4,848	471	351	2,796	4,927	-	-	-	-
Force Motors Ltd	336	375	2,803	2,038	-	-	-	-	210	406	2,632	2,100
Mahindra & Mahindra Ltd	2,220	3,572	18,339	40,293	2,480	5,052	19,356	40,911	8	48	290	410
Piaggio Vehicles Pvt Ltd	5,786	7,786	46,592	83,406	4,504	7,034	29,362	61,221	2,756	1,328	18,195	21,938
TVS Motor Company Ltd	15,362	11,632	1,30,361	1,38,343	750	1,241	5,472	11,777	14,791	13,105	1,24,629	1,28,215
Total Three Wheelers	**66,775**	**63,370**	**5,54,366**	**6,37,159**	**28,184**	**38,693**	**1,77,998**	**3,35,123**	**42,908**	**26,225**	**3,86,047**	**3,03,495**
Two Wheelers												
Ather Energy Pvt. Ltd	1,752	4,993	14,852	53,932	1,761	7,085	15,465	53,709	-	-	-	-
Bajaj Auto Ltd	3,12,719	2,21,785	29,26,882	26,88,983	1,27,593	1,25,525	13,01,984	13,90,698	1,91,176	1,21,499	16,75,781	13,26,541
Chetak Technology Ltd	-	3,023	-	3,023	-	195	-	195	-	-	-	-
Hero MotoCorp Ltd	3,78,989	3,90,102	37,04,311	40,02,183	3,74,485	3,81,365	35,37,640	39,21,309	20,287	12,814	2,17,624	1,36,744
Honda Motorcycle & Scooter India Pvt Ltd	2,29,111	2,25,110	27,78,023	35,65,119	2,10,638	2,33,151	25,58,379	33,22,746	16,073	17,020	2,53,101	2,72,660
India Kawasaki Motors Pvt Ltd	155	765	2,599	2,644	316	442	2,803	2,761	-	-	-	-
India Yamaha Motor Pvt Ltd	59,508	46,585	5,38,137	6,66,595	44,736	30,157	3,64,928	4,45,888	20,570	21,669	1,98,545	2,27,514
Mahindra Two Wheelers Ltd	-	-	-	72	-	-	3	96	-	-	-	-
Okinawa Autotech Pvt. Ltd	9,098	-	49,427	81,754	8,119	2,523	48,836	82,880	-	-	113	78
Piaggio Vehicles Pvt Ltd	4,080	3,115	57,761	48,424	3,652	2,426	38,840	35,254	1,284	1,272	19,687	13,720
Royal-Enfield (Unit of Eicher Motors)	70,015	67,612	4,08,487	6,29,325	65,194	59,821	3,60,905	5,42,818	8,552	8,579	55,695	73,552
Suzuki Motorcycle India Pvt Ltd	44,946	56,026	5,34,076	6,76,230	32,549	40,905	4,39,868	5,39,027	18,599	23,007	1,07,283	1,46,173
Triumph Motorcycles India Pvt Ltd	89	46	529	505	136	88	950	830	-	-	-	-
TVS Motor Company Ltd	1,97,322	1,91,428	23,02,447	26,70,899	1,46,763	1,61,369	15,09,615	19,19,283	88,629	66,297	8,13,406	7,54,376
Total Two Wheelers	**13,07,784**	**12,10,590**	**1,33,17,531**	**1,50,89,688**	**10,15,942**	**10,45,052**	**1,01,80,216**	**1,22,57,494**	**3,65,170**	**2,72,157**	**33,41,235**	**29,51,358**
Quadricycle												
Bajaj Auto Ltd	250	250	3,844	1,533	10	20	64	441	252	240	4,139	1,200
Total	**250**	**250**	**3,844**	**1,533**	**10**	**20**	**64**	**441**	**252**	**240**	**4,139**	**1,200**
Grand Total	**16,49,036**	**15,57,238**	**1,64,50,531**	**1,90,91,511**	**12,63,557**	**13,19,074**	**1,25,07,116**	**1,54,64,753**	**4,63,176**	**3,66,551**	**41,55,418**	**37,47,090**
Society of Indian Automobile Manufacturers (13/01/2023)												

SIAM						
Summary Report: Cumulative Production, Domestic Sales & Exports data for the period of April - December 2022						
						Report I
						(Number of Vehicles)
Category	**Production**		**Domestic Sales**		**Exports**	
Segment/Subsegment	**April-December**		**April-December**		**April-December**	
	2021-22	**2022-23**	**2021-22**	**2022-23**	**2021-22**	**2022-23**
Passenger Vehicles (PVs)*						
Passenger Cars	13,08,045	16,15,425	10,29,765	12,99,831	2,75,709	3,16,289
Utility Vehicles (UVs)	11,82,282	16,45,691	10,36,006	14,69,594	1,46,667	1,74,453
Vans	84,463	1,02,015	83,067	1,02,270	1,621	295
Total Passenger Vehicles (PVs)	**25,74,790**	**33,63,131**	**21,48,838**	**28,71,695**	**4,23,997**	**4,91,037**
Commercial Vehicles (CVs)**						
M&HCVs						
Passenger Carrier	9,648	28,091	6,442	23,745	3,804	7,406
Goods Carrier	1,63,785	2,34,497	1,40,161	2,17,268	18,556	9,627
Total M&HCVs	**1,73,433**	**2,62,588**	**1,46,603**	**2,41,013**	**22,360**	**17,033**
LCVs						
Passenger Carrier	14,420	31,534	13,015	30,278	1,251	1,490
Goods Carrier	3,44,972	4,50,994	3,07,142	4,12,019	41,331	42,427
Total LCVs	**3,59,392**	**4,82,528**	**3,20,157**	**4,42,297**	**42,582**	**43,917**
Total Commercial Vehicles (CVs)	**5,32,825**	**7,45,116**	**4,66,760**	**6,83,310**	**64,942**	**60,950**
Three Wheelers						
Passenger Carrier	4,86,499	5,44,585	1,16,851	2,45,125	3,78,588	2,99,438
Goods Carrier	60,963	72,555	53,870	69,622	7,459	4,057
E-Rickshaw	6,250	17,749	6,633	18,133	-	-
E-Cart	654	2,270	644	2,243	-	-
Total Three Wheelers	**5,54,366**	**6,37,159**	**1,77,998**	**3,35,123**	**3,86,047**	**3,03,495**
Two Wheelers						
Scooter/ Scooterettee	32,72,006	42,67,802	30,20,454	39,85,312	2,70,402	3,10,380
Motorcycle/Step-Throughs	96,87,671	1,04,95,373	67,95,894	79,39,498	30,62,369	26,38,470
Mopeds	3,57,854	3,26,513	3,63,868	3,32,684	8,464	2,508
Total Two Wheelers	**1,33,17,531**	**1,50,89,688**	**1,01,80,216**	**1,22,57,494**	**33,41,235**	**29,51,358**
Quadricycle	**3,844**	**1,533**	**64**	**441**	**4,139**	**1,200**
Grand Total	**1,69,83,356**	**1,98,36,627**	**1,29,73,876**	**1,61,48,063**	**42,20,360**	**38,08,040**
* BMW, Mercedes and Volvo Auto data is not available						
** Daimler, JBM Auto & Scania data is not available						
Society of Indian Automobile Manufacturers (13/01/2023)						

