

# METALWORLD

Devoted to Foundry & Non-Ferrous Metals Industry

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**Subodh Panchal,**  
*Chairman Indian Foundry Congress*

■ Indian Foundry aims to double its market size of 32 Bln and annual capacity to 21 MT



**D. K. Jain,**  
*President - IIF*

■ 70<sup>th</sup> IFEX clinch the "business beyond boundaries"

■ Material World: Shape of Things to Come: Material Informatics

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## D. A. Chandekar Editor

Dear Readers,

A part from organising our own branded events in the metallurgical domain, 'Metalworld' (and 'Steelworld') gets numerous invitations to associate with other events as 'Media Partner'. We promote the event through editorials as well as advertisements and also carry pre and post events reports in our publications. Now post covid, the organising and promotion strategy of such B2B trade shows has already undergone a huge change and I feel in the next few years, these events will decisively shift to digital platform. I do not mean the ground shows will completely stop but the online part of these trade shows will gradually grow. For the next few years, I see a hybrid model (comprising of both ground as well as digital mode) will remain popular but then gradually the ground component will taper. This is obvious as we can't just ignore the enormous benefits of digital platform such as cost effectiveness, global reach, can be visited 24 X 7, simplicity of operations, etc. Further, as the youngsters are taking the guard and the seniors are returning to the pavilion, the use of digital platform in the promotion, visibility and advertising strategy is bound to increase.

There were two events recently held, one in Mumbai (Global Stainless Steel Expo) and one in Gandhinagar

## Editorial Desk



(IFEX & 70th IFC). I saw a fresh enthusiasm in exhibitors as well as visitors. The past two years were really dull for the corporates and even on the individual level, the interactions were mostly on digital platforms. I do agree that meeting friends, acquaintances, associates and customers in person has its own charm and the participants were really enjoying the first mask free industry gathering after the deadly pandemic. Smiles & handshakes all the way !

On the industry front, the demand seems to be ok and growing. Most of the disruptions were corrected after the covid and now the industry was really looking forward to a great upward leap but for this Russia – Ukraine war. This has drastically affected the prices and the availability of most of the raw materials and this seems to have neutralised all the positive effect of growing demand. The war now does not seem to be nearing the end and after sinking of the Russian warship Moskva in the Black Sea, there is a likelihood that this will not remain merely a war between two countries and can escalate to any level. It is also very sad to learn that Azovstal Iron & Steel Works, situated in the city of Mariupol, producing more than 4 Mt of crude steel annually and providing livelihood to more than a lac families, has now turned into a key battleground in this bloody war.

Let's hope both sides' leaders understand the plight of the world economy and discuss ending violence and establishing peace ! ■

Write your comments :

<https://metalworldddac.wordpress.com>



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# Foundry Products for Non-Ferrous Metals

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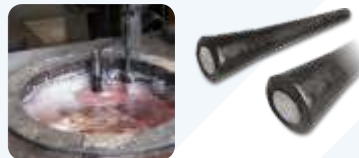
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## Indian Foundry aims to double its market size of 32 Bln and annual capacity to 21 MT



*The Indian foundry industry is aiming to double its market size to USD 32 billion and annual production capacity to 21 million tonnes (MT) over the next 5-7 years. The industry is also expected to attract investment of Rs 500 crore from domestic as well as international players.*

*The current market size of the Indian foundry industry is at USD 16 billion with capacity of 10.5 million tonnes per annum (MTPA). The industry employs around 5 lakh people directly and 15 lakh indirectly.*

*India's exports of castings are around \$3.1 billion. Gujarat has the lion's share of 30% in total production of foundries across the country. Nearly 3,000 foundries are operational in the state, mostly at Rajkot, Ahmedabad and Vadodara.*

*Despite increasing demand, foundries across the country are in the process of reducing production activities following an unprecedented price hike in raw material prices that had an adverse impact on the Indian Foundry industry.*

*India's three important foundry clusters including Kolhapur, Belgaum and Rajkot have cut production by 50%, and most of these foundries from these three cities are operating thrice a week. However, the organiser of the event expressed that by the end of May 2022 the situation will improve positively.*

*Apart from supplying to the domestic industry, the industry exports to a large extent. Pig iron prices have jumped nearly 50 per cent*

*from January, while ferro alloy prices have gone up by 20 per cent in line with global trend.*

*"The 70th Indian Foundry Congress and IFEX 2022 is among the first few large-scale industry events since the pandemic situation started easing. It has received an excellent response with companies from India and overseas. After successfully organizing the Indian Foundry Congress and the IFEX 2022, Dnanesh Chandekar, Editor & CEO, Steelworld had an exclusive interactions with Subodh Panchal, Chairman of Indian Foundry Congress to get more updates on success mantra, key take aways, overall response to the event especially after the pandemic.*



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**Excerpts :**

This year's 70<sup>th</sup> Indian Foundry Congress and IFEX

Foundry Congress and IFEX was given the responsibility to our Western Region and it



2022, the Fair of Foundry METAL and the Exhibition of Metal Processing Technologies STOM was held in parallel during 17<sup>th</sup> to 19<sup>th</sup> April 2022 at Gandhinagar ; this makes the expo cluster one of the most prominent events for the foundry and metalworking industry.

***How was the response to IFEX 2022 especially after the post-covid?***

We are very thankful to all the foundry men and entire supply chain stakeholder including 12 casting buyers for extending their overwhelming responses with the support of 230 exhibitors plus 1200 registered delegates, 24 speakers etc.

***What was your mantra for successfully organizing IFEX 2022 ?***

Well, every year The Institute of Indian Foundrymen association provides the opportunity to host the IFEX for one region by rotation. This year Indian

has a proven track record of hosting grand scale events successfully in the past giving value of time & money to delegates, exhibitors and visitors. This time exceptional support from all-India regions to Mumbai, Ahmedabad and the entire western region team was the key for successfully organizing the grand event at the fullest capacity.

***Could you please tell us more about IFEX 2022 theme "Business Beyond Boundries"?***

We had a vision to provide the opportunities for Business Beyond Boundaries to get the maximum participation from policy makers, local buyers, business leaders, foundrymen and its entire supply chain stakeholders, global buyers academia and the foundry industry as a whole and it has been successfully turn out very well beyond our imagination. Eminent personalities from India and across the globe,

comprising senior foundrymen, experts, innovators, investors and entrepreneurs from various sectors and areas of specialization, technology experts gathered together at IFEX and Indian Foundry Congress. On the casting front the results were even more promising. Around 12 leading casting buyers presented their requirement for the foundry. The interaction was very positive.

Truly, it was one of the most high-level networking events for the foundry fraternity to explore new business opportunities, collaborations and refresh existing ones. Besides, more success stories presentation with players and stakeholders of foundry fraternity was also one of the features at 70<sup>th</sup> IFEX while doing the business beyond foundries.

***How do you analyse the foundry industry would make a comeback especially after Pandemic and war situation?***

As you know, Indian foundry industry is ranked second globally with the production of 10 million tons per annum which caters foreign markets of automobile, tractors, railways, power train, energy and engineering segment.

Especially, during pandemic



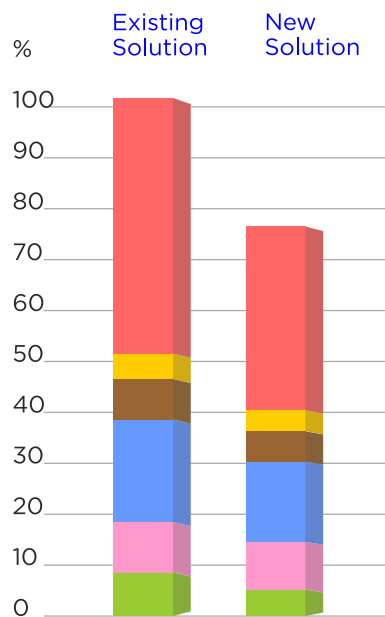


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and the Russia-Ukraine war conflicts has really fueled the raw material prices and also impacted very badly for the foundry industry and subsequent uncertainty for raw material supply and its fluctuating cost was the major concerns.

