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S M E

Smart Manufacturing & Enterprises

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**BUDGET
DECODED!**

With emphasis on infrastructure, skill development, and MSMEs, budget FY25 aims to drive India's manufacturing-led growth. But, what these initiatives mean to industries. SME deciphers the short- and long-term impact of the budget.

INSIDE

- Growth drivers of Indian electrical vehicles industry 44
- How lithium-ion battery market is riding on the green wave 62
- Interview: Anand Kulkarni, CPO, Tata Passenger Electric Mobility Ltd 78
- OPC UA: The language of Industry 4.0 81
- Tips to navigate GST reconciliation complexities 91

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A “skilful” budget

In June 2024, while speaking to reporters, S N Subrahmanyam, Chairman of Larsen & Toubro (L&T), stated that the company was facing a manpower shortage of over 45,000 laborers and engineers across its businesses. This shortage persists despite the company having established nine skill-training centers in the country and three associate centers through which it trains about 25,000 people every year in carpentry, masonry, welding, fitting, and other trades.

Infrastructure-linked sectors have witnessed robust demand over the last couple of years. The total order book of the top 25 companies in infrastructure, power, and capital goods rose by 18 per cent to ₹12.22 trillion as of March 31, 2024, compared with ₹10.33 trillion at the end of FY23. A rebounding economy and a steep rise in project spending have contributed to this surge in order books.

According to recent internal surveys by the CII, capacity utilisation levels across most sectors are above 75 per cent, with some sectors such as cement, steel, and automobiles reaching 80-90 per cent. This high utilization necessitates capacity building with fresh investments. The private sector's capital expenditure (capex) share in the country's GDP, which rose to 23.8 per cent in FY23, is expected to increase further. According to a Business Standard report, nine engineering and capital goods companies, including Siemens, L&T, and KEC International, have a combined capex of about ₹115 billion or more in FY25. With private sector companies gearing up for expansion, they are concerned about the lack of availability of a skilled workforce.

Acknowledging this concern and aiming to address the employment issue, Union Finance Minister Nirmala Sitharaman announced a provision of ₹1.48 trillion for education, employment, and skilling in the FY25 budget. The intention is to provide an industry-ready workforce. Some of the measures include a year-long paid internship opportunity for 10 million youth in India's top 500 companies over the next five years, industry collaboration to upgrade 1,000 industrial training institutes (ITIs), and the introduction of new courses for emerging fields, among others. The focus of the new centrally sponsored scheme, with an outlay of ₹600 billion aimed at skilling over 2 million youth annually, will be on the outcome and quality of skilling, with course content and design aligned to the needs of the industry. The comprehensive internship scheme, offering real-world experience and supported by CSR funding, can bridge the gap between education and practical experience.

Experts feel that the paid internship scheme should have included MSMEs in addition to the top 500 companies, as they are the leading employment generators who often struggle to hire qualified people. This inclusion could have helped in job creation and economic development. Additionally, despite previous mentions of amending the act to scale up apprenticeships, this budget did not emphasise such a transformative opportunity. Some experts suggest allowing flexibility in the 12-month internship duration depending on the course and the requirements of the companies.

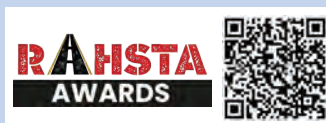
Overall, a good attempt has been made to increase the number of trained individuals in a market where job opportunities are not growing proportionally.

“The focus of the new centrally sponsored scheme, with an outlay of ₹600 billion aimed at skilling over 2 million youth annually, will be on the outcome and quality of skilling, with course content and design aligned to the needs of the industry.”



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COVER STORY



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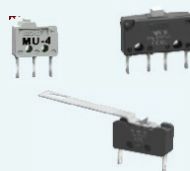


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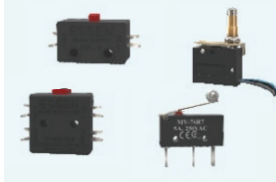
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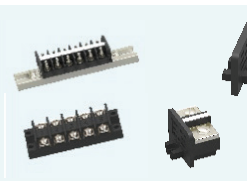
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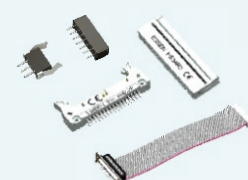
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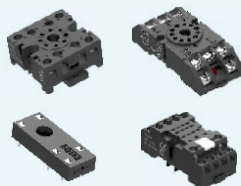
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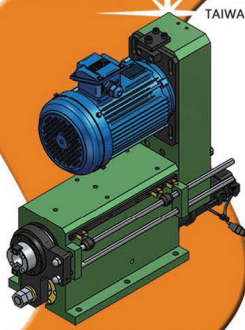
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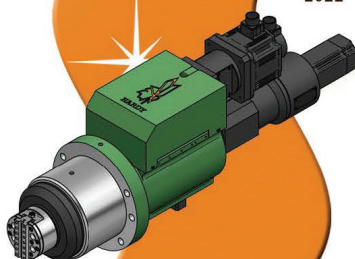
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Servo Type Drilling / Tapping
Spindle Head Unit



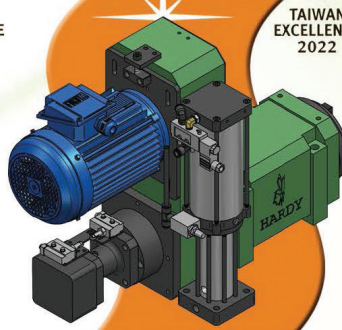
TAIWAN EXCELLENCE
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Built-in Motor Facing Head Unit - Flange Type



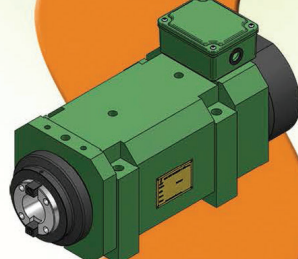
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Boring/Milling Head Unit with ATC



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Built-in Motor Spindle Unit



Built-in Spindle



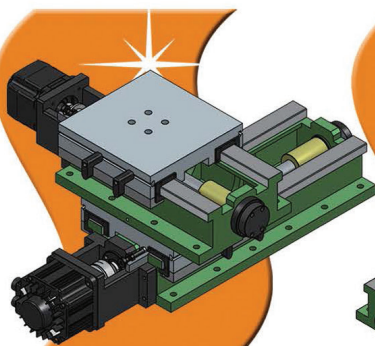
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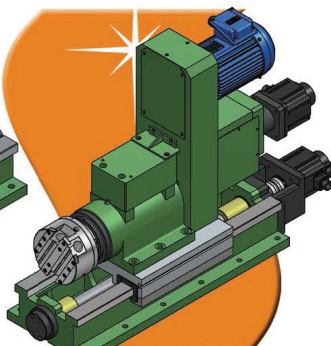
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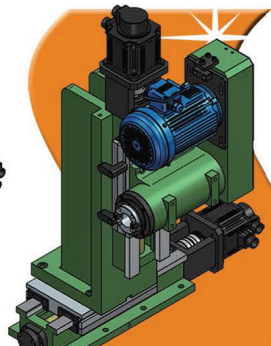
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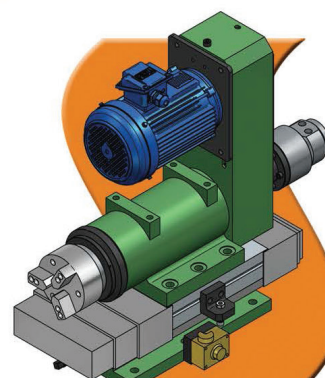
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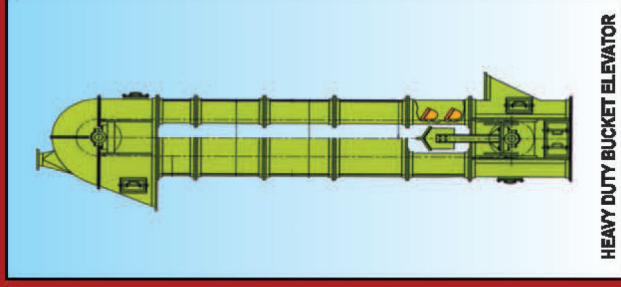
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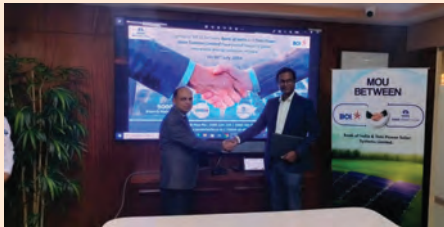
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Electric & Electronics

TPSSL and BOI to offer financing for rooftop solar and EV charging stations

Tata Power Solar Systems Limited (TPSSL), one of the leading solar companies in India and a wholly-owned subsidiary of Tata Power Renewable Energy Limited (TPREL) announced a strategic partnership with Bank of India (BOI), a premier public sector bank, to facilitate easy financing for rooftop solar installations and establishment of electric vehicle (EV) charging stations. The partnership is a significant milestone with Tata Power Solar becoming the first solar company to collaborate with BOI for both solar and EV Charging Station financing and strengthening its leadership as a green energy solutions provider.

This collaboration supports the Government's initiatives to promote rooftop solar installations, targeting a wide spectrum of customers, including



residential users under the PM Surya Ghar Yojana, housing societies, and Micro, Small, and Medium Enterprises (MSMEs). By providing tailored easy financing solutions, the partnership will mainstream green solutions and make sustainable energy adoption more accessible and

affordable for all.

Under the PM Surya Ghar Yojana, residential customers seeking to install solar systems up to 3 KW can avail loans up to ₹200,000 with only a 5 per cent margin money requirement. These loans are offered at an attractive interest rate of 7.10 per cent per annum, are collateral-free, and have tenure of up to 10 years. For installations above 3 KW and up to 10 KW, loans can be availed up to ₹600,000 with a 5 per cent margin money requirement.

Auto Components

IIT Delhi introduces certificate programme in HEV design

As the automotive industry accelerates towards a sustainable future, the demand for professionals who can design and develop hybrid electric vehicles (HEVs) is surging. With the Indian government's ambitious target of electrifying 30% of new vehicle sales by 2030, the industry needs skilled professionals who can bridge the gap between conventional automotive engineering and the rapidly evolving EV and Hybrid EV space. In response to the growing need for expertise in the rapidly evolving field of vehicle electrification, the Indian Institute of Delhi (IITD), acclaimed for its 2nd rank in the Ministry of Education's NIRF 2023 rankings in Engineering, announced the launch of a first-of-its-kind certificate programme in Hybrid Electric Vehicles (HEVs) design.

This high-impact 6-month programme is specifically designed for engineers from mechanical, electrical, automotive, and allied areas seeking to establish a strong foundation in EV/HEV technology. It is also tailored for



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professionals transitioning from traditional internal combustion engine technology to EVs and HEVs. Additionally, it also caters to professionals aiming to fortify their existing expertise in the EV/HEV

sector, providing them with the advanced knowledge and skills required to design and develop innovative, sustainable, and efficient hybrid electric vehicles that meet the industry's evolving needs.

According to the report by Arthur D. Little titled 'Transforming India into a Global Automotive Hub: Roadmap for the Automotive Ecosystem', the Indian automotive industry is expected to be worth \$1 trillion by 2035.

Another report by research firm Counterpoint highlights that India's EV market expected to grow by 66% in 2024. In order to meet this demand and bridge the gap in EV industry, there is a need for skilled professionals who can design, develop, and manufacture hybrid electric vehicles.



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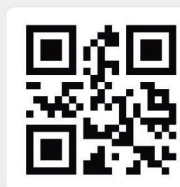


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Renewable Energy

Godrej & Boyce delivers 12.5MWp rooftop solar project in MP

Godrej Electricals & Electronics, a business unit of Godrej & Boyce commissioned a 12.5MWp rooftop solar project for a textile facility in Madhya Pradesh. This installation spans over 1 million square feet of large manufacturing sheds, making it one of the three largest rooftop installations in India and the largest in Madhya Pradesh. Aligned with the government's goal of tripling renewable capacity by 2030, Godrej Electricals & Electronics is committed to promoting renewable energy solutions and supporting corporate sustainability goals.

Raghavendra Mirji, Executive Vice President & Business Head, Godrej Electricals & Electronics, Godrej & Boyce, said, "The transition to renewable energy is imperative not just for combating climate change, but for securing our nation's long-term energy independence and economic resilience. Projects like this landmark solar installation showcases our commitment to

harnessing India's abundant solar potential to power industrial growth sustainably. As the country triples its renewable capacity by 2030, we see such innovative solutions being pivotal in decarbonizing energy-intensive sectors while driving job creation and technological leadership. This is just the beginning of a profound transformation towards a clean energy future that promises economic prosperity while safeguarding our environment for generations to come."

The solar rooftop installation will enable the facility to utilise green energy, resulting in an estimated annual saving of 17 million kWh.

Godrej Electricals & Electronics is engaged in similar projects across various industries, including cement, textile, automobile, and pharma. With India emerging as the third-largest solar power generator globally, the country's renewable energy sector is witnessing unprecedented growth and momentum.

Industrial Automation

Wipro opens new smart and connected IoT experience centre in Pune

Wipro Commercial & Institutional Business (CIB), a leader in lighting and seating solutions, has opened its new Experience Centre in Pune. The Experience Centre is designed to meet the evolving needs of modern businesses via advanced IoT and Smart Technology applications. Featuring open collaborative spaces, the centre showcases Wipro's innovative Internet of Lighting (IoL) solutions and ergonomic seating designs. The centre also features vibrant and inclusive designs aimed to boost employee productivity and promote mental well-being.

The facility highlights Wipro's Smart & Connected solutions for Smart Factories, Smart Cities, and Smart Offices, utilising technologies like Power over Ethernet (PoE) and wireless lighting management systems.

The showcase features Wipro's iSense, an advanced wireless IoT solution, which is widely adopted by office and industrial clients for seamless, wireless control of



lighting fixtures, TVs, and AC units.

The facility provides live demonstrations that show how different lighting settings can influence space functionality and mood.

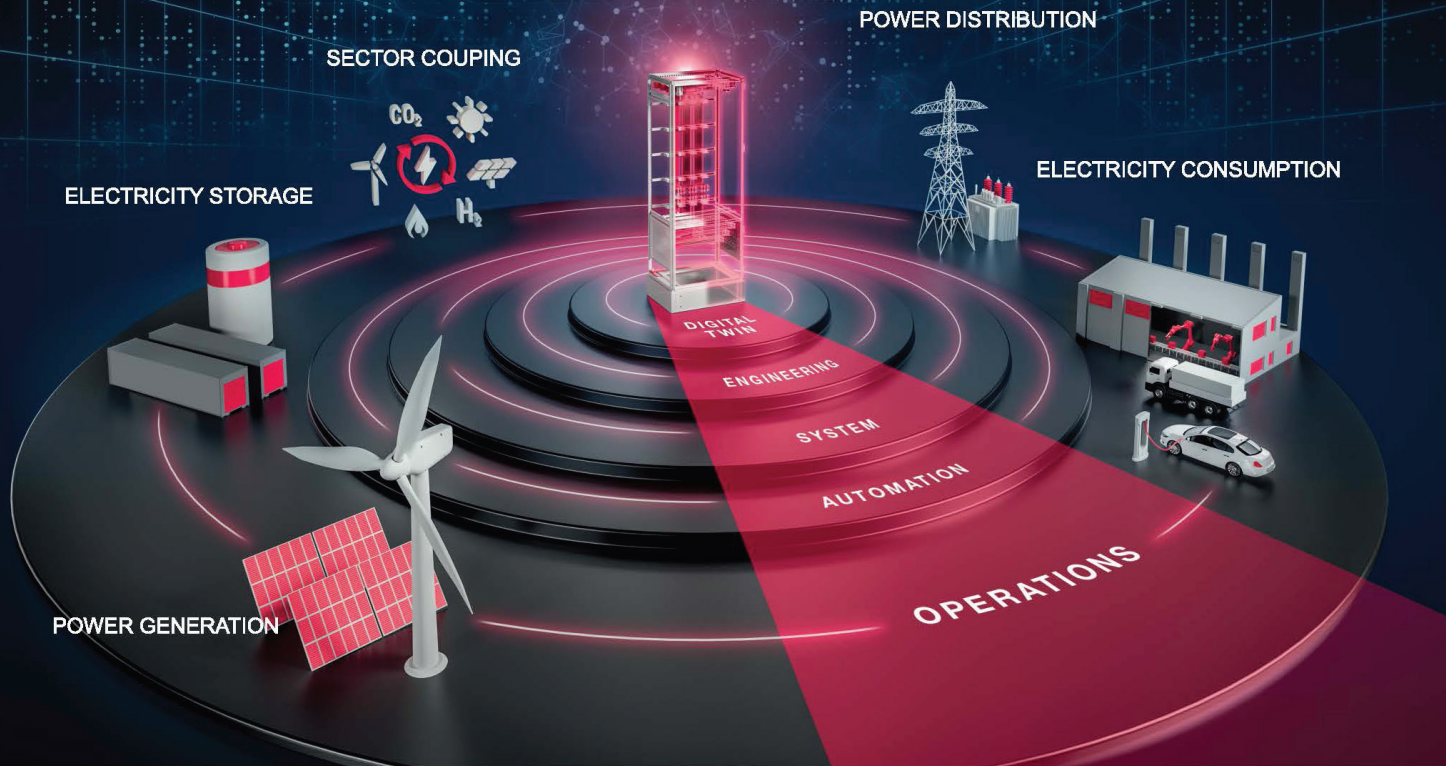
Visitors can explore Wipro's innovative and ergonomically designed seating solutions and receive personalised advice and

project support from in-house design consultants and technical experts. Wipro Seating Solutions offers a variety of solutions for offices, public spaces, collaborative environments, and auditoriums. The company has integrated acoustic materials, launching partitions and luminaires that add vibrancy to office interiors while delivering excellent noise reduction for peaceful and productive workspaces.

Wipro CIB is certified with ISO 9001, ISO 14001, and ISO 45001, ensuring the highest standards of quality in its products and services.

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Railways

Siemens partners with BMRCL for sustainable rail electrification

Siemens Limited, as part of a consortium along with Rail Vikas Nigam Limited (RVNL), has secured an order from Bangalore Metro Rail Corporation Limited (BMRCL) for electrification of Bengaluru Metro Phase 2 project contributing to sustainable public transport in the city.

Total order value is approximately ₹7.66 billion. Siemens Limited's share as part of the consortium is approximately ₹5.58 billion.

Siemens Limited will design, engineer, install and commission rail electrification technologies as well as a digital solution comprising Supervisory Control and Data Acquisition (SCADA) systems. The project covers 30 stations spanning over 58 kilometers connecting



Bengaluru Airport terminal to Central Silk Board via KR Puram and two depots. With this order, Siemens is present in 11 out of 20 cities that have a Metro in India.

Gunjan Vakharia, Head- Mobility Business, Siemens Limited, said, "As part of our continued efforts towards nation building through sustainable rail transportation, we are proud to be associated with BMRCL on the electrification of Bengaluru Metro

Phase 2 project. The implementation of Phase 2 will significantly contribute to sustainable urban development in Bengaluru, catering to the requirements of commuters and Metro Rail authorities. We express our gratitude to BMRCL for entrusting Siemens in their journey of creating a safer, greener and smarter transport for Bengaluru."