SIAM												
Category & Company wise Summary Report for the month of December 2022 and Cumulative for April-December 2022												
												Report II
												(Number of Vehicles)
Category	**Production**				**Domestic Sales**				**Exports**			
Segment/Subsegment	**December**		**April-December**		**December**		**April-December**		**December**		**April-December**	
Manufacturer	**2021**	**2022**	**2021-22**	**2022-23**	**2021**	**2022**	**2021-22**	**2022-23**	**2021**	**2022**	**2021-22**	**2022-23**
Passenger Vehicles (PVs)												
FCA India Automobiles Pvt Ltd	983	519	12,804	13,187	916	769	8,795	10,163	189	188	4,796	3,622
Force Motors Ltd	100	58	271	534	68	37	190	540	-	1	-	5
Ford India Private Ltd	NA	NA	39,337	NA	NA	NA	15,818	NA	NA	NA	18,022	NA
Honda Cars India Ltd	11,136	9,231	75,488	88,556	7,973	7,062	61,406	70,819	1,153	1,388	13,031	17,118
Hyundai Motor India Ltd	53,100	52,877	4,49,100	5,34,877	32,312	38,831	3,48,828	4,19,839	16,621	19,021	1,00,059	1,19,099
Isuzu Motors India Pvt Ltd	268	3	1,310	1,875	136	83	587	496	-	(51)	141	428
Kia Motors India Pvt Ltd	14,000	30,676	1,62,337	2,68,884	7,797	15,184	1,26,725	1,94,494	3,603	9,462	34,341	65,540
Mahindra & Mahindra Ltd	11,500	25,555	1,52,910	2,58,499	17,722	28,445	1,50,665	2,59,858	990	1,333	7,366	6,777
Maruti Suzuki India Ltd	1,48,767	1,24,135	11,39,780	13,93,114	1,23,016	1,12,010	9,34,825	11,79,292	22,058	21,600	1,67,964	1,92,071
MG Motor India Pvt Ltd	3,901	4,724	28,114	39,932	2,550	3,899	26,814	34,508	32	-	32	12
Nissan Motor India Pvt Ltd	7,058	6,577	57,036	73,446	3,010	2,020	27,965	25,364	4,016	6,971	28,597	44,084
PCA Motors Pvt. Ltd	5	291	674	5,963	24	932	624	5,915	-	-	-	-
Renault India Pvt Ltd	8,330	6,656	79,939	86,676	6,130	6,126	64,270	63,913	2,670	3,949	18,380	21,533
SkodaAuto India Pvt Ltd	3,703	3,635	22,410	41,883	3,234	4,788	20,842	40,601	-	13	-	288
Tata Motors Ltd*	NA	NA	2,48,600	4,09,173	NA	NA	2,49,249	4,08,087	NA	NA	1,381	1,766
Toyota Kirloskar Motor Pvt Ltd	4,523	9,974	53,669	98,842	10,833	10,416	90,557	1,26,641	-	178	91	223
Volkswagen India Pvt Ltd	6,853	8,117	51,011	47,690	3,700	4,707	20,678	31,165	3,514	3,876	29,796	18,471
Total Passenger Vehicles (PVs)	**2,74,227**	**2,83,028**	**25,74,790**	**33,63,131**	**2,19,421**	**2,35,309**	**21,48,838**	**28,71,695**	**54,846**	**67,929**	**4,23,997**	**4,91,037**
* Only Cumulative data is available	NA=Not Available											

Statistics

SIAM

Segment & Company wise Production, Domestic Sales & Exports Report for the month of December 2022 and Cumulative for April-December 2022

Report III

(Number of Vehicles)

Category	Production				Domestic Sales				Exports			
Segment/Subsegment	December		April-December		December		April-December		December		April-December	
Manufacturer	2021	2022	2021-22	2022-23	2021	2022	2021-22	2022-23	2021	2022	2021-22	2022-23
Passenger Vehicles (PVs)												
A: Passenger Cars												
Ford India Private Ltd	NA	NA	5,595	NA	NA	NA	2,006	NA	NA	NA	2,640	NA
Honda Cars India Ltd	10,950	8,761	70,120	83,186	7,888	6,703	56,554	66,061	1,069	1,366	12,317	16,695
Hyundai Motor India Ltd	26,250	34,274	2,36,028	2,83,874	13,296	18,731	1,67,781	1,95,369	10,598	13,651	68,161	86,337
Mahindra & Mahindra Ltd	-	-	-	-	7	-	29	214	-	-	2	-
Maruti Suzuki India Ltd	1,07,928	86,582	7,91,845	10,05,441	86,869	68,421	6,41,703	8,22,985	16,783	20,568	1,31,490	1,54,947
Nissan Motor India Pvt Ltd	2,879	3,796	23,590	36,318	227	-	1,493	-	3,319	4,675	22,442	36,468
Renault India Pvt Ltd	2,521	1,840	26,969	23,520	1,056	1,827	19,806	16,398	1,567	695	8,495	7,414
SkodaAuto India Pvt Ltd	-	1,566	6,627	22,146	338	2,495	6,751	20,445	-	-	-	-
Tata Motors Ltd*	NA	NA	1,05,695	1,35,198	NA	NA	1,05,226	1,35,177	NA	NA	366	150
Toyota Kirloskar Motor Pvt Ltd	6	33	673	722	2,360	4,536	18,467	29,616	-	-	-	-
Volkswagen India Pvt Ltd	4,521	4,417	40,903	25,020	832	1,888	9,949	13,566	3,514	2,939	29,796	14,278
Total A: Passenger Cars	**1,55,055**	**1,41,269**	**13,08,045**	**16,15,425**	**1,12,873**	**1,04,601**	**10,29,765**	**12,99,831**	**36,850**	**43,894**	**2,75,709**	**3,16,289**
B: Utility Vehicles (UVs)												
FCA India Automobiles Pvt Ltd	983	519	12,804	13,187	916	769	8,795	10,163	189	188	4,796	3,622
Force Motors Ltd	100	58	271	534	68	37	190	540	-	1	-	5
Ford India Private Ltd	NA	NA	33,742	NA	NA	NA	13,812	NA	NA	NA	15,382	NA
Honda Cars India Ltd	186	470	5,368	5,370	85	359	4,852	4,758	84	22	714	423
Hyundai Motor India Ltd	26,850	18,603	2,13,072	2,51,003	19,016	20,100	1,81,047	2,24,470	6,023	5,370	31,898	32,762
Isuzu Motors India Pvt Ltd	268	3	1,310	1,875	136	83	587	496	-	(51)	141	428
Kia Motors India Pvt Ltd	14,000	30,676	1,62,337	2,68,884	7,797	15,184	1,26,725	1,94,494	3,603	9,462	34,341	65,540
Mahindra & Mahindra Ltd	11,157	25,481	1,50,582	2,56,496	17,469	28,333	1,48,903	2,57,849	873	1,331	6,767	6,775
Maruti Suzuki India Ltd	31,794	27,303	2,67,711	2,91,375	26,982	33,008	2,13,716	2,60,172	5,166	1,032	35,566	36,911
MG Motor India Pvt Ltd	3,901	4,724	28,114	39,932	2,550	3,899	26,814	34,508	32	-	32	12
Nissan Motor India Pvt Ltd	4,179	2,781	33,446	37,128	2,783	2,020	26,472	25,364	697	2,296	6,155	7,616
PCA Motors Pvt. Ltd	5	291	674	5,963	24	932	624	5,915	-	-	-	-
Renault India Pvt Ltd	5,809	4,816	52,970	63,156	5,074	4,299	44,464	47,515	1,103	3,254	9,885	14,119
SkodaAuto India Pvt Ltd	3,703	2,069	15,783	19,737	2,896	2,293	14,091	20,156	-	13	-	288
Tata Motors Ltd*	NA	NA	1,40,994	2,70,261	NA	NA	1,42,095	2,68,570	NA	NA	899	1,536
Toyota Kirloskar Motor Pvt Ltd	4,517	9,941	52,996	98,120	8,473	5,880	72,090	97,025	-	178	91	223
Volkswagen India Pvt Ltd	2,332	3,700	10,108	22,670	2,868	2,819	10,729	17,599	-	937	-	4,193
Total B: Utility Vehicles (UVs)	**1,09,784**	**1,31,435**	**11,82,282**	**16,45,691**	**97,137**	**1,20,015**	**10,36,006**	**14,69,594**	**17,770**	**24,033**	**1,46,667**	**1,74,453**
C: Vans												
Mahindra & Mahindra Ltd	343	74	2,328	2,003	246	112	1,733	1,795	117	2	597	2
Maruti Suzuki India Ltd	9,045	10,250	80,224	96,298	9,165	10,581	79,406	96,135	109	-	908	213
Tata Motors Ltd*	NA	NA	1,911	3,714	NA	NA	1,928	4,340	NA	NA	116	80
Total C: Vans	**9,388**	**10,324**	**84,463**	**1,02,015**	**9,411**	**10,693**	**83,067**	**1,02,270**	**226**	**2**	**1,621**	**295**
Total Passenger Vehicles (PVs)	**2,74,227**	**2,83,028**	**25,74,790**	**33,63,131**	**2,19,421**	**2,35,309**	**21,48,838**	**28,71,695**	**54,846**	**67,929**	**4,23,997**	**4,91,037**
*Only Cumulative data is available	NA=Not Available											