However, looking at the overwhelming response at the 70<sup>th</sup> Indian Foundry Congress and IFEX 2022, the large-scale industry events have managed to get a tremendous response from India and overseas as well. The industry is also expected to attract investment of Rs 500 crore from domestic as well as international players.

We are confident that this exhibition will play the key role as a catalyst to get the new business to the pre-pandemic level. Such unprecedented supply and pricing challenges are hurting the industry and making it challenging for

MSMEs and even large units to maintain supply commitments.

### ***What was the key take away and deals concluded at IFEX 2022?***

Foundry is the mother of manufacturing industries and the foundrymen expressed commitment to supporting the recovery of the economy. This year IFEX, IFC and Cast India Expo, have broken all previous records. There was the highest square metre area participation with 240 exhibitors, all time highest delegate registration which crosses 1250 nos and the



registration had to be closed due to overcrowding. The footfalls were more than 15000 which had never happened earlier.

I am happy to inform you here that Our PM Modiji has given the mantra of



Atmanirbhar Bharat which focuses on Make in India and Ease of Doing Business. This year

During the three-day conference and exhibition, leading castings buyers from India and around the world projected a sharp rise in demand for castings in the coming months. The issue of uncertainty in the supply of raw materials and volatility in prices.

Foundrymen also assured to scale up production capacities to meet growing demand. The foundrymen called for the adoption of monthly price revision instead of the existing quarterly revision. For the first time we had the visit of buyers from defence and ordinance segment of the Indian armed forces. ■



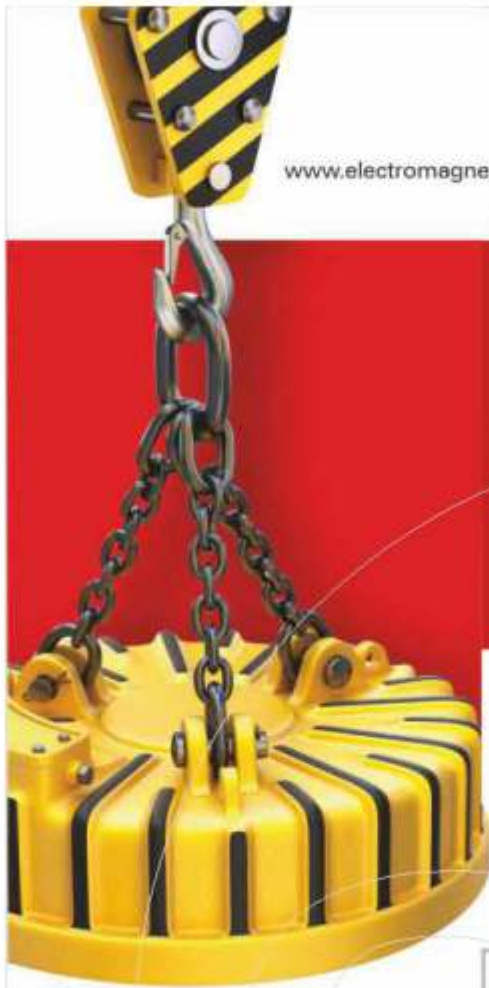


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## 70<sup>th</sup> IFEX clinch the “business beyond boundaries”



The 70th Indian Foundry Congress, 18th International Exhibition on Foundry Technology, Equipment, Supplies and Services (IFEX) and the Cast India Expo managed to get tremendous response at Helipad Exhibition Center in Gandhinagar during the three days event concluded during 17<sup>th</sup> April to 19<sup>th</sup> April 2022 at foundry IFEX, IFC and Cast India Expo, quite in sync with the theme of this

"Indian foundry industry is aiming to double its market size to USD 32 billion and annual production capacity to 21 million tonnes (MT) over the next 5-7 years"

**D. K. Jain, President - IIF**

year “business beyond boundaries”.

With the successful conclusion, The Indian foundry industry is aiming to double its market size to USD 32 billion and annual production capacity to 21 million tonnes (MT) over the next 5-7 years. The industry is also expected to attract investment of Rs 500 crore from domestic and as well as international players, Institute of Indian Foundrymen (IIF) President Devendra Jain.

The current market size of the Indian foundry industry is at USD 16 billion with

capacity of 10.5 million tonnes per annum (MTPA). The industry employees around 5 lakh people directly and 15 lakh indirectly. "Our aim is to double our market size to USD 32 billion in 5-7 years, double our capacity and job opportunities," he said.

Jain further said there are key challenges facing the Indian Foundry sector which includes raw material prices which have shot up significantly in the past few months.

In November 2021, prices of pig iron and steel scrap stood at Rs 44 and Rs 39 per kg, respectively. In March, the rates of the two items climbed to Rs 68 and Rs.52 per kg. Similarly, one kg of ferro alloy silicon, which was costing Rs 140 in November, is now priced at Rs 240, he noted. This has impacted production cost





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## Feature

which has grown by about 50 per cent, Jain said, adding "70 percent of our production is consumed by the automobile sector." Besides, the foundry industry supplies items to industries like railways, engineering and wind energy generators, among others. This year IFEX , IFC and Cast

papers were kept in the morning session only instead of the whole day. The papers selected were very good and the halls were fully packed. On the casting front the results were even more promising. Around 12 leading casting buyers presented their requirement for the foundry. The interaction was very positive.

forces.

This has been by far the best IFEX , IFC and Cast India Expo so far. The credit goes to the organizing committee under the able leadership of our past President Subodh Bhai Panchal.



India Expo, have broken all previous records. There was the highest square metre area participation with 240 exhibitors, all time highest delegate registration which crosses 1250 nos and the registration had to be closed due to overcrowding. The footfalls were more than 15000 which had never happened earlier. This time the technical

We have been regularly participating in this event, but this is the first time that four serious buyers have contacted us and we have even received the drawings and technical specifications from them and the discussions are on. For the first time we had the visit of buyers from the defence and ordinance segment of the Indian armed







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### Copper price falls to 5-month low on China lockdown worries



The copper price slipped on Monday as covid-19 lockdowns in China and prospects of aggressive US rate hikes fuelled recession fears.

Copper for delivery in July fell 4% from Friday's settlement price, touching \$4.23 per pound (\$9,307 per tonne) midday Monday on the Comex market in New York, the lowest since December 1.

The official Purchasing Managers' Index (PMI) fell to 47.4 points in April, down from 49.5 in March and the weakest outcome since February 2020, China's National Bureau of Statistics said on April 30.

It was the second straight month for the index below the 50 mark separating growth from contraction, and the soft outcome came amid a series of coronavirus lockdowns in major cities, including Shanghai.

There are worries that China's strict zero-covid policy means more cities will be locked down, including the capital Beijing, with restrictions lasting for longer than the market had initially expected.

Beijing closed some schools and public spaces on Thursday, as most of the Chinese capital's 22 million residents turned up for more mass covid-19 testing aimed at averting a Shanghai-like lockdown.

"The ongoing lockdowns will make it more challenging for China to meet its 5.5% economic growth target for 2022, especially since the current quarter appears likely to be weak, with some economists saying a negative gross domestic product number is a possibility," wrote Reuters columnist Clyde Russell.

US Federal Reserve officials have aligned around plans to accelerate the pace of interest rate hikes this year but remain split over what could be the make-or-break decision of where to stop to avoid dragging the economy into recession.

Data showed the US economy unexpectedly contracted in the first quarter amid a resurgence in covid-19 cases and a drop in pandemic relief money from the government.