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Industrial Automation

M&M picks ABB's PixelPaint for EV paint facility

ABB's innovative PixelPaint technology has been selected by Mahindra & Mahindra Ltd (M&M), India's leading SUV manufacturer, for its new electric vehicle paint facility. The technology, which uses an award-winning paint head similar to an inkjet printer, will begin serial production in 2025.

"Our revolutionary PixelPaint technology can apply large areas of uniform colour as well as the tiniest details with complete accuracy, without delaying the production line or the need for manual intervention," said Joerg Reger, Managing Director- Automotive Business Line, ABB Robotics. "By deploying PixelPaint-equipped robots in dedicated cells, Mahindra's paint shop will be able to apply finishes such as contrasting roof and pillar treatments on its new line of EVs in a completely automated process."

PixelPaint consists of a paint head with more than 1,000 tiny, individually controlled nozzles, mounted on an ABB robot such as the IRB 5500 paint series. Combined with ABB's 3D vision system and coordinated by ABB's RobotStudio® planning and programming software, the head tracks very closely to the vehicle body to ensure that 100% of the paint is applied to the car with no overspray or airborne misting. This eliminates the need for labour-intensive masking and repeat trips through the paint shop, resulting in zero waste while ensuring faithful reproduction of precise details.

Demand for personalisation options has been growing in recent years, and PixelPaint is just one example of how ABB's technologies are helping to establish Mahindra's products within the luxury segments.

The deployment, which builds on ABB and Mahindra's existing relationship, also includes 42 robots from the IRB 5500 family making M&M the first OEM in India to use PixelPaint technology for the painting of contrasting roofs and pillars.

Complex and time-consuming operations such as interior painting and sealing are performed entirely autonomously, with the accuracy of ABB's systems ensuring that paint is applied precisely and only where needed, eliminating the need to manually mask off areas, saving time and materials. Similarly, ABB's RB1000i digitally-enabled paint atomizers improve transfer efficiency by 10% and reduce waste by more than 30%, ensuring less paint is lost to the air.



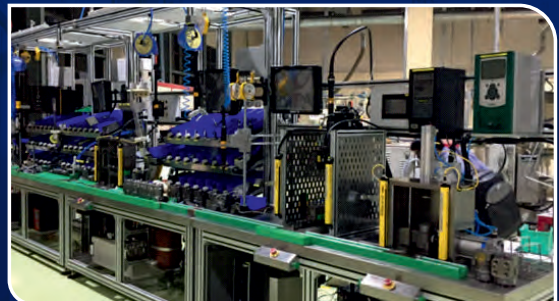
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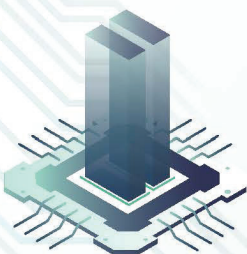
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Electrical & Electronics

KEC bags new orders worth ₹10.17 billion

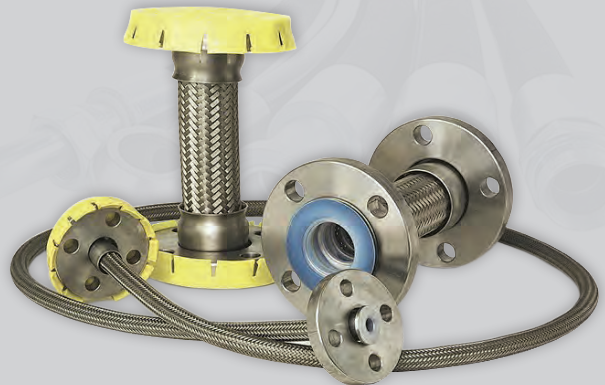
KEC International Ltd., a global infrastructure EPC major, an RPG Group Company, has secured new orders of ₹10.17 billion in T&D and the renewables businesses.

The business has secured orders for EPC project and supply of towers in the Middle East. The business has secured an order for balance of system package of a 625 MWp Solar PV project in Rajasthan from a subsidiary of a reputed PSU in renewable power generation segment.

Vimal Kejriwal, MD & CEO, KEC International Ltd. commented, "We are delighted with the continuous inflow of orders in the first quarter of the financial year. The prestigious Solar order has reaffirmed our confidence that the Renewable EPC business will contribute significantly to our future growth. The T&D orders in the Middle East have further strengthened our order book in the international T&D market. With these orders, our YTD order intake has surpassed ₹50 billion, a remarkable growth of 50% vis-à-vis last year."

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Renewable Energy

NSDCI awards 140 BluPine Energy funded students technician training certificates

BluPine Energy, a leading renewable energy services company established in India by global infrastructure investor Actis, announces the completion of its skill development initiative aimed at upskilling the local youth of Gujarat in the utility-scale renewable energy sector. After a successful assessment by an external agency, 140 students were awarded certificates under the Skill India program of the National Skills Development Corporation of India.

The skill development centres established by BluPine Energy as part of a social investment program in Gujarat trained students in the installation and operation of utility-scale renewable energy projects free of cost. These centres have equipped participants with essential skills in the utility-scale renewable energy sector. The



centres were located in three villages (Porana, Bhadiya, Nenava) of the Patan and Banas Kantha districts, and in two villages (Rampara, Kanakiya) in the Gir Somnath district.

With a special focus on diversity and inclusion, 40% of upskilled students in these centres were

women. The training was completely sponsored by BluPine Energy, and no fees were charged to the beneficiaries. This investment in social initiatives is voluntary and does not form part of BluPine's statutory CSR investment requirement.

The 6-month training imparted crucial skills in the renewable energy sector such as design, installation, operation, and maintenance of solar power systems including panels, inverters, batteries, and equipment.

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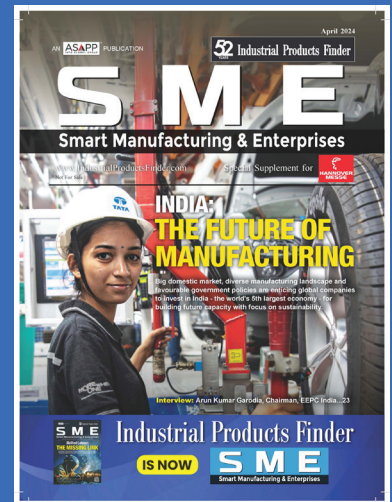
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Material Handling

Beumer Group sets up ₹2 billion production site in Reliance MET City

The new production site will further strengthen Beumer's global factory footprint as well as boosting the continued success of its Beumer India subsidiary. With an area of more than ten acres, the new plant will be placed at a highly strategic location. Beumer will be the first German company to set up production in the development zone. Construction work will commence soon with the inauguration of the new plant is scheduled for September 2025.

Beumer Group has been active in India since 2003. Initially catering to the cement industry exclusively, Beumer India has grown significantly over the years and now offers solutions for the airport industry, minerals and mining, for automated warehouses and distribution centres in the retail industry as well as in the areas of e-commerce and courier, express and parcel. In addition, Beumer India is also providing engineering support to the group's global network.

On the product side, Beumer India has been a trailblazer of new bulk as well as discrete material handling technologies to India, for example: high-capacity, high-speed automatic loop sortation for passenger baggage, fully automated truck loading for cement bags, high-efficiency bulk material transport, as well as curved belt and pipe conveyors.

Over the years, Beumer strengthened its position in India through various steps, such as diversifying to all business segments as global operations, acquisition of ENEXCO Technologies India, FAM India and the establishment of a modern manufacturing unit at Naurangpur, Haryana.

"This expansion reflects Beumer Group's commitment to long-term success in India. The site plays an important part in our factory footprint, strengthening our position in the industry", said Rudolf Hausladen, CEO, Beumer Group.

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Industrial Automation

Nicholas Cumins appointed as CEO of Bentley Systems



Following the CEO transition plan previously announced by Bentley Systems, Incorporated (Nasdaq: BSY), Nicholas Cumins takes charge as CEO. Cumins succeeds Greg Bentley, the eldest of the five brothers who founded Bentley Systems,

who becomes Executive Chair of its Board of Directors.

Cumins is the first CEO in the company's 40-year history who is not a Bentley family member, marking a significant milestone in the company's development. The Bentley brothers redefined what was then computer-aided design (CAD) software when they developed MicroStation as a groundbreaking engineering application platform. Four decades of innovation and more than 120 acquisitions later, Bentley Systems is the leading provider of infrastructure engineering software, with its infrastructure digital twin solutions used to design, build, and operate critical infrastructure around the world.

The transition to Cumins' leadership comes at a critical time for infrastructure sectors. There are not enough engineers to accomplish the work required to achieve global sustainability targets while also adapting aging infrastructure vulnerable to the effects of climate change.

Cumins unveiled Bentley's vision for infrastructure resilience, noting that engineering firms and asset owner-operators are looking to software to help them overcome the limitations of scarce talent.

For example, Bentley's AI solutions are already transforming the way organisations are monitoring the health of roads, bridges, dams, water networks, and telecommunications towers.

Before his promotion to CEO, Cumins served as Bentley Systems' COO from January 2022. He joined Bentley Systems as Chief Product Officer in September 2020 prior to the company's IPO. Previously he was General Manager of SAP Marketing Cloud and served as Chief Product Officer of Scyt1, a platform for online voting, and as Senior Vice President of Product with OpenX, a pioneer in programmatic advertising.



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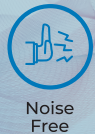
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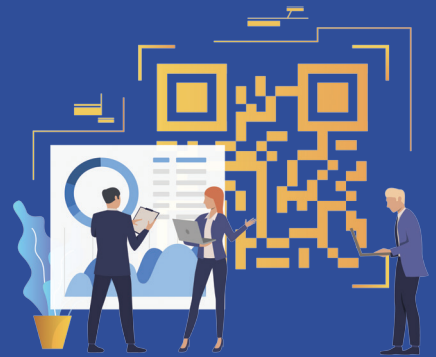
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Aerospace and Defence

Magellan Aerospace and Aequs join hands to start engine MRO business in India

Magellan Aerospace Corporation (Magellan) has signed a Memorandum of Understanding (MOU) with Aequs Private Limited (Aequs) to explore the development of a business plan for a jointly-owned engine MRO business in the Aequs Special Economic Zone, at Belagavi in Karnataka, India.

India's aerospace sector has experienced growth over the past decade, driven by government initiatives including Make in India and UDAN Scheme, growth in the private sector, and increasing air traffic. Air travel demand in India has surged, making it one of the fastest-growing aviation markets in the world.

Given the substantial growth of aerospace and aviation in India, the MRO sector is poised for significant development. Under the terms of this MOU, Magellan and Aequs will work together to evaluate the market for



business, commercial and military aircraft engine MRO services, to develop a comprehensive business plan that expands our existing partnership into the MRO sector through this exciting new project.

In 2008, Aequs and Magellan established Aerospace Processing India (API), a joint venture (JV) that was the first Airbus and Boeing approved plant in India, providing OEMs aerospace surface treatments not readily available in country at the time.

This successful venture has flourished and grown over the past 15+ years to be the largest in India processing more than 1.5 million parts per year. This partnership demonstrates the solid foundation of their move that delivers unique, cost-effective solutions to support a global customer base.

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Auto Components

Mahindra appoints Ankit Todi as CSO

Mahindra Group has appointed Ankit Todi as Group CSO. Since joining the Mahindra Group in 2022, Todi has been instrumental in shaping the group's refreshed 'Planet Positive' sustainability strategy. He has anchored the Group Sustainability CEO Council and led the Mahindra Group's engagement with prestigious global platforms such as the World Economic Forum, United Nations Global Compact, and Sustainable Markets Initiative, in addition to various domestic industry associations.

Todi will report to Abanti Sankaranarayanan, Group Public Affairs Officer, Mahindra Group and Member – Group Executive Board. Commenting on the appointment, Sankaranarayanan said, "Ankit's promotion from within the organisation highlights Mahindra Group's commitment to nurture future leaders. Ankit has driven strong outcomes by integrating business strategy with sustainability initiatives."

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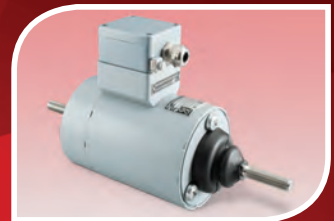
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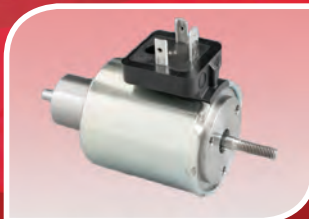
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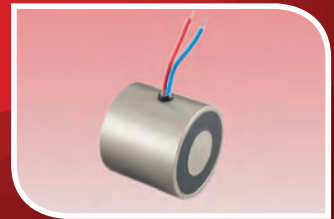
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Policy & Regulation

DBS Bank India & RXIL to partner for pre-shipment financing solution

DBS Bank India has announced its partnership with Receivables Exchange of India Limited (RXIL), the first RBI-licensed exchange platform under the Trade Receivables electronic Discounting System (TReDS). While the bank already offers post-shipment financing on the TReDS platform, it is now launching a pre-shipment financing solution that will empower Indian SMEs with an additional way of availing trade finance in a credit-light manner. By using alternative trade lending data from RXIL to build better borrower profiles, the bank will be able to support the supplier's entire trade cycle, from sourcing raw materials to delivering the end product to the customer. This offering will be particularly relevant for MSMEs and SMEs across India, enabling them to enhance cash flows to fulfil orders even



before goods are delivered to buyers.

MSMEs contributed 45.56% of total exports from April-September '23 as per the Ministry of External Affairs report.

Despite their sizeable share in trade flows, MSMEs often face challenges establishing favourable payment and credit terms with buyers, managing outflows, and obtaining the documentation required by formal lenders. With the new DBS solution, MSMEs on TReDS will now be empowered through a transparent, simplified process to secure funding against purchase orders from buyers, thereby streamlining cash flows.

Additionally, this collaboration promises to alleviate the working capital challenges faced by MSMEs, offering tailored solutions to enhance their financial stability and propel their growth trajectory.




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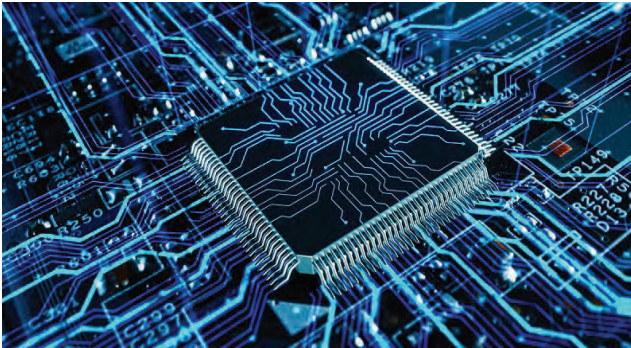
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Electric & Electronics

Altair & ARAI join hands to advance technology and digital transformation goals



Altair, a global leader in computational intelligence, announced it has signed a memorandum of understanding (MoU) with the Automotive Research Association of India (ARAI) to foster technology and digital transformation within the automotive and heavy engineering sectors.

This collaboration is set to harness state-of-the-art digital twin technology, data-driven design, and artificial intelligence (AI)-powered engineering solutions to help propel innovation and promote sustainability. Within the collaboration, both organisations will work together to enhance digital transformation and product development.

“We are excited to partner with ARAI, an esteemed institution in the automotive industry,” said Stephanie Buckner, Global Chief Operating Officer, Altair.

“Together, we aim to drive the adoption of AI-driven engineering and data analytics, facilitating digital transformation and enhancing the capabilities of the automotive and heavy engineering sectors.”

“This MoU signifies a major step forward in our mission to integrate cutting-edge technologies in our R&D processes,” said Reji Mathai, Director, ARAI. “Altair’s expertise will allow us to deliver more sustainable solutions and position ARAI as a leader in automotive innovation.”

Known for its comprehensive automotive testing and certification capabilities, ARAI will integrate Altair’s advanced simulation and data analytics tools into its consulting services. This will enable the exploration of new use cases in electrification, connectivity, and energy management.

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Budget FY25 Decoded

The Union Budget 2024-25, presented on July 23, has laid out an ambitious framework to invigorate India's manufacturing sector. This year's budget emphasises on revitalising the industry through strategic investments in infrastructure, skill development, and support for small and medium enterprises, say **Pramod Achuthan, Neeraj Menon, Prasad Kulkarni, Shweta Patni**, of Ernst and Young LLP.



Over the past years, India has been actively fostering the expansion of the manufacturing industry as a crucial catalyst for the economy, positioning it at par with its global peers.

The Micro, Small and Medium Enterprise (MSME) sector has emerged as a very important sector of the Indian economy, contributing significantly to employment generation, innovation, exports, and inclusive growth of the economy. The MSMED Act, 2006, was enacted to provide an environment for promotion and development of the sector by way of defining MSMEs, putting in place a framework for developing and enhancing competitiveness of the MSME enterprises, ensuring flow of credit to the sector and paving the way for preference in Government

procurement to products and services of the MSMEs, address the

The package primarily consists of following three schemes:

Scheme A – First Timers (Available to first time employees)	Scheme B Job Creation in Manufacturing	Scheme C Support to Employers (Available to employers)
➤ One-Month wage to new entrants in all formal sectors in 3 installments upto ₹15,000 for employees with a salary of up to ₹ 100,000 per month.	➤ Linked to substantial hiring of first-time employees in manufacturing sector; ➤ Incentive to both employees & employer for EPFO contributions in specific scales for the first 4 Years	➤ Government will reimburse EPFO contributions of employers up to ₹ 3000 per month for 2 years for all new hires (need not be first time employees) drawing a salary up to ₹ 100,000 per month

issue of delayed payments, etc.

In this backdrop, the Hon'ble Finance Minister revealed the Union Budget 2024-25 ('Budget') on 23 July bringing in a roadmap to Viksit Bharat with policies aimed at strengthening the manufacturing sector and specifically focusing on Micro, Small and Enterprises ('MSME'), employment generation and skilling, infrastructure and research and development.

The following announcements were made to boost the manufacturing sector:

Key amendments:

A. policy:

➤ Employment and skilling:

In line with the requirement laid out in the Economic Survey regarding the need to create 7.85 million jobs annually in the non-farming sector, the Finance Minister announced the Prime Minister's Package for Employment and Skilling with a significant outlay of ₹2 trillion.

Apart from the above, the package also consists of a comprehensive scheme for providing internship opportunities in 500 top companies to 10 million youth in five years and plans to upgrade 1,000 Industrial Training Institutes (ITIs). These schemes coupled with existing income-tax benefit under section 80JJAA, provides additional weighted tax deduction (spread across 3 years) of 90 per cent of salary paid to newly hired employees is likely to incentivise and boost the manufacturing sector.

