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Rajkamal Shrivastav (President, Marketing, Jayaswal Nesco Industries Ltd)

Avinash Arankalle (Consultant)

- **Customer Expectations from Special Steels WRT to Current Trends**

- **BHP expects copper demand to grow by 1 mln metric tons a year until 2035**
- **Women in Mining India successfully conducted their flagship event CLI**
- **Future Insights from IBAAS-IIM 2024 Conference**

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D. A. Chandekar
Editor

Dear Readers,

It is a well-known fact that the metals demand is somewhat depressed during the monsoon. This is because the construction activity is almost halted during this period and thus the metals requirement is also reduced but once the monsoon is over I am sure it will bounce back. This has been a regular pattern for the last so many years but I am not saying this only because of that. This is not only a wishful thinking. This year, the rain did not disappoint the farmers and there seems to be sufficient water for the farms as well as in the lakes. One may think why I am discussing water in a metal magazine ? What is the connection ? My friends, there is a very strong connection between the rainfall and the metals industry. Let me explain.

Firstly if the rainfall is good more soil is irrigated and thus the usage of tractors increases which ultimately translates in to higher castings demand. Secondly, when the rains are good, we get good harvest and the farmers and the middlemen get some extra money. We must understand that even today, majority of India's population is dependent on agriculture. More rains means more farming and more usage or agricultural equipments which are mostly castings. Also they utilise this extra money to buy things like refrigerator, AC, vehicle etc. They will eat more in the restaurants, travel more. All this will ensure that the country's economy wheel starts rotating faster and a growing economy will always have a bigger appetite for metals. This is not a small thing. These farmers can make or break the country's economy. We can also observe that the districts and the regions having less rainfall will have a less economic growth and the metals demand there will also be less. Now that the country is having good rains this year, can we predict a good metals demand till next march / April ? I think we can. Thus we have enough reasoning to believe that the water and metals have very thick co-relation.

We all know that the only permanent thing in this world is 'Change'. So it is logical to think that the good days after a satisfactory monsoon will not last forever. Apart from making the most out of this period, one also has to think and make provisions for a probable slack period in the future. I am not talking only about monetary provision. There are so many other things which can add to the sustainability of the enterprise. Identifying the risk areas, working on them and finally reducing the risk is the key consideration in achieving sustainability. There are other things too and the experts can surely provide guidance in this regard.

So friends, maximize the business but also address to the issues like longevity and sustainability !

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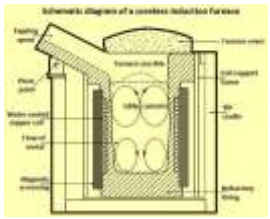
Face to Face

Technology



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13th Special Steel Convention

Customer Expectations from Special Steels WRT to Current Trends

The 13th Special Steels Convention & Expo brings together experts and industry leaders to discuss the future of special steels in India. The panel discussion focuses on various crucial aspects that shape the special steel industry, including market trends, technological advancements, and emerging concepts such as microlet steels and green steel making.

Avinash Arankalle (Consultant)

Avinash Arankalle (Consultant) -India currently produces about 161 million tons of crude steel, aiming for 300 million tons by 2030. With over 40 years in automotive materials technology, I've observed key trends in steel production and usage. In the mid-1980s, I found that over 50% of specialty steels were imported, especially relevant for the automotive sector, which still heavily relies on imported auto steel despite India being the second-largest steel producer. The automotive industry's expectations for high-quality domestic steel must be met to achieve the government's production goals. While domestic manufacturers like Tata and JSW produce various steel grades, the sector increasingly depends on advanced high-strength steels (AHSS) and ultra-high-strength steels (UHSS). Automotive quality requires stringent control over chemical compositions and cleaner steels, but around 62% of automotive-grade steel in India is still imported.

To compete, domestic manufacturers need to enhance material properties and adopt sustainable practices to reduce CO2 emissions. Controlling the phases in steel is vital for meeting customer requirements. Significant development and investment in India's steel industry are necessary to produce high-quality, locally sourced materials.

Rajkamal Shrivastav (President, Marketing, Jayaswal Nesco Industries Ltd) - Focusing on the value-added aspect of India's steel industry is essential. In 2023, global steel production reached about 1.89 billion tons, with China producing approximately 1.01 billion tons and India around 140 million tons. India's growth rate is

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Rajkamal Shrivastav (President, Marketing, Jayaswal Nesco Industries Ltd)

impressive at 8-11% annually, but our crude steel capacity is about 160 million tons, with only 140 million tons operational. On the trade front, India imported about 6.02 million tons of steel in 2023, while exports dropped to 6.7 million tons from 10.7 million tons in 2021. Current per capita steel consumption in India is around 81 kg, significantly lower than South Korea's 988 kg and China's 645 kg, indicating a gap that affects our production capacity. Globally, demand varies, with the EU expecting 151 million tons and the automotive sector consuming about 137 million tons—less than 10% of total steel production. While the stock market is thriving, steel companies' financial health has declined, with EBITDA dropping from 2021 levels despite increased production and market demand.

D.A Chandekar - The steel industry faces significant challenges despite rising demand and ambitious goals, like reaching a $300 billion market. Profitability is declining due to weak domestic consumption in China and slowing global production. While investments in steel production grow, rising raw material costs, like fluctuating coke and iron ore prices, are shrinking profit margins. To move forward, the industry must adopt cost management strategies, improve efficiency, and focus on high-value products to boost profitability.

Avinash Arankalle - The rise of lithium-ion batteries increases vehicle weight, which can reduce power efficiency. To address this, the automotive industry is turning to aluminum and advanced lightweight steels. Safety is a critical concern, as rising automotive safety standards require materials that can absorb more energy during crashes, leading manufacturers to replace traditional materials with stronger options. Additionally, the environmental impact of materials is significant. High-strength steel can produce lower CO2 emissions over its lifecycle compared to aluminum—approximately 400 million tons for steel versus 260 million tons for aluminium.

Rajkamal Shrivastav -Green steel and carbon emissions are crucial topics demanding significant investment. As governments tighten regulations to promote sustainability, the industry must navigate the high costs of financing these initiatives. Steel production is both capital- and energy-intensive, necessitating substantial investments.

The push for green steel may favor scrap-based production methods, raising questions about the future of traditional methods like blast furnaces and electric arc furnaces. Currently, only one plant globally claims to produce entirely green steel using a scrap route. However, relying solely on carbon credits to offset emissions is seen as inadequate; meaningful improvements are essential.

D.A Chandekar-What kind of research and development is currently happening in special steel plants?

Rajkamal Shrivastav -The steel industry often profits quickly but tends to reinvest for expansion without a strong focus on research and development (R&D). While

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per capita steel consumption, helping to balance imports with domestic production.

D.A Chandekar-We've all been in the steel sector for a long time, and this discussion has focused on sharing ideas and perspectives rather than reaching a specific conclusion.

Rajkamal Shrivastav-We need to prioritize cost reduction and product improvement by enhancing practices and efficiency. In the current market, inefficiency is not an option—companies must evolve to remain competitive. Any industry that falls behind will not receive market support.

Avinash Arankalle-I believe that steel will remain the predominant material over composites and aluminium. To secure its future, the industry must emphasize green steel, which minimizes CO2 emissions and promotes a circular economy through recycling and reuse. Steel has a bright future as the superior material.

there is some emphasis on lightweight, strong materials for safety, India lacks robust R&D in special steel products. The government is investing in studying carbon footprints, but we must also prioritize value addition in steel. Countries like China have advanced in micro-alloying, enhancing steel quality, while India has not made significant progress due to various factors. Japanese and German companies excel in R&D and use specific alloy compositions to enhance their products. To compete effectively and improve quality, Indian steelmakers need to invest more in R&D. We need to implement index-linked pricing in the Indian specialty steel industry, similar to global practices, to ensure fair earnings across the value chain and reduce unpredictable profits.