Fund managers have been increasing bearish bets on the CME copper contract over the last couple of weeks.

### Chile's mining sector contracts in March as local copper production falls 5%

According to Chile's National Institute of Statistics (INE), the country's Industrial Production Index (IPI) increased 0.8% in March 2022 due to the improvement in two of the three sectors that make it up.

However, INE said that the Mining Production Index (IPMin) fell 2.2% year-on-year, with a -0.914 point impact in the variation of the IPI. This decline was explained by a lower activity recorded in the country's metal mining subsector, which fell 3.9% due to the drop in the extraction and processing of copper.

According to the report, Chile, the world's largest producer



of copper, mined 462,360 tonnes of the metal in March 2022, which is 5.4% lower than 488,700 tonnes mined

in March 2021.

On the contrary, the country's non-metallic mining increased 34.0% compared to the same month of the previous year, mainly due to an increased production of lithium carbonate.

Likewise, Chile's energy sector grew 22.1% and had a 0.088 point impact in the variation of the general index, due to an increase in crude oil extraction.

### Copper prices declining on demand concerns

Copper prices were under pressure Monday morning, with London Metal Exchange (LME) three-month metal falling below the \$10,000 per tonne level for the first time in a month.

Copper has spent the last few weeks hanging in suspended animation, the price too high for buyers to chase the market, supply too tight for sellers to risk shorting it.

The risk equilibrium appears to be shifting, however, with signs that funds are starting to raise bear bets on the CME copper contract.

Supply concerns haven't gone away. Far from it.

Protests at two big copper mines in Peru knocked out a fifth of the country's production capacity last week before the government imposed a state of emergency to regain control of the Cuajone mine.



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### Hindustan Copper draws up Rs 5,500-crore ore expansion capacity

Hindustan Copper draws up Rs 5,500-crore plan to expand its ore capacity

The company targets to complete the first phase of the plan, which will take its capacity to 12.2 mtpa, by 2028-29. HCL is the lone copper producer in the country. Its ore output is used solely for captive purpose. The PSU operates mines at Malanjkhand in Madhya Pradesh, Khetri in Rajasthan, and Surda and Kendadih, both in Jharkhand. Rakha mine in Jharkhand has been closed since August 2021, but the company is seeking to renew the licence for the mine.



### Vedanta Aluminium To Source 380 MW Green Power for Smelters

Vedanta Aluminium on Monday announced it will source 380 MW of green power on a long-term basis for its smelters.

Vedanta Aluminium on Monday announced it will source 380 MW of green power on a long-term basis for its smelters.

Once online, this project has the potential to reduce the



company's greenhouse gas emissions by 15,00,000 tonnes of CO2 equivalent annually.

This will be carried out through a power delivery agreement between Vedanta Ltd and Special Purpose Vehicles – affiliates of Sterlite Power Technologies.

In a statement, the company said that 180 MW of this Renewable Energy will be for the aluminium smelter at Jharsuguda, in Odisha, and 200 MW for the Bharat Aluminium Company at Korba, in Chhattisgarh.

"This 380 MW renewable energy power delivery agreement for our aluminium smelters stands true to our mission of aligning the incentives of growth with the imperatives for the planet," Vedanta CEO – aluminium business Rahul Sharma said.

Charting its roadmap to net zero by 2050, Vedanta Aluminium is working on a three pronged-approach to decarbonise its operations - increasing the quantum of renewable energy in its energy mix, bolstering operational efficiencies to reduce energy consumption, and rapidly

### CRISIL Research: Aluminium prices could average 25% higher on-year

The sharp rise has impacted domestic demand across end-user segments such as power, automobiles, and consumer durables, which are facing input cost surges, CRISIL Research says.

April 28, 2022 12:32 IST | India Infoline News Service |

Domestic prices of aluminium, which surged to Rs 300 per kg in March 2022, are expected to gradually decline

in the second half of this fiscal and average Rs 225-235 per kg for the whole fiscal, in sync with the global trend.

Domestic prices are linked to three-month contracts on the London Metal Exchange (LME), where the average

price was \$3,537 per tonne in March, up 8.5% on-month.

Despite the decline, CRISIL Research foresees the LME price averaging ~\$3,100 per tonne in 2022, a good 25%

higher than in 2021. The ramifications of the Russia-Ukraine conflict will be a monitorable, and can affect price movement going forward.

On February 23, 2022, a day before the war broke, global aluminium prices were hovering around \$3,220 per tonne.

On March 7, they rose to an all-time high of ~\$3,985 per tonne after the conflict in Ukraine stoked concerns about supplies from Russia – at a time when there were production cuts in China and Europe.

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## HIGHLIGHTS

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24x 7 availability

B2B meetings

Parallel Sessions

Technical Conferences

Confederation of Indian Industry (WR)  
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T: 91 22 2493 1790 E: [ciiwr@cii.in](mailto:ciiwr@cii.in) W: [www.cii.in](http://www.cii.in)

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### Indian aluminium producer NALCO faces coal scarcity due to train shortage



Indian state-run aluminium producer National Aluminium Co Ltd (NALCO) is facing a coal supply shortfall, due to supplies being diverted to priority electricity generation and a shortage of

trains to deliver fuel to NALCO's power plants.

India has diverted coal supplies from the non-power sector, and put on hold plans for some fuel auctions, in a bid to ensure coal availability for utilities and tackle widespread power outages across the country.

There is also a general shortage of trains to move coal around the country. State-run Indian Railways has fallen short of utilities' requirements by 16% in the first half of April, a government official familiar with the matter said.

Price have since retreated to ~\$3,200 per tonne because a sudden surge in Covid-19 cases in China has brought demand to a standstill, leading to an inventory build-up.

This has opened up an exports opportunity Chinese traders.

### Hindustan Zinc signs MoU with Sandvik to introduce BEVs in underground mining

Hindustan Zinc has signed a Memorandum of Understanding (MoU) with Sandvik AB to introduce battery powered loaders and trucks in underground mining. A step closer towards carbon neutrality, Hindustan Zinc, India's only and world's leading integrated zinc-lead-silver producer, is set to introduce Sandvik's battery electric TH550B trucks and LH518B loaders in their underground mines to reduce carbon emissions and make mine operations more eco-friendly.

The company recently added to its fleet of electric vehicles, including electric scooters for security staff, passenger EVs at locations, underground service EV for mines and electric forklifts for transportation of goods. All these vehicles are in addition to the MoUs that Hindustan Zinc has already signed with Epiroc Rock Drills AB and Normet Group Oy to introduce BEVs in underground mining operations.

Hindustan Zinc is a pioneer in the use of transformational and environment friendly mining technology. By reiterating its commitment to environmental solutions, this partnership emphasises Hindustan Zinc's focus on driving the green economy. This will aid the organisation in achieving its Sustainable Development Goal (SDG) of zero



noise pollution, zero harm to the environment, and zero carbon emissions.

"Smart, Safe, and Sustainable operations has been a motto for us at Hindustan Zinc, and we believe that it is our responsibility as a leader to be catalysts for change in the adoption of sustainability-driven business solutions. We have been investing in the development of processes that are well designed to incorporate sustainable aspects as well in day-to-day business decision-making. This partnership with Sandvik bring us one step closer to our goal of carbon neutrality," said Mr Arun Misra, CEO, Hindustan Zinc.

As a COP 26 Business Leader, the company has been consistently adopting innovative solutions and smart technology for responsible mining. The company is ranked 1st in Asia-Pacific and globally 5th in Dow Jones Sustainability Index in 2021 for its initiatives towards tackling climate change.