➤ Support for MSME in the manufacturing sector:

A package was formulated covering financing, regulatory changes and technology support to help them grow and compete globally. The policy includes:

➤ Credit Guarantee Scheme for facilitating term loans for purchase of machinery and equipment without collateral or

- third-party guarantee
- New credit assessment model for MSME credit with divergence from traditional model focused on asset or turnover criteria and linking it to the digital footprint scoring mechanism
- Limit for Mudra loans enhanced to ₹2 million from ₹1 million
- Enhanced threshold, from existing ₹5 billion to ₹2.5 billion, for mandatory onboarding in Trade Receivables Discounting System (TReDS). This will expand the outreach of the system and will be crucial for facilitating MSMEs to unlock their working capital by converting their trade receivables into cash.
- Development of 'plug and play' industrial parks in 100 cities along with sanctioning 12 new industrial parks under the National Industrial Corridor Development Programme
- Rental housing with a dormitory type accommodation for industrial workers will be facilitated in the Public-Private Partnership mode with support and commitment from Anchor Industries.
- Additionally, SIDBI i.e. Small Industries Development Bank of India will open new branches to reach and provide credit to all MSME clusters in 3 years. 24 Branches are expected to be opened during the year to extend this facility.

B. Proposed income-tax amendments:

➤ Scope of obtaining lower deduction/collection certificates:

Taxes to be deducted / collected at source at 0.1 per cent on sale / purchase of goods exceeding ₹5 million will be covered under the ambit of provision related to lower deduction / collection certificates. It will reduce the blockage of working capital, especially in case of loss-

making companies and thereby help in allocation of resources.

➤ Focus on reducing litigation and providing certainty:

The Finance Minister mentioned in her Budget speech about a plan to focus in the next 6 months on comprehensive review of the Income-tax Act to make it concise, lucid, easy to read and understand. This will reduce disputes and litigation, thereby providing tax certainty to the tax-payers. It will also bring down the demand embroiled in litigation.

Apart from the above, following are other key litigation related amendments proposed:

- Reduction of time limit for initiating reassessment proceedings from 10 years to 5 years where income escaping assessment is ₹5 million or more.
- Vivad Se Vishwas Scheme 2024: It is a one-time opportunity to settle pending disputes which may help facilitate ease of doing business and reduce industry's tax litigation burden.
- Increase in the monetary limit for filing of appeals by the Department before the Income-Tax Appellate Tribunal, High Court and Supreme Court likely to reduce litigation on small matters
- No prosecution under section 276B of the Act if TDS has been paid to the credit of the Central Government at any time on or before the time prescribed for filing TDS statement.

Rationalisation of capital gains tax provisions

Capital gains tax provisions are proposed to be rationalised as under with effect from 23 July 2024:

- Period of holding for determination of LTCG vs. STCG simplified - 12 months (for listed securities) and 24 months (for others). Period of holding for sale or undertaking in a

slump sale still remains at 36 months and appears to be a miss-out.

- Tax rate for LTCG proposed at 12.5 per cent on all categories of assets (currently, LTCG taxable at 20 per cent for residents and 10 per cent for non-residents as well as residents selling securities with payment of STT)
- Indexation will not be applicable on cost of acquisition henceforth
- Tax rate for STCG on sale of certain securities (with payment of STT) proposed to be increased from 15 per cent to 20 per cent



The Budget has prioritised the manufacturing sector along with jobs and skilling development.

➤ Others:

- Some of the TDS rates have been reduced, e.g. TDS on commission payment under section 194H is reduced from 5 per cent to 2 per cent
- Corporate tax rate for foreign companies reduced from 40 per cent to 35 per cent (plus applicable surcharge and cess) with effect from 1st April 2024
- Withdrawal of 2 per cent Equalisation Levy ('EL') on e-commerce supply of services provided or facilitated by non-residents on or after 1 August 2024
- Capital gains tax exemption for corporate gifts removed. Exemption for gifts now proposed to be made applicable only to individuals and HUFs.
- Buy back of shares also to be taxed as dividend income, thus plugging the tax planning used by some of the companies due to tax

arbitrage between buy back tax and dividend tax, especially for high net worth promoters.

C. Proposed GST amendments:

➤ **Unified approach for tax discrepancies (Section 74A):**

Starting FY 24-25, a new process for handling non-payment or short payment of taxes, erroneous refunds, or incorrect input tax credit claims would be established. Notices under this section must be issued within 3.5 years, and orders passed within a year (with a 6-month extension possible). Taxpayers would now have 60 days to settle dues, and taxes paid are eligible for input tax credit, subject to conditions. Penalties would now be levied in a staggered manner.

➤ **GST litigation changes:**

The pre-deposit cap for appeals would be reduced to ₹200 million for both CGST and SGST before the Appellate Authority, and to 10 per cent of the disputed amount (capped at ₹200 million for both CGST and SGST) before the Appellate Tribunal. The appeal filing deadline would now be three months from the order date or a government-specified date. Further section 128A offers a waiver of interest and penalty on certain demand notices for FY 2017-18 to 2019-20.

➤ **Extension of Input Tax Credit (ITC) claim period:**

The timeline to claim ITC for invoices/debit notes from July 2017 to March 2021 would be extended to November 30, 2021. Further for reinstated registrations (i.e. post revocation of registration cancellation), the deadline would be later of the return filed up to 30th November of the subsequent financial year or within 30 days from the revocation order.

➤ **Time of supply for reverse charge services:**

The time of supply for services

under reverse charge where the recipient is required to raise invoice, would be earlier than the payment date or the date of invoice issued by the recipient, not exceeding the timeline to be prescribed.

➤ **Other amendments:**

Proposals include setting a deadline for anti-profiteering applications, restricting refunds on zero-rated goods subject to export duty, excluding certain alcohols from GST, allowing the GST Council to regularise non-levy or short levy of GST, and defining co-insurance premium apportionment as neither a supply of goods nor services.

D. Proposed customs law amendments:

➤ **Rationalisation of taxes:**

Changes in the Basic Customs Duty (BCD) rate structure are proposed to support domestic manufacturing and export competitiveness. Effective July 24, 2024, BCD rates are increased for certain plastics, consumer goods, and chemicals, while reduced for products in agriculture, aquafarming, marine, minerals, textiles, leather, cancer drugs, precious metals, medical equipment, and renewable energy.

➤ **Validity of exemptions:**

The customs duty rate structure would be reviewed, with exemptions phasing out gradually, maintaining some exemptions with sunset dates. Goods imported for job work related to export orders are exempt until March 31, 2026. The time limit for duty-free re-import of goods under warranty is increased to five years, extendable by two years.

➤ **Other key amendments:**

➤ Proposals include accepting various proofs of origin under trade agreements and empowering the government to specify operations not

permitted in a warehouse.

➤ The much-awaited Product Linked Incentives for Toys and Footwear and Leather manufacturers with an expected allocation of ₹34.89 billion and ₹26 billion respectively have not been approved by the cabinet during the budget. This incentive would boost the sales for the two sectors leading them to Aatmanirbhar Bharat, but they now await further announcements.

Additionally, special provisions were announced for the development of Andhra Pradesh and Bihar.

These amendments are designed to provide clarity, reduce litigation, and support economic growth by aligning with global trade practices and promoting domestic industries. One of the misses in the Budget is the extension of the 15 per cent Concessional Tax Rate regime for new manufacturing entities and it seems the Government does not plan to re-introduce the same.

The Budget has prioritised the manufacturing sector with infrastructure, employment and skilling development. It has fostered a climate for investment, innovation, and industry scaling which will give an impetus to the manufacturing sector and aligns with the broader goals of enhancing productivity and competitiveness in the global market.

The Government has taken steps on manufacturing, skilling, employment, which provide upliftment and pave the way for growth in the years to come.

SME

(Views expressed above are personal)

About the authors:

The Article is written by Pramod Achuthan and Neeraj Menon, Partner at Ernst and Young LLP. It is co-authored by Prasad Kulkarni, Director and Shweta Patni, Senior Manager at Ernst and Young LLP.



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The Budget Buzz

With emphasis on infrastructure, skill development, MSMEs, and manufacturing, the FY25 budget aims to drive India's manufacturing-led expansion and exports. However, there are some missed opportunities as well. **SME** deciphers the short and long term impact of the budget with industry experts.

Despite global economy remaining under the grip of policy uncertainties, India's economic growth continues to shine driving by domestic consumption and better-expected exports market in the last quarter of FY24 and first quarter of FY25. Against this backdrop, Union Finance Minister Nirmala Sitharaman presented the budget FY25 on July 23, 2024 with funding focus on nine priorities including productivity and resilience in agriculture, employment & skilling, human resource development and social justice, manufacturing & services, urban development, energy security, infrastructure, innovation, research & development, and next generation reforms. "This budget paves way for a significant growth towards a 'Viksit' Bharat. With ₹1 trillion fund being allocated for research and innovation, it will help in providing a substantial sustainable growth opportunity for our country by 2047. The policy highlighting on the use of appropriate energy transition will help in balancing the

imperatives of employment leading to a more organised growth and environmental sustainability," said **Meenu Singhal**, Regional Managing Director, Socomec Innovative Power Solutions, Greater India.

He added, "The budget's emphasis on providing skilling programmes will empower the youth in obtaining quality employment opportunities. We appreciate government's move to reduce the corporate tax for foreign companies from 40 per cent to 35 per cent. This endeavour will improve the overall business environment, making it conducive to foreign direct investments into the country which will create more employment opportunities for the youth and stimulate economic growth."

Staying invested in infrastructure

As always infrastructure has been a strong area for subsequent budgets which have been announced over the years. This time as well, a provision of ₹11 trillion, which is 3.4 per cent of the GDP, has been positive for infrastructure development which has a multiplier effect on the economy. "Critically, the phase 4 of PMGSY, a program which focuses only on rural roads connecting over 25,000 rural habitations, has also been announced. This will create employment and reduce the farm to market distance sprucing up rural economy," said **Deepak Shetty**, CEO and Managing Director, JCB India Ltd.

Infrastructure has been a trust of the Narendra Modi-led Government in the last 10 years which has benefited companies in the sector.



This is reflected in the surging order book of the companies. The total order book of 25 top companies – across infrastructure, power and capital goods – rose by 18.3 per cent to ₹12.22 trillion in FY24 compared with ₹10.33 trillion in FY 2022-23. The total order book position of top 25 firms had increased by 9.7 per cent in FY23 from ₹9.42 trillion in FY22. **Sunil Mathur**, Managing Director and Chief Executive Officer, Siemens Ltd, commented, "We welcome the Government's consistent approach towards fiscal consolidation, supporting capex in infrastructure by reconfirming the allocation of ₹11.11 trillion in the budget as also additional allocations towards improving urban and rural infrastructure. We also welcome the Government's focus on employment generation, skilling, woman empowerment, MSMEs and climate change mitigation as well as their encouragement to the states to carry out land and labour reforms and improve ease of doing business further. We believe this budget paves the way for the next generation of reforms which we are confident will

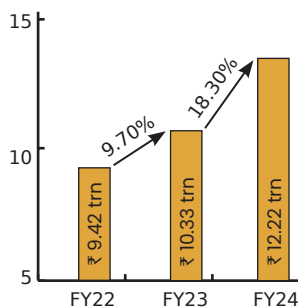


We welcome the Government's consistent approach towards fiscal consolidation, supporting capex in infrastructure by reconfirming the allocation of Rs 11.11 trillion in the budget as also additional allocations towards improving urban and rural infrastructure.



Sunil Mathur, MD and CEO, Siemens Ltd

Order book of 25 top companies



Source: The Financial Express

lead India to its deserved place of being Viksit Bharat.”

The Finance Minister’s announcement of ₹2.66 trillion for rural development, including rural infrastructure, in the Union Budget 2024-25 is considered to be a significant investment. **Baba Kalyani**, Chairman & MD, Bharat Forge Ltd, said, “The focus on natural farming and agricultural productivity, incentivising job creation and employment, continued impetus to bolster MSMEs, modernising urban cities and policies aimed at accelerating India’s energy transition will have a long-standing affect that would significantly improve economic resilience in an otherwise volatile world economy. I would also particularly commend the fresh-thinking and approach of the government in skilling and urban development - both of which demanded urgent attention. Infrastructure creation, which is a



Reduction in customs duty to nil on critical minerals such as lithium, copper, cobalt, nickel etc will encourage cell manufacturing in the country and add to the evolving EV ecosystem in the country.

Shradha Suri Marwah, President ACMA & CMD Subros

direct contributor to India’s competitiveness and positioning as a favoured investment destination, has been the hallmark of Prime Minister Modi’s governments; continued attention towards roads, ports, plug & play industrial parks, irrigation projects and affordable housing is noteworthy.”

Initiatives announced in Budget FY24 collectively signal a robust blueprint for India’s progressive, integrated and inclusive development. **Baba Kalyani** added, “I greatly appreciate the operationalisation of Anusandhan NRF and the exclusive venture-fund for space segment. More importantly, the ₹1-trillion financing pool to bolster private sector driven research and innovation at commercial scale will have a great impact in transitioning India towards a product’s nation in the long-term. While the budget allocation for defence industry is in expected lines, creation of the Critical Minerals Mission and articulation of India’s strategy on small modular nuclear reactors will go a long way in bolstering the AatmaNirbhar Bharat agenda.”

According to **Amit Sharma**,



The electronics and infrastructure sectors got a big boost in the union budget. MeitY saw a 52% increase in its allocation of ₹219.37 billion in FY25, compared to the revised estimate of 2023-24 at ₹144.21 billion.

Ashish Dhakan, MD & CEO, Prama Hikvision India Pvt Ltd

Managing Director & CEO, Tata Consulting Engineers, the Indian government’s transformative and futuristic initiatives are set to accelerate the growth of the nation’s infrastructure landscape while enabling technological advancement and ensuring a viable and sustainable energy transition. He explained, “The 2024 Union Budget’s focus on green growth with a ₹350 billion investment, the adoption of nuclear, clean energy with Bharat Small Reactor (BSR) and Bharat Small Modular Reactor (BSMR), and private participation in the nuclear energy arena, incentivising the adoption of higher

Budget highlights

- Rs 11.11 trillion (3.4 % of GDP) to be provided for capital expenditure
- PM’s package of 5 schemes and initiatives with an outlay of ₹2 trillion to facilitate employment, skilling and other opportunities for 41 million youth in 5 years
- 1,000 industrial training institutes will be upgraded
- The limit of Mudra loans will be enhanced to ₹2 million from the current ₹1 million
- Emphasis on expanding the space economy by 5 times in the next 10 years with a venture capital fund of ₹10 billion
- 12 investment-ready “plug and play” industrial parks to be created under National Industrial Corridor Development Programme
- Angel tax abolished for all class of investors to boost start-ups and investments
- Corporate tax on foreign companies reduced from 40% to 35% to invite investments
- Custom duty on x-ray panels, mobile phones & PCBA reduced to 15%
- Precious metals including gold and silver to become cheaper, custom duty reduced to 6%

efficiency Advanced Ultra Super Critical (AUSC) thermal plants, and focus on Pumped Storage Projects (PSP) for renewable energy integration, alongside a national critical metals and minerals policy, and the promotion of domestic solar cell and module manufacturing, create a comprehensive roadmap for the energy transition in hard-to-abate sectors.”

Skilling in focus

Welcoming the employment and manufacturing generation initiatives outlined in the budget, **Mahesh Viswanathan**, Deputy CEO and CFO, Finolex Cables Ltd, said, “The introduction of a credit guarantee scheme for term loans on machinery and equipment purchases, without collateral or third-party guarantees, is a progressive step that will empower MSMEs to innovate and expand, driving growth and job creation across the nation. Additionally, the exemption of customs duties on 25 critical minerals is a strategic move towards strengthening the economy and ensuring vital resources are available for the manufacturing sector. As the budget prioritises expanding the manufacturing footprint, we anticipate a corresponding increase in consumer uptake.”

The budget 2024-25 shows the government’s comprehensive approach to prioritise skilling, infrastructure development, and digital transformation. **Niranjan Nayak**, MD, Delta Electronics India, said, “The focus on creating a skilled workforce through internship programs aligns perfectly with our own commitment to nurturing talent and driving innovation. We also applaud the budget’s emphasis on increasing women’s participation in the workforce. Delta strongly believes in the power of diversity, and these measures will contribute significantly to India’s socio-economic progress. Overall, the

budget serves as a catalyst for accelerating our growth trajectory and supporting India’s digital transformation journey.”

The budget very critically focusses on employment and skilling, through a variety of initiatives. “Employment and skilling opportunities will be created through financial assistance where over 2 million youth will be skilled over a five-year period. Additionally, to modernise the Industrial Training Institutes, 1000 such institutes will be upgraded in a hub and spoke arrangement. This will certainly create the necessary skills for youth for gainful employment in industries. With a focus on manufacturing, particularly MSMEs, the Hon’ble Minister has extended credit support and has also announced 12 new industrial parks which will create a manufacturing conducive ecosystem,” said Deepak Shetty.

The budget marks a significant stride for the manufacturing sector, especially for MSMEs. **Bharat Gite**, MD & CEO, Taural India Pvt Ltd, stated, “The focus on facilitating term loans for machinery purchases and financing technology support for MSMEs is commendable, as it will enhance productivity and competitiveness, enabling smaller enterprises to scale up their operations and contribute more



 **We anticipated announcements on the FAME-III policy and special incentives for the EV sector, which weren't part of this budget. Maintaining policy consistency will be essential to the overall expansion of the electric vehicle market.**

Rashi Agarwal, Co-founder and CBO, Zypp Electric



 **While the budget allocation for defence industry is in expected lines, creation of the Critical Minerals**

Mission and articulation of India’s strategy on small modular nuclear reactors will go a long way in bolstering the AatmaNirbhar Bharat agenda.

Baba Kalyani, Chairman & MD, Bharat Forge Ltd

effectively to the economy. Employment and skill building are crucial, and the incentives for job creation in manufacturing, linked to EPFO contributions for employers hiring 3 million youth, are strategic. The provision of rental housing for industrial workers through PPP mode addresses a vital need for affordable living arrangements. The emphasis on increasing women’s workforce participation is particularly noteworthy. Establishing hostels and women-specific skilling programs will help bridge the gender gap and provide women with the necessary resources and opportunities to thrive in the industrial sector.”

Driving auto industry growth

The Automotive Component Manufacturers Association of India (ACMA) has welcomed the budget’s focus on inclusive growth, development of infrastructure, ease of doing business, enhanced outlay for capital expenditure, impetus on growth & development of manufacturing & MSMEs and thrust on skilling & research. **Shradha Suri Marwah**, President ACMA & CMD Subros, said, “ACMA is also delighted by the measures announced towards employment, skilling, internships and research. Reduction in customs

duty to nil on critical minerals such as lithium, copper, cobalt, nickel etc will encourage cell manufacturing in the country and add to the evolving EV ecosystem in the country. That apart, measures to facilitate higher participation of women in workforce are indeed welcome for fostering inclusive growth and encouraging gender diversity in the automotive value chain.”



“**With this budget, the government aims to address key issues, provide targeted support, and sets a robust agenda for growth and development. Focus on private investment in infrastructure, mining and housing sector is also likely to boost the sale of CVs.**

Dheeraj Hinduja, Executive Chairman, Ashok Leyland

According to **Dheeraj Hinduja**, Executive Chairman, Ashok Leyland, the Finance Minister has presented a growth-oriented and pro-development budget for 2024-25 by focusing on national infrastructure development, urban development, sustainable planning, and inclusive growth through a tech-enabled economy. “With this budget, the government aims to address key issues, provide targeted support, and sets a robust agenda for growth and development. The continued emphasis on fostering investment and enhancing road infrastructure, especially in Andhra Pradesh and Bihar will facilitate growth in the manufacturing and automobile sectors. Focus on private investment in infrastructure, mining and housing sector is also likely to boost the sale of CVs. Furthermore, reduction in duties on rare earth minerals will help in promoting sustainable mobility and

this resonates with our commitment to fostering a cleaner and more sustainable future,” he added.