SIAM

Segment & Company wise Production, Domestic Sales & Exports Report for the month of December 2022 and Cumulative for April-December 2022

Report III

(Number of Vehicles)

Category	Production				Domestic Sales				Exports			
Segment/Subsegment	December		April-December		December		April-December		December		April-December	
Manufacturer	2021	2022	2021-22	2022-23	2021	2022	2021-22	2022-23	2021	2022	2021-22	2022-23
Three Wheelers												
A: Passenger Carrier												
Atul Auto Ltd	963	579	5,854	8,658	745	529	4,690	6,380	75	146	952	1,934
Bajaj Auto Ltd	37,505	34,623	3,15,658	3,22,267	15,610	20,468	88,945	1,73,514	24,098	10,008	2,34,622	1,47,386
Continental Engines Pvt Ltd	135	119	634	1,459	144	79	745	1,475	-	-	-	-
Force Motors Ltd	336	375	2,803	2,038	-	-	-	-	210	406	2,632	2,100
Mahindra & Mahindra Ltd	756	1,257	5,027	14,234	717	1,535	5,293	14,169	12	48	234	289
Piaggio Vehicles Pvt Ltd	3,936	5,400	27,043	59,140	2,189	4,653	11,878	38,127	2,436	1,275	15,805	20,789
TVS Motor Company Ltd	15,187	11,579	1,29,480	1,36,789	729	1,209	5,300	11,460	14,703	12,932	1,24,343	1,26,940
Total A: Passenger Carrier	**58,818**	**53,932**	**4,86,499**	**5,44,585**	**20,134**	**28,473**	**1,16,851**	**2,45,125**	**41,534**	**24,815**	**3,78,588**	**2,99,438**
E-Rickshaw												
Atul Auto Ltd	152	372	761	2,362	168	334	756	2,404	-	-	-	-
Continental Engines Pvt Ltd	75	172	201	974	73	132	206	990	-	-	-	-
Mahindra & Mahindra Ltd	919	1,491	5,288	14,413	903	2,317	5,671	14,739	-	-	-	-
Total E-Rickshaw	**1,146**	**2,035**	**6,250**	**17,749**	**1,144**	**2,783**	**6,633**	**18,133**	**-**	**-**	**-**	**-**
B: Goods Carrier												
Atul Auto Ltd	723	1,073	4,824	6,427	602	1,089	4,660	6,379	5	-	139	104
Bajaj Auto Ltd	3,200	2,795	26,073	27,600	2,766	2,542	21,659	26,746	965	1,184	4,588	1,408
Continental Engines Pvt Ltd	250	169	1,937	2,384	254	140	1,829	2,434	-	-	-	-
Mahindra & Mahindra Ltd	345	824	7,699	10,324	659	1,130	8,066	10,652	(4)	-	56	121
Piaggio Vehicles Pvt Ltd	1,850	2,386	19,549	24,266	2,315	2,381	17,484	23,094	320	53	2,390	1,149
TVS Motor Company Ltd	175	53	881	1,554	21	32	172	317	88	173	286	1,275
Total B: Goods Carrier	**6,543**	**7,300**	**60,963**	**72,555**	**6,617**	**7,314**	**53,870**	**69,622**	**1,374**	**1,410**	**7,459**	**4,057**
E-Cart												
Atul Auto Ltd	68	103	313	917	88	53	302	864	-	-	-	-
Continental Engines Pvt Ltd	-	-	16	31	-	-	16	28	-	-	-	-
Mahindra & Mahindra Ltd	200	-	325	1,322	201	70	326	1,351	-	-	-	-
Total E-Cart	**268**	**103**	**654**	**2,270**	**289**	**123**	**644**	**2,243**	**-**	**-**	**-**	**-**
Total Three Wheelers	**66,775**	**63,370**	**5,54,366**	**6,37,159**	**28,184**	**38,693**	**1,77,998**	**3,35,123**	**42,908**	**26,225**	**3,86,047**	**3,03,495**

SIAM

Segment & Company wise Production, Domestic Sales & Exports Report for the month of December 2022 and Cumulative for April-December 2022

Report III

(Number of Vehicles)