As we target producing 300 million tons of steel, improving logistics is essential. International transportation costs can be high, ranging from $9 to $20 per ton, so efficient methods are crucial for cost reduction. While road transport in India has improved, we must enhance efficiency across all sectors to meet the growing demand for raw materials. Advocating for better infrastructure and decision-making is vital for industry growth. To sustain a $300 billion steel industry, we should significantly increase

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Optimization of Energy consumption in Induction Melting Furnace

Introduction: India is one of the leading countries in the global foundry market, with Steel Casting in particular also taking a leadership role. The primary cause for this is the increased demand for metal casting from various industries like automotive, railways, and construction equipment, in particular. To meet the increased demand for metal castings in India, foundries are investing in new technology and equipment.

India's share of the foundry market is predicted to grow by USD 12.23 billion, with the market's growth velocity accelerating at a CAGR of 10 percent and the industry is attracting foreign investors. With the geopolitical scene changing almost daily, Indian manufacturers are ideally positioned to capitalize on this unexpected opportunity to improve their economic fortunes.

The buyers have a very dynamic attitude towards both the quality and the delivery of the goods. They expect receiving the most up-to-date items and services available in this market. It is a never-ending game. Most notably, top-tier steel casting foundries contribute to the strategic value added intermediary goods of original equipment manufacturers (OEMs), meaning that we must be exceptionally adaptable to keep up with the pace with our customer's needs.

In this article, Techniques are described to optimize energy consumption during melting cast iron or steel in an Induction furnace in the foundries. Schematic diagram of Induction furnace is shown in Figure 1.

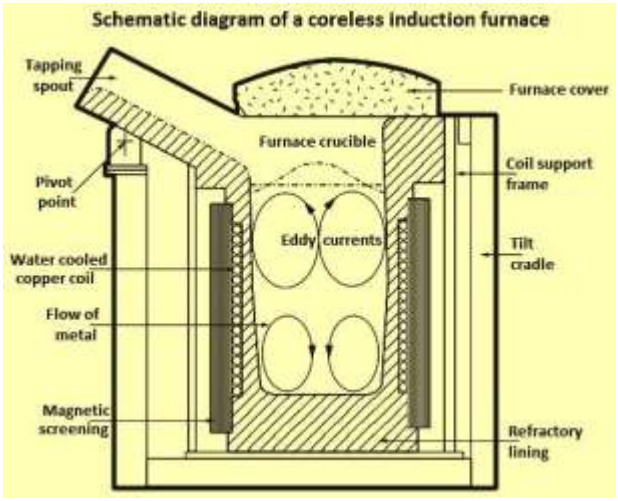

Figure1: Induction Furnace for Foundry Applications

The metal casting industry is one of the most energy-intensive manufacturing sectors, with the melting process accounting for 55–70% of its energy consumption. The availability of energy is far less than the demand. Moreover, as we assume the responsibility of embracing greener manufacturing practices, it becomes imperative to optimize energy consumption in order to mitigate the industry's carbon footprint.

In the foundry industry, efficient utilization of energy is crucial to maximizing output while minimizing input. However, achieving optimal energy efficiency remains a challenge for many foundries due to various operating conditions.

Dhiraj K. Chauhan
(Director: METCON-Metallurgical Consultants)

Techniques to save energy consumption: Following factors are considered.

1) Cleanliness of Charge: To maximize energy efficiency in foundries, it is essential to avoid use of rusty and dirty inputs and opting for cleaner carburizers. When unclean foundry returns containing sand are utilized, the conversion of adhesive sand residue into slag consumes a significant amount of energy, comparable to that required for melting the iron itself, i.e., 500 kWh/t. Considering a practical quantity of 20 kg of sand per tonne of iron, this accounts for an additional energy consumption of 10 kWh/t. This increases the quantity of slag as well. The presence of rusty charge material in foundries adversely affects electromagnetic coupling, leading to an inefficient transfer of melting energy and significantly longer melting times. In fact, rusty steel scrap can take 2 to 3 times longer to melt compared to non-rusty scrap, requiring a 40% to 60% higher power input. Energy consumption for different quality of scrap melting is shown in the Table 1 below.

Charge material Quality	Weight Kgs	Time Minutes	Energy Consumption Kwh	Kwh/t
Clean steel scrap	250	75	210	840
Rusty steel scrap1	200	185	270	1350
Rusty steel scrap2	275	192	335	1218

Table1: Comparison - Clean and Rusty scrap charge

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This not only results in increased energy consumption but also leads to higher melting losses and larger volumes of slag. To mitigate these issues and improve energy efficiency, shot blasting techniques can be employed.

2) Packing Density: The density at which the materials are packed into a foundry furnace has a direct impact on the degree of electromagnetic coupling that is attained and the power required to operate the charge. The heat cycle and energy consumption vary accordingly based on the packing density. Insufficiently compacted raw materials inside the furnace lead to suboptimal operation at the supplied power, resulting in time loss. Experiments involving different dimensions of returns and steel scrap fractions showed that packing densities in the range of 2 to 2.7 tonne/m³ can be achieved. Trial results revealed that decreasing the packing density from 2.5 to 2.0 tonnes/m³ resulted in a 25 kWh increase in power consumption. Despite the additional cost and effort, it is recommended to crush bulky returns to achieve a higher packing density. This not only facilitates furnace charging but also eliminates the risk of material bridging in the furnace.

3) Size of scrap: The presence of long scrap sections that extend out of the top of the furnace can significantly impact furnace utilization as they take longer to melt. It is important to consider the size of the scrap to prevent bridging of the charge inside the furnace. As a general guideline, each piece of scrap should not have a dimension greater than 33% of the furnace diameter, and no dimension should exceed 50% of the furnace diameter. Adhering to these size limitations ensures proper melting and prevents obstructions or inefficiencies in the furnace's operation.

4) Selection of charging pattern: Efficient energy consumption in foundries can be achieved by implementing specific charging patterns tailored to the type of raw materials being used. The electromagnetic field reaches its highest density at the walls of the crucible, making it the ideal location for the densest charge materials. Rough, bulky pieces should be in the center of the furnace. Continuous charging is essential to ensure the furnace remains consistently full, enabling it to operate at full power. By maintaining a full furnace through continuous charging, optimal energy utilization and efficient operation of the furnace can be achieved. Charge can be prepared as under:

a) CRC scrap can be compacted into solid cubes and charged into the furnace instead of loose scrap. This approach is beneficial because loose scrap can create air gaps, which hinder efficient electromagnetic induction. Air gaps act as poor conductors, leading to reduced overall efficiency. By compacting CRC scrap into solid cubes, these air gaps are minimized, resulting in improved energy efficiency during the melting process.

Other factors to decrease energy consumption:

a) Continuous charging through vibrating chute. (See Figures 2 and 3). b) Charge distribution according to size c) Optimizing carburizing with a high quality carburizer.

Fig: 2 Induction Furnace charging system

Fig. 3: Vibratory Furnace Charging Feeder

Adding carburizing agents to the molten metal bath after the melting process consumes more power compared to adding them along with the solid charge material at the beginning. This practice can

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result in an additional energy consumption of approximately 1 to 2 kWh per kilogram of carburizing agent. For example, a realistic input of around 2% carburizing agents can lead to an extra consumption of up to 40 kWh per tonne of iron. It is crucial to perform carburizing before alloying with FeSi. It is crucial to perform carburizing before alloying with FeSi. Additionally, it should be noted that higher silicon (Si) content in the cast iron reduces the need for carburization.

5) Closed furnace lid: To minimize energy losses in foundries, it is crucial to minimize the opening times of the furnace. The necessary opening times for charging, removing slag, temperature measuring, sampling, and pouring typically vary between 50 and 25% of the shift time. A well fitted closed lid limits the surface heat loss to about 1% of the input power. It is observed that when a 1.5 m diameter lid of a 1tonne induction furnace opens for 5 minutes, heat losses are of the order of 7kWh.

6) Scrap sorting: Scrap sorting and charging systems that achieve higher density charges show an increase in efficiency through an increase in coil efficiency and a shortening of melting time. Furnace loading time has been shortened by utilizing special vibrating conveyor systems designed to directly feed scrap into the furnace during melting. Charge distribution according to size and optimizing carburizing with a high- quality carburizer are very important factors.