Yatin Gupte, CMD, Wardwizard Innovations & Mobility Ltd, believes that the commitment to maintaining strong fiscal support for infrastructure projects over the next five years is a significant boost for the automotive sector. “The announcement to fully exempt customs duty on critical materials, such as rare earth metals including lithium, can further incentivize electric mobility. We are looking forward to receiving the benefit of this exemption along with the sectors mentioned by the Hon’ble Finance Minister,” he stated.

However, the EV sector was expecting more from the budget. “Abolishing the angel tax is a commendable decision to foster innovation and support the start-up ecosystem. However, we anticipated announcements on the FAME-III policy and special incentives for the EV sector, which weren’t part of this budget. Maintaining policy consistency will be essential to the overall expansion of the electric vehicle market. We expect that the government will provide clarification and lower or eliminate taxes on last-mile delivery services before the present program expires this month,” said **Rashi Agarwal**, Co-founder and CBO, Zypp Electric.

Electrifying electronics manufacturing

Budget 2024-25 has made significant allocations for electronics manufacturing to speed up the economic growth. **Ashish Dhakan**, MD & CEO, Prama Hikvision India Pvt Ltd, said, “The budget estimate of 2024-25 for the Ministry of Electronics and Information Technology (MeitY), saw a 52 per cent increase in its allocation of ₹219.37 billion, compared to the revised estimate of 2023-24, at ₹144.21 billion. The electronics and infrastructure sectors

got a big boost in the union budget; these initiatives will help the electronics security industry to grow faster.”

The significant allocation for infrastructure development and technology upgrades shows the government’s commitment to enhancing domestic manufacturing capabilities.

Dhakan stated, “Increased funding for the PLI (Production-Linked Incentive) scheme would attract more investments and boost production capacity, enabling us to be more competitive on a global scale. The government’s focus on the MSME sector and manufacturing is commendable. The scheme strengthens the manufacturing ecosystem, fostering innovation and competitiveness.”

Welcoming several announcements that reflect the government’s continued support for the renewable energy (RE) sector, **Srivatsan Iyer**, Global CEO, Hero Future Energies, stated, “The impetus on PM Surya Ghar Muft Bijli Yojana will help fast track nationwide adoption of roof top solar, helping expand our overall RE capacity. The proposed investment in pumped storage programmes is a

much-needed step that will ensure smoother integration of growing RE, leading to more reliable supply of green power and grid stability.

The focus on transitioning hard to abate industries to greener alternatives will catalyse the commercial and industrial (C&I) sector’s journey towards net zero. Introduction of a taxonomy for climate finance will help attract much needed capital for boosting climate resilience.

Finally, the expanded duty exemptions will also help propel the RE sector ahead. This is a positive budget for the sector that should help continue the momentum of India’s energy transition.”



The Indian government's transformative and futuristic initiatives are set to accelerate the growth of the

nation's infrastructure landscape while enabling technological advancement and ensuring a viable and sustainable energy transition.

Amit Sharma, MD & CEO, Tata Consulting Engineers

And some missed opportunities...

There are experts who are disappointed with Budget. N Jegatheesan, president, Tamil Nadu Chamber of Commerce and Industry, "While the budget announced a reduction in income tax rates, the benefits remain negligible for most taxpayers. A minor reduction in customs duty was noted, but, the anticipated broader tax reforms did not materialise. Despite a few positive measures, the Budget is largely seen as a missed opportunity for significant economic reform and creative solutions to current challenges."

Some industry experts point out lack of significant new measures to support the green hydrogen sector in the budget. This represents a missed opportunity despite the green hydrogen's growing importance in global energy strategies. Vineet Bhatia, Executive Director, Grant Thornton Bharat, stated, "India's fiscal support under National Green Hydrogen Mission (NGHM) for green hydrogen and its derivatives are creating an initial ecosystem for establishing the market, however, there is a necessity to provide

additional support. Support such as including tax holiday or concessional corporate tax, additional fiscal support for production of green molecules, and electrolyser manufacturing which would increase India's competitiveness in the global platform and counter the green subsidies offered by global counterparts."

Also, experts feel that the paid internship scheme (announced for the top 500 companies) should have included MSMEs, as they are the leading employment generators who often struggle to hire qualified people. This inclusion could have helped in job creation and economic development. Additionally, despite previous mentions of amending the act to scale up apprenticeships, this budget did not emphasise such a transformative opportunity. Some experts suggest allowing flexibility in the 12-month internship duration depending on the course and the requirements of the companies.

Table: Capex plans of leading companies in FY24

Company	Capex Underway (₹billion)
Larsen & Toubro*	48
Hindustan Aeronautics	30
Siemens*	10
Bharat Electronics	7
CG Power*	6.62
Apar Industries	4
KEC International	3.5
Ashoka Buildcon	1.1
Kalpataru Projects International	5
Total	115.22

*Capex spread beyond FY25

Source: Business Standard

Investing in capacity expansion

Burgeoning investments in new projects in infrastructure and other sectors is generating demand for engineering and manufacturing firms. To fulfill the rising orders, companies' capacity utilisation is increasing. As per the recent internal surveys of CII, the capacity utilisation levels of many sectors are upwards of 75 per cent (in some sectors such as cement, steel, and automobiles it is 80-90 per cent), which is leading to fresh investments. Some large capital goods and engineering companies are investing to create additional capacities. For example, as reported by Business Standard, nine engineering and capital goods companies, including Siemens, Larsen & Tourbo (L&T) and KEC International, have a combined capex of about ₹115 billion or more for FY24.

Calendar year 2024 has started on a good note for Indian manufacturing. According to the Reserve Bank of India, capacity utilisation in manufacturing increased to 76.5 per cent in Q4 of 2023-24 from 74.7 per cent in the preceding quarter, reaching well above the long-term average of 73.8 per cent. This high utilisation necessitates capacity building with fresh investments. The private sector's capex share in the country's GDP, which rose to 23.8 per cent in FY23, is expected to increase further. Moreover, the contribution of high-end manufacturing exports to GDP improved during FY24 with India's electronics exports increasing 23.6 per cent to \$ 29.12 billion.

With emphasis on infrastructure, skill development, MSMEs, and manufacturing, the FY25 Budget is aimed at helping India to drive its manufacturing-led-expansion of GDP and exports.

SME



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The Auto **EV**olution

Though the electric vehicle (EV) penetration in India is only 6.8 per cent (in FY24), the growth opportunity in the EV sector is only going to go up in the future driven by shifting consumer preferences, strong governmental support and technological progress, says **Rakesh Rao**.

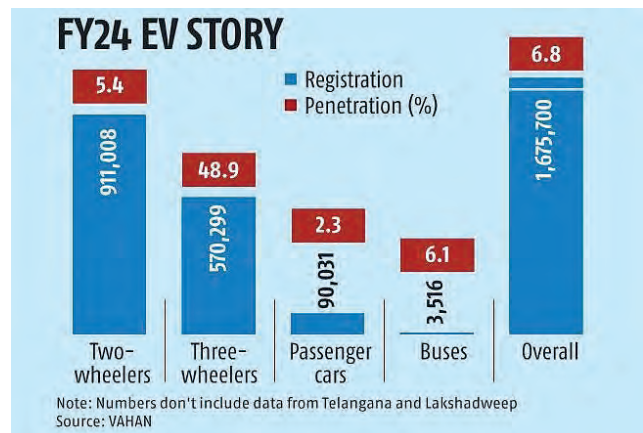


Rising concern about the environment and policy initiatives of the government have been driving the sales of electric vehicle (EV) in India in the last few years. The Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme, launched in 2015, has been a major driver. Notwithstanding the subsidy cuts and regulatory shifts, EV sales in 2023-24 grew robustly over 41 per cent, surpassing 1.6 million, which is significantly higher than FY23's 1.1 million. Overall EV penetration in India rose to 6.8 per cent in FY24 against 5.3 per cent in FY23.

Prajyot Sathe, Associate Director, Mobility – Electric Vehicles, Frost & Sullivan India, elaborates, “The EV industry in India has been growing over the last five years in all segments, led by electric two wheelers (e-2Ws), followed by e-buses, electric commercial vehicles (e-CVs) and electric four-wheelers (e-4Ws). Areas which have seen significant technological advances include batteries, electric motors, power electronics, and

charging technology which are applicable to all vehicle segments.”

The Indian government has set an ambitious target for electric vehicles to comprise 30 per cent of private car sales, 70 per cent of commercial vehicle sales, and 80 per cent of two- and three-wheeler sales by 2030. Thanks to government policy to subsidise EV sales to encourage consumer acceptance, India's electric vehicles industry has made significant progress. **Veer Singh**, CEO Lord's Automotive Pvt Ltd, explains, “Initiatives like FAME scheme have provided incentives for the development of EV infrastructure. The implementation of smart grids and renewable energy sources for charging stations is further promoting sustainable and eco-friendly practices within the industry.”



Courtesy: Business Standard

“The industry has been trying to establish localised supply chains with up to 20-30% component localisation having been achieved mainly for e-4Ws. Local battery production will only reach around 50% by 2030.”



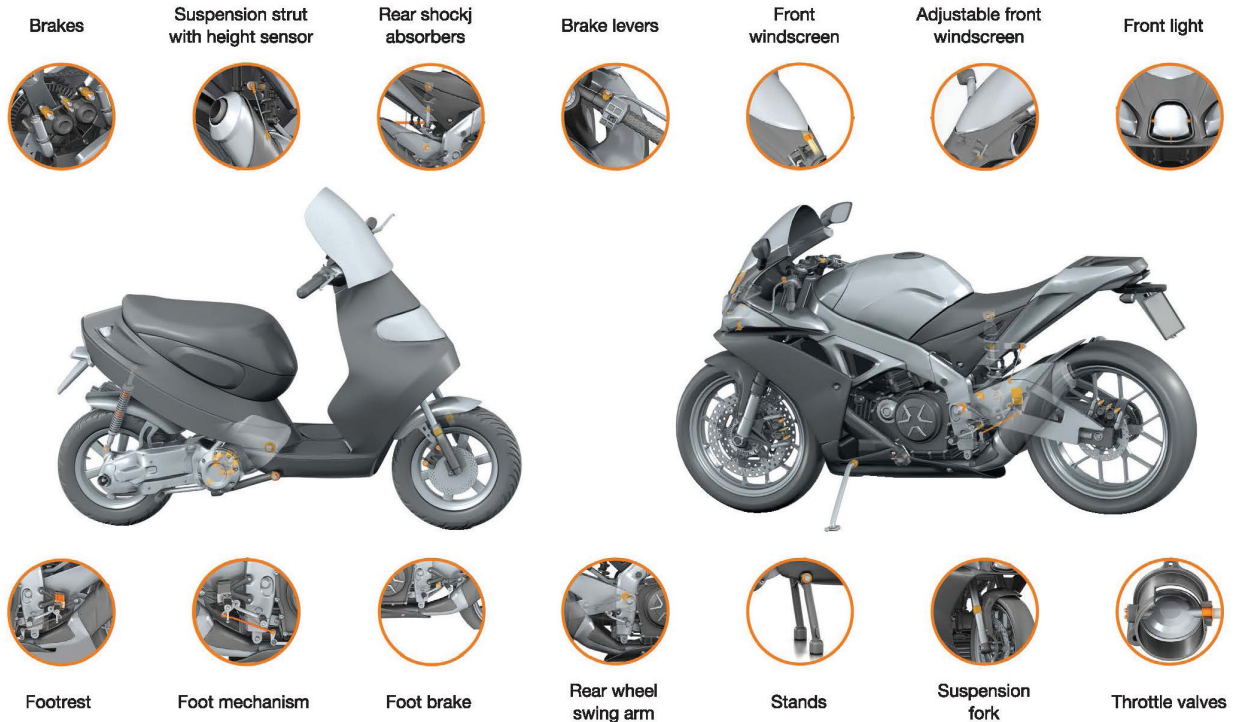
Prajyot Sathe,
Associate Director, Frost & Sullivan India

The evolving market

The electric vehicle industry in India has witnessed a significant transformation over the past few years. Singh explains, “The materials used in EVs have undergone substantial changes. Lightweight materials such as aluminium, carbon fiber, and advanced composites are now commonly used to reduce the overall weight of vehicles, thereby improving their energy efficiency. Moreover, innovations in electric motors, such as the development of permanent magnet synchronous motors (PMSMs) and induction motors, have contributed to improved performance and efficiency.”

Battery technology, a critical component of EVs, has also seen a remarkable progress. He elaborates, “The

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shift from traditional lead-acid batteries to lithium-ion batteries has been pivotal. Lithium-ion batteries offer higher energy density, longer life cycles, and faster charging times. Additionally, advancements in solid-state battery technology and research into alternative



“There has been a boom of suppliers for multiple components like chassis, batteries, electronics, etc. Customers are now expecting high quality at affordable prices.”

Namit Jain,
Founder and CEO, Zen Mobility

materials like graphene are poised to further revolutionise the industry by providing even higher performance and safety.”

Commenting on the technological evolution in the light electric vehicle (LEV) industry, **Namit Jain**, Founder and CEO, Zen Mobility, says, “In the early years, EVs were primarily built in countries like China and imported here in CKD (Completely Knocked Down) kit versions. There was no R&D being done locally in India. This is still the case with the majority of EV companies today. However, now there are a few emerging companies that are investing in R&D and building new innovative products purpose-built for the Indian conditions and market. There has been a boom of suppliers for multiple components like chassis, batteries, electronics, etc. Customers are now expecting high quality at affordable prices. Charging infrastructure has also seen a drastic change in the last few years, with many companies developing charging and swapping infrastructure.”

As more customers transition to EVs, customer preferences are driving the technology evolution. “For example, we are seeing customers demand higher speed vehicles which match the speed of their ICE (internal combustion engine) counterparts. Previously, customers were satisfied with 25 kmph EVs or max 50 kmph EVs – 4 years ago about 90 per cent market share vehicles were sub-50 kmph top speed and now they are less than 10 per cent market share. Related to this, we are now seeing many more motor companies coming up in India, and many of them working on innovative new technologies on the motor,” states **Anirudh Ravi Narayanan**, CEO, BNC Motors Pvt Ltd.

Hurdles on the EV road

Despite the green advantage of electric vehicles, consumers are still skeptical about buying electrical vehicles because of various reasons. “One of the key

challenges is building EVs that are robust and long-lasting. This requires extensive testing and validation of the vehicles before they are launched in the market. Second is after-sales service, which is crucial for the upkeep of the vehicles currently on the road. Finally, the supply chain for a few selected electronics is still a challenge since these are still imported from China and need to be localised,” explains Jain.

India’s reliance on imported lithium-ion batteries and components raises costs and exposes the sector to global risks. “The global supply chain for EV components, including batteries and rare earth metals, faces challenges related to geopolitical tensions, supply disruptions, and raw material availability. Building resilient supply chains and reducing dependence on limited resources are strategic imperatives for the industry. While the cost of EVs has been decreasing with technological advancements and scale economies, upfront purchase costs remain higher than conventional vehicles. Affordability barriers need to be addressed through incentives, subsidies, and advancements in manufacturing efficiencies,” stresses Singh.



“We are seeing customers demand higher speed vehicles which match the speed of their ICE counterparts. Related to this, we are now seeing many more motor companies coming up in India.”

Anirudh Narayanan,
CEO, BNC Motors Pvt Ltd

The government is eyeing 30 per cent EV sales by 2030 and to achieve this level of EV penetration, approximately 5.6–5.8 million public charging units will be needed. “In terms of charging infrastructure, relatively slow charging infrastructure development is a hurdle to market development. Acquiring land banks to optimally position charging stations in cities has constituted a major bottleneck that the government has failed to address to date,” opines Sathe.

According to Singh, “As the demand for EVs increases, so does the volume of batteries that reach the end of their life cycle. Effective recycling and disposal of lithium-ion batteries pose environmental challenges and require scalable solutions to minimise environmental impact and maximise resource recovery.”

Building robust domestic supply chain

The fast-growing EV sector presents big opportunity for auto component makers as well. The new EV policy

New laser distance diffuse sensor with TOF technology - ODT3CL1-2M



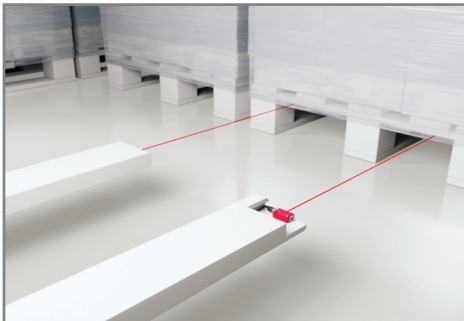
Compact diffuse sensor for detection and measurement tasks with high operating ranges



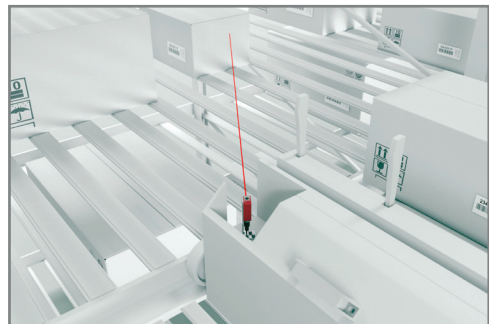
The ODT3CL1-2M solves detection tasks and supplies the machine control with distance information. The sensor also detects colored structured objects at a distance of up to two meters.



Thanks to the extremely small and space-saving housing (11.4 mm x 34.2 mm x 18.3 mm), the ODT3CL1-2M can be used in many different applications.



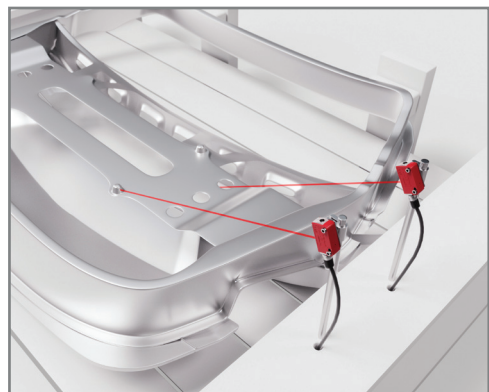
On automated guided vehicles, the ODT3CL1-2M optical sensors monitor that pallets are correctly received and transferred, for example.



The diffuse sensors are ideal for compartment occupation checking with shuttles. They detect whether a space to be occupied is free.

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framework, announced by the Indian government in March 2024, mandates that companies entering the EV manufacturing sector must establish facilities within three years and achieve a localisation threshold of 50 per cent within five years.



“Effective recycling and disposal of lithium-ion batteries pose environmental challenges and require scalable solutions to minimise environmental impact and maximise resource recovery.”

Veer Singh,
CEO, Lord's Automotive Pvt Ltd

Sathe comments, “The industry has been trying to establish localised supply chains with up to 20-30 per cent component localisation having been achieved mainly for e-4Ws. Localised component production is likely to increase to nearly 50-60 per cent by the end of 2030. Localisation trends will be the highest for components such as power and control wiring harness, along with connectors, AC charging inlets, DC-DC convertors, miniature circuit breakers (MCBs), circuit breakers, electric safety devices (power electronics), electric compressors, traction motors and controllers. Local battery production will only reach around 50 per cent by 2030.”