"Aligned with our expansion strategy for battery-electric vehicles, meaning a global reach in 2023, I'm delighted to sign this agreement with Hindustan Zinc to deliver the first battery fleet in India." said Henrik Ager, President of Sandvik Mining and Rock Solutions. "This is a testament to both the pioneering ambitions of Hindustan Zinc and the technological maturity of Sandvik BEV products." During the first phase of the partnership, Hindustan Zinc will deploy two different categories of Sandvik BEV machines - TH550B truck and LH518B loader in underground mining operations.

### Alcoa receives funding for low-carbon alumina refining

The Australian governments have provided Alcoa USD7.7m of funding to conduct pilot trials on a new carbon reduction technology for alumina refining. The funding supports Alcoa's Refinery of the Future initiative, which intends to unlock decarbonization at scale by delivering a cost-competitive refinery that will eliminate fossil fuels, as well as reduce freshwater use, and minimize and ultimately eliminate new bauxite residue deposits. Specifically, Alcoa of Australia has received support to test electric calcination with USD6.4m





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from the Australian Renewable Energy Agency (ArenA) and USD1.3m from Western Australia's Clean Energy Future Fund.

Electric calcination – a new carbon reduction technology. Calcination is the final stage in the alumina refining process and uses fossil fuels, primarily natural gas, to heat alumina hydrate crystals. Electric calcination, when powered with renewable energy, has the potential to significantly reduce carbon emissions. Additionally, electrification of calciners would allow significant amounts of residual energy, currently lost in the atmosphere as steam, to be captured and reused, saving water and negating the need for stacks to vent that steam.

"We are the lowest carbon intensity alumina producer in the world, and we have a technology roadmap of future-oriented research and development projects with the goal to reduce our footprint even further," said Eugenio Azevedo, Alcoa's VP for Continuous Improvement. "With this support from Australian governments, we are working on our vision to reinvent the aluminium industry for a sustainable future, which includes advancing projects of global significance for the aluminium industry and its customers."

While the application of electric calcination is still in the R&D phase, the technologies that support the process are proven. It is one of two R&D projects included in Alcoa's Refinery of the Future, which intends to unlock decarbonization at scale by delivering a cost-competitive refinery that will eliminate fossil fuels, as well as reduce freshwater use, and minimize and ultimately eliminate new bauxite residue deposits.

**Huge carbon reduction potential**

The grants now provided complement the funding support announced in 2021 by ArenA to support Mechanical Vapor Recompression (MVR), another technology that would use renewable energy to recycle low-pressure steam in alumina refining to generate process heat. When combined with a decarbonized grid, MVR and electric calcination could reduce a refinery's carbon emissions by about 98 % and reduce fresh water use by up to 70 %.

The pilot project for electric calcination will include two

stages. The first stage will run until the end of 2023 and will involve the study, selection, engineering and testing of technologies. Subject to satisfactory completion of the first stage, the second portion of the project will begin in the first quarter of 2024 and continue into mid-2026 with detailed design, construction and pilot testing of this emerging technology at Alcoa's Pinjarra refinery in Western Australia.

### **BMW to use sustainable aluminium wheels from 2024**

BMW is increasingly focusing on sustainability and intends to use aluminium wheels produced 100 % with 'green' electricity throughout the group from 2024. For the automaker, this is another step towards its goal of creating the most sustainable supply chain in the automotive industry. The transition applies, in particular, to the energy-intensive electrolysis used in producing primary aluminium and to the wheel-casting process. To this end, corresponding agreements have been reached with all BMW Group wheel suppliers.

CO2 savings of up to 500,000 t annually

Up until now, wheels have accounted for about 5 % of supply chain CO2 emissions. Transitioning to more



sustainable production that relies on green power will reduce these emissions by more than half. The BMW Group procures about 10m light-alloy wheels a year; 95 % of these are made from cast aluminium.

Through independent audits, the automaker can ensure sustainable use of aluminium by its contracted producers, saving up to 500,000 t of CO2 annually.

Suppliers are obliged to use 'green' power

"Green power is one of the biggest levers for reducing CO2 emissions in our supply chain. We have already signed more than 400 contracts with our suppliers, including suppliers of wheels and aluminium, requiring them to use green power," says Joachim Post, board member at BMW AG and responsible for Purchasing and Supplier Network. Aluminium has excellent recycling properties, making it





easier to melt down old wheels as part of the circular economy. This eliminates the need for energy-intensive electrolysis in the initial production of the metal. At the same time, the recycling material must also meet BMW's premium requirements for quality, design, safety and mechanical properties.

The Mini brand will become a pioneer in this field in 2023, when it will begin using light-alloy cast wheels made from 70 % recycling aluminium in the new generation of the Countryman model. The combination of 100 % green power for production and 70 % secondary raw material content can reduce CO2 emissions by up to 80 %, compared to conventional manufacturing processes.

#### **ASI Certification**

The BMW Group has been actively involved for many years in international initiatives focused on standardizing raw material extraction. These include the Aluminium Stewardship Initiative (ASI). In December 2019 ASI already certified BMW's light metal foundry in Landshut for its sustainable use of aluminium. Many of the automaker's wheel suppliers have already joined ASI and are making an important contribution to creating an environmentally and socially responsible aluminium value chain in this way.

Transitioning to 100 % green power for production of cast aluminium wheels is another step towards reducing CO2 emissions in the BMW Group supplier network. The aim is to reduce emissions throughout the supply chain by 20 % from 2019 levels by 2030. Systematically increasing the percentage of recycling aluminium through this process makes a further contribution to sustainability.

#### **Solar Aluminium from Dubai**

Since 2021, the BMW Group has sourced aluminium from the United Arab Emirates manufactured exclusively using electricity obtained from solar power. The aluminium produced in Dubai is processed in BMW's light metal foundry in Landshut, Germany, where it is used to manufacture body and drive train components. The 43,000 t of solar aluminium sourced in this way supply almost half the annual requirements of the Landshut light metal foundry.

### **Matthew Chamberlain, CEO of the London Metal Exchange (LME) and group head of Commodities, is to remain in his post.**

Chamberlain, who announced his departure earlier this year, will now remain with the group, says an LME press statement. His decision allows him to drive forward the LME's long-term development as the world's leading trading, hedging and pricing centre for industrial metals.

Chamberlain commented: "Events of recent weeks have brought into focus the importance of the LME and the metals markets. I want to continue to work with the team on supporting the long-term health and efficiency of the market and drive forward the sustainable development of our industry. We have only just begun to deliver the positive long-term enhancements to the metals market and we are committed to making LME an even more attractive and resilient market with more liquidity and more participation. I look forward to working closely in partnership with our members, our customers and all other stakeholders to make this happen."

Gay Huey Evans, LME Chairman added: "The global metals industry continues to evolve, and Matt's leadership will be vital as we drive forward LME's strategy, look to introduce reforms that will further modernize and develop the market and continue to provide vital pricing, trading and hedging services for our customers. On behalf of the board of the LME, I am delighted that Matt has elected to remain with the LME to continue this important work."

#### **Further management news**

Adrian Farnham, who deferred retirement to act as interim CEO while Chamberlain's successor was identified, will return to his original plan and step down as CEO of LME Clear in July. He retires after a distinguished career spanning more than 30 years in financial markets and market infrastructure and nine years with the LME.

Farnham joined LME Clear in 2013 as Chief Operating Officer, overseeing the building and eventually the day-to-day running of LME Clear. In January 2016, he was appointed LME Clear CEO and has since driven both the strategic development of the clearing house, while also leading the major technology refresh programme currently underway at the LME Group level. An announcement on his successor will be made in due course.

Finally, after more than eight years as LME Group CFO, Catherine Lester has decided to leave the LME to pursue interests outside the group. Tabitha Silverwood, the LME's current acting CFO, will succeed Ms Lester with effect from 1 May. Ms Silverwood has been at the LME since 2014, first as head of External Reporting and then as head of Finance from January 2019.