Category	Production				Domestic Sales				Exports			
Segment/Subsegment	December		April-December		December		April-December		December		April-December	
Manufacturer	2021	2022	2021-22	2022-23	2021	2022	2021-22	2022-23	2021	2022	2021-22	2022-23
Two Wheelers												
A: Scooter/ Scooterettee												
Ather Energy Pvt. Ltd	1,752	4,993	14,852	53,932	1,761	7,085	15,465	53,709	-	-	-	-
Bajaj Auto Ltd	940	1,315	4,991	27,876	728	3,249	4,803	26,409	-	2	-	5
Chetak Technology Ltd	-	3,023	-	3,023	-	195	-	195	-	-	-	-
Hero MotoCorp Ltd	18,404	40,276	2,57,917	2,95,390	17,438	35,400	2,41,346	2,82,169	472	2,032	8,173	8,118
Honda Motorcycle & Scooter India Pvt Ltd	1,31,152	1,11,131	15,88,267	20,16,493	1,16,664	1,18,042	14,69,739	18,93,750	7,860	9,480	1,28,376	1,48,883
India Yamaha Motor Pvt Ltd	15,255	13,386	1,83,427	1,71,653	14,236	13,979	1,62,222	1,52,049	2,558	786	33,372	26,004
Okinawa Autotech Pvt. Ltd	9,098	-	49,427	81,754	8,119	2,523	48,836	82,880	-	-	113	78
Piaggio Vehicles Pvt Ltd	4,080	3,115	57,761	48,424	3,652	2,425	38,835	35,245	1,284	1,272	19,687	13,720
Suzuki Motorcycle India Pvt Ltd	33,376	44,623	4,48,285	5,72,811	31,124	40,587	4,22,670	5,22,972	4,239	8,821	36,584	55,760
TVS Motor Company Ltd	40,077	57,100	6,67,079	9,96,446	62,238	72,013	6,16,538	9,35,934	5,315	4,753	44,097	57,812
Total A: Scooter/ Scooterettee	**2,54,134**	**2,78,962**	**32,72,006**	**42,67,802**	**2,55,960**	**2,95,498**	**30,20,454**	**39,85,312**	**21,728**	**27,146**	**2,70,402**	**3,10,380**
B: Motorcycle/Step-Throughs												
Bajaj Auto Ltd	3,11,779	2,20,470	29,21,891	26,61,107	1,26,865	1,22,276	12,97,181	13,64,289	1,91,176	1,21,497	16,75,781	13,26,536
Hero MotoCorp Ltd	3,60,585	3,49,826	34,46,394	37,06,793	3,57,047	3,45,965	32,96,294	36,39,140	19,815	10,782	2,09,451	1,28,626
Honda Motorcycle & Scooter India Pvt Ltd	97,959	1,13,979	11,89,756	15,48,626	93,974	1,15,109	10,88,640	14,28,996	8,213	7,540	1,24,725	1,23,777
India Kawasaki Motors Pvt Ltd	155	765	2,599	2,644	316	442	2,803	2,761	-	-	-	-
India Yamaha Motor Pvt Ltd	44,253	33,199	3,54,710	4,94,942	30,500	16,178	2,02,706	2,93,839	18,012	20,883	1,65,173	2,01,510
Mahindra Two Wheelers Ltd	-	-	-	72	-	-	3	96	-	-	-	-
Piaggio Vehicles Pvt Ltd	-	-	-	-	-	1	5	9	-	-	-	-
Royal-Enfield (Unit of Eicher Motors)	70,015	67,612	4,08,487	6,29,325	65,194	59,821	3,60,905	5,42,818	8,552	8,579	55,695	73,552
Suzuki Motorcycle India Pvt Ltd	11,570	11,403	85,791	1,03,419	1,425	318	17,198	16,055	14,360	14,186	70,699	90,413
Triumph Motorcycles India Pvt Ltd	89	46	529	505	136	88	950	830	-	-	-	-
TVS Motor Company Ltd	1,32,649	1,12,394	12,77,514	13,47,940	51,130	63,395	5,29,209	6,50,665	82,570	61,310	7,60,845	6,94,056
Total B: Motorcycle/Step-Throughs	**10,29,054**	**9,09,694**	**96,87,671**	**1,04,95,373**	**7,26,587**	**7,23,593**	**67,95,894**	**79,39,498**	**3,42,698**	**2,44,777**	**30,62,369**	**26,38,470**
C: Mopeds												
TVS Motor Company Ltd	24,596	21,934	3,57,854	3,26,513	33,395	25,961	3,63,868	3,32,684	744	234	8,464	2,508
Total C: Mopeds	**24,596**	**21,934**	**3,57,854**	**3,26,513**	**33,395**	**25,961**	**3,63,868**	**3,32,684**	**744**	**234**	**8,464**	**2,508**
Total Two Wheelers	**13,07,784**	**12,10,590**	**1,33,17,531**	**1,50,89,688**	**10,15,942**	**10,45,052**	**1,01,80,216**	**1,22,57,494**	**3,65,170**	**2,72,157**	**33,41,235**	**29,51,358**
Quadricycle												
Bajaj Auto Ltd	250	250	3,844	1,533	10	20	64	441	252	240	4,139	1,200
Total Quadricycle	**250**	**250**	**3,844**	**1,533**	**10**	**20**	**64**	**441**	**252**	**240**	**4,139**	**1,200**
Grand Total	**16,49,036**	**15,57,238**	**1,64,50,531**	**1,90,91,511**	**12,63,557**	**13,19,074**	**1,25,07,116**	**1,54,64,753**	**4,63,176**	**3,66,551**	**41,55,418**	**37,47,090**

Society of Indian Automobile Manufacturers (13/01/2023)

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Sub-segment & Company wise Production, Domestic Sales & Exports Report for the month of December 2022 and Cumulative for April-December 2022

Report IV

(Number of Vehicles)