Customer requirements are also encouraging companies to go for localisation. Narayanan elaborates, “We are seeing more demand from customers for quality, which is filtering out companies which are predominantly importing from China and white labelling. This is forcing companies to build up their R&D and localise their supply chains.”

He adds, “Due to FAME subsidy, all OEMs localised a good portion of their supply chains and over the past four years, we have seen a flourishing EV components eco-system develop in India. We have also seen foreign capital coming on to establish or expand domestic EV component manufacturing – with Musashi (of Japan) itself being a great example.” BNC Motors is collaborating with Musashi to introduce the Japanese firm's technology (related to batteries and drivetrain) in its new EVs.

Musashi is investing Rs 1.60 billion to establish new assembly lines and upgrade existing facilities in India, and aims to achieve a localisation level covering two-thirds of the total cost by the end of the financial year. **Naoya Nishimura**, CEO, Musashi India & Africa Region, elaborates, “The EV industry in India is evolving rapidly, with advancements in manufacturing processes,

materials, and technologies. Musashi is at the forefront of this transformation, providing products such as the 2W E-axle side unit and battery management system (BMS) software, which enhance overall efficiency and performance. Therefore, we address key challenges in the industry, such as optimising battery performance and improving component efficiency, through our high-quality gear systems that minimise friction losses and extend driving ranges. Our strategic plans include increasing localisation levels to over 75 per cent by next year and exploring export opportunities in Southeast Asia and Africa.”

Green and bright future

According to Sathe, over 120,000 passenger EVs are likely to be sold in 2024, which will drive EV penetration to 3-4 per cent. “OEMs such as Tata Motors, SAIC, and Mahindra & Mahindra will continue to lead the market. BYD and Stellantis, in addition to other foreign OEMs, have been trying to gain a foothold in the Indian market and it will be interesting to see how the competitive landscape evolves in the next 4-5 years. Demand in the domestic market will be good to absorb both e-2Ws with an anticipated penetration rate of 50 per cent in the scooter segment by 2030, e-3Ws with an expected 60 per cent and e-4W with 12-15 per cent penetration rate by



“The EV industry in India is evolving rapidly, with advancements in manufacturing processes, materials, and technologies. Our strategic plans include increasing localisation levels to over 75% by next year.”

Naoya Nishimura,
CEO, Musashi India & Africa Region

2030. Besides this, OEMs will target traditional export markets in Africa and Latin America,” he adds.

Government initiatives have always helped the EV industry; they act as a catalyst for the growth and adoption of EVs in the country. Jain believes that the time is apt for the launch of FAME III, which will be very important as there are now many organised players in the industry. Through FAME, the government can really push the switch from ICE to electric by providing subsidies to lower prices further and aid adoption.

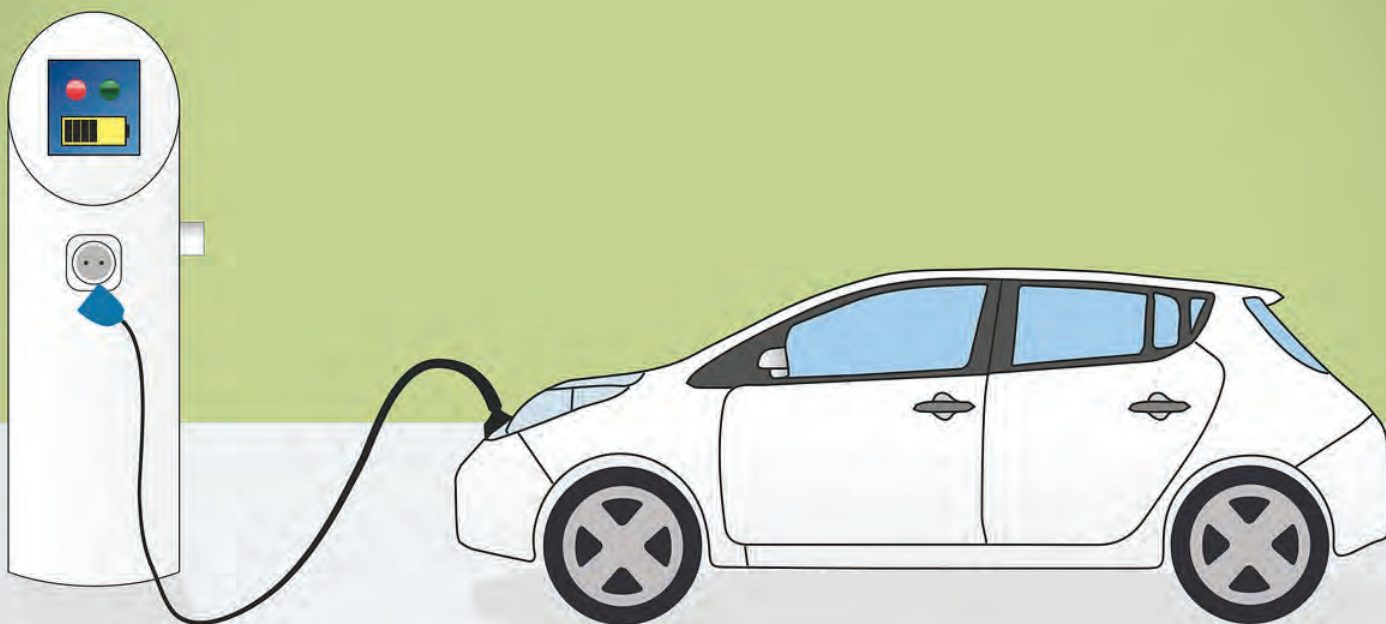
Though there are challenges at present, the future of EVs in India is promising. Driven by shifting consumer preferences, strong governmental support and technological progress, the growth opportunity in the EV sector is only going to go up in the future.



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Skilling Up for EV Manufacturing

India, renowned for its automobile market and manufacturing, is rapidly embracing EVs. There is a need on reskilling the workforce to shift from ICE to EV skills, highlighting the critical need for continuous learning and adaptation in this evolving landscape, says **Neeti Sharma**, CEO, TeamLease Digital



India, the world's third-largest automobile market and a leading manufacturer of three-wheelers, passenger vehicles, and tractors, is experiencing a significant transformation. The country's move towards electric vehicles (EVs) is accelerating rapidly, with projections estimating 2.5 million EVs on the roads by 2025. This swift transition is dramatically affecting traditional automotive roles, which have seen a staggering decline of nearly 70 per cent. The demand for internal combustion engine (ICE) and powertrain designers has plummeted by 50 per cent to 62 per cent over the past two years.

For decades, internal combustion engines powered billions of vehicles with minimal disruption, even as advancements in performance and fuel efficiency were made. However, the advent of electric cars is now shaking up the automotive industry's core. Batteries and

drive units are replacing IC engines and their associated components, signaling a major shift in product portfolios and creating a need for new talent. This shift has led to emerging job opportunities and a transition away from the ICE sector.

An analysis reveals that out of over 30 EV-related job categories, only a third require skills similar to those in the ICE sector. This highlights the urgent need for continuous upskilling and reskilling of the current workforce. Around 22 per cent of new jobs in the EV ecosystem will demand entirely new skill sets, while the rest can be filled through adequate reskilling and upskilling.

Skilled talent

The demand for talent in the Indian EV sector is

robust. There is a strong focus on both fresh graduates and experienced professionals who are willing to adapt and learn new skills relevant to the evolving automotive landscape. The sector is projected to create 10 million

direct jobs and 50 million indirect jobs by 2030, underscoring the urgent need for a skilled workforce to support the industry's expansion.

To meet the current need for skilled talent, the industry is hiring experienced staff from EV-adjacent sectors like ICE and power. Additionally, there is a high demand for fresh talent in R&D, design, production, and techno-managerial roles. Between FY23 and FY24, most EV companies hired 30 per cent of their new workforce from fresh graduates for roles in design, development, testing and analysis.

Further exploring the talent landscape, it's evident that primary hiring is concentrated in key urban centers like Delhi, Bangalore, and Hyderabad. These cities have become major hubs for employment opportunities due to their well-established infrastructure and technological ecosystems. Specifically, Delhi, Bangalore, and

Hyderabad accounted for a significant portion of new hires. Delhi led with 53 per cent of employers increasing their workforce sizes in the city, followed closely by Bangalore at 50.46 per cent and Hyderabad at 47 per cent.

Skill trends

As the electric vehicle (EV) industry undergoes rapid growth, the demand for specialised skills has surged, reflecting the sector's transformation and its pivotal role in the future of transportation. The industry's evolution requires expertise across various domains to drive innovation and ensure successful integration of new technologies. Given the rising demand for talent, there is ofcourse a skills shortage that the sector is

experiencing. Addressing this broader talent deficit is crucial for sustaining the sector's growth. To bridge this gap, look at the top 5 competency areas the sector needs:

- **Battery technology:** Expertise in battery management systems (BMS), electrochemistry, and battery pack design is crucial. The sector is facing a talent shortage in professionals who understand advanced battery technologies and can design and integrate complex battery systems.
- **Electrical and electronics engineering:** Skills in power electronics, electric motor design, and embedded systems are essential. There is a notable shortage of engineers proficient in designing and optimising power electronics and integrating sophisticated embedded systems into EVs.
- **Software development:** Proficiency in embedded software, autonomous driving technologies, and vehicle-to-everything (V2X)

communication is needed. The industry seeks more developers with experience in real-time operating systems, autonomous vehicle algorithms, and V2X communication.

- **Mechanical engineering:** Expertise in lightweight materials, thermal management, and computer-aided design (CAD) is vital. There is a shortage of engineers skilled in designing with advanced materials and managing thermal challenges specific to EVs.
- **Systems engineering:** Skills in integrating EV components, diagnostics, and quality assurance are important. The sector requires more professionals who can effectively integrate diverse EV systems and ensure high standards of product reliability and quality.

Emerging demographics

The evolving automotive sector is also witnessing a shift in its workforce demographics. Historically, women made up less than 15 per cent of the industry's workforce, primarily in finance, marketing, and HR roles. However, the rise of new technologies is paving the way for women to enter roles that were once predominantly male-dominated. From FY 2022 to FY 2024, EV sales in India surged by over 250 per cent, leading to increased job opportunities for women in design, manufacturing, and leadership roles, as well as on the shop floor.

Women are now represented across various levels, from shop floors to middle management, and even in executive positions. Currently, women constitute about 11-15 per cent of the 11 million-strong EV workforce in India, with expectations to reach 50 per cent by 2030-33.

Conclusion

India's automotive market is experiencing a dramatic shift towards electric vehicles, driving significant changes in job demands and creating new opportunities for those ready to adapt and upskill. This rapid growth underscores the need for a skilled workforce to support the sector's transformation and highlights key urban centers as pivotal hubs for EV employment.

SME



About the authors:

As the CEO of TeamLease Digital, Neeti Sharma leverages over three decades of rich and varied experience to guide the company with a blend of humility and purpose-driven focus. She is a distinguished leader known for her transformative contributions to the learning and staffing industry. Her tenure at TeamLease has been marked by numerous achievements and leadership across pivotal roles, cementing her reputation as a pioneering female leader and entrepreneur. Recognised as one of the 'Top 200 women founders of EdTech companies' by HolonIQ, Neeti's journey continues to inspire many individuals and organisations.



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“Customers expect high quality at affordable prices.”

In an exclusive conversation with SME, **Namit Jain**, Founder and CEO, Zen Mobility delves into the recent achievements and future plans of the company. Jain shares insights into how an expansion will impact the company, the evolution of the Light Electric Vehicle (LEV) industry in India, and the challenges faced by EV makers. He also discusses the influence of government initiatives on the industry and outlines Zen Mobility's plans in the EV space.

In May 2024, Zen Mobility opened a manufacturing hub for micro-pods in Manesar (Gurgaon). What is the significance of this event for Zen Mobility's business?

This is a significant milestone for Zen Mobility as an organisation since it enables the company to start manufacturing at a large scale.

With a capacity of over 30,000 units, we are now in a position to supply vehicles across the country. In the last three months, we have expanded our presence to over 11 cities with close to 1,000 vehicles deployed.

How has the Light Electric Vehicle (LEV) industry evolved technologically over the last few years in India?

In the early years, EVs were primarily built in countries like China and imported here in CKD kit versions. There was no R&D being done locally in India. This is still the case with the majority of EV companies today. However, now there are a few emerging companies that are investing in R&D and building new innovative products purpose-built for Indian conditions and the Indian market.

There has been a boom of suppliers for multiple components like chassis, batteries, electronics, etc. Customers are now expecting high quality at affordable prices. Charging infrastructure has also seen a drastic change in the last few years, with many companies developing charging and swapping infrastructure.

What are key concerns or challenges before the EV makers at present?

One of the key challenges is building EVs that are robust and long-lasting. This requires extensive testing



and validation of the vehicles before they are launched in the market. Second is after-sales service, which is crucial for the upkeep of the vehicles currently on the road.

Finally, the supply chain for a few selected electronics is still a challenge since these are still imported from China and need to be localised.

What has been the effect of various Government initiatives (like FAME, PLI scheme, new EV policy announced in Mar 2024,

etc) on the EV industry?

Government initiatives have always helped the EV industry; they act as a catalyst for the growth and adoption of EVs in the country. Now it is time for FAME III to be launched, and this will be very important as there are now many organised players in the industry. Through FAME, the government can really push the switch from ICE to electric by providing subsidies to lower prices further and aid adoption.

What are your plans to tap new opportunities in the EV space?

Zen Mobility is a complete solution provider of EVs. Having launched the first product, the Zen Micro Pod, we are confident in our solutions and services that we provide to customers.

This move will greatly enable us to build further variants for multiple use cases and applications. As of now, our focus has been heavily on customisation and providing reliable products that best suited the needs of our society and environment. Through extensive product innovation and upcoming technologies, Zen Mobility is vying to bring a variety of innovative solutions into the booming market.

SME



“Manufacturing Costs Are a Challenge for EV OEMs.”

The electric vehicle (EV) industry in India has undergone significant technological advancements over the past few years, driven by the rise of electric two-wheelers (e2Ws), eBuses, electric commercial vehicles (eCVs), and electric four-wheelers (e4Ws). An increased consumer awareness and a focus on localisation have propelled the industry's growth, says **Prajyot Sathe**, Associate Director, Mobility – Electric Vehicles, Frost & Sullivan India.

How has the EV industry in India grown over the last few years? Which scapes have seen the largest boost?

The EV industry in India has been growing over the last five years in all segments, led by electric two wheelers (e2Ws), followed by eBuses, electric commercial vehicles (eCVs) and electric four-wheelers (e4Ws).

Areas which have seen significant technological advances include batteries, electric motors, power electronics, and charging technology which are applicable to all vehicle segments. In terms of battery development, e2Ws and e3Ws use nickel-metal hydride (NiMh) batteries which have transformed completely over the years.

Accordingly, all e2Ws and e3Ws currently use lithium-ion batteries with a capacity range of between 2-3kWh. In terms of e4Ws and eBuses, most OEMs initially adopted Li-ion battery technology but have since shifted to lithium iron phosphate (LFP) batteries due to their superior cost and efficiency profile.

Another major factor which has helped the market gain momentum is rising consumer awareness about EV technology in terms of use cases and enhanced total cost of ownership. Range limitations, high acquisition costs, and inadequate charging infrastructure has meant that, at present, most EV buyers tend to use EVs only as their second car.

In terms of localisation of EV parts, where does the industry stand today?

The industry has been trying to establish localised supply chains with up to 20-30 per cent component localisation having been achieved mainly for e4Ws. Localised component production is likely to increase to



nearly 50-60 per cent by the end of 2030.

The trends will be the highest for components such as power and control wiring harness, along with connectors, AC charging inlets, DC-DC convertors, miniature circuit breakers (MCBs), circuit breakers, electric safety devices (power electronics), electric compressors, traction motors and controllers. Local battery production will only reach around 50 per cent by 2030.

What are some of the key challenges in the EV industry at present?

Manufacturing costs are a critical factor for EV OEMs, and matching the cost competitiveness of China will pose a huge challenge for Indian manufacturers. This will continue to be a challenge for the next 10-15 years at least.

In terms of charging infrastructure, relatively slow charging infrastructure development is a hurdle to market development. Acquiring land banks to optimally position charging stations in cities has constituted a major bottleneck that the government has failed to address to date.

Ambiguity vis a vis central and state policies and incentives for EVs presents another challenge for industry stakeholders.

EV efficiency also suffers from the inability of the supporting component ecosystem to keep pace. For instance, 100 per cent localisation will be difficult, if not impossible, to achieve in India as the country is dependent on imports of key rare earth materials used in battery manufacturing.

Capacity limitations both in terms of domestic battery manufacturing as well as semiconductor and power electronics manufacturing will further impact the

Indian EV industry. This will be aggravated by the slow pace of development of advanced EV technologies like SiC, 800V, wireless battery management, and vehicle to grid technology, among others.

How has the effect of government initiatives been on the industry and what more can be done?

On September 15, 2021, the government approved the Production Linked Incentive (PLI) Scheme for the automotive sector with a budgetary outlay of ₹259.38 billion to support domestic vehicle manufacturing. EVs are covered under this PLI scheme. The scheme has two components viz. the Champion OEM incentive scheme and the Component Champion incentive scheme. A total of 95 applicants have been approved under the PLI scheme.

The Ministry of Heavy Industries (MHI) had earlier approved 20 applicants, along with their 12 subsidiaries, for the Champion OEM incentive scheme, subsequently approving 75 applicants, along with their 56 subsidiaries under the Component Champion incentive scheme. Two auto OEM companies were approved for both parts of the scheme. The forthcoming Faster Adoption and

Manufacturing of Hybrid and Electric Vehicles (FAME) Scheme III is set to be mainly an extension of the ongoing FAME II and will focus on component localisation as well as charging infrastructure development.

What is your outlook for the booming EV industry in India? What trends do we need to watch out for in the coming years?

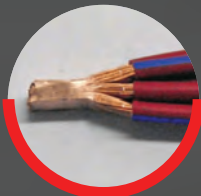
Over 120,000 passenger EVs are likely to be sold in 2024, which will drive EV penetration to 3-4 per cent. OEMs such as Tata Motors, SAIC, and Mahindra & Mahindra will continue to lead the market. BYD and Stellantis, in addition to other foreign OEMs, have been trying to gain a foothold in the Indian market and it will be interesting to see how the competitive landscape evolves in the next 4-5 years.

Demand in the domestic market will be good to absorb both E2Ws with an anticipated penetration rate of 50 per cent in the scooter segment by 2030, E3Ws with an expected 60 per cent and E4W with 12-15 per cent penetration rate by 2030. Besides this, most of the major OEMs will target traditional export markets in Africa and Latin America.