### **Record year for aluminium packaging recycling in the UK**

The UK's aluminium packaging recycling rate was a record 68 % in 2021, with more than 156,000 t collected for recycling (a 3 % rise year-on-year). According to annual data published by the Environment Agency, more than four in five beverage cans were recycled last year (82 %) –



matching the previous record set in 2020.

Despite a growing domestic market, aluminium packaging collected through kerbside, bring and on-the-go systems increased by 5 % (112,210 t), while tonnage recovered from incinerator bottom ash grew by 2 % (41,941 t). More than 88 % of this total volume was recycled within the UK and EU, with just 12 % being exported for reprocessing further afield.

"Recycling rates kept pace"

Tom Giddings, executive director at Alupro, commented:

"It's pleasing news indeed to report yet another record-breaking year for aluminium packaging recycling. While the total UK market size grew, recycling rates kept pace. More importantly still, the vast majority of material was collected through kerbside, bring and on-the-go systems, which maximized the potential for closed-loop recycling."

"We hope to see record rates continuing in Q1 2022"

"Looking forward to the first quarter of 2022, we hope to see record rates continuing, reflecting the positive trends of 2021," Giddings continued. "With higher, more ambitious national targets, we're pleased to be moving ever-closer towards a 100% recycling rate for aluminium packaging. As we do so, communication will prove ever-more pivotal in maintaining consumer engagement and maximizing positive recycling behaviours. This is a key point included within our Aluminium Manifesto, which was released in March and calls for fundamental change in the UK's approach to packaging and waste management."

### Zero CO2 emissions: Gamechanger cryotank technology

In order to optimally use LH2 as a fuel, the R&D experts of the Salzburg Aluminium Group have developed an efficient hydrogen cryo-tank system for trucks with fuel cell drives, which simultaneously offers flexibility, economic efficiency and zero emission on the long haul. In addition to its environmental friendliness, other advantages speak in favour of LH2: a long range and short refuelling time. Additionally, LH2 - compared to gaseous hydrogen - requires a much lower storage pressure, which brings enormous technical advantages. In a next development step, the SAG experts are now researching storage solutions that function with different supply pressures and can be used in trucks with both fuel cells

and combustion engines.

Johannes Winklhofer, SAG-Entwicklungsleiter explains:

"We have researched the technical requirements of this broad range of pressures and presented in our study what technology is needed to be able to provide supply pressures for different propulsion concepts in cryogenic liquid hydrogen storage systems." Photo: SAG

New study on the compatibility of liquid hydrogen storage tanks SAG has summarised the technical requirements in a compatibility study and recently presented these results to an international audience of experts at the 43rd Vienna Motor Symposium for the first time. Johannes Winklhofer, SAG development manager and co-author of the study, explains: "Different hydrogen drive concepts require different supply pressures. These range from less than 10 bar for battery-powered fuel cells to 300 bar for high-pressure direct injection in an internal combustion engine. We have researched the technical requirements of this broad range of pressures and presented in our study what technology is needed to be able to provide supply pressures for different propulsion concepts in cryogenic liquid hydrogen storage systems."

Emission-free truck transport with LH2 – a reality by 2030 Hydrogen - when produced using green electricity - offers a CO2-neutral fuel alternative. The only "by-products" of the conversion of hydrogen into drive energy are water and heat. Fuel cell propulsion using liquid hydrogen in particular is exceptionally efficient due to its high energy density. This is shown by a comparison with other zero-emission solutions - such as gaseous hydrogen, synthetic fuels or battery electricity. Small space requirement combined with low net weight of our LH2 tank system for trucks enables a high loading volume with extremely low payload loss. Another decisive factor for LH2 is the high energy density of LH2, which enables long ranges. A truck equipped with two liquid hydrogen tanks of maximum size registered in Europe will be able to cover up to 1.000 kilometres after a full tank. The development of the SAG cryo-tank system is already virtually complete. The first test phases are underway. Series production is expected to start within the next three years.

Cryogenic tank technology for aviation

According to many experts, liquid hydrogen will also become established in the future as an emission-free alternative to fossil fuel in aviation. SAG's cryotank technology can also make a valuable contribution to zero emissions in this area. "Our LH2 cryotank technology is also suitable for use in aircraft. There is interest from the industries and the first development steps are underway. For our development teams this is a great challenge which we are facing with full enthusiasm. It goes in parallel with the further development of the cryo tank system for other applications. Our aim is to contribute to zero emissions in many areas with our solutions soon," concludes Karin Exner-Wöhrer, CEO of the SAG Group.





## Alcoa supplies low-carbon Ecolum to Speira

Alcoa has entered into a supply agreement to provide low-carbon Ecolum aluminium to rolling and recycling company Speira in Grevenbroich, Germany.

The Ecolum brand is part of Alcoa's Sustana family of low-carbon products. "In 2022, we expect to see year-over-year sales of both Ecolum and EcoDura increase more than three-fold," Kelly Thomas, Alcoa's head of Commercial, said. "From mine to metal, our integrated approach to sustainability across the value chain provides an inherent advantage for Alcoa and our customers."

3.5 times better than the industry average

Ecolum is produced at hydroelectric-powered aluminium smelters and has no more than 4.0 t of CO<sub>2</sub>e emissions for every tonne of metal produced, including both direct and indirect emissions (scope 1&2) across the entire production chain, including bauxite mining and alumina refining. This carbon footprint is around three and a half times better than the global average and is a key enabler to allow downstream manufacturers to reduce their emissions profile.

Speira is a leading producer and recycler of advanced rolled aluminum products, serving the automotive, packaging, printing, engineering, and building and construction industries. It operates seven manufacturing facilities in Germany and Norway.

Primary aluminum with a low-carbon footprint

"In Speira, we share the passion of reducing the carbon footprint of our products and driving the decarbonization of our business," said Reinhild Schmidt, Senior Vice President of Strategic Operations at Speira. "The partnership with Alcoa and the decision to purchase Ecolum is a natural and important step on this path." Both Alcoa and Speira are members of the Aluminum Stewardship Initiative, a robust system that validates responsible production practices.

More than 80 percent of Alcoa's smelting operations are powered by renewable energy, and its alumina refining system has the world's lowest average CO<sub>2</sub> intensity. In addition, the company has a technology roadmap that has the potential to further decarbonize its operations and support its net zero 2050 ambition.

## HAI sources solar aluminium from the Emirates

Emirates Global Aluminium (EGA) has signed an agreement with Hammerer Aluminium Industries for the supply of solar aluminium.

EGA supplies thousands of tonnes of aluminium to HAI each year. A proportion of this supply now switch to Celestial metal. The material will be used for the



production of aluminium profiles in Mercedes-Benz models.

Solar aluminium for automotive parts

Rob van Gils, chief executive of HAI, said: "This partnership with EGA enables us to contribute to a better future and shows that aluminium has a key role to play in achieving the European Union's Green Deal ambitions to decarbonise manufacturing. I am personally excited that many parts of the premium SUVs which are so popular in the UAE will be produced by HAI using EGA's UAE-made Celestial solar aluminium. I look forward to driving these vehicles on the UAE's sand dunes."

Abdulnasser Bin Kalban, chief executive of EGA, said: "The launch of EGA's Celestial solar aluminium was a landmark in our industry's drive to net zero. We expect to soon be able to increase production of Celestial, and meet more of the significant global demand for this innovative, low-carbon metal. We are proud that HAI, and their customers like Mercedes-Benz AG, will use aluminium made with the power of the UAE sun."