Category	Production				Domestic Sales				Exports			
Segment/Subsegment	December		April-December		December		April-December		December		April-December	
Manufacturer	2021	2022	2021-22	2022-23	2021	2022	2021-22	2022-23	2021	2022	2021-22	2022-23
Passenger Vehicles (PVs)												
A : Passenger Cars - Upto 5 Seats												
Mini :Seats upto-5, Length Normally <3600 mm, Body Style-Hatchback, Engine Displacement Normally upto 1.0 Litre												
Regular												
Maruti Suzuki India Ltd (Alto,Spresso)	19,396	11,348	1,85,500	2,09,081	16,320	9,765	1,57,946	1,74,008	2,058	4,260	28,275	33,011
Renault India Pvt Ltd (Kwid)	2,521	1,840	26,969	23,520	1,056	1,827	19,806	16,398	1,567	695	8,495	7,414
Total Mini	**21,917**	**13,188**	**2,12,469**	**2,32,601**	**17,376**	**11,592**	**1,77,752**	**1,90,406**	**3,625**	**4,955**	**36,770**	**40,425**
Compact :Seats upto-5, Length Normally between 3600 - 4000 mm, Body Style-Sedan/Estate/Hatch/Notchback, Engine Displacement Normally upto 1.4 Litre												
Regular												
Ford India Private Ltd (Figo,Figo Aspire,Ford Freestyle)	NA	NA	5,595	NA	NA	NA	2,006	NA	NA	NA	2,640	NA
Honda Cars India Ltd (Amaze,Jazz)	4,885	4,800	30,030	39,534	4,145	3,617	29,428	37,737	210	36	837	749
Hyundai Motor India Ltd (Aura,Grand i10,i20,Santro,Xcent)	20,902	26,798	1,96,439	2,36,559	12,314	17,193	1,51,817	1,80,397	6,514	8,021	44,776	54,392
Maruti Suzuki India Ltd (OEM Model#,Baleno,Celerio,Dzire,Ignis,Swift,WagonR)	86,694	72,405	5,89,845	7,74,903	69,345	57,502	4,73,300	6,37,459	13,579	14,629	97,329	1,12,577
Nissan Motor India Pvt Ltd (Datsun GO,Datsun Redi-GO)	40	-	2,512	-	227	-	1,493	-	-	-	1,079	-
Tata Motors Ltd* (Altroz,Tiago,Tigor)	NA	NA	1,05,695	1,35,198	NA	NA	1,05,226	1,35,177	NA	NA	366	150
Toyota Kirloskar Motor Pvt Ltd (Glanza)	-	-	-	-	2,359	4,465	17,763	28,851	-	-	-	-
Volkswagen India Pvt Ltd (Polo)	1,029	-	13,265	874	762	-	8,606	753	173	-	7,468	1,095
Total Compact	**1,13,550**	**1,04,003**	**9,43,381**	**11,87,068**	**89,152**	**82,777**	**7,89,639**	**10,20,374**	**20,476**	**22,686**	**1,54,495**	**1,68,963**
Super Compact :Seats upto-5, Length Normally between 4000 - 4250 mm, Body Style-Sedan/Estate/Hatch/Notchback, Engine Displacement Normally upto 1.6 Litre												
Regular												
Mahindra & Mahindra Ltd (Verito)	-	-	-	-	7	-	29	214	-	-	2	-
Total Super Compact	**-**	**-**	**-**	**-**	**7**	**-**	**29**	**214**	**-**	**-**	**2**	**-**
Mid-Size: Seats upto-5, Length Normally between 4250 - 4500 mm, Body Style-Sedan/Estate/Hatch/Notchback, Engine Displacement Normally upto 1.6 Litre												
Regular												
Honda Cars India Ltd (City)	6,065	3,961	40,090	43,652	3,743	3,086	27,126	28,324	859	1,330	11,480	15,946
Hyundai Motor India Ltd (Verna)	5,348	7,476	39,411	47,315	982	1,538	15,786	14,972	4,084	5,630	23,385	31,945
Maruti Suzuki India Ltd (Ciaz)	1,838	2,829	16,500	21,457	1,204	1,154	10,457	11,518	1,146	1,679	5,886	9,359
Nissan Motor India Pvt Ltd (Sunny)	2,839	3,796	21,078	36,318	-	-	-	-	3,319	4,675	21,363	36,468
SkodaAuto India Pvt Ltd (Rapid)	-	-	3,863	-	158	-	4,111	-	-	-	-	-
Toyota Kirloskar Motor Pvt Ltd (Yaris)	-	-	237	-	-	-	295	-	-	-	-	-
Volkswagen India Pvt Ltd (Vento,Virtus)	3,492	4,417	27,638	24,146	70	1,888	1,343	12,813	3,341	2,939	22,328	13,183
Total Mid-Size	**19,582**	**22,479**	**1,48,817**	**1,72,888**	**6,157**	**7,666**	**59,118**	**67,627**	**12,749**	**16,253**	**84,442**	**1,06,901**
Executive :Seats upto-5, Length Normally between 4500 - 4700 mm, Body Style-Sedan/Estate/Hatch/Notchback, Engine Displacement Normally upto 2 Litre												
Regular												
Hyundai Motor India Ltd (Elantra)	-	-	178	-	-	-	178	-	-	-	-	-
SkodaAuto India Pvt Ltd (Octavia,Slavia)	-	1,398	1,649	20,762	164	2,386	1,401	19,196	-	-	-	-
Total Executive	**-**	**1,398**	**1,827**	**20,762**	**164**	**2,386**	**1,579**	**19,196**	**-**	**-**	**-**	**-**
Premium :Seats upto-5, Length Normally between 4700 - 5000 mm, Body Style-Sedan/Estates, Engine Displacement Normally upto 3 Litre												
Regular												
SkodaAuto India Pvt Ltd (Superb,Superb -B8)	-	168	1,115	1,384	16	109	1,239	1,249	-	-	-	-
Specialty												
Toyota Kirloskar Motor Pvt Ltd (Camry)	6	33	436	722	1	71	409	765	-	-	-	-
Total Premium	**6**	**201**	**1,551**	**2,106**	**17**	**180**	**1,648**	**2,014**	**-**	**-**	**-**	**-**
Total Passenger Cars	**1,55,055**	**1,41,269**	**13,08,045**	**16,15,425**	**1,12,873**	**1,04,601**	**10,29,765**	**12,99,831**	**36,850**	**43,894**	**2,75,709**	**3,16,289**

#Only production volume of OEM Model is reported by Maruti Suzuki India Limited. NA= Not Available *Only Cumulative data is available

SIAM

Sub-segment & Company wise Production, Domestic Sales & Exports Report for the month of December 2022 and Cumulative for April-December 2022

Report IV

(Number of Vehicles)