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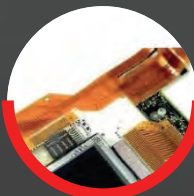


Advanced Products and Solutions for EV Manufacturing



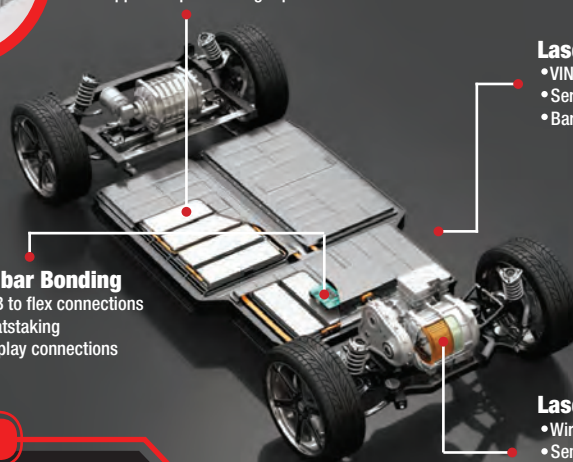
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- Battery pack welding
- Terminal welding
- wire compacting
- Copper hairpin welding repair



Hot bar Bonding

- PCB to flex connections
- Heatstaking
- Display connections



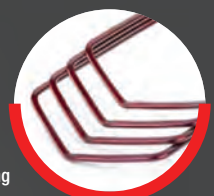
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“By FY26, we are Targeting ₹ 10 Billion+ Revenue.”

The electric vehicle (EV) industry in India is experiencing a period of dynamic transformation, driven by technological advancements, evolving customer preferences, and supportive government policies. In this interview, **Anirudh Ravi Narayanan**, CEO, BNC Motors Pvt Ltd explores the technological evolution of EVs in India, the unique approaches taken by companies like BNC Motors, and the broader opportunities shaping the future of electric mobility in India.

How has the EV industry evolved technologically over the last few years in India? (Technology with respect to EV manufacturing, components/materials used in EV, customer experiences, battery/charging infrastructure, etc)

As more and more customers transition to EVs, we are seeing that the technology evolution is being shaped by customer preferences. For example, we are seeing more demand from customers for quality, which is filtering out companies which are predominantly importing from China and white labelling. This is forcing companies to build up their R&D and localise their supply chains.

Another example is where we are seeing customers demand higher speed vehicles which match the speed of their ICE counterparts. Previously, customers were satisfied with 25 kmph EVs or max 50 kmph EVs – 4 years ago 90+ per cent market share vehicles were sub-50 kmph top speed and now they are less than 10 per cent market share. Related to this, we are now seeing many more motor companies coming up in India, and many of them working on innovative new technologies on the motor.

We are seeing that most customers look for app features in their vehicles, and most of the vehicles being sold today have built in telematics and connected capabilities. We are also seeing cost reductions going on by all manufacturers to make vehicles more affordable to customers. For example, manufacturers who had large touch screens on their scooters are reducing or eliminating touch screens to reduce costs.

How is your company tapping the opportunities in electric vehicles (EV) space?



BNC Motors is the only company in the industry who has a vehicle in the 100-150 cc equivalent motorcycle category.

We are planning to launch additional vehicles in underserved – but nonetheless significant – categories. For example, we have a 125cc equivalent scooter launching soon: the Peretto. We have another 150cc equivalent motorcycle coming later this year: the Boss. So far, EV manufacturers have tended to focus predominantly on compact scooters, we are the first company to branch out to across categories in this way.

How has BNC’s collaboration with Musashi Seimitsu Industry benefited the company?

Musashi has very strong technology on batteries and drivetrain, and BNC is collaborating with them to introduce this technology in our new products. Our Peretto scooter, for example, incorporates a drivetrain unit supplied by Musashi. We are also collaborating with Musashi on drivetrain for future product developments. Our future battery products will also soon feature Musashi technology.

What are key concerns/challenges before the EV industry at present? What are the biggest challenges in optimising EV efficiency?

While the government has done a tremendous job in boosting the EV industry, increasing localisation, and forcing quality improvements, one of the biggest challenges in the industry has been policy uncertainty. For example, the assumption was that after FAME II ends on March 31, 2024, subsidy will end in India, but then EMPS was announced just a few weeks before

FAME II ended. EMPS is supposed to cover subsidies through July 31, 2024 – we are now in the middle of July and under the assumption that there will be no new subsidy after this.

These kinds of last minute announcements make it very difficult for manufacturers to make business plans. It really doesn't matter at this point whether the EV industry has subsidies or not, but it does matter that we know one way or another so that we can plan our investments, supply chains, and other aspects of our business. Subsidy changes affect gross margins or pricing by >10 per cent, so they are very important.

The other challenge is that some manufacturers are potentially indulging in anti competitive pricing for gaining market share. This can negatively impact the industry as a whole in the long run and should be reviewed.

Any new innovative products/solutions you have launched for EVs in 2023 & 2024 (so far)?

In 2023, we launched the Challenger S110 and S125 which are 110cc and 125cc equivalent motorcycles respectively. We also launched our battery platform: Etrol, which includes a swappable battery, automated cabinet, and related software.

This year, in 2024 we are gearing up production for the Perfetto scooter and Boss motorcycle. We also have a lot of innovations / patent filings at a component level – we are continuously developing new technologies for components that go in our vehicles.

What has been the effect of various Government initiatives on the EV supply chain industry?

On localisation, due to FAME subsidy, all OEMS localised a good portion of their supply chains and over the past 4 years, we have seen a flourishing EV components eco-

system develop in India. We have also seen foreign capital coming on to establish or expand domestic EV component manufacturing – with Musashi itself being a great example. On quality, new regulations such as AIS-156 Amendment 3 were much needed for the industry and has led to significant improvement on battery safety, as well as localisation of battery manufacturing for all players.

What more can be done to propel growth?

On the policy side, three primary feedbacks: First, as mentioned earlier, to provide longer term policy clarity. For example, Mercedes recently mentioned that they would invest in the EV market in India if GST stayed at 5 per cent for the next 10-years.

This type of policy clarity will be beneficial for all players. Automotive investment returns are over many years, and policy plays a big role in the returns, so having long-term clarity is necessary for long-term investments.

Second, to either eliminate subsidies altogether or make them more inclusive. The PLI policy, for example, is closed to a certain set of manufacturers and the criteria for investments and audits are so high that most who have qualified are not able to benefit from it.

Third, it really is time to roll out a policy for battery swapping. Battery swapping is far superior to charging – it cuts down time of refueling to a few minutes from a few hours, and eliminates one of the major inconveniences of owning an EV. Clarity on this will be a big boost for the EV industry.

What are your growth plans for the EV business?

By FY26, we are targeting ₹ 10 billion+ revenue while maintaining strong customer satisfaction and dealer satisfaction. We are in the process of expanding our distribution network in order to support this.

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“Improving battery tech remains a challenge.”

The electric vehicle (EV) industry in India is undergoing a remarkable transformation, driven by rapid technological advancements and a supportive policy environment. As the country shuffles towards a more sustainable and eco-friendly transportation system, progress is being made in manufacturing technologies, component innovations, and infrastructure development. This evolution is shaping customer experiences and addressing key challenges in the sector, says **Dr Veer Singh, CEO, Lord's Automative Pvt LTD** in this interview.

How do you see the evolution of the EV industry in India?

The electric vehicle (EV) industry in India has experienced significant technological advancements in recent years, transforming various aspects of the industry. In terms of manufacturing, companies have adopted advanced techniques such as automation, robotics, and 3D printing, enhancing precision, efficiency, and scalability. Additionally, artificial intelligence (AI) and machine learning (ML) have been integrated into manufacturing processes, optimising supply chain management, quality control, and predictive maintenance, which has led to reduced production costs and improved product reliability.

The materials used in EVs have also evolved, with a shift towards lightweight materials like aluminum, carbon fiber, and advanced composites to improve energy efficiency. Innovations in electric motors, including the development of permanent magnet synchronous motors (PMSMs) and induction motors, have further enhanced performance and efficiency. Battery technology has seen remarkable progress, moving from traditional lead-acid batteries to lithium-ion batteries, which offer higher energy density, longer life cycles, and faster charging times.

Advances in solid-state battery technology and research into alternative materials like graphene promise even greater performance and safety improvements.

How is Lord's tapping the opportunities in the EV space?

Our company is strategically positioned to capitalise on the opportunities within the electric vehicle (EV) industry, offering a comprehensive lineup of 16 variants



across both 2-wheeler and 3-wheeler segments. In the 2-wheeler category, our products include the stylish and efficient Lord's Zoom e-scooter, the enhanced Zoom Plus, the robust Lords Bijli e-loader for small-scale commercial use, the high-speed Lords Stylon e-scooter, and the high-speed Lords Prime e-loader for heavy-duty commercial applications.

In the 3-wheeler category, we offer the reliable and economical Lord's King e-rickshaw, the versatile Lord's Samrat e-loader, the innovative Lord's Sawari butterfly e-rickshaw for passenger transport, the ergonomic Lord's Gati butterfly e-loader for goods transportation, and the inclusive Lord's Grace e-rickshaw designed for passengers with disabilities. Additionally, our lineup includes the specialised Lord's Swachh Yaan garbage vehicle, the high-speed Lords Vayu auto rickshaw, and the high-speed Lords Velocity loader for commercial use.

What are the key concerns and challenges facing the EV industry at present?

The electric vehicle (EV) industry faces several key concerns and challenges that need to be addressed for its sustainable development and widespread adoption. One primary challenge is the establishment of a robust and widespread charging infrastructure, including both fast-charging stations for public use and home charging solutions. Effective recycling and disposal of lithium-ion batteries also pose environmental challenges, requiring scalable solutions to minimise impact and maximise resource recovery.

Improving battery technology remains a critical

challenge, with a need for advancements in energy density, charging speed, longevity, and cost reduction to increase range and efficiency. While the cost of EVs has been decreasing, upfront purchase costs remain higher than conventional vehicles, necessitating further affordability measures through incentives, subsidies, and manufacturing efficiencies.

What are the biggest challenges in optimising EV efficiency?

Optimising EV efficiency involves several challenges, primarily related to battery technology and management. Maximising energy density in batteries allows for longer driving ranges and reduced weight, enhancing overall vehicle efficiency. Improving charging infrastructure and technology to support faster charging times without compromising battery life or safety is crucial.

Vehicle design and materials play a significant role, with the use of lightweight materials like aluminum and carbon fiber improving efficiency by reducing energy consumption and extending battery range. Enhancing vehicle aerodynamics through design optimisation also reduces drag and improves energy efficiency.

Efficient thermal management systems are essential for optimal battery performance and longevity in diverse climate conditions.

Optimising regenerative braking systems allows for the recovery of kinetic energy during deceleration, improving overall energy efficiency and extending driving range. Software and connectivity solutions, such as vehicle-to-grid (V2G) integration and AI-driven predictive analytics, can further enhance efficiency by optimising powertrain performance and battery usage based on driving conditions and user behavior.

What has been the effect of various government initiatives on the sector?

The Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme, for instance, has provided incentives for EV adoption and infrastructure development.

The new EV policy announced in March 2024 aims to accelerate EV adoption through enhanced subsidies, tax incentives, and concessional financing options, reducing the total cost of ownership and making EVs more attractive to consumers.

This policy also emphasises the expansion of charging infrastructure, including fast-charging stations, battery swapping facilities, and renewable energy integration, addressing range anxiety and promoting widespread adoption.

Clear and supportive regulatory frameworks under the new EV policy provide certainty to stakeholders, facilitating long-term planning and investments.

However, to further propel growth, additional measures are needed. Enhanced subsidies and tax benefits can reduce initial costs and promote investment.

Rapid deployment of charging stations, particularly in rural and semi-urban areas, and establishing standards for charging connectors and protocols can ensure seamless charging experiences nationwide. Increased funding for research and development in battery technology and fostering collaborations between industry, academia, and research institutions can drive innovation.

What more can be done in the EV industry to propel growth?

Continued financial incentives, infrastructure expansion, and increased investment in research and development are critical for propelling growth in the EV industry.

Enhanced subsidies and tax benefits can further reduce the upfront cost of EVs, making them more accessible to a broader audience. This financial support can also encourage investment in manufacturing facilities and technological advancements.

The rapid expansion of charging infrastructure is essential, particularly in underserved rural and semi-urban areas.

This includes establishing a tight network of fast-charging stations and developing standards for charging connectors to ensure compatibility across different vehicle models.

Implementing battery swapping stations could also address range anxiety and reduce downtime for commercial and fleet operators.

Exploring alternative materials and technologies, such as solid-state batteries, can enhance performance and safety. Collaborative efforts between industry, academia, and research institutions can drive innovation and accelerate technological advancements.

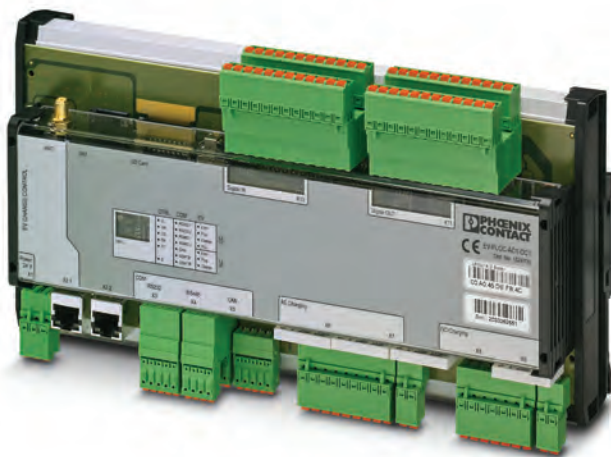
Moreover, enhancing public awareness and education about the benefits of EVs can drive consumer adoption. Several government-led campaigns and partnerships with industry stakeholders can promote the environmental and economic advantages of electric transportation. Streamlining regulatory processes and providing clear guidelines for EV standards and infrastructural development will support the industry growth and ensure a consistent and productive policy environment.

Ultimately, a well-coordinated approach involving strong government support, industry investment, and consumer engagement will be the key to accelerating the growth and adoption of electric vehicles, driving the transition to a more sustainable and efficient transportation ecosystem.



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Sector coupling is becoming increasingly important for the future of e-mobility and for the transition to the All Electric Society based on CO₂-neutral energy. Communication between providers, grids, buildings, charging points, and vehicles is the key factor for sustainable e-mobility based on renewable energy. This includes the integration of electric vehicles into the smart grid or smart home, efficient and user-friendly business processes, and device and patch

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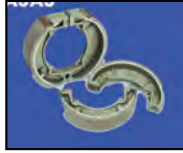
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Lithium-Ion Battery Charging the Future Green

The rapid growth of lithium-ion battery manufacturing in India is driven by the increasing demand for clean energy solutions, particularly in the electric vehicle (EV) sector. The Indian government is aiming to achieve high adoption rates of EVs by 2030, making lithium-ion battery production a focal point of national energy policy. The article delves into various aspects of lithium-ion battery manufacturing in India, exploring market dynamics, technological advancements, challenges, and future prospects.



The surge in demand for lithium-ion batteries in India is primarily due to their widespread usage across various industrial sectors, including telecommunications, healthcare, and uninterruptible power supply (UPS) systems. However, the most significant driver is the increasing adoption of electric vehicles. The Indian government aims to achieve 30 per cent electric vehicle penetration by 2030, focusing on electrifying two-wheelers, three-wheelers, and commercial vehicles. This push is part of a broader strategy to reduce dependence on fossil fuels and cut greenhouse gas emissions.

The lithium-ion battery market in India is projected to reach `1.77 trillion by 2028, expanding at a compound annual growth rate (CAGR) of approximately 20.09 per cent during the 2023-2028 period. This growth is supported by various government initiatives, including the National Mission on Transformative Mobility, which aims to promote the domestic production of lithium-ion batteries.

Government policies and subsidies are instrumental in driving the adoption of EVs and supporting the growth of the lithium-ion battery industry. For instance, the Faster Adoption and Manufacturing of Hybrid and

Electric Vehicles (FAME) scheme offers incentives for the purchase of electric vehicles and supports the development of charging infrastructure. Additionally, the Production-Linked Incentive (PLI) scheme aims to boost domestic manufacturing by offering financial incentives to companies engaged in the production of advanced chemistry cell (ACC) batteries.

Advancements

Technological advancements in lithium-ion batteries, such as faster charging times and extended runtimes, are expected to decrease operating expenses for consumers. The sustainability of electric bikes is also driving the market with response to increasing demand for green mobility.

Despite India's reliance on imports for over 70 per cent of its lithium-ion cell needs, domestic and multinational efforts are actively addressing the growing demand. For instance, the construction of a gigafactory in Hyderabad and participation in government incentives are crucial steps towards self-sufficiency.

Prominent market players such as Exide Industries, Amara Raja Batteries, and Ola Electric are taking considerable strides in establishing local Li-ion manufacturing capabilities. Exide Industries, through its subsidiary Exide Energy Solutions, is nearing the completion of a green-field 12-gigawatt lithium-ion cell manufacturing plant in Bengaluru. Similarly, Amara Raja has signed a licensing agreement with GIB EnergyX Slovakia for lithium-ion cell technology, enabling the company to manufacture world-class LFP cells.

In addition to this, several startups and new entrants are entering the market, bringing innovative solutions and driving competition. Companies like Log9 Materials, a Bengaluru-based startup, are developing advanced battery technologies tailored to Indian conditions, such as rapid charging and enhanced thermal management. These innovations are expected to play an important role

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in the widespread adoption of electric vehicles and energy storage solutions.

Limitations

India's lack of domestic lithium production and the control over it poses a hurdle. The country must develop lithium-ion battery technology and establish local manufacturing capabilities to meet the projected demand of 70 GWh by 2030. This will require substantial investments exceeding \$10 billion in cell manufacturing capacity and raw material refining by 2030.

The lack of charging infrastructures across rural and semi-urban areas indirectly pose a challenge to the battery market, as customers get discouraged from adopting the vehicles (mainly two-wheelers and rickshaws), due to insufficient ports even if the batteries possess better lifelines. According to data, only 50 out of the sanctioned 2,877 charging stations have been installed as of July 01, 2022.

The dependence on imported raw materials, particularly lithium, cobalt, and nickel, makes the supply chain vulnerable to geopolitical tensions and price volatility. To mitigate these risks, India must explore alternative sources of raw materials and invest in the development of domestic mining and refining capabilities. The recent discoveries of lithium reserves in J&K and Rajasthan offer promise for local lithium production, in reducing reliance on imports and strengthening the Indian supply chain.

Environmental concerns

While lithium-ion batteries are more environmental

friendly compared to traditional lead-acid batteries, their production and disposal still pose enormous environmental challenges. The extraction and processing of lithium and other materials can lead to considerable environmental degradation if not managed properly. Additionally, the safe disposal and recycling of lithium-ion batteries are imperative to preventing environmental contamination.

Safety concerns also persist, particularly regarding the risk of battery fires and explosions. Ensuring the highest safety standards in battery manufacturing and handling is paramount to preventing accidents and building consumer trust in EV technology. Manufacturers must invest in robust quality control measures and advanced safety technologies, such as thermal management systems and overcharge protection, to mitigate these risks.

Recycling is another aspect of the lithium-ion battery lifecycle. Developing efficient and environmental friendly recycling processes is essential to minimise the environmental impact of battery disposal and recover valuable materials for reuse. Companies like Attero Recycling are revolutionising lithium-ion battery recycling in India, using advanced technologies to extract metals like lithium, cobalt, and nickel from used batteries and reintroduce them into the supply chain.