EGA plans to increase production of solar aluminium. In 2021, EGA became the first company in the world to produce aluminium commercially using the solar power through a partnership with Dubai Electricity and Water Authority, which operates the Mohammed bin Rashid Al Maktoum Solar Park in the desert outside Dubai. EGA expects to vastly increase its production of Celestial. The aluminium producer plans to divest its electricity generation assets and source power from the grid, including an increasing proportion of renewable, low-carbon energy.

## Enough nickel, lithium for 14 million EVs in 2023: European climate group

Data shows there is enough nickel and lithium to produce up to 14 million electric vehicles (EVs) globally in 2023, so Europe should secure more raw materials to shift away from oil faster, campaign group Transport and Environment (T&E) said on Tuesday.

In a study based on BloombergNEF data on global maximum volumes of EV battery-grade nickel and lithium, T&E said that in 2025 there would be enough to make 21 million EVs globally.



Excluding Russian nickel, T&E said there should be sufficient raw materials for 19 million EVs in 2025. Global EV sales more than doubled to 4.2 million vehicles in 2021 from just over 2 million in 2020. Automotive consultancy LMC has forecast global EV sales will hit 9 million in 2023 and 14.2 million in 2025.

Prices of EV battery materials have soared over the last year, with battery-grade nickel breaking fresh records after the invasion of Ukraine as Russia is a major nickel producer.

Some analysts have warned of short-term battery-supply bottlenecks as the auto industry rapidly accelerates production of zero-emission cars, which could then be followed by a glut as a plethora of mining and battery plant projects come online.

### **U.S. to spend more than \$3 bln on EV battery manufacturing -White House**

The Biden administration will allocate more than \$3 billion in infrastructure funding to finance electric vehicle (EV) battery manufacturing, U.S. officials said on Monday. The funds will be allocated by the Department of Energy from the \$1 trillion infrastructure bill President Joe Biden signed last year. Among the initiatives will be processing of minerals for use in large-capacity batteries and recycling those batteries, the agency said in a statement. Biden wants half of vehicles sold in the U.S. to be electric by 2030, a goal he hopes will boost unionized manufacturing jobs in key election battleground states, thwart Chinese competition in a fast-growing market, and reduce climate-changing carbon emissions. The administration is also positioning the measures as a step to secure energy independence and cut long-term inflation pressures exacerbated by Russia's Feb. 24 invasion of Ukraine.

"As we face this Putin price hike on oil and gas, it's also important to note that electric vehicles will be cheaper



over the long-haul for American families," Mitch Landrieu, the White House infrastructure coordinator, told reporters in a briefing, referring to Russian President Vladimir Putin. Ford Motor Co (F.N) welcomed the announcement.

"This investment will strengthen our domestic battery supply chain, create jobs, and help U.S. manufacturers compete on the global stage," Steven Croley, Ford's general counsel, said in a statement. "We have a moment of opportunity to own this technology here in the U.S., and investments like the one announced today will help us get there."

The latest funding will help establish and retrofit battery factories. The infrastructure law also allocated billions more for the government to purchase electric buses and install EV chargers. The administration has been collaborating with manufacturers, including Tesla Inc (TSLA.O) Chief Executive Elon Musk, General Motors (GM.N) CEO Mary Barra and Ford CEO Jim Farley. But the funds will not go toward developing new domestic mines to produce the lithium, nickel, cobalt and other high-demand minerals needed to make those batteries. Some of those projects face local opposition and are tied up in Biden administration environmental and legal reviews.

"These resources are about battery supply chain, which includes producing, recycling critical minerals without new extraction or mining," said Gina McCarthy, Biden's national climate adviser. "So that's why we're all pretty excited about this."

In March, Biden invoked the Cold War-era Defense Production Act to support the production and processing of those minerals. read more He requested funding to support that initiative last week as part of a \$33 billion package on Ukraine-related initiatives





# Material World: Shape of Things to Come: Material Informatics

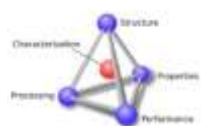
In continuation of the articles covering different areas advancing in the field of metals, materials and minerals, and the directions which are shaping the world of material science, we have so far spoken about the overview and covered Recycling. This month we speak about the fast upcoming powerful concept of *Material Informatics*.

As we have seen, progress is always accompanied by new materials. And that's how the progress of human life over the millennia is in fact named after the main materials used by humans then. Thus, we had stone age, copper age, bronze age, steel age, polymer age etc. Quest for newer materials drives growth and progress.

However, the process of new material, new chemical. Discovery has often been a chance event; or at least tedious, long drawn, costly process, with a low chance of success and often unpredictable output. Only a few like Arnold Kekule's *benzene ring* structure, Goodyear's *rubber vulcanization process*, Felix Hoffmann the *inventor of Aspirin* process, and in recent years Alan Scott – the chance inventor of *Botox* have been successful in finding truly new materials or chemicals.

The question is what is the process by which new materials are discovered or invented? When materials were more abundant, and were waiting to be discovered, ad hoc search by the curious minds led to the unveiling of new materials. Thus, the curiosity

in the minds of the Curies resulted in the discovery of radium; in the mind of young



Charles Martin Hall led to aluminium; a host of

curious chemists from Jacques E Brandenberger to Leo Hendrik Baekeland to Walter Semon & Cross & Bevan led to cellophane, viscose, bakelite, PVC and Viscose Rayon. Often, the materials got discovered first, and their useful properties were known later. Hardly ever were the properties targeted to be what they turned out to be!

However, as the world of research gets more and more complex, costly and competitive, the need to develop a systematic approach to invent new materials became necessary. Advances in the fields of experimentation, instrumentation for property measurement led to generation of a large amount of data, which had the capability to provide some insights to the observant scientists to work on combinations of materials for further enhancement of properties. Thus, came alloys and composites. Advances in mathematical modeling techniques, simulation capabilities and computation enabled thought experiments on different scales, from molecular modeling to phase diagrams, to structure-property relationship, to geometric modeling of chemicals and materials. The amount of information and data available on chemicals, materials, reactions, properties and

performance is vast, and over last twelve years that has led to a new branch of material science named as *Material Informatics*.



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The traditional way of inventing materials starts on the chemist's work bench; gets combined with the Measurement Sciences laboratory, sometimes with a theory and computation, and ends with performance testing. No more! The vast amount of data available on materials, molecules or parts thereof enables a data scientist to scan the information for availability of a suitable material; following that use combination rules/ mixing rules to guesstimate the effects of combining materials, elements, chemicals etc. to get the desired end results. This results in short-list of prospective materials/ chemicals/ molecules which are likely to be suitable for the end results. Mixing models and property combination rules based on sound thermodynamics can be used to estimate the dosages quantitatively as well; and probable effects of operating conditions such as



## Technology

temperature, pressure, shear rate etc. can be predicted. This virtual screening amounts to a virtual-HTS, High Throughput Pre-screening, and enables minimizing the experimental work to the short-listed range. This is where the techniques of combinatorial chemistry and high throughput screening (Lab-HTS) comes into picture. The validation of the predicted results is thus conducted experimentally; and if successful, it can be progressed to a technical success. The approach builds on *all* available knowledge, accessible through material data bases, utilizes public domain software tools for material property prediction and; and reduces actual experimentation on an average to ten percent of the work, thus helping reduce cost of experimentation, improves quality of results through guided or directed experimental design, and enhances the chance of success.

Over last decade, several examples of successes in new material discovery via this approach have been reported, some of these as listed below: While many of these hail from special materials, and not commodities, it helps offer a proof of concept for the new science of material discovery.

- CALPHAD (CALculation of PHase Diagrams) was one of the early adaptations of material



informatics, based on basic

properties of metals, mixing rules and solution thermodynamics theory, that enabled the development of new alloys. This work has resulted in the development of new alloys for aircraft engines, advanced aerospace vehicles, new steel alloy for aircraft landing gears, new polycrystalline and single nickel alloys for power generation and gas turbine components.