Category	Production				Domestic Sales				Exports			
Segment/Subsegment	December		April-December		December		April-December		December		April-December	
Manufacturer	2021	2022	2021-22	2022-23	2021	2022	2021-22	2022-23	2021	2022	2021-22	2022-23
B: Utility Vehicles (UVs)												
B : Utility Vehicles/ Sports Utility Vehicles; 4x2 or 4x4 offroad capability ; Generally ladder on frame ; 2 box ; 5 Seats or more but upto 10 Seats.												
UVC : Length < 4000 mm & Price <20 Lakhs												
Ford India Private Ltd (Ford Ecosport)	NA	NA	29,795	NA	NA	NA	9,865	NA	NA	NA	15,382	NA
Honda Cars India Ltd (WR-V)	186	470	5,368	5,370	85	359	4,852	4,758	84	22	714	423
Hyundai Motor India Ltd (Venue)	12,478	12,134	80,522	98,384	10,360	8,285	74,282	89,894	765	879	5,668	5,222
Kia Motors India Pvt Ltd (Sonet)	4,938	9,356	65,852	89,915	3,578	5,772	53,935	66,322	1,035	1,755	12,273	21,239
Mahindra & Mahindra Ltd (Bolero,Kuv100,Thar,Xuv300)	6,388	13,303	1,07,583	1,51,552	11,712	15,536	1,05,349	1,52,423	725	508	4,947	4,974
Maruti Suzuki India Ltd (OEM Model #,Brezza,Jimny)	14,693	11,110	1,29,719	1,50,052	9,531	11,200	82,480	99,292	3,963	11	29,127	30,110
Nissan Motor India Pvt Ltd (GO +,Magnite)	4,005	2,781	31,967	35,882	2,653	2,020	25,166	24,299	665	2,284	5,876	7,596
PCA Motors Pvt. Ltd (C3)	-	291	-	5,726	-	913	-	5,686	-	-	-	-
Renault India Pvt Ltd (Kiger,Triber)	5,809	4,816	51,393	63,156	5,018	4,299	42,519	47,515	1,103	3,254	9,864	14,119
Tata Motors Ltd* (Nexon,Punch)	NA	NA	1,04,813	2,29,059	NA	NA	1,06,311	2,27,639	NA	NA	827	1,530
Toyota Kirloskar Motor Pvt Ltd (Urban Cruiser)	-	-	-	-	2,634	-	18,574	22,158	-	-	-	-
Total UVC	**48,497**	**54,261**	**6,07,012**	**8,29,096**	**45,571**	**48,384**	**5,23,333**	**7,39,986**	**8,340**	**8,713**	**84,678**	**85,213**
UV1 : Length 4000 to 4400 mm & Price <20 Lakhs												
Force Motors Ltd (Gurkha)	78	58	249	538	68	37	190	540	-	1	-	5
Hyundai Motor India Ltd (Creta)	12,234	2,806	1,11,592	1,20,393	7,609	10,205	88,085	1,10,888	4,649	2,753	24,489	19,520
Kia Motors India Pvt Ltd (Seltos)	8,812	14,875	93,203	1,18,169	4,012	5,995	69,456	75,096	2,568	6,483	22,068	38,259
Maruti Suzuki India Ltd (Ertiga,Grand Vitara,S-Cross)	13,324	12,826	1,07,269	1,11,190	13,361	18,444	1,00,535	1,30,901	1,203	1,002	6,409	6,695
MG Motor India Pvt Ltd (Astor)	2,126	1,005	3,968	14,851	1,125	1,687	2,143	12,472	-	-	-	-
Nissan Motor India Pvt Ltd (Kicks)	174	-	1,479	1,246	130	-	1,306	1,065	32	12	279	20
Renault India Pvt Ltd (Duster)	-	-	1,577	-	56	-	1,945	-	-	-	21	-
SkodaAuto India Pvt Ltd (Kushaq)	3,593	1,969	15,650	18,865	2,840	2,186	14,013	19,252	-	13	-	288
Toyota Kirloskar Motor Pvt Ltd (Model Manufactured for the sale to other OEM-Urban Cruiser HyRyder)	-	8,585	-	36,787	-	4,201	-	11,864	-	178	-	178
Volkswagen India Pvt Ltd (Taigun,T-Roc)	2,332	3,541	10,108	21,716	2,828	2,690	10,689	16,669	-	937	-	4,193
Total UV1	**42,673**	**45,665**	**3,45,095**	**4,43,755**	**32,029**	**45,445**	**2,88,362**	**3,78,747**	**8,452**	**11,379**	**53,266**	**69,158**
UV2 : Length between 4400 - 4700 mm & Price <20 Lakhs												
Hyundai Motor India Ltd (Alcazar)	2,099	3,663	20,009	29,599	1,002	1,478	17,708	21,081	609	1,738	1,741	8,020
Kia Motors India Pvt Ltd (Carens)	-	5,637	-	57,439	-	3,195	-	50,064	-	1,083	-	5,901
Mahindra & Mahindra Ltd (Marazzo,Scorpio,Xuv500,Xuv700)	4,752	12,178	42,692	1,04,508	5,739	12,797	43,230	1,04,980	148	823	1,820	1,801
Maruti Suzuki India Ltd (XL6)	3,777	3,367	30,723	30,133	4,090	3,364	30,701	29,979	-	19	30	106
MG Motor India Pvt Ltd (Hector)	1,607	2,773	20,052	19,186	1,215	1,575	20,109	16,471	32	-	32	12
Tata Motors Ltd* (Harrier,Safari)	NA	NA	36,181	41,202	NA	NA	35,784	40,931	NA	NA	72	6
Total UV2	**12,235**	**27,618**	**1,49,657**	**2,82,067**	**12,046**	**22,409**	**1,47,532**	**2,63,506**	**789**	**3,663**	**3,695**	**15,846**
UV3 : Length >4700 mm & Price <20 Lakhs												
Force Motors Ltd (Trax)	-	-	-	(4)	-	-	-	-	-	-	-	-
Isuzu Motors India Pvt Ltd (Hi-Lander,V-Cross)	268	3	1,278	1,830	128	76	534	452	-	(51)	139	428
Toyota Kirloskar Motor Pvt Ltd (Innova Crysta)	2,905	-	39,429	40,934	3,989	36	39,550	41,901	-	-	-	-
Total UV3	**3,173**	**3**	**40,707**	**42,760**	**4,117**	**112**	**40,084**	**42,353**	**-**	**(51)**	**139**	**428**

#Only production volume of OEM Model is reported by Maruti Suzuki India Limited. NA= Not Available *Only Cumulative data is available

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Sub-segment & Company wise Production, Domestic Sales & Exports Report for the month of December 2022 and Cumulative for April-December 2022

Report IV

(Number of Vehicles)

Category	Production				Domestic Sales				Exports			
Segment/Subsegment	December		April-December		December		April-December		December		April-December	
Manufacturer	2021	2022	2021-22	2022-23	2021	2022	2021-22	2022-23	2021	2022	2021-22	2022-23
UV4 : Price between Rs. 20 to 30 Lakh												
FCA India Automobiles Pvt Ltd (Jeep Compass)	983	306	12,804	9,403	916	484	8,795	6,712	189	90	4,796	2,925
Force Motors Ltd (Gurkha)	22	-	22	-	-	-	-	-	-	-	-	-
Hyundai Motor India Ltd (Kona,Tucson)	39	-	949	2,627	45	132	972	2,607	-	-	-	-
Isuzu Motors India Pvt Ltd (MU-X)	-	-	1	-	-	-	3	-	-	-	2	-
Kia Motors India Pvt Ltd (Carnival)	250	808	3,282	3,346	207	88	3,334	2,582	-	141	-	141
Mahindra & Mahindra Ltd (Alturas G4)	17	-	307	436	18	-	324	446	-	-	-	-
MG Motor India Pvt Ltd (ZS EV)	61	785	2,025	4,412	102	526	2,167	4,136	-	-	-	-
PCA Motors Pvt. Ltd (C5 Aircross)	5	-	674	237	24	19	624	229	-	-	-	-
SkodaAuto India Pvt Ltd (Karoq)	-	-	-	-	1	-	2	-	-	-	-	-
Total UV4	**1,377**	**1,899**	**20,064**	**20,461**	**1,313**	**1,249**	**16,221**	**16,712**	**189**	**231**	**4,798**	**3,066**
UV5 : Price >Rs. 30 Lakh												
FCA India Automobiles Pvt Ltd (Jeep Meridian)	-	213	-	3,784	-	285	-	3,451	-	98	-	697
Ford India Private Ltd (Endeavour)	NA	NA	3,947	NA	NA	NA	3,947	NA	NA	NA	NA	NA
Isuzu Motors India Pvt Ltd (MU-X)	-	-	31	45	8	7	50	44	-	-	-	-
Kia Motors India Pvt Ltd (EV6)	-	-	-	15	-	134	-	430	-	-	-	-
MG Motor India Pvt Ltd (Gloster)	107	161	2,069	1,483	108	111	2,395	1,429	-	-	-	-
SkodaAuto India Pvt Ltd (Kodiaq)	110	100	133	872	55	107	76	904	-	-	-	-
Toyota Kirloskar Motor Pvt Ltd (Fortuner,Vellfire)	1,612	1,356	13,567	20,399	1,850	1,643	13,966	21,102	-	-	91	45
Volkswagen India Pvt Ltd (Tiguan)	-	159	-	954	40	129	40	930	-	-	-	-
Total UV5	**1,829**	**1,989**	**19,747**	**27,552**	**2,061**	**2,416**	**20,474**	**28,290**	**-**	**98**	**91**	**742**
Total Utility Vehicles (UVs)	**1,09,784**	**1,31,435**	**11,82,282**	**16,45,691**	**97,137**	**1,20,015**	**10,36,006**	**14,69,594**	**17,770**	**24,033**	**1,46,667**	**1,74,453**
Vans												
C :Vans ; Generally 1 or 1.5 box; seats upto 5 to 10												
V1 :Hard tops mainly used for personal transport, Price upto Rs. 10 Lakh												
Mahindra & Mahindra Ltd (Maxximo,Supro)	318	74	2,268	1,850	221	95	1,673	1,671	117	2	597	2
Maruti Suzuki India Ltd (Eeco)	9,045	10,250	80,224	96,298	9,165	10,581	79,406	96,135	109	-	908	213
Tata Motors Ltd* (Magic Express)	NA	NA	1,812	3,654	NA	NA	1,928	4,261	NA	NA	-	35
Total V1	**9,363**	**10,324**	**84,304**	**1,01,802**	**9,386**	**10,676**	**83,007**	**1,02,067**	**226**	**2**	**1,505**	**250**
V2 :Soft tops mainly used as Maxi Cabs, Price upto Rs. 10 Lakh												
Mahindra & Mahindra Ltd (Supro)	25	-	60	153	25	17	60	124	-	-	-	-
Tata Motors Ltd* (Magic Iris)	NA	NA	99	60	NA	NA	-	79	NA	NA	116	45
Total V2	**25**	**-**	**159**	**213**	**25**	**17**	**60**	**203**	**-**	**-**	**116**	**45**
Total Vans	**9,388**	**10,324**	**84,463**	**1,02,015**	**9,411**	**10,693**	**83,067**	**1,02,270**	**226**	**2**	**1,621**	**295**
Total Passenger Vehicles (PVs)	**2,74,227**	**2,83,028**	**25,74,790**	**33,63,131**	**2,19,421**	**2,35,309**	**21,48,838**	**28,71,695**	**54,846**	**67,929**	**4,23,997**	**4,91,037**