Melting time is reduced by preheating the charge before loading to remove moisture and residual oil. It is important to consider that when incorporating metal chips into the charge, despite

their favorable packing density, there is a significant limitation in electrical contact due to the small contact surface area and surface oxidation. This results in poor electrical conductivity within the charge. However, by briquetting loose chips, the electrical energy consumption can be reduced.

7) Avoid Superheating: The tapping temperature depends upon the type of steel or cast iron and the superheat needed in the liquid metal for its end use. It is important to note that tapping molten metal at high temperatures can lead to increased refractory erosion and higher power consumption. Unnecessarily superheating the liquid metal to excessively high temperatures results in significant energy costs. For instance, a temperature rise of 50 K can consume approximately 20 kWh per tonne of iron. Minimizing the overheating of a molten bath saves energy.

Conclusion: Optimizing energy consumption in foundries is critical for reducing costs and environmental impact. Implementing these strategies not only enhance operational efficiency but also contribute to a more sustainable and environmentally friendly manufacturing industry. It is imperative for foundries to embrace these energy saving techniques and pave the way towards a greener future.

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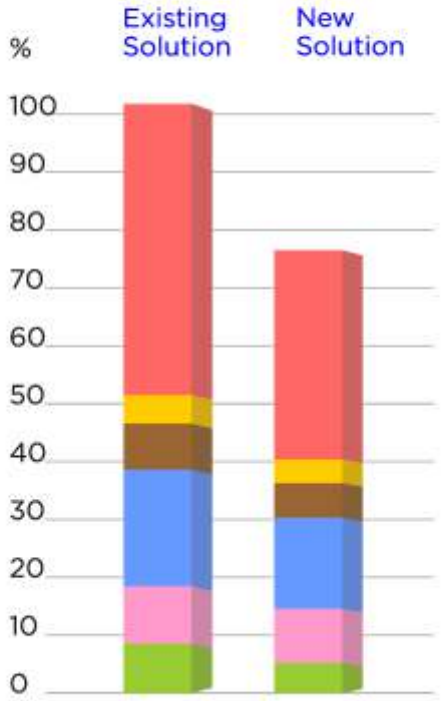

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Future Insights from IBAAS-IIM 2024 Conference

The 12th International Bauxite, Alumina, and Aluminium Conference & Exhibition (IBAAS-IIM 2024) was successfully held from September 25-27, 2024, at the Birla Institute of Technology and Science (BITS), Goa Campus. The event concluded with a well-organized post-conference tour of HINDALCO's Belagavi Alumina Refinery on September 28. The conference theme, "Aluminium Industry – Vision 2030," underscored India's rapid growth in alumina and aluminium production, aiming to meet the rising domestic demand. Around 230 delegates from 100 companies and organizations globally participated, representing sectors such as bauxite, alumina, aluminium, research institutions, and technology suppliers. Experts from India, Canada, Germany, and other countries contributed to over 70 technical papers and keynote addresses, focusing on crucial topics including decarbonization, digitalization, and sustainability in the aluminium industry.

The inaugural session featured Prof. D.M. Kulkarni of BITS and Dr. Anupam Agnihotri from JNARDDC as the Chief Guest, alongside industry dignitaries. The session included the unveiling of the conference souvenir, which contained abstracts of technical papers, and the distribution of Environment, Social, and Governance (ESG) awards to leading organizations, recognizing their contributions to sustainability. Keynote addresses from renowned experts provided insights into industry trends, particularly the evaluation of the Indian alumina sector and the development of specialized aluminium alloys for aerospace applications. The second day emphasized decarbonization strategies, with presentations outlining methods to reduce greenhouse gas emissions and adopt commercially viable technologies.

The third day included three parallel sessions covering bauxite-alumina, aluminium smelting, and downstream industries. Participants presented findings on topics such as bauxite evaluation, pot control systems, energy efficiency, and waste utilization. Special recognition was given to young researchers, with awards for best papers aimed at encouraging future contributions to the aluminium industry. Networking opportunities were abundant, allowing delegates to connect and share insights. The event also featured a technical exhibition with seven companies showcasing the latest innovations in equipment and specialty chemicals.

Overall, IBAAS-IIM 2024 was a significant step forward in addressing the challenges and opportunities facing the aluminium industry.

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Feature

BHP expects copper demand to grow by 1 mln metric tons a year until 2035

Copper has shaped human history and civilisation for millennia. In the 20th century, the story of copper was inextricably linked to the rise of electricity demand. Australian miner BHP expects the world to consume an extra 1 million metric tons of copper per year on average until 2035 due to the adoption of copper-intensive technologies, double the annual volume growth in the past 15 years.

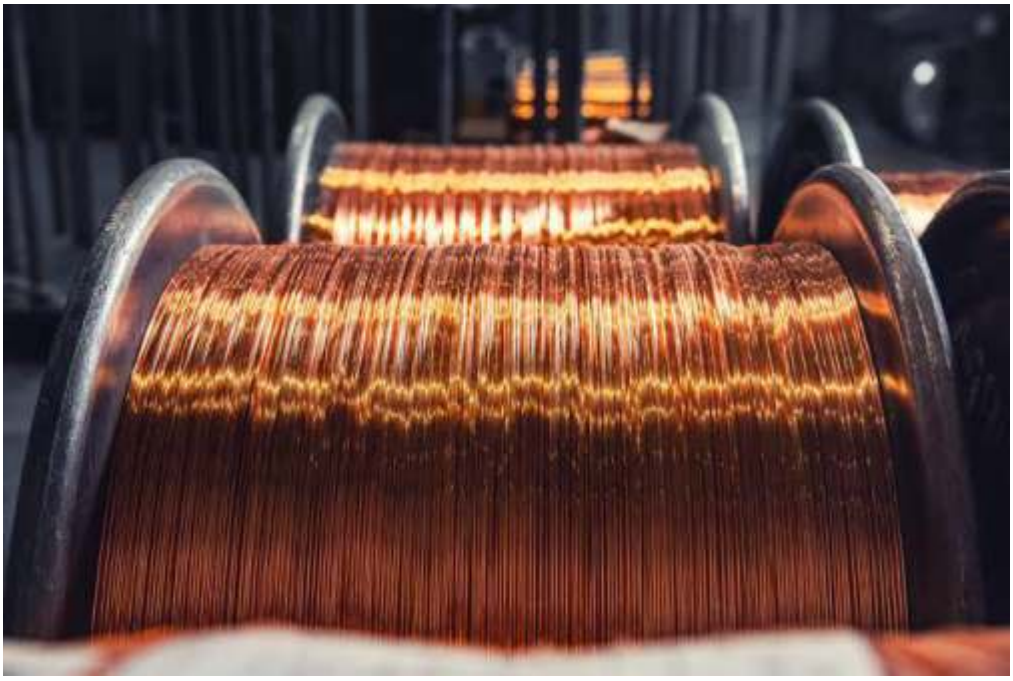
Copper has long been used in the construction, transport and power sectors due to its durability, malleability and conductivity. In recent years, it is also used in making electric vehicles, green energy plants, and data centres.

As we harnessed electrical power, copper became an indispensable material, crucial to our energy systems and modern technology. Through the 21st century, we expect copper to remain an essential building block to modern life as the world seeks to improve living standards for billions of people, transitions towards a net zero greenhouse gas (GHG) emissions economy, and further digitalises its industries and societies.

BHP said in a report released on 30th September 2024 that global copper demand has grown at a 3.1% compound annual growth rate over the last 75 years. But this growth rate has been slowing to only 1.9% over the 15 years to 2021, it said.

"Looking to 2035, however, we expect this growth rate to jump back to 2.6% annually," the report said.

Total copper demand in 2023 was 31 million tons, including 25 million tons of copper cathode and 6 million tons of copper scrap, according to BHP, which operates and owns most of the world's largest copper mine Escondida.



"As we look towards 2050, we see a 70% surge in global copper demand to 50 million tonnes annually, driven by copper's role in existing and emerging technologies, and in the world's decarbonisation aspirations," said BHP Chief Commercial Officer Rag Udd.