- Optoelectronic materials: Directly performing, efficient optoelectronic materials are relevant to newgen computers, synthetic alternatives to plant photosynthesis, efficient conversion of energy etc. The choice of such materials so far has been limited. Material discovery via material informatics has resulted in the ab initio discovery of transition metal perovskite chalcogenides with hitherto unknown opto-electronic properties. These are predicted to be useful for both electronic devices, as well as solar photovoltaic etc, providing a new class of materials.



- Chemo-responsive toxic gas sensors: Material informatics has resulted in highly sensitive metal alloy surface designs,

which can detect parts per billion level of toxic gases, enabling the design of reliable sensors for toxic gases like chlorine.

- Fast upcoming applications in space travel and power generation require new thermally stable materials. These ultra-high thermally stable composites are generated by combining carbon, nitrogen, and boron with refractory metals (Hf, Mo, Nb, Ta, Ti, V, W, and Zr) to produce complex atomic structures, which are harder, and have higher melting points.
- The fast upcoming manufacturing technique of *Additives Technology* is benefitting a lot from the material informatics providing multiple options, with a higher chance of success.
- The work has been significantly helped by the advents in multiple other areas:
  - Advances in measurement science: Quantitative data, imaging analysis, three-dimensional structural analysis etc, available through advanced measuring techniques, provide a plethora of data that can be regressed to develop often hidden correlations and can be reverse engineered to identify Materialstructure Property correlations and to discover new materials
  - Computational material science: The semi-empirical modeling of







thermodynamic properties of chemicals, especially in homologous series started with the advents of Group Contribution Theory and UNIFAC models which provided a modular contribution to the properties based on functional groups and known structural variations. *Unifac* was quickly adapted by the early modelers of plant flow sheet simulators like Chemtran, Aspen Plus etc., as a tool for property estimation. It got combined with stand-alone thermodynamic models to help estimate mixture properties. It even got integrated into the unit operations models, which significantly enhanced the predictive abilities of these modules. Over the years, this capability has been enhanced through molecular modeling, reaction modeling and rigorous thermodynamics making these tools excellent tabletop experimental tools of desk top computers.

- Material data bases: Since the early adaptation of these tools was in universities, primarily by academics, professors and postdocs, both the tools and the data bases have been largely in public domain. With advent of Linux in open-source

software, with platforms like Github for standardization and sharing of software, and materials data bases in public domain, the combination has been a powerful driver for the area of Material Informatics. Sensing the potential of this new technology, and the head start it

can provide in terms of discovery of new entities in chemicals, drugs, metals, and materials, US government has formed a platform named as MGI-Materials Genome Initiative. With integration of academics, public and private laboratories, end user industry and startups, MGI is supposed to be the growth engine for new materials, facilitating discovery, design, development, and deployment of new materials, at a fraction of the cost, by harnessing the power of data and computational tools in concert with experiment

. Early fruits of this work are already visible.

- In India, the leading software companies have started putting

together teams of coders, data scientists, data analysts, domain experts, AI/ML experts and integrators to enable get a



share of this new global pie, and to service the world in this exciting journey of material discovery.

The focus of the material informatics work now is to compliment with the advances in artificial intelligence, machine learning, and deep knowledge, so that the discovery process gets nearly automated, as if done by a scientist! With this the insights that an experienced, innovative material scientist and engineer may get, often as a flash, are targeted to be automated. The days are not far, when we will them start getting likes of the insights of August Kekuléin discovering benzene ring structure, the addition of sticky, gluey rubber juice to the oven that led Goodyear to the discovery of vulcanization, or even the chance finding of non-sticking teflon polymer or post it glue as a nearly guaranteed new material discovery! ■





# SIAM Statistics

## Small cars and passenger vehicles segment facing affordability issues :

The Indian automobile industry continued to feel the pain during March 2022 which has been reflected in the domestic sales of two-wheelers and passenger vehicles falling vis-à-vis March of 2021 as per the latest data revealed by Society of Indian Automobile Manufacturers (SIAM) shows while exports are up, performance across almost every automobile segment in the domestic market remains firmly in the red.

Besides, the increasing prices, as well as the supply bottleneck of semi-conductors, has prompted automobile OEMs and ancillary companies to increase their prices. The increasing prices, as well as the supply bottleneck of semi-conductors, has prompted automobile OEMs and ancillary companies to increase their prices.

The semi-conductor shortage has even forced some companies to scale down production while analysts have warned that the bottleneck may last for at least a year or two.

Commenting on annual sales data, Mr Kenichi Ayukawa, President, SIAM said, "The year gone by was full of unforeseen challenges and new learning for the industry. Indian auto industry has worked hard against these challenges to keep the value chain running, to indigenize parts, control cost, invest in new technologies, and enhance exports. The Government also came out with targeted support like PLI schemes, FAME scheme extension, etc. "

Elaborating on the sales performance, he mentioned, "Despite some recovery from a low base, sales of all four segments of the auto industry are below even 2018-19 level.

While some segments like Commercial Vehicles and SUVs are seeing improvement in demand, the mass segments like two-wheelers and smaller cars are facing serious affordability issues. Of course,

our immediate challenge in most segments is semiconductor availability." Talking about export performance, he said, "We are happy to share that all four segments of the industry have increased their exports. In fact, two-wheelers achieved their highest ever exports.

It is good to see that Indian products are becoming more acceptable worldwide for their quality, cost and performance."

Commenting on the 2021-22 performance, Mr Rajesh Menon, Director General, SIAM said, "Overall Industry witnessed a de-growth of (-) 6% in FY22. All segments are facing supply side challenges and the industry is yet to see complete recovery following the disruptions it has been facing since early 2020. Passenger Vehicles, Commercial Vehicles and Three-wheelers have witnessed a growth compared to a low base of the industry in 2020-21, but the Two-Wheeler segments further declined by (-) 11% from the previous year."

SIAM						
Segment wise Comparative Production, Domestic Sales & Exports data for the month of March 2022						
Category Segment/Subsegment	Production		Domestic Sales		Exports	
	March		March		March	
	2021	2022	2021	2022	2021	2022
<b>Passenger Vehicles (PVs)*</b>						
Passenger Cars	190,588	168,117	156,985	138,031	25,909	40,453
Utility Vehicles (UVs)	141,704	149,860	122,350	132,032	13,992	20,785
Vans	12,057	9,601	11,604	9,438	282	32
<b>Total Passenger Vehicles (PVs)</b>	<b>344,349</b>	<b>327,578</b>	<b>290,939</b>	<b>279,501</b>	<b>40,183</b>	<b>61,270</b>
<b>Three Wheelers</b>						
Passenger Carrier	62,726	62,812	21,779	23,011	38,767	38,217
Goods Carrier	11,422	9,267	10,531	9,077	1,005	318
<b>Total Three Wheelers</b>	<b>74,148</b>	<b>72,079</b>	<b>32,310</b>	<b>32,088</b>	<b>39,772</b>	<b>38,535</b>
<b>Two Wheelers</b>						
Scooter/ Scooterette	519,061	391,015	458,122	360,082	27,883	21,842
Motorcycle/Step-Throughs	1,381,625	1,135,153	993,996	786,479	327,347	329,399
Mopeds	50,135	34,550	44,688	37,649	942	0
<b>Total Two Wheelers</b>	<b>1,950,821</b>	<b>1,560,718</b>	<b>1,496,806</b>	<b>1,184,210</b>	<b>356,172</b>	<b>351,241</b>
Quadricycle	336	23	7	49	270	12
<b>Grand Total of All Categories</b>	<b>2,369,654</b>	<b>1,960,398</b>	<b>1,820,062</b>	<b>1,495,848</b>	<b>436,397</b>	<b>451,058</b>
* BMW, Mercedes, Tata Motors and Volvo Auto data is not available						
Society of Indian Automobile Manufacturers ( 13/04/2022)						