*Only Cumulative data is available NA= Not Available

SIAM																
Sub-segment & Company wise Production, Domestic Sales & Exports Report for the month of December 2022 and Cumulative for April-December 2022																
																Report IV
																(Number of Vehicles)
Category	**Production**				**Domestic Sales**				**Exports**							
Segment/Subsegment	**December**		**April-December**		**December**		**April-December**		**December**		**April-December**					
Manufacturer	**2021**	**2022**	**2021-22**	**2022-23**	**2021**	**2022**	**2021-22**	**2022-23**	**2021**	**2022**	**2021-22**	**2022-23**				
Three Wheelers																
A: Passenger Carrier																
A1:No. of seats Including driver not exceeding 4 & Max.Mass not exceeding 1 tonne																
Atul Auto Ltd (Atul Gemini,Atul Rik,Atul Rik + 3P ,Atul Rik 3P 200 Rik)	473	337	3,022	4,575	270	165	1,898	2,445	75	146	911	1,904				
Bajaj Auto Ltd (Maxima,RE)	37,505	34,623	3,15,658	3,22,267	15,610	20,468	88,945	1,73,514	24,098	10,008	2,34,622	1,47,386				
Continental Engines Pvt Ltd (Baxy EVE PRO,Baxy Express Passenger)	135	119	634	1,459	144	79	745	1,475	-	-	-	-				
Mahindra & Mahindra Ltd (Alfa,Treo)	756	1,257	5,027	14,234	717	1,535	5,293	14,169	12	48	234	289				
Piaggio Vehicles Pvt Ltd (Ape Auto,Ape City)	3,936	5,400	27,043	59,140	2,189	4,653	11,878	38,127	2,436	1,275	15,805	20,789				
TVS Motor Company Ltd (TVS King 4S)	15,187	11,579	1,29,480	1,36,789	729	1,209	5,300	11,460	14,703	12,932	1,24,343	1,26,940				
Total A1	**57,992**	**53,315**	**4,80,864**	**5,38,464**	**19,659**	**28,109**	**1,14,059**	**2,41,190**	**41,324**	**24,409**	**3,75,915**	**2,97,308**				
A2:No. of seats Including driver exceeding 4 but not exceeding 7 & Max.Mass not exceeding 1.5 tonnes																
Atul Auto Ltd (Atul Gem,Gemi Paxx)	490	242	2,832	4,083	475	364	2,792	3,935	-	-	41	30				
Force Motors Ltd (Minidor)	336	375	2,803	2,038	-	-	-	-	210	406	2,632	2,100				
Total A2	**826**	**617**	**5,635**	**6,121**	**475**	**364**	**2,792**	**3,935**	**210**	**406**	**2,673**	**2,130**				
Total Passenger Carriers	**58,818**	**53,932**	**4,86,499**	**5,44,585**	**20,134**	**28,473**	**1,16,851**	**2,45,125**	**41,534**	**24,815**	**3,78,588**	**2,99,438**				
E-Rickshaw																
Atul Auto Ltd (Atul Elite)	152	372	761	2,362	168	334	756	2,404	-	-	-	-				
Continental Engines Pvt Ltd (Baxy E Rath)	75	172	201	974	73	132	206	990	-	-	-	-				
Mahindra & Mahindra Ltd (e-Alfa Mini,Treo Yaari)	919	1,491	5,288	14,413	903	2,317	5,671	14,739	-	-	-	-				
Total E-Rickshaw	**1,146**	**2,035**	**6,250**	**17,749**	**1,144**	**2,783**	**6,633**	**18,133**	**-**	**-**	**-**	**-**				
B: Goods Carrier																
B1: Max mass not exceeding 1 tonnes																
Atul Auto Ltd (Atul Gem,Atul Gemini,Atul Samart Aqua,Atul Shakti,Gemi Cargo)	723	1,073	4,824	6,427	602	1,089	4,660	6,379	5	-	139	104				
Bajaj Auto Ltd (Maxima)	3,200	2,795	26,073	27,600	2,766	2,542	21,659	26,746	965	1,184	4,588	1,408				
Continental Engines Pvt Ltd (Baxy Cargo,Baxy Cargo Super King EV)	250	169	1,937	2,384	254	140	1,829	2,434	-	-	-	-				
Mahindra & Mahindra Ltd (Alfa,Treo,Zor Grand)	345	824	7,699	10,324	659	1,130	8,066	10,652	(4)	-	56	121				
Piaggio Vehicles Pvt Ltd (Ape Xtra)	1,850	2,386	19,549	24,266	2,315	2,381	17,484	23,094	320	53	2,390	1,149				
TVS Motor Company Ltd (TVS King Kargo)	175	53	881	1,554	21	32	172	317	88	173	286	1,275				
Total B1	**6,543**	**7,300**	**60,963**	**72,555**	**6,617**	**7,314**	**53,870**	**69,622**	**1,374**	**1,410**	**7,459**	**4,057**				
Total Goods Carrier	**6,543**	**7,300**	**60,963**	**72,555**	**6,617**	**7,314**	**53,870**	**69,622**	**1,374**	**1,410**	**7,459**	**4,057**				
E-Cart																
Atul Auto Ltd (Atul Elite Cargo)	68	103	313	917	88	53	302	864	-	-	-	-				
Continental Engines Pvt Ltd (Baxy E Cart)	-	-	16	31	-	-	16	28	-	-	-	-				
Mahindra & Mahindra Ltd (e-Alfa Cargo,Treo Yaari)	200	-	325	1,322	201	70	326	1,351	-	-	-	-				
Total E-Cart	**268**	**103**	**654**	**2,270**	**289**	**123**	**644**	**2,243**	**-**	**-**	**-**	**-**				
Total Three Wheelers	**66,775**	**63,370**	**5,54,366**	**6,37,159**	**28,184**	**38,693**	**1,77,998**	**3,35,123**	**42,908**	**26,225**	**3,86,047**	**3,03,495**				