The mining giant expects the energy transition sector will account for 23% of copper demand by 2050, from 7% currently, it said in the report.

The digital sector, which spans data centres, 5G, artificial intelligence, internet of things and blockchain, will account for 6% of copper demand by 2050, from 1% now, BHP forecast.

China's demand will continue to grow, albeit at a lower rate, because its copper usage per capita is only half that of developed countries. India will also see growth, it said.

Meanwhile, copper mining output growth is constrained by high costs and depleting ore grade.

"We estimate the average grade of copper mines has declined by around 40% since 1991... We expect between one-third and one-half of global copper supply to face grade decline and ageing challenges over the next decade," BHP added.

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The total bill for all expansion capex from 2025–2034 is seen reaching around $250 billion, a significant increase from the previous 10 years, when the total spend on copper projects was approximately $150 billion, BHP said.

Demand BHP report focused more on :

Why we believe global copper demand will grow by around 70% to over 50 million tonnes (Mt) a year by 2050 and our view on how copper's role in multiple applications will provide demand resilience.

The looming global copper supply challenge as existing copper mines age, with the pipeline of potential projects less healthy than in previous cycles. Both brownfield and greenfield projects are expected to face cost and stakeholder challenges.

Why 'long-run marginal cost'-based inducement is still our preferred approach to forecasting price in the long run. We expect copper to remain an essential building block to modern life.

Demand Total global copper demand has grown at a 3.1% compound annual growth rate (CAGR) over the last 75 years—but this growth rate has been slowing. It was only 1.9% over the 15 years to 2021. Looking to 2035, however, we expect this growth rate to jump back to 2.6% annually.

We believe this reversal will come from a combination of three key themes:

'Traditional' economic growth, and the newer themes of the 'Energy Transition' and 'Digital' (primarily data centres). 'Traditional' demand refers to the basic relationship between economic growth, electricity consumption and copper.

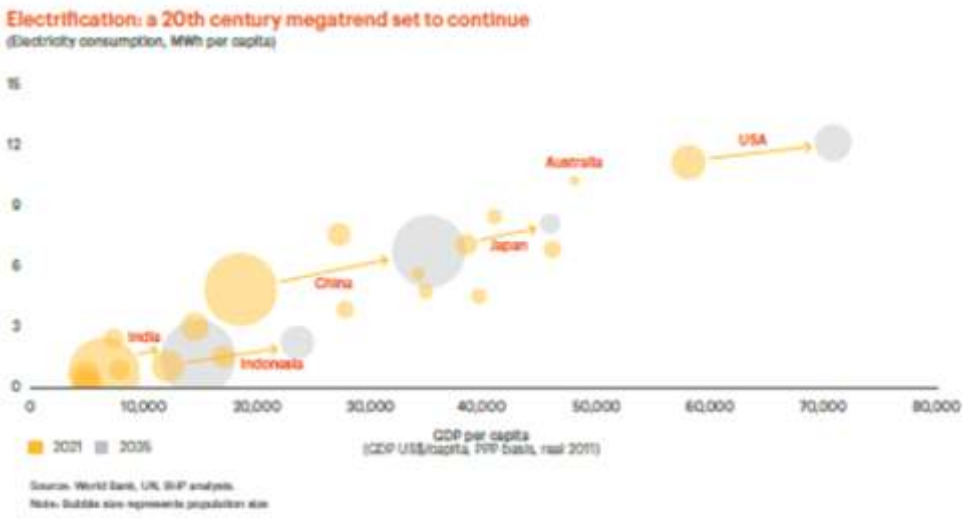
Through the 20th century and into the 21st, as countries developed, electricity became accessible to industry and homes and led to the creation of products that lifted living standards:

lighting, washing machines, refrigerators, air conditioners, radio and television, computers and smartphones. It is not only these products that need copper; so do the factories and supply chains that produce and deliver them, and the power infrastructure keeping them all running. Copper's broad application across multiple end-uses has made it resilient and less-exposed to single point failures of demand.

Traditional demand in the developed world is expected to remain strong and as living standards rise globally, the demand for copper is expected to follow suit. Developing economies, which have nearly five times the population of high-income economies, will increasingly strive to achieve the same high standard of living.

This transition will lead to a greater need for copper. Take China for example, despite its enormous appetite for copper over the past two decades, it still only has half of the copper accumulated stock-in-use per capita (e.g. buildings, machinery, vehicles) compared to developed economy, at around 100 kilograms per capita. India, the other major economy with over one billion people, also has a compelling copper story. India's electricity consumption per capita currently stands at around one-seventh of Japan's and one-fifth of China's, and we expect its copper demand to grow five-fold over its pre-Covid volumes in the coming decades as electricity is made more accessible.

This traditional demand provides a solid foundation, but



it does not account for the rapid acceleration of growth expected in the decades to come. That will be driven by the 'Energy Transition' and 'Digital' trends.

Since the Industrial Revolution, the use of fossil fuels has helped the world unlock greater levels of productivity.

As the world seeks to rein in the use of these fuels (and

their related carbon emissions), it will need more electricity (mainly from renewable sources) to keep everything running.

Most energy modellers agree that electrification will be a major enabler of the decarbonisation of transport, buildings and large parts of industry. Under our base case, we see electricity demand roughly doubling from today to 2050, as electricity's share of total energy consumption also doubles to around 40% by 2050.

'Energy Transition' copper demand refers to the additional copper required to achieve that level of electrification. As the most conductive industrial metal, copper is a key enabler of low GHG emissions energy sources, such as wind, solar, and hydro, as well as electric vehicles (EV) and batteries.

Some aggressive decarbonisation scenarios come in 10 to 15 percentage points higher in terms of end-use electrification than we are assuming in the base case.

For a full list of deep decarbonisation scenarios that we track, see BHP's Climate Transition Action Plan 2024 Additional information (page 62).

Forecast developed prior to the recent slowdown in EV adoption (ex-China). While the pace of adoption of EVs may underwhelm in the short term, the rationale for electrified transport remains compelling in the long run. Offshore wind requires around 11 tonnes of copper per megawatt, or over 5 times as much as gas-fired power which uses around 2 tonnes per megawatt. Onshore wind and solar are also more copper-intensive, at around 1.7 and 1.4 times, respectively. In addition, the capacity factors of wind and solar power are generally lower than fossil power, which means you need to install more renewable power capacity to generate the same amount of electricity.

We estimate copper use in data centres (including those used for cryptocurrency and AI) to be around half a million tonnes of copper today, rising to around three million tonnes in 2050.

An EV, for example, uses around three times more copper than typical internal combustion engines (ICE). As the energy transition unfolds, we anticipate the roll-out of EVs to lift transport sector's share of total copper demand from around 11% in 2021, to over 20% by 2040.

2 Copper is also needed for energy efficiency and conservation measures, such as smart grids, LED lighting, and heat pumps. On top of this, the generation and transmission of low GHG emissions electricity is expected to require more copper than conventional fossil fuel power generation.

'Digital' demand refers to the growth from the expected ramp-up demand for digital infrastructure, as the world creates and consumes massive amounts of data, enabled by copper-hungry data centres. Artificial Intelligence (AI) enabled technology requires vast amounts of data and processing capability, which in turn needs larger and faster computers consuming more electricity.

We expect global electricity consumption for data centres to rise from around 2% of global demand today, to 9% by 2050, with copper demand in data centres increasing six-fold by 2050. Today, we estimate that the Traditional vs Energy Transition vs Digital split of global demand is around 92%/7%/1%. By 2050 we predict the split to have evolved to 71%/23%/6%.

Feature

Women in Mining India successfully conducted their flagship event CLI

Women in Mining (WIM) India, a pioneering industry body founded by young female professionals and supported by senior veterans, aims to empower women in the mining sector. With a vision of promoting employment, retention, and leadership opportunities for women, WIM India collaborates with global networks, including WIM UK, to connect over 500 influential women in mining worldwide. Their efforts focus on enhancing women's representation across the entire mining value chain.