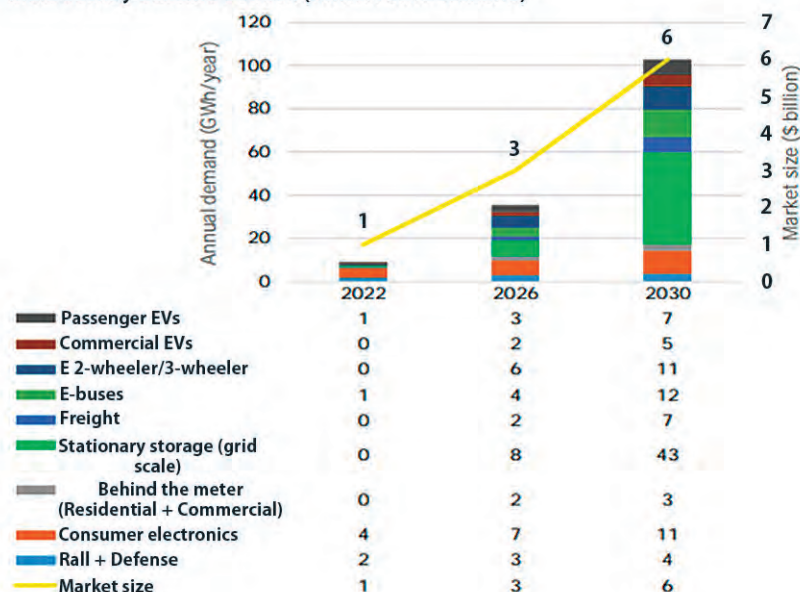
Financial issues

High capital investment required for setting up lithium-ion battery manufacturing facilities is a barrier for many companies. Access to affordable financing and government incentives is key in overcoming this

challenge. While the PLI scheme and other government initiatives provide financial support, navigating the complex regulatory landscape can be daunting for businesses.

Regulatory clarity and streamlined approval processes are essential to facilitate the growth of the lithium-ion battery industry. The government must work closely with industry stakeholders to develop clear guidelines and policies that promote innovation while ensuring environmental and safety standards are met. Public-private partnerships and collaborative efforts between government agencies, research institutions, and private companies can help address these challenges and accelerate the development of the lithium-ion battery ecosystem in India.

India battery demand outlook (conservative scenario)



Source: IBEF.org

Recycling and partnerships

India has the potential to lead global urban mining efforts, with the ability to recycle lithium-ion batteries in zero-effluent facilities, recovering over 90 per cent of valuable metals. By 2030, recycling is expected to contribute 80 GWh of capacity, meeting a big portion of the world's lithium needs. The National Mission on Transformative Mobility and NITI Aayog's plan to invest '400 billion in mega factories by 2030 are expected to reduce dependency on imports and enhance domestic production of lithium-ion batteries.

India is also exploring partnerships with other lithium-producing countries to secure a stable supply of raw materials. Strategic alliances with countries like Australia, Argentina, and Chile, which have abundant lithium reserves, can help India diversify its supply sources and reduce dependency on any single region. These partnerships can also facilitate technology transfer and knowledge sharing, enabling India to adopt best practices in lithium mining and refining.

Innovations and collaborations

The focus on technological innovations is crucial for the growth of the lithium-ion battery industry in India. Companies are investing in advanced battery chemistries such as Lithium Nickel Manganese Cobalt Oxide (NMC), Lithium Iron Phosphate (LFP), and Lithium Manganese Iron Phosphate (LMFP) to enhance battery performance, safety, and cost-effectiveness.

Emerging technologies such as solid-state batteries and silicon anode batteries hold the promise of improving energy density, charging speed, and overall performance of lithium-ion batteries. Research and development efforts in these areas are gaining momentum, with several Indian institutions and companies collaborating on cutting-edge projects. For instance, the Indian Space Research Organisation (ISRO) has developed a high-energy lithium-ion cell technology, which can be transferred to domestic manufacturers for commercial production.

Strategic collaborations and partnerships are also playing a vital role. For instance, Ola Electric's investment in a gigafactory for lithium-ion battery cell production aims to establish a 1.5 GWh cell manufacturing capacity in its initial phase, with plans to expand to 5 GWh. The company is developing advanced 4680 form factor battery cells, which are more energy-dense and efficient than the currently used 2170 form factor.

International collaborations with leading battery manufacturers and technology providers can accelerate the adoption of advanced technologies in India. Companies like Tata Chemicals and Bharat Heavy Electricals Limited (BHEL) are entering into joint

ventures and technology licensing agreements with global players to leverage their expertise and establish world-class manufacturing facilities in India. These collaborations can also help Indian companies gain access to global markets and enhance their competitiveness.

Government support

The state's backing on promoting clean energy and electric mobility is necessary for the growth of the lithium-ion battery industry. Policies and incentives that support research and development, infrastructure development, and domestic manufacturing are crucial to achieving the country's goals.

The National Electric Mobility Mission Plan (NEMMP) and the FAME scheme provide a comprehensive policy framework to support the adoption of electric vehicles and the development of associated infrastructure. These policies aim to create an environment for the growth of the lithium-ion battery industry by addressing key challenges such as high upfront costs, lack of charging infrastructure, and consumer awareness.

The government is also working on establishing uniform standards for battery performance, safety, and environmental compliance, to ensure the quality and reliability of domestically produced batteries. The Bureau of Indian Standards (BIS) and other regulatory bodies are collaborating with industry stakeholders to develop these standards and facilitate their implementation.

Public-private partnerships and industry collaborations are essential to leveraging the strengths of various stakeholders and achieving the desired outcomes. The Automotive Research Association of India (ARAI) and the Society of Indian Automobile Manufacturers (SIAM) are actively involved in promoting research, innovation, and standardization in the electric mobility sector.

Conclusion

The lithium-ion battery manufacturing industry in India is set to grow rapidly amidst the shift to sustainable battery solutions. While challenges such as infrastructure, supply chain dependencies, and environmental impact need to be addressed, the opportunities for innovation and domestic production are vast. The current investments, technological advancements, and robust government support can help India establish itself as a strong player in the global market.

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Sources: Ibf, Astute Analysis, Business Line, Hindustan Times, Swarajya Magazine, Research and Markets

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“UPS Plays a Significant Role in Data Centres.”

There has been a trend in recognising UPS systems as essential power backup devices, as most organisations today use computers to streamline their work, explains **Saju SR**, Sr Vice President- Smart Power Division, Electrification, ABB India.

What are ABB’s offerings in the UPS space?

ABB offers a wide range of UPS solutions suitable for any application size and context, from server rooms to large data centres, and across various settings like factories, offices, transportation, oil & gas, and marine environments. Our standalone and modular UPS systems cater to both low and medium-voltage applications and are designed to ensure a continuous and stable power supply for critical processes, seamlessly taking over in case of normal power source failures. For tough industrial situations ABB can offer AVC (automatic voltage conditioner) to ensure clean and constant power under extreme conditions.



transmission or data loss. Key application areas include cloud storage, data warehouses, Enterprise Resource Planning (ERP) systems, Customer Relationship Management (CRM) systems, file servers, application servers, and more.

Highlight some of your recent innovations in the UPS space

ABB’s recent innovations in the UPS space include the launch of the PowerScale, an online, double-conversion, VFI (voltage frequency independent) UPS that offers enhanced power protection in a compact format. It provides excellent value for money with outstanding price, performance, system reliability, and power availability. Available in three cabinet sizes, PowerScale allows users to choose the ideal capacity and required autonomy for their critical loads. Additionally, ABB has introduced the MegaFlex DPA (Decentralised Parallel Architecture) UPS solutions to the Indian market. Part of the ABB EcoSolutions™ portfolio, MegaFlex is a sustainable UPS designed according to the ABB circularity framework, tailored for high-density computing environments with the highest efficiency rating and smallest footprint. Targeting the IEC and UL markets, MegaFlex offers power ranges from 1.5 MW to 6 MW respectively, delivering excellent availability and reliability while being up to 45 per cent smaller for the IEC version.

What factors are driving demand?

According to the Frost and Sullivan report, India’s UPS market was valued \$ 631 million in 2022 and is projected to grow at a CAGR of 4.5 per cent through 2030. In the bustling landscape of India’s residential power solutions, the home UPS market stands out as a dynamic and rapidly evolving sector. Additionally, being a power-deficit nation, India has a large market for power backup products. There has been a growing trend in recognising UPS systems as essential power backup devices, as nearly every organisation today uses computers to streamline their workflows. E-commerce, data centres, servers, and electronic and medical equipment require a high level of uninterrupted power supply, thus generating significant demand for high-power range UPS systems in India.

How are data centres aiding growth?

Beyond domestic usage, UPS systems have found a significant role in data centres as well. A UPS is crucial for data centre backups, providing protection against power disruptions that could interfere with workloads or even paralyse server hardware. Data centre providers are compelled to adopt UPS solutions due to the decreasing tolerance among businesses for disconnections in data

What are some of the emerging trends?

Trends in the UPS space include the introduction of features that extend battery life, enhance energy efficiency, and integrate smart connectivity options. To conserve energy and reduce carbon footprints, more manufacturers are developing eco-friendly UPS solutions or incorporating eco-modes. Green UPS technology now offers significantly higher efficiency, ranging from 94 to 97 per cent, compared to the traditional 80 to 88 per cent, marking a substantial improvement in energy conservation and sustainability.



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The Surging Battery Recycling Market

The battery recycling market is drawing fierce competition as the EV industry undergoes rapid development, leading to an influx of retired power batteries. Companies across the industry are vying for dominance. **Renee Ju**, Research Associate, Interact Analysis, explores the major players and their strategies, highlighting the contrast between large-scale recyclers in major markets and the collaborative efforts seen in the recycling landscape.



battery recycling market is dominated by large-scale recycling manufacturers that specialise in recycling businesses, such as Li-cycle. Other companies in the lithium battery industry chain predominantly participate in the battery recycling market through collaboration with recycling companies.

Aside from signing cooperative research agreements, cooperation on battery recycling among

In recent years, the EV industry is going through rapid development that, eventually will lead to a horde of retired power batteries. Additionally, as the capacity of li-ion batteries increases, the amount of scrap batteries in production are also piling up fast, making battery recycling a focal point for the market.

Li-ion companies in the market lead

Manufacturers that establish recycling businesses come from across the battery industry chain, including upstream raw mineral and material suppliers, midstream battery manufacturers, vehicle OEMs and businesses specialising in battery recycling. In China, there are fewer large-scale companies that specialise in lithium battery recycling and currently companies with battery recycling plants tend to be manufacturers from elsewhere in the lithium battery industry chain. In contrast, in other major country markets the li-ion

companies in the lithium battery industry chain usually takes the form of signing supply agreements. These can be divided into directional supply and establishing a closed-loop recycling ecosystem. Directional supply involves OEMs and battery manufacturers supplying scrap batteries or scrap materials to recycling companies, and recycling companies supplying recycled materials obtained from processing scrap batteries to raw material manufacturers.

In contrast, some companies collaborate with the aim of establishing a closed-loop recycling ecosystem. Let's take the collaboration announced by GEM in February 2023 with Mercedes-Benz China, CATL, and Brunp as an example: Mercedes-Benz China's retired waste batteries will be processed by GEM and Brunp, with the recycled key raw materials such as nickel, cobalt, manganese, and lithium supplied to CATL's supply chain and used to produce new batteries for Mercedes-Benz. The

cooperation in battery recycling between upstream and downstream companies in the lithium battery industry chain not only meets environmental protection requirements but also maximises battery value and reduces battery production costs.

Non-lithium battery-related companies also explore battery recycling

Some companies whose main operations are not directly related to batteries are also exploring the market for battery recycling, such as sanitation companies and other recycling enterprises (including those specialising in metal recycling and solid waste recycling). Typically, these companies run the battery recycling businesses through collaboration with lithium battery-related companies, with the recycling business supplying the products of their recycling plants to raw material manufacturers for further application in the lithium battery industry and for use in other industries. For example, the recycled nickel, cobalt, and tungsten powders can be utilised in the production of hard alloys, rather than being directly used in the production of lithium battery-related products. The battery recycling landscape is becoming increasingly complex.

Final thoughts

With the rapid expansion of lithium battery capacity and the imminent wave of retired power batteries, recycling has become a safe, environmentally friendly, and economical way to dispose of scrap batteries and raw materials. As relevant policies and regulations are continuously improved and implemented by different countries, the battery recycling market is entering a new stage of professionalisation and scale, with market opportunities continuously emerging. As a restructuring of the industry ecosystem takes place, optimising resource allocation, strengthening technological research and development, accelerating upstream and downstream collaboration, and promoting the integration of the industrial chain may become the keys to success.

SME

About the author:

As a Research Associate at Interact Analysis based in China, Renee Ju, focuses on lithium battery and hydrogen research. She also assists the commercial vehicle team in database setup and conducts both primary and secondary information research for data and industry analysis.

News Snippet

BPE celebrates 24 years with 'Vision 25' awards night

Best Power Equipments (BPE) recently celebrated its 24th anniversary, 'Vision 25' and hosted an award ceremony at Hotel Crowne Plaza in Greater Noida. The event was a monumental success, with over 500 attendees apart from 30 partners from ASEAN countries. e.g. Singapore, Malaysia, Vietnam, Indonesia, UAE, Nepal, Sri Lanka, and African countries.

BPE invited partners from across India and various other countries to honour their dedication and performance. **Amitansu Satpathy**, Founder and Group Managing Director of BPE, expressed immense pride in reaching this milestone. He highlighted BPE's pioneering efforts as the first Indian UPS manufacturing company to expand into countries such as the Philippines, Malaysia, Vietnam, Indonesia, and Singapore, receiving excellent responses from these markets. "We are proud to be the first Indian company with the courage to expand internationally, and the positive response we've received is truly a proud moment for us," remarked Satpathy.

The strong relationship with channel partners was a

key focus during the event. Satpathy added, "We are a company 'by the partner, for the partner, and of the partner.' Our growth is intertwined with our partners, and their confidence in us has been instrumental to our success." This partner-centric approach has been key to BPE's consistent growth, with both the company and its partners thriving together.

BPE sign agreement with Enzo Plus a leading distributor at Malaysia, with 300 strong partners, on the stage, shows a significance milestone.

BPE's commitment to the Make in India initiative and its expansion into international markets were also highlighted.

Satpathy proudly stated that Made in India products have gained wide acceptability across Asian countries, fitting well into the global market's shift away from China. "Make in India has wide acceptability all across Asia, and we are proud to be at the forefront of this movement," he added.

BPE's focus on innovation, partner relationships, and the Make in India initiative positions it for continued growth and prosperity.

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Aluminium: Applications Unlimited!

Extensive research and development efforts have led to the creation of innovative engineered aluminium products. The engineered aluminium industry in India is set to experience substantial growth driven by global energy shifts, rising consumer demands, and strategic advancements in emerging sectors, says **M Sathesh Kumar**, Senior GM – Operations, Jindal Aluminium.



The downstream aluminium industry in India is a vital and dynamic sector, significantly contributing to the nation's industrial growth. This segment specialises in transforming raw aluminium into value-added products, serving a wide array of industries such as automotive, construction, aerospace, power transmission, defence, transportation, and packaging. With approximately 3,500 entities, including major and mid-sized producers, along with numerous smaller and unorganised operators, the industry is a diverse and robust network.

The sector has proactively adopted strategic initiatives to boost its capabilities and economic impact. Extensive research and development efforts have led to the creation of innovative engineered aluminium products, addressing evolving market needs. Investment in cutting-edge technologies and digital advancements has optimised operations, streamlined supply chains, and enhanced overall efficiency. Additionally, the industry's focus on sustainable practices and the use of renewable energy highlights its commitment to environmental responsibility and long-term ecological balance. These comprehensive efforts have not only strengthened the downstream aluminium industry but continues to drive progress and play a crucial role in India's industrial landscape.

Automotive sector

The automotive sector is a key driver of India's economy, contributing 2.3% to GDP. Engineered aluminium is pivotal in this industry, used extensively for car body parts, frames, electrical systems, lighting, wheels, air conditioning components, and engine elements like radiators, pistons, and cylinder heads. It also plays a role in manufacturing magnets for tachometers and speedometers, as well as airbag systems. The sector relies on auxiliary industries for tools, machinery, and components, sourced from both organised and unorganised sectors. With global attention shifting to electric vehicles (EVs), aluminium's lightweight and durable properties are crucial for EV technology and charging infrastructure development, underscoring its growing importance in the downstream aluminium segment.

Transportation sector

The government is investing in transportation infrastructure to accommodate the growth of its major cities. Engineered aluminium is increasingly utilised across various transportation applications, including aluminium rakes, high-speed trainsets, and metro coaches. This expansion has spurred the establishment of numerous supporting industries, such as those specialising in castings, forgings, and furnishings like berths and seats. Efforts are also underway to localise the production of components such as air conditioners and couplers, aiming to ensure a steady supply of spare parts and streamline maintenance operations in the future.

Construction sector

Aluminium's prominence in India's building and construction sector is driven by rapid urbanisation. Increasing urban migration necessitates the construction of taller buildings to accommodate more people efficiently. Its malleability allows it to be shaped into numerous forms, making it highly favoured for structural

purposes and various building components such as windows, doors, roofing, sliding systems, curtain walls, flashings, balustrades, sunshades, and decorative elements. When used as a primary construction material, aluminium structures weigh significantly less—about 35-65 per cent lighter—than traditional metals while offering comparable strength. Furthermore, aluminium adds a touch of sophisticated design to architectural finishes. The rising popularity of fenestration in the industry has cemented aluminium as the preferred material among builders, capturing approximately 55 per cent of India's fenestration market share, surpassing wood and steel, which holds a 25-30 per cent share.

Electrical sector

Aluminium and its alloys play a crucial role in the electrical industry due to their strong, lightweight nature, structural integrity, high flexibility, excellent conductivity, and non-magnetic properties. They are widely used in various applications such as busbars, cables, electric motors, overhead power lines, foil windings, heating elements, electrolytic capacitors, and heat sinks. Aluminium wires and cables have significant market demand in India, although per capita usage in the country's electrical sector, at approximately 0.9 kilograms, is lower than the global average of around 1.3 kilograms. Aluminium wire rods are preferred for transmission lines because they are twice as light as steel and resistant to corrosion. Their low weight helps prevent sagging in transmission lines, ensuring reliable electricity transmission over long distances.

Packaging sector

The packaging industry in India consumes approximately 7 to 8 per cent of the total aluminium supply, driven by increasing consumerism and the demand for enhanced product branding. Aluminium is favoured over materials like glass, tinplate, paper, and jute due to its advantageous properties. Aluminium foil, renowned for its versatility, is widely used in packaging across sectors such as food and beverages, aerospace, transportation, medical devices, and pharmaceuticals. Its high malleability allows it to be easily folded, moulded, and rolled to meet diverse packaging needs. Globally, the demand for aluminium foil is growing at a rate of approximately 4 per cent annually and is projected to exceed 7 million tonnes by 2025.

Current trends

Recent trends in the downstream aluminium sector reflect a growing emphasis on sustainable development and the transition to a circular economy, responding to pressing environmental concerns worldwide. This shift

has led to a widespread adoption of engineered aluminium across multiple industries.