SIAM												
Sub-segment & Company wise Production, Domestic Sales & Exports Report for the month of December 2022 and Cumulative for April-December 2022												
												Report IV
												(Number of Vehicles)
Category	**Production**				**Domestic Sales**				**Exports**			
Segment/Subsegment	**December**		**April-December**		**December**		**April-December**		**December**		**April-December**	
Manufacturer	**2021**	**2022**	**2021-22**	**2022-23**	**2021**	**2022**	**2021-22**	**2022-23**	**2021**	**2022**	**2021-22**	**2022-23**
Motorcycle/Step-Throughs												
B : Motorcycles/Step-Through: Big wheel size – more than 12".												
B2: Engine Capacity >75 CC but less than equal to 110 CC												
Bajaj Auto Ltd (Boxer,CT,Discover,Platina)	1,63,057	1,01,744	15,44,629	11,29,745	53,088	39,489	6,43,144	4,92,622	1,09,823	73,357	9,17,445	6,51,577
Hero MotoCorp Ltd (HF Deluxe,Passion,Splendor)	3,04,306	3,25,480	28,37,653	31,39,505	3,00,348	3,22,373	28,20,874	31,27,206	7,843	6,627	73,999	65,401
Honda Motorcycle & Scooter India Pvt Ltd (Dream,Livo)	6,746	10,817	1,57,584	1,79,308	4,296	7,890	1,33,577	1,46,144	2,000	1,596	30,865	37,084
India Kawasaki Motors Pvt Ltd (KLX 110,KX 100)	-	-	-	-	-	-	2	1	-	-	-	-
India Yamaha Motor Pvt Ltd (Crux,Saluto RX)	1,264	3,804	22,157	26,188	-	-	-	-	2,830	4,738	29,814	27,420
TVS Motor Company Ltd (Radeon,Sport,Star City)	48,796	42,840	5,14,277	4,96,829	16,415	14,937	2,31,595	2,47,643	38,307	29,304	2,90,404	2,51,194
Total B2	**5,24,169**	**4,84,685**	**50,76,300**	**49,71,575**	**3,74,147**	**3,84,689**	**38,29,192**	**40,13,616**	**1,60,803**	**1,15,622**	**13,42,527**	**10,32,676**
B3: Engine Capacity >110 CC but less than equal to 125 CC												
Bajaj Auto Ltd (Boxer,CT,Discover,Husqvarna,KTM,Platina,Pulsar)	58,489	59,891	6,03,130	7,84,313	28,888	43,813	3,43,470	5,11,216	30,950	20,001	2,70,691	2,76,048
Hero MotoCorp Ltd (Glamour,Splendor)	44,222	19,970	4,64,564	4,66,637	52,232	21,265	4,28,078	4,52,274	2,808	776	38,938	20,786
Honda Motorcycle & Scooter India Pvt Ltd (CB Shine)	65,608	77,515	8,36,804	10,85,985	68,061	87,760	8,19,628	10,64,761	2,583	1,336	28,528	25,970
India Yamaha Motor Pvt Ltd (Saluto,YD125)	2,550	3,940	21,770	37,072	-	-	-	-	1,232	2,140	15,080	35,324
Suzuki Motorcycle India Pvt Ltd (Hayate)	122	-	3,149	1,508	-	-	-	-	372	-	3,118	1,972
TVS Motor Company Ltd (Raider,Star City 125,Victor)	45,577	47,288	3,67,797	4,89,892	10,843	26,063	38,493	1,50,807	32,112	26,258	3,28,383	3,43,141
Total B3	**2,16,568**	**2,08,604**	**22,97,214**	**28,65,407**	**1,60,024**	**1,78,901**	**16,29,669**	**21,79,058**	**70,057**	**50,511**	**6,84,738**	**7,03,241**
B4: Engine Capacity >125 CC but less than equal to 150 CC												
Bajaj Auto Ltd (Boxer,CT 150,Pulsar)	48,382	28,993	4,13,778	3,37,090	27,169	23,909	1,75,625	1,65,560	22,440	8,896	2,47,187	1,73,712
Hero MotoCorp Ltd (Acheiver,Hunk,Xtreme)	8,542	2,711	85,581	27,191	-	-	-	-	8,873	2,473	82,490	28,460
Honda Motorcycle & Scooter India Pvt Ltd (CB Trigger,CB Unicorn 150)	120	-	2,026	200	-	-	-	-	155	-	2,035	240
India Kawasaki Motors Pvt Ltd (KLX 140)	-	-	-	-	-	-	2	-	-	-	-	-
India Yamaha Motor Pvt Ltd (FZ,SZ)	29,857	13,434	1,84,493	2,53,886	19,790	6,103	97,432	1,44,322	11,617	11,938	97,563	1,13,146
Total B4	**86,901**	**45,138**	**6,85,878**	**6,18,367**	**46,959**	**30,012**	**2,73,059**	**3,09,882**	**43,085**	**23,307**	**4,29,275**	**3,15,558**
B5: Engine Capacity >150 CC but less than equal to 200 CC												
Bajaj Auto Ltd (Avenger,Husqvarna,KTM,Pulsar)	22,013	18,858	2,08,726	2,89,921	10,774	12,471	75,465	1,56,523	15,023	9,830	1,51,932	1,35,550
Hero MotoCorp Ltd (Xpulse 200,Xtreme.)	3,515	1,665	58,596	73,460	4,397	2,296	46,873	59,377	291	906	14,024	13,979
Honda Motorcycle & Scooter India Pvt Ltd (CB 200X,CB Hornet 160R,CB Unicorn 160,Hornet 2.0,Unicorn,BRM,X Blade)	23,537	25,422	1,64,075	2,47,811	20,240	18,389	1,12,721	1,88,956	2,737	4,608	55,808	54,361
India Kawasaki Motors Pvt Ltd (W175)	-	382	-	387	-	224	-	224	-	-	-	-
India Yamaha Motor Pvt Ltd (MT 15,R15)	9,538	10,811	1,10,947	1,60,059	10,708	10,074	1,00,171	1,45,071	815	1,227	8,593	12,706
Suzuki Motorcycle India Pvt Ltd (Gixxer,Intruder)	9,371	8,328	67,171	80,611	1,213	11	15,110	10,556	10,840	10,808	54,296	72,822
TVS Motor Company Ltd (Apache)	35,840	20,212	3,73,566	3,37,937	23,533	22,181	2,55,828	2,49,110	9,253	4,434	1,27,868	85,180
Total B5	**1,03,814**	**85,678**	**9,83,081**	**11,90,186**	**70,865**	**65,646**	**6,06,168**	**8,09,817**	**38,959**	**31,813**	**4,12,521**	**3,74,598**

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