The organization hosts initiatives like the Collaborative Leadership Initiative (CLI) conference, which brings together industry leaders to discuss emerging trends. The CLI 2024 event, themed "Sustainability Transition: Integrating Safety and Sustainability for a Greener Future," attracted over 70 delegates and featured a keynote from Ms. Michelle Manook, CEO of Future Coal. She emphasized the necessity of balancing economic growth with environmental responsibility, urging attendees to lead with ability rather than age or gender.

A central panel discussion included industry experts like Adity Ganguly (Tata Steel), Denise Eaton (Austrade), Jayshree Daga (JMS Mining), and Kamal Chatterjee (A & B Global Mining), moderated by Sohini Paul from Komatsu Mining. Key insights emerged on the integration of technology in promoting safety and sustainability. Denise highlighted the role of technological innovation in achieving both operational and environmental goals, while Adity underscored the long-term benefits of embracing sustainable practices. Kamal addressed regulatory challenges, advocating for innovative compliance strategies, and Jayshree discussed how corporate social responsibility can enhance sustainability and safety.

A touching moment of recognition was the acknowledgment of Prof. Rajni Singh from IIT (ISM) Dhanbad for her outstanding contributions to gender equality in mining and STEM fields.

The event was made possible by the support of sponsors like Komatsu, Mine Line Pvt Ltd, A & B Global Mining, and Master Drilling India Pvt Ltd, along with partners ICF and CPA.

In summary, CLI 2024 served as a catalyst for change, fostering a collective commitment to a more sustainable and inclusive mining industry. As articulated by Ms. Manook, "Our responsibility extends beyond the mines—we're shaping the world for future generations," reinforcing the urgent need for a transition in mining practices.

Growing EV Copper Demand in an Efficiency-Driven Era

Copper's role in battery electric vehicles (BEVs) is changing. Each BEV typically uses about 70 kg of copper, which is crucial for many parts, like the copper foil that separates the battery's anode and cathode, as well as motors and charging cables.

However, car manufacturers are working to use less copper in these parts to save money as they increase BEV production. Estimates suggest that by 2030, the average amount of copper used per vehicle could drop by 38 kg. This reduction is happening because companies are finding cheaper materials and improving efficiency.

Almost all parts that contain copper are expected to see some reduction. Busbars, which help distribute power from the battery to different vehicle parts, will see the biggest yearly decrease, averaging 6% until 2030. Many manufacturers are switching to lighter and cheaper aluminum busbars instead of copper.

Even with this decrease in copper per vehicle, the overall demand for copper in the BEV sector is expected to rise a lot as more vehicles are made and charging stations are built. These factors should more than make up for the lower copper usage in each vehicle.

Copper at the Core of India's Green Energy Drive

In India's effort to build a sustainable future, copper has become essential for renewable energy. Often called the "metal of electrification," copper is vital for technologies such as electric vehicles (EVs), solar panels, and wind turbines.

Recent reports from Goldman Sachs suggest that the share of copper used in green technologies, which was just 4% of total use in 2020, is expected to rise to 17% by 2030. This growth is largely due to the increasing demand for EVs and renewable energy, both of which depend heavily on copper. To reach its goal of net-zero emissions by 2070, India may need to increase its copper use by

about 54% beyond current estimates for 2030, which could mean needing an additional 13 million metric tons each year.

According to S&P Global, by 2035, energy-related uses of copper in India are expected to require nearly 21 million metric tons. This increase reflects the rapid expansion of electric transportation and renewable energy systems. For instance, copper demand for EVs is projected to rise from around 2.7 million metric tons in 2022 to about 5.5 million by 2035. Offshore wind farms require around five metric tons of copper per megawatt, while solar farms use about 2.3 metric tons.

Despite this strong demand, India faces significant supply challenges. Current mining and recycling capacities may fall short, highlighting the need for new companies like Adani, as well as support for established players like Vedanta Sterlite Copper. The copper industry must address environmental regulations and public acceptance to meet future demands and support India's climate goals.

Shaping the Future of Metals at MMMM 2024

The 14th International Conference & Exhibition on Minerals, Metals, Metallurgy, and Materials (MMMM 2024) recently took place in New Delhi. This flagship event, organized by the Indian Institute of Metals (IIM) Delhi Chapter every two years, highlighted some of the most advanced and innovative research currently

happening in the metals industry. The conference was titled “Product & Process Innovations in Metal Production,” and it focused on improving efficiency, promoting sustainability, and overcoming challenges in adopting new technologies.Bhupathi Raju Srinivasa Varma, the Minister of State for Steel and Heavy Industries, emphasized the importance of adopting best practices in India's metals industry to ensure resource efficiency and sustainability in production processes. Rajesh K. Vijayavergia, Chairman of the IIM Delhi Chapter Executive Committee, noted that the challenges facing the metals sector require collaboration across disciplines. This conference aimed to create an ideal platform for promoting interdisciplinary research and technological innovation.Brigadier Retd. Arun Ganguli, Secretary General of IIM, discussed the various technical activities and achievements of the Indian Institute of Metals over the years.

Several insightful research papers were presented at the conference. SAIL (Steel Authority of India Limited) shared its efforts to develop local production capabilities for electrical steels, which are currently imported, to meet the rising domestic demand. Tata Steel presented on the challenges and solutions for lightweighting in the automotive sector using advanced high-strength steel (AHSS).Sustainability was a key focus. A paper by Joachim von Scheele from Linde plc. outlined three major approaches for reducing emissions from ironmaking: using hydrogen, syngas, and carbon capture. Another paper by M.N. Dastur highlighted the need for technologies like carbon capture, utilization, and storage (CCUS) in India's steel production to reduce emissions. While hydrogen is often seen as a solution for decarbonizing iron production, there are metallurgical complexities that need to be considered when compared to traditional methods.

R.K. Singhal from SRTMI emphasized the need for adopting the best available technologies to help India's steel industry reduce its carbon footprint. Technology providers like Danieli and Tenova also shared insights on transitioning to low-carbon operations and recycling industrial by-products like slag. Overall, MMMM 2024 emphasized the urgency of driving innovation, improving energy efficiency, and promoting sustainability in India's metals industry to ensure growth and progress.

The Impact of Scrap and eWaste Recycling

As technology advances, the generation of scrap metal and electronic waste (e-waste) continues to grow rapidly, leading to significant environmental challenges. Recycling these materials is crucial for reducing ecological harm and conserving valuable resources. Tools like scrap metal buying software enhance the recycling process by efficiently managing the collection, processing, and resale of scrap materials. Alongside metals and e-waste, recycling scrap ammunition plays a vital role in responsible waste management, further contributing to a sustainable future.

Scrap metal refers to any metal that is no longer useful,

including materials such as steel, aluminum, copper, and iron. These metals are often sourced from old vehicles, appliances, construction materials, and even scrap ammunition, which is increasingly recognized as recyclable. On the other hand, e-waste encompasses discarded electronic devices like computers, mobile phones, and televisions. These gadgets frequently contain hazardous substances, including lead, mercury, and cadmium, which can be detrimental to both human health and the environment if not recycled properly.

The improper disposal of scrap metal and e-waste poses serious risks. When these materials end up in landfills, harmful chemicals can leach into the soil and water, contaminating groundwater supplies and agricultural land. Additionally, as e-waste and scrap metal decompose in landfills, they can release toxic gases and dust into the atmosphere, contributing to air pollution. For instance, incinerating old electronics can produce harmful substances that degrade air quality.

Recycling these materials not only helps the environment but also offers significant economic benefits. The recycling industry creates jobs in waste collection, material processing, and equipment manufacturing. By increasing the recycling of scrap metal, scrap ammunition, and e-waste, we can generate more job opportunities within local economies. Moreover, the recycling industry generates revenue by selling recovered metals and components. Companies like buyscrapapp facilitate the sale and purchase of scrap, providing a convenient platform for individuals and businesses to recycle their waste and turn it into profit.

The importance of e-waste recycling cannot be overstated. E-waste contains toxic materials that are harmful to both the environment and human health. Proper recycling ensures that these substances are safely extracted and managed, preventing contamination of soil and water sources. Furthermore, recycling scrap metal, including ammunition, significantly reduces energy consumption compared to mining and refining new metals. This decrease in energy use contributes to lower greenhouse gas emissions and helps combat climate change.