SIAM						
Summary Report: Cumulative Production, Domestic Sales & Exports data for the period of January-March 2022						
(Number of Vehicles)						
Category	Production		Domestic Sales		Exports	
Segment/Subsegment	January-March		January-March		January-March	
	2020-2021	2021-2022	2020-2021	2021-2022	2020-2021	2021-2022
<b>Passenger Vehicles (PVs)*</b>						
Passenger Cars	594,030	536,940	513,765	437,291	74,315	99,277
Utility Vehicles (UVs)	425,250	508,799	383,643	453,172	38,141	54,369
Vans	37,025	30,169	36,175	30,198	771	232
<b>Total Passenger Vehicles (PVs)</b>	<b>1,056,305</b>	<b>1,075,908</b>	<b>933,583</b>	<b>920,661</b>	<b>113,227</b>	<b>153,878</b>
<b>Commercial Vehicles (CVs)#</b>						
<b>M&amp;HCVs</b>						
Passenger Carrier	4,943	5,862	4,744	5,362	1,211	2,695
Goods Carrier	82,622	92,872	75,790	88,612	6,593	7,126
<b>Total M&amp;HCVs</b>	<b>87,565</b>	<b>98,734</b>	<b>80,534</b>	<b>93,974</b>	<b>7,804</b>	<b>9,821</b>
<b>LCVs</b>						
Passenger Carrier	5,688	7,564	4,662	6,942	733	534
Goods Carrier	141,939	166,404	125,160	148,890	11,503	17,000
<b>Total LCVs</b>	<b>147,627</b>	<b>173,968</b>	<b>129,822</b>	<b>155,832</b>	<b>12,236</b>	<b>17,534</b>
<b>Total Commercial Vehicles (CVs)</b>	<b>235,192</b>	<b>272,702</b>	<b>210,356</b>	<b>249,806</b>	<b>20,040</b>	<b>27,355</b>
<b>Three Wheelers</b>						
Passenger Carrier	175,984	178,188	57,680	60,328	119,272	110,947
Goods Carrier	31,943	25,758	29,080	22,890	2,335	2,736
<b>Total Three Wheelers</b>	<b>207,927</b>	<b>203,946</b>	<b>86,760</b>	<b>83,218</b>	<b>121,607</b>	<b>113,683</b>
<b>Two Wheelers</b>						
Scooter/ Scooterette	1,500,999	1,143,808	1,377,775	1,052,923	82,365	80,041
Motorcycle/Step-Throughs	3,971,854	3,202,478	2,820,684	2,188,292	1,021,538	1,020,073
Mopeds	176,351	115,318	155,140	109,282	1,774	1,782
<b>Total Two Wheelers</b>	<b>5,649,204</b>	<b>4,461,604</b>	<b>4,353,599</b>	<b>3,350,497</b>	<b>1,105,677</b>	<b>1,101,896</b>
Quadricycle	1,536	217	15	60	1,272	187
<b>Grand Total of All Categories</b>	<b>7,150,164</b>	<b>6,014,377</b>	<b>5,584,313</b>	<b>4,604,242</b>	<b>1,361,823</b>	<b>1,396,999</b>
* BMW, Mercedes and Volvo Auto data is not available						
# Daimler, JBM Auto & Scania data is not available						
Society of Indian Automobile Manufacturers ( 13/04/2022)						

SIAM						
Summary Report: Cumulative Production, Domestic Sales & Exports data for the period of April - March 2022						
Report I						
(Number of Vehicles)						
Category	Production		Domestic Sales		Exports	
Segment/Subsegment	April-March		April-March		April-March	
	2020-21	2021-22	2020-21	2021-22	2020-21	2021-22
<b>Passenger Vehicles (PVs)*</b>						
Passenger Cars	1,772,972	1,844,985	1,541,866	1,467,056	264,907	374,986
Utility Vehicles (UVs)	1,182,144	1,691,081	1,060,750	1,489,178	137,842	201,036
Vans	107,164	114,632	108,841	113,265	1,648	1,853
<b>Total Passenger Vehicles (PVs)</b>	<b>3,062,280</b>	<b>3,650,698</b>	<b>2,711,457</b>	<b>3,069,499</b>	<b>404,397</b>	<b>577,875</b>
<b>Commercial Vehicles (CVs)#</b>						
<b>M&amp;HCVs</b>						
Passenger Carrier	10,010	15,510	7,322	11,804	4,040	6,499
Goods Carrier	171,232	256,657	153,366	228,773	13,508	25,682
<b>Total M&amp;HCVs</b>	<b>181,242</b>	<b>272,167</b>	<b>160,688</b>	<b>240,577</b>	<b>17,548</b>	<b>32,181</b>
<b>LCVs</b>						
Passenger Carrier	15,475	21,984	12,088	19,957	1,641	1,785
Goods Carrier	428,222	511,376	395,783	456,032	31,145	58,331
<b>Total LCVs</b>	<b>443,697</b>	<b>533,360</b>	<b>407,871</b>	<b>475,989</b>	<b>32,786</b>	<b>60,116</b>
<b>Total Commercial Vehicles (CVs)</b>	<b>624,939</b>	<b>805,527</b>	<b>568,559</b>	<b>716,566</b>	<b>50,334</b>	<b>92,297</b>
<b>Three Wheelers</b>						
Passenger Carrier	523,314	670,779	135,414	183,607	387,397	489,535
Goods Carrier	91,299	87,309	84,032	77,388	5,604	10,195
<b>Total Three Wheelers</b>	<b>614,613</b>	<b>758,088</b>	<b>219,446</b>	<b>260,995</b>	<b>393,001</b>	<b>499,730</b>
<b>Two Wheelers</b>						
Scooter/ Scooterette	4,559,222	4,351,535	4,482,305	4,009,076	232,020	350,330
Motorcycle/Step-Throughs	13,154,501	12,890,149	10,021,231	8,984,186	3,042,453	4,082,442
Mopeds	636,218	473,172	617,247	473,150	8,313	10,246
<b>Total Two Wheelers</b>	<b>18,349,941</b>	<b>17,714,856</b>	<b>15,120,783</b>	<b>13,466,412</b>	<b>3,282,786</b>	<b>4,443,018</b>
Quadricycle	3,836	4,061	(12)	124	3,529	4,326
<b>Grand Total of All Categories</b>	<b>22,655,609</b>	<b>22,933,230</b>	<b>18,620,233</b>	<b>17,513,596</b>	<b>4,134,047</b>	<b>5,617,246</b>
* BMW, Mercedes and Volvo Auto data is not available						
# Daimler & Scania data is not available and JBM Auto data is available for Apr-June only						
Society of Indian Automobile Manufacturers ( 13/04/2022)						

# 10<sup>th</sup> International Bauxite, Alumina & Aluminium Conference & Exhibition

## IBAAS-JNARDDC 2022



**NEW DATES**

**September 14-17, 2022**

**Courtyard Marriott, Raipur, INDIA**



- Participation by more than 50 companies
- Over 200 delegates expected to attend
- Over 40 abstracts received
- Non-Ferrous metal recycling sessions by JNARDDC
- Aluminium Sustainability sessions by ASI

### Special Sessions

**Sustainability by Aluminium Stewardship Initiative ASI (September 16)**

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

**Co- Organizer    Associated Organizer    Gold Sponsor    Co-Supporter**



Jawaharlal Nehru Aluminium Research  
Development and Design Centre  
(JNARDDC), India



Aluminium Stewardship Initiative  
(ASI), Australia



Tokai COBEX GmbH, Germany



Bokela GmbH, Germany

For participation and further details, please contact the IBAAS Office, India

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