Despite the clear benefits, challenges persist in recycling efforts. A lack of awareness about the importance of recycling, especially in developing regions, hampers

progress. Many individuals are unaware of how to recycle effectively or lack access to appropriate facilities. Illegal dumping and the export of e-waste to countries with lax environmental regulations also pose significant challenges, often leading to unsafe recycling practices.
In conclusion, recycling scrap metal, scrap ammunition, and e-waste is essential for minimizing their environmental impact. By raising awareness and promoting responsible disposal methods, we can all contribute to a greener, more sustainable future.
Engaging in recycling not only protects our environment but also supports local economies and conserves natural resources, making it a vital practice for everyone.

Aluminum Market Faces Intensified Squeeze

Signs of a mounting squeeze in the aluminum market have emerged, particularly as contracts for October delivery on the London Metal Exchange (LME) are trading at a higher premium compared to November contracts. This development highlights increasing pressures on traders who are currently navigating lengthy queues to withdraw aluminum from the LME's storage system. Many are facing challenges as they need to roll over their hedging positions while they wait for access to their metal.
Compounding these difficulties, warehouse owner Istim Metals LLC has controversially raised a key administrative fee, making it significantly more expensive for traders to re-register aluminum if market prices shift against them. This fee increase has raised concerns among market participants about the overall cost of managing their aluminum positions in a volatile environment.
Additionally, market attention is focused on a substantial long position in October contracts held by Trafigura Group. This is the same trader responsible for initially depositing a large quantity of aluminum in Istim's warehouses, further complicating the current market dynamics.
As these factors converge, the aluminum market remains under scrutiny. On Monday, aluminum prices showed little change in London, indicating a period of uncertainty amid rising costs and logistical challenges. Traders are closely monitoring the situation as they assess the impact of these developments on supply, demand, and pricing.
The ongoing squeeze, coupled with the administrative fee hike and the concentration of long positions, suggests that the aluminum market could experience heightened volatility in the coming weeks. Stakeholders are advised to stay informed and prepared for potential shifts in market conditions as they navigate this complex landscape.

NALCO Confident in Beating Earnings Projections

NALCO's Chairman and Managing Director, Sridhar Patra, is optimistic about the company's potential to exceed earnings expectations, provided that costs remain stable. He stated in an interview with CNBC-TV18, "We are the lowest-cost producer of alumina and bauxite. If these costs hold steady, we are confident we will perform better than market forecasts."

Brokerage firm Kotak Securities anticipates that NALCO's earnings before interest, tax, depreciation, and amortization (EBITDA) will grow by 8% in 2024-25, 11% in 2025-26, and 17% in 2026-27, driven by the introduction of new capacity.

Patra expects a decline in aluminum prices in the coming months but believes that alumina prices will remain steady due to an anticipated supply deficit. He predicts a shortage of approximately one million tonnes of alumina, while aluminum could see a surplus of about half a million tonnes. He explained, "For every ton of aluminum produced, around 1.9 to 2 tonnes of alumina are needed. This alumina deficit and the expected aluminum surplus should balance each other out."He estimates that aluminum prices will average around $2,400 per tonne, while alumina prices could settle at approximately $600 per tonne.

Additionally, Patra highlighted NALCO's refinery expansion, which is scheduled to be operational by September 2025. This expansion is projected to significantly enhance alumina production, with expected outputs of 2.6 million tonnes in FY25-26 and nearly 3.1 million tonnes in FY26-27.For the current financial year, NALCO has set a capital expenditure target between ₹2,000 crore and ₹2,500 crore, aimed at supporting these growth initiatives. The combination of stable costs, increased production capacity, and strategic planning positions NALCO favorably for the upcoming years, suggesting a promising outlook for the company in the aluminum market.

Passenger Vehicle sales dip 1.8%, two-wheeler sales grow 9.3% in August: SIAM

The Society of Indian Automobile Manufacturers (Siam) released its auto sales data for August 2024, revealing that the passenger vehicle (PV) segment witnessed a decline for the second consecutive month. It fell 1.8 per cent year-on-year (Y-o-Y) to touch 352,921 units.

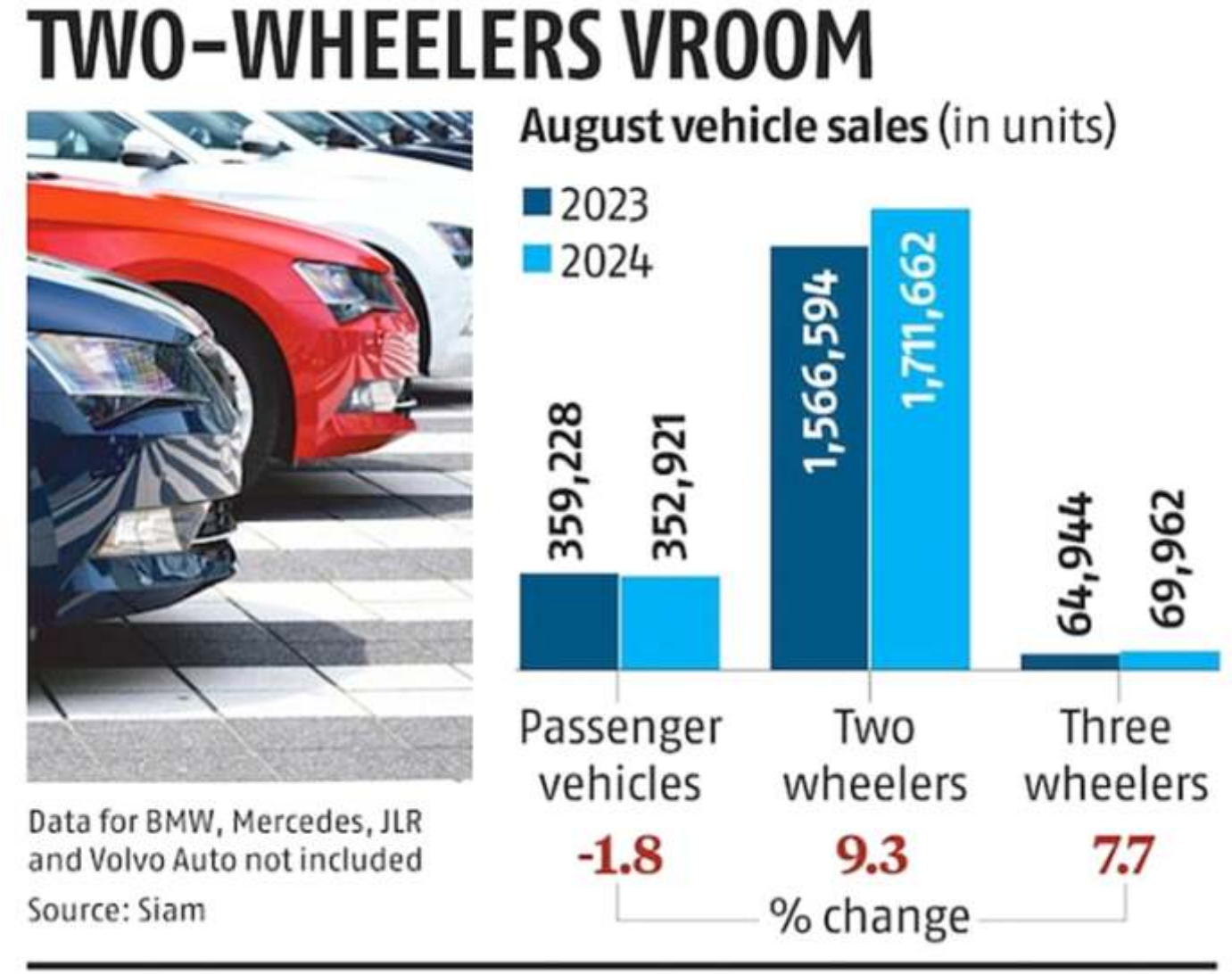
This follows a 2.5 per cent decline in July 2024, marking a slowdown after the segment grew by 3 per cent in the first quarter (April-June) of FY24.

In contrast, the two-wheeler segment posted a 9.3 per cent growth in August 2024 compared to the same month last year, with sales reaching 1.71 million units. This comes after a 20.4 per cent growth in Q1 and a 12.5 per cent rise in July 2024, reflecting strong demand in the domestic market.

The three-wheeler segment also showed positive momentum, recording a 7.7 per cent growth in August 2024 compared to its peak in August 2023, with sales hitting 69,962 units. In Q1, sales grew by 14.2 per cent followed by a 5.1 per cent growth in July.

According to Siam, total production of passenger vehicles, three-wheelers, two-wheelers, and quadricycles in August 2024 stood at 2.49 million units.

The industry anticipates a surge in vehicle demand as India enters its festival season. Also, the recent introduction of PM E-DRIVE and PM-eBus Sewa schemes by the Centre are set to drive sales.



Commenting on August-2024 performance, Mr Rajesh Menon, Director General, SIAM said, "In August 2024, Passenger Vehicle segment de-grew by (-)1.8% compared to August 2023, posting a sales of about 3.53 lakh units. Three Wheelers posted a sales of 0.7 Lakh units in August 2024, a growth of 7.7% from the previous peak of August 2023. Two-Wheeler segment also posted a decent growth of 9.3% in August 2024 as compared to August 2023, with sales of 17.12 Lakh units. Looking ahead, as the country enters the festive season, demand for Vehicles is expected to grow, which will also be duly augmented by the recent announcements of PM E-DRIVE and PM-eBus Sewa Schemes of Government of India."

Domestic Sales: Monthly

Category / Segment/Subsegment	Domestic Sales (In Nos.) August 2023	August 2024	% Change
Total Passenger Vehicles[3]	**3,59,228**	**3,52,921**	**-1.8%**
Three Wheelers			
Passenger Carrier	52,497	58,698	11.8%
Goods Carrier	9,132	8,434	-7.6%
E-Rickshaw	3,116	2,655	-14.8%
E-Cart	199	175	-12.1%
Total Three Wheelers	**64,944**	**69,962**	**7.7%**
Two Wheelers			
Scooters	5,49,290	6,06,250	10.4%
Motorcycles	9,80,809	10,60,866	8.2%
Mopeds	36,495	44,546	22.1%
Total Two Wheelers	**15,66,594**	**17,11,662**	**9.3%**
Quadricycle	**110**	**6**	**-94.5%**

[3] *BMW, Mercedes, JLR & Volvo Auto data are not available. Tata Motors Domestic Sales data included only in 'Total PV', detailed break-up is not available. However, without Tata Motors, 'Total PV' would be 3,13,715 for August 2023 and 3,08,779 for August 2024*

SIAM

Segment wise Comparative Production, Domestic Sales & Exports data for the month of August 2024

(Number of Vehicles)

Category / Segment/Subsegm	Production August 2023	Domesti August 2024		Exports August 2023	2024		2023	2024	
Passenger Vehicles*									
Passenger Cars	1,55,806	1,35,585	-13.0%	1,20,0	97,198	-19.0%	39,92	35,21	-11.8%
Utility Vehicles	2,06,366	2,29,349	11.1%	1,81,8	2,00,5	10.3%	23,25	29,90	28.6%
Vans	11,846	11,792	-0.5%	11,859	10,985	-7.4%	704	888	26.1%
Total Passenger Vehicles	**3,74,018**	**3,76,726**	**0.7%**	**3,13,7**	**3,08,7**	**-1.6%**	**63,88**	**66,00**	**3.3%**
Three Wheelers									
Passenger Carrier	82,744	89,750	8.5%	52,497	58,698	11.8%	25,81	28,27	9.5%
Goods Carrier	8,911	10,603	19.0%	9,132	8,434	-7.6%	158	601	280.4
E-Rickshaw	3,110	3,022	-2.8%	3,116	2,655	-14.8%	-	-	-
E-Cart	210	151	-28.1%	199	175	-12.1%	-	-	-
Total Three Wheelers	**94,975**	**1,03,526**	**9.0%**	**64,944**	**69,962**	**7.7%**	**25,97**	**28,87**	**11.2%**
Two Wheelers									
Scooters	6,01,793	6,23,277	3.6%	5,49,2	6,06,2	10.4%	43,80	54,31	24.0%
Motorcycles	12,72,569	13,39,213	5.2%	9,80,8	10,60,	8.2%	2,4	2,84,1	15.0%
Mopeds	42,427	48,066	13.3%	36,495	44,546	22.1%	66	180	172.7
Total Two Wheelers	**19,16,789**	**20,10,556**	**4.9%**	**15,66,**	**17,11,**	**9.3%**	**2,9**	**3,38,6**	**16.4%**
Total Quadricycle	**304**	**455**	**49.7%**	**110**	**6**	**-94.5%**	**168**	**282**	**67.9%**
Grand Total	**23,86,086**	**24,91,263**	**4.4%**	**19,45,**	**20,90,**	**7.5%**	**3,8**	**4,33,7**	**13.9%**

* BMW, Mercedes, JLR, Tata Motors and

Society of Indian Automobile Manufacturers (

SIAM										
Summary Report: Cumulative Production, Domestic Sales & Exports data for the period of April-August 2024										
										Report I
										(Number of Vehicles)
Category	**Production**	**Domes**	**Exports**							
Segment/Subsegment	**April-**	**April-**	**April-August**							
	2023-24	**2024-25**		**2023-**	**2024-**		**2023-**	**2024-**		
Passenger Vehicles*										
Passenger Cars	8,23,465	7,20,723	-12.5	6,43,6	5,35,1	-16.9	1,73,	1,69,	-2.3%	
Utility Vehicles	10,20,880	11,91,380	16.7%	9,09,8	10,34,	13.7%	98,8	1,35,	37.2%	
Vans	59,960	66,001	10.1%	59,54	61,82	3.8%	3,38	3,45	2.1%	
Total Passenger Vehicles	**19,04,305**	**19,78,104**	**3.9%**	**16,13,**	**16,31,**	**1.2%**	**2,75,**	**3,08,**	**11.9%**	
Three Wheelers										
Passenger Carrier	3,38,425	3,69,396	9.2%	2,11,1	2,40,6	14.0%	1,25,	1,25,	0.3%	
Goods Carrier	42,332	48,610	14.8%	39,69	43,59	9.8%	842	1,64	94.9%	
E-Rickshaw	11,949	8,576	-28.2	13,42	8,627	-35.7	-	-	-	
E-Cart	1,168	1,180	1.0%	1,434	1,259	-12.2	-	-	-	
Total Three Wheelers	**3,93,874**	**4,27,762**	**8.6%**	**2,65,6**	**2,94,1**	**10.7%**	**1,26,**	**1,27,**	**0.9%**	
Two Wheelers										
Scooters	24,73,088	30,70,286	24.1%	22,76,	28,24,	24.1%	2,14,	2,60,	21.3%	
Motorcycles	57,61,386	65,33,664	13.4%	45,35,	51,09,	12.7%	11,68	13,2	13.3%	
Mopeds	1,89,171	2,14,015	13.1%	1,77,9	2,04,8	15.1%	666	2,00	200.9	
Total Two Wheelers	**84,23,645**	**98,17,965**	**16.6%**	**69,89,**	**81,38,**	**16.4%**	**13,8**	**15,8**	**14.7%**	
Total Quadricycle	**1,768**	**3,154**	**78.4%**	**371**	**104**	**-72.0**	**1,41**	**2,91**	**106.5**	
Grand Total	**1,07,23,592**	**1,22,26,985**	**14.0%**	**88,68,**	**1,00,6**	**13.5%**	**17,8**	**20,2**	**13.3%**	
* BMW, Mercedes, JLR, Volvo Auto data is not available										
Society of Indian Automobile Manufacturers (										

SIAM													
Category & Company wise Summary Report for the month of August 2024 and Cumulative for April-August 2024													
													Report II
													(Number of Vehicles)
Category	**Production**	**Domestic Sales**			**Exports**								
Segment/	**August**	**April-August**	**August**	**April-**		**April-August**							
Manu	**2023**	**2024**	**2023-24**	**2024-25**	**2023**	**2024**	**2023-**	**2024-**	**2023**	**2024**	**2023-**	**2024-**	
Passenger Vehicles													
FCA India	823	599	4,514	2,680	299	340	2,513	1,612	563	269	2,33	973	
Force Motors Ltd	142	195	544	941	119	220	502	814			2	10	
Honda Cars India Ltd	10,998	10,590	35,578	43,800	7,880	5,32	27,79	23,92	2,18	5,81	8,35		
Hyundai Motor India	71,693	70,400	3,21,543	3,25,98	53,83	49,5	2,52,	2,47,9	17,6	13,6			
Isuzu Motors India	-	2	90	315	30	19	166	150			-	-	
JSW MG Motor India	3,063	1,855	23,627	11,191	3,113	2,98	21,10	14,65			-	-	
Kia Motors India Pvt	23,334	24,206	1,34,907	1,12,41	19,21	22,5	1,00,	1,03,7	5,30	2,60			
Mahindra &	38,984	45,402	1,76,185	2,14,37	37,27	43,2	1,73,	2,09,1	930	1,39	5,65	4,07	
Maruti Suzuki India	1,63,546	1,65,782	8,00,392	8,35,84	1,56,11	1,43,	7,22,	6,99,6	24,3	25,6			
Nissan Motor India	8,790	7,831	31,155	39,035	2,258	2,25	12,19	10,97	1,91	8,36			
PCA Motors Pvt. Ltd	430	901	4,806	2,460	525	1,27	3,725	2,868	196	297	1,04	2,19	
Renault India Pvt Ltd	5,961	6,098	25,035	22,275	3,633	3,01	21,63	16,81	2,59	1,27	7,55	3,61	
SkodaAuto India Pvt	3,398	1,992	23,228	11,388	4,307	2,77	20,03	12,90	59	113	729	623	
Tata Motors Ltd*	NA	NA	1,43,601	1,48,08	NA	NA	1,43,	1,43,2	NA	NA	361	632	
Toyota Kirloskar	32,576	33,584	1,38,112	1,61,37	20,94	28,5	93,17	1,26,4	1,94	2,29	6,84	9,24	
Volkswagen India	10,280	7,289	40,988	45,955	4,174	3,57	17,70	16,56	6,22	4,26			
Total Passenger	**3,74,018**	**3,76,726**	**19,04,305**	**19,78,10**	**3,13,71**	**3,08,**	**16,13**	**16,31,**	**63,8**	**66,0**			
* Only cumulative data		NA= Not											

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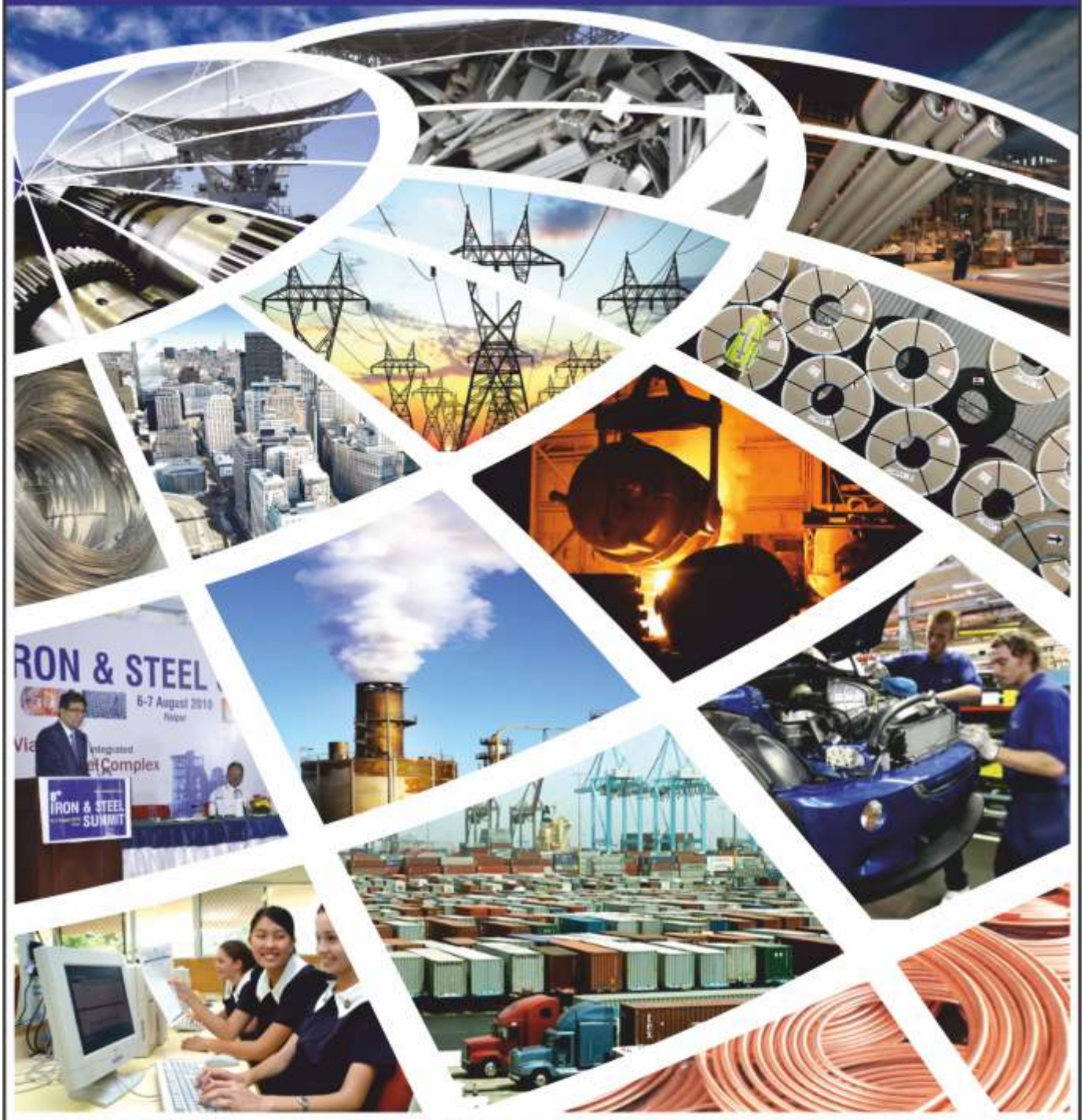

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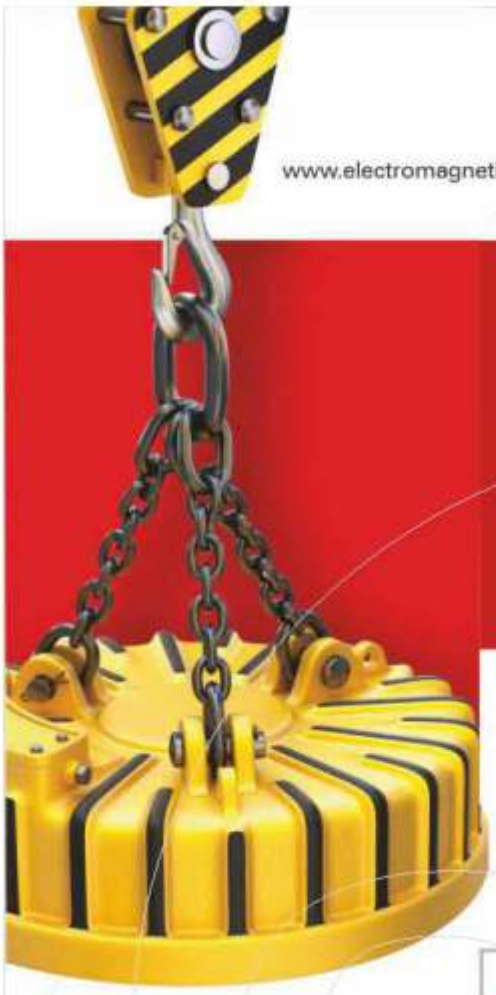

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