Government's support for domestic manufacturing has significantly boosted the adoption of aluminium alloys in the defence and aerospace sectors. These alloys are increasingly being explored for various indigenous applications, such as structural connections and propellant tanks within defence and aerospace equipment. India's ambitious plans include achieving ₹1.75 trillion in domestic defence manufacturing, highlighting the strategic importance of aluminium alloys in advancing national defence capabilities.

Advancements in aerospace technologies, including innovations in manufacturing techniques like 3D printing, further underscore aluminium's role in achieving lightweight and intricate designs essential for aerospace components. Additionally, the ongoing electrification of infrastructure and continuous advancements in consumer electronics are driving new applications and opportunities for aluminium, facilitating innovations in product design and customisation.

Future outlook

The engineered aluminium industry in India is set to experience substantial growth driven by global energy shifts, rising consumer demands, and strategic advancements in emerging sectors. The transportation industry, in particular, will lead this surge as it aligns with decarbonisation goals and the growing preference for electric vehicles (EVs) over internal combustion engine (ICE) vehicles. The current limitations of EV range and the underdeveloped charging infrastructure highlight the need for lightweight materials like aluminium. Public transportation is also expected to undergo significant green transformations, further increasing the demand for aluminium.

India's potential for increased engineered aluminium consumption is immense, supported by government initiatives such as Make in India, smart cities, housing for all, rural electrification, dedicated freight corridors, and high-speed rail networks. The Niti Aayog's report, "Need for an Aluminium Policy for India," highlights the critical role of the downstream aluminium sector in driving economic growth.

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About the author:

M Sathesh Kumar, Senior GM – Operations, Jindal Aluminium, started his career in Gas Turbine Research Establishment-DRDO as a Work package Engineer. He then Joined Jindal Aluminium Ltd.-B/F as a Management Trainee, and is part of the company till the present day. He has been committed to Jindal Aluminium for 19 years and 3 months.



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In industries reliant on stringent contamination control, Avians high-speed clean room doors are emerging as a game-changing solution. These doors, designed by Avians, a leading industrial door and automation system manufacturer, are meticulously crafted to meet the demands of clean room environments, ensuring both rapid access and impeccable cleanliness.

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- **Safety:** Advanced safety features, like obstacle sensors, ensure worker safety within clean room environments.

Used in diverse applications

Avians high speed clean room doors find applications across diverse industries:

- **Pharmaceutical manufacturing:** Ensuring product purity by preventing contamination during production.
- **Semiconductor fabrication:** Maintaining clean environments for the fabrication of microchips and electronic components.
- **Biotechnology research:** Controlling contamination in laboratories for accurate results.
- **Healthcare:** Creating sterile environments in operating rooms and critical care areas.

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For details, contact Avians Innovations Technology Pvt Ltd, Pune, on Mob: +91 83903 00400, Email: sales@avians.co.in, or visit www.avians.co.in

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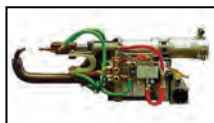


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“Tata Motors aims to make EVs more accessible for customers.”

Electric car sales in India have witnessed a strong double-digit growth rate in the last few years; in fact the market witnessed a 91 per cent jump in sales in 2023–24 to 90,996 units from 47,551 units in 2022–23. With over 70 per cent share, Tata Motors dominates the electric car market in India. Tata Passenger Electric Mobility Ltd (TPEML) – a division of Tata Motors – is working on a proactive strategy to drive the mainstreaming of electric vehicles in India with plans to launch multiple models by March 2026. Rakesh Rao spoke to **Anand Kulkarni**, Chief Products Officer, Head of HV Programs and Customer Service, Tata Passenger Electric Mobility Ltd, to understand the growth propellers of EVs, challenges and opportunities, and future plans of TPEML.



How has the electric vehicle (EV) market in India evolved over the years?

The evolution of the EV market in India has been quite significant. Initially, one of the main challenges was optimising energy storage in batteries, which are heavier and bulkier compared to traditional fuel systems. This required innovative solutions in terms of battery placement and vehicle design to maximise energy efficiency and range. Over the years, battery prices have decreased and energy densities have improved, allowing for longer ranges and making EVs more viable as primary vehicles for families. We have seen advancements in power electronics and motor efficiency, further enhancing vehicle performance. At Tata Motors, our journey began with the launch of the Nexon EV in 2020, which initially offered a range of about 200 kilometres. Today, our Nexon EV Max model offers over 300 kilometres of real-life range due to these technological improvements.

What are the key advantages and challenges of EVs compared to traditional internal combustion engine (ICE) vehicles?

Electric vehicles offer several advantages over ICE vehicles, including lower emissions, reduced noise pollution, and lower operating costs due to fewer moving parts. They also provide opportunities for innovative vehicle designs, such as expanding the footprint by moving the wheels to the extremities and optimising space for battery placement. However, there are challenges to overcome. These include optimising energy density, managing the additional weight and space

occupied by batteries, and developing efficient cooling and powertrain systems. Another significant opportunity with EVs is the potential for enhanced connectivity and data acquisition, which can lead to smarter and more efficient vehicle operation.

How indigenised is the Indian electric vehicle industry currently?

The Indian EV industry is making strides towards indigenisation, due to consistent government support through schemes like the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME), Phased Manufacturing Programme (PMP), and the Productivity Linked Incentive (PLI) scheme. These initiatives encourage local manufacturing and supply chain development. At Tata Motors, we have achieved significant localisation with vehicles like the Tiago EV, which has over 50% domestic value addition. This involves a rigorous process where not only the direct components but also those from tier 2 and tier 3 suppliers are localised. This approach helps control costs, improve supply chain management, and develop local competencies.



Electric vehicles offer several advantages over ICE vehicles, including lower emissions, reduced noise pollution, and lower operating costs.

Do you think the Corporate Average Fuel Economy (CAFE) regulation will aid the growth of the EV industry?

The CAFE regulations set stringent standards for fuel economy and emissions for ICE vehicles, encouraging automakers to develop more efficient and cleaner alternatives. Electric vehicles, with their lower carbon footprint, are key to meeting emission targets set by the country and contributing to global decarbonization efforts. As regulations become stricter, the shift towards electric mobility will accelerate, making EVs an integral part of the solution to reduce emissions and achieve national and corporate decarbonization targets.

How does Tata Motors support its suppliers, especially SMEs?

We collaborate closely with our suppliers, including small and medium enterprises (SMEs). Our approach

involves transferring knowledge and specifications derived from our customer requirements to our suppliers. This ensures that they can meet the standards and quality required for our EV components. We work in collaboration with our partners, utilising their expertise while providing insights based on our extensive data and experience in electric mobility. This collaborative effort helps build a robust supply chain capable of supporting the growing EV market in India.



By leveraging data and connectivity, we can continuously improve our products and services, ensuring that our EVs meet the evolving needs of our customers.

What are the major drivers for the increased adoption of EVs?

Firstly, the unparalleled driving experience of EVs, characterised by their simplicity, ease of use, and refinement, makes it hard for users to switch back to ICE vehicles. Additionally, advancements in battery technology and power electronics are making EVs more affordable and practical. The expansion of public charging infrastructure is also crucial. While Tata Power and our partners have established a significant number of chargers, further investment in this sector is required to support the increasing number of EVs on the road. As the charging infrastructure improves, it will encourage more people to adopt EVs.

How important is public charging infrastructure for the growth of the EV market?

Public charging infrastructure provides the convenience and confidence needed for users to consider EVs as their primary vehicles. While we have made significant progress with around 10,000 chargers established through Tata Power and our partners, further expansion is essential. Private investment in charging infrastructure will help boost growth in the rising EV demand. The more chargers become available; more users will find long-distance travel feasible, thereby encouraging more people to switch.

How does Tata Motors plan to address the cost and range challenges associated with EVs?

Addressing the cost and range challenges of EVs is a continuous process. Technological advancements are helping reduce costs and improve range. For instance, battery prices are falling, and energy densities are increasing, allowing us to offer vehicles with higher ranges at competitive prices. We are also focusing on optimising our power electronics and motor efficiencies to enhance overall vehicle performance. By providing multiple battery options and improving the public charging infrastructure, we aim to make EVs more accessible and practical for a broader range of customers.



The Indian EV industry is making strides towards indigenisation, due to consistent government support through schemes like the FAME, PMP, and the PLI scheme.

What are some of the opportunities and challenges faced in India compared to the global market?

One of the key opportunities is the ability to design vehicles specifically for the Indian market, taking into account local driving conditions and customer preferences. This allows us to optimise our products for better performance and cost-efficiency. However, challenges include developing a robust supply chain, ensuring the availability of charging infrastructure, and managing the high initial costs of EVs. The Indian market also requires significant investment in educating consumers about the benefits of EVs and addressing concerns related to range and charging availability.

How do you leverage data and connectivity in EVs?

Our EVs are equipped with advanced telematics systems that collect and analyse vast amounts of data. This data helps us monitor vehicle performance, predict maintenance needs, and improve overall efficiency. Connectivity also enables us to offer features such as remote diagnostics, over-the-air updates, and real-time monitoring, providing our customers with a seamless and convenient ownership experience. By leveraging data

and connectivity, we can continuously improve our products and services, ensuring that our EVs meet the evolving needs of our customers.

How does Tata Motors ensure the quality and reliability of its vehicles?

Ensuring the quality and reliability of our electric vehicles is a top priority. We have stringent quality control processes in place, from design and development to manufacturing and after-sales service. Our vehicles undergo rigorous testing to ensure they meet the highest standards of safety, performance, and durability. We also collaborate closely with our suppliers to ensure that all components meet our quality requirements. Continuous monitoring and feedback from our customers help us identify areas for improvement and implement necessary enhancements. Our commitment to quality and reliability ensures that our EVs provide a superior ownership experience.

What initiatives are you taking to promote sustainability?

Our electric vehicles themselves contribute to lower emissions and reduced carbon footprint. We are also investing in sustainable manufacturing practices, such as using renewable energy sources and minimising waste. We try to recycle and reuse battery materials as much as possible to help create a circular economy. Our focus on sustainability extends to our supply chain, where we encourage our partners to adopt eco-friendly practices. By integrating sustainability into our operations, we aim to create a positive impact on the environment and society.

What new EVs can we expect from TPEML in the near future?

Tata Motors has an ambitious plan to introduce 10 EVs by FY 2025-26. Currently, we offer four models - Nexon EV, Tiago EV, Punch EV, and Tigor EV. Our upcoming offerings include new body styles and models such as the Curvv and Sierra SUVs, which we showcased at the Auto Expo.

Additionally, we are working on the Avinya, a world-ready product developed in collaboration with Jaguar Land Rover. These new models will cater to a wide range of customer preferences and contribute to our goal of leading the EV market in India. By addressing the key challenges and leveraging our strengths, we will establish Tata Motors as a leading brand in the global EV landscape.

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OPC UA: The Language of Industry 4.0

Industry 4.0, which links the IT (Information Technology) and automation systems, requires many machines and devices to communicate with each other for seamless operation. OPC UA, an information architecture designed to enable interoperability between industrial components, is considered to be a perfect tool for building interoperable Industry 4.0 systems, says Rakesh Rao.

As we stand on the precipice of the fourth industrial revolution, the significance of seamless, secure, and reliable communication between machines cannot be overstated. Against this background, the Open Platform Communications Unified Architecture (OPC UA) emerges as a critical standard, addressing the challenges and demands of modern industrial automation, said **Smitha Rao**, Director & Co-founder, Utthunga Technologies Pvt Ltd, while speaking exclusively with SME during the VDMA symposium on "Smart Manufacturing Technologies - Revolutionizing the Future", which was held on 3 July 2024 in Pune.

OPC and its evolution

OPC, which stands for Open Platform Communications, is an international standard that ensures secure and reliable information exchange between machines and controllers. This initiative began in 1995 when a few forward-thinking companies identified the need for interoperability amidst the proliferation of diverse devices and communication protocols. Initially termed OPC Classic, it utilised Microsoft COM technology to facilitate these exchanges. However, as the industry evolved, so did the standard, leading to the development of OPC Unified Architecture (OPC UA).

She elaborated, "OPC UA extends the capabilities of OPC Classic by being platform-independent, ensuring



compatibility across various systems, from sensors without operating systems to data centres and cloud infrastructures. This versatility allows OPC UA to serve as a universal language, enabling different devices and systems to communicate seamlessly, akin to how English serves as a common lingua franca."

The architecture

The transition from OPC Classic to OPC UA was driven by the need for a more robust, secure, and scalable solution. OPC UA is designed to operate across the entire automation pyramid, from the lowest levels of sensors and PLCs to the highest levels of enterprise systems. It supports a mesh network, facilitating direct communication between devices, thus enhancing flexibility and efficiency.

Key features of OPC UA are:

- Platform independence: OPC UA can run on various operating systems, or even on devices without any OS, making it highly adaptable.
- Security by design: Built-in security mechanisms ensure that data exchanges are protected from unauthorised access and tampering.
- Interoperability: By providing a common framework, OPC UA enables different systems and devices to understand and exchange information effortlessly.
- Scalability: The architecture can scale from small, simple devices to complex enterprise systems, accommodating a wide range of applications.



Conducting training programs and workshops to educate industry professionals about the benefits and implementation strategies for OPC UA will be the key to its widespread adoption and success in India.

Smitha Rao,
Director & Co-founder, Utthunga Technologies Pvt Ltd

Global collaboration

The OPC Foundation, a non-profit organisation, oversees the development and promotion of OPC standards. It boasts nearly 1,000 member companies, including players like Emerson, Rockwell Automation, Microsoft, Google, Amazon, and SAP.

Rao informed, “The foundation’s collaborative approach has led to the development of domain-specific standards, tailored to the needs of different industries, such as robotics, marine, and even coffee vending machines. This adaptability ensures that OPC UA remains relevant and valuable across diverse applications.”

The Indian landscape

Despite its global prominence, OPC UA’s adoption in India is still in its nascent stages. India contributes less than 8 per cent of the global member companies of the OPC Foundation, indicating significant room for growth. According to Smitha Rao, this underrepresentation can be attributed to several factors such as:

- Lack of awareness as many Indian companies are not fully aware of the benefits and potential of OPC UA
- Cost considerations as the investment required to adopt and implement OPC UA can be a deterrent for cost-sensitive markets
- Standardisation efforts as unlike countries like China, which have integrated OPC UA into their national standards, India is still working towards

such recognition.

Recognising the need to boost OPC UA adoption, initiatives such as the OPC Hub India have been established. Headed by prominent organisations like Siemens and Fraunhofer, this hub aims to raise awareness, provide education, and foster collaboration among Indian companies. Utthunga Technologies, with its deep involvement in OPC for over 15 years, plays a crucial role in this initiative, contributing to specifications and promoting best practices.

Efforts are also underway to engage with national standard bodies to incorporate OPC UA into India’s national standards. This integration would ensure a more structured and widespread adoption, driving the country towards a more connected and efficient industrial ecosystem.

Rao added, “For OPC UA to truly thrive in India, a concerted effort from both industry stakeholders and the government is essential. Increasing membership by encouraging more Indian companies to join the OPC Foundation will enhance the country’s influence and contribution to global standards. Advocating for government policies and incentives that promote the adoption of international standards like OPC UA is crucial. Additionally, conducting training programs and workshops to educate industry professionals about the benefits and implementation strategies for OPC UA will be the key to its widespread adoption and success in India.”

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News Snippet

Cummins opens global competency center in Pune

Cummins Group in India (Cummins India), one of the leading power solutions technology providers, on July 16, 2024, opened its first IT Global Competency Center (GCC) at its India Office Campus in Balewadi, Pune (Maharashtra).

The center was inaugurated by Earl Newsome, Vice President and Chief Information Officer, Cummins Inc, and Annapurna Vishwanathan, Chief Information Officer, Cummins India, in the presence of other senior Cummins India officials. The GCC is an integral part of the company’s multi-year IT transformational strategy and will focus



on scaling up the operational efficiencies and speeding up the time-to-market of its products and services.

It will house software engineers, product owners, architects, technology leads, and process experts to drive innovation impacting the automobile, engineering research and development (ER&D), manufacturing, and

energy sectors. With 55 per cent women employees, the GCC is leading the charge in gender diversity, and strengthening it further across all tech roles will be a key focus area for the future.

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“Havells always offers safe, efficient electrical products.”

Havells India Ltd – which owns brands like Havells, Lloyd, Crabtree, Standard Electric, Reo and Promptec – is one of the leading players in the fast moving electrical goods (FMEG) industry. Havells, a name synonymous with quality and innovation in the electrical industry, has journeyed from modest beginnings to becoming a formidable player in the global market. In this interview with Rakesh Rao, **Saurabh Goel**, Executive President, Havells India Ltd, delves into the company's origins, strategic milestones and product innovations.

Can you tell us about the origins of Havells and its early years?

The origins of Havells date back to 1957-58 when our founder chairman, with just ₹10,000 rupees in his pocket, started a trading business for power cables in Delhi. In the early years, we primarily dealt with heavy electrical products like power cables and electric metres, which were the core of our business at the time. In 1993, Havells got incorporated on the stock exchange. At that time, we were a relatively small company with an approximate valuation of around ₹1 billion. Over the years, we have significantly grown, and now we are close to ₹180 billion company. In the early '90s, our product range was primarily limited to electrical oriented products such as electric metres, cables, and other conventional switchgear products.

What was the major turning point for Havells in terms of product diversification?

The watershed moment for Havells came in 2003 when we decided to diversify into consumer categories. We ventured into the consumer brown goods category, which included products like fans, lighting and switches. This was a significant shift from our traditional heavy electrical orientation, and it marked our entry into the consumer-centric market. Every two to three years, we added new categories to our portfolio. The market was surprised that an electrical oriented company wished to change their market perception and establish a foothold in the consumer goods segment. But we managed to do it.

Can you explain Havells' entry into the consumer electronics market?



In 2017, we entered the consumer electronics market by acquiring Lloyd, a well-known brand in the consumer electronics space. This acquisition marked our foray into products like air conditioners, refrigerators, and washing machines. Initially, we bought the brand and subsequently set up our own manufacturing plants for these products. This move allowed us to expand our product offerings and strengthen our presence in the consumer electronics market.

What are the main sectors in which Havells currently operates, and what is the size of these markets?

Havells operates in five main sectors:

1. **Cables and wires:** This includes industrial cables and house wires, also known as flexible cables. The market size for cables and wires combined is around ₹550 billion.
2. **Switchgear:** This sector includes both residential switches and industrial switchgear. The market size for switches and switchgear combined is approximately ₹200 billion.
3. **Consumer electricals:** This includes products like fans, water heaters, kitchen appliances, water purifiers, and air coolers. The market size for consumer electricals is around ₹400 to 450 billion.
4. **Lighting:** This sector covers both consumer lighting and professional lighting, including street lighting and RGB lighting. The market size for lighting products is substantial.
5. **Consumer electronics:** This includes products like air conditioners, refrigerators, and washing machines. The market size for consumer

electronics is around ₹1 trillion.

Overall, the total market size for all these sectors combined is close to ₹2.2 trillion, and Havells reigns with a market share of about 9-10 per cent.

What is the company's approach to manufacturing?

We have a strong manufacturing setup with 17 plants spread across nine locations. Our most recent manufacturing facilities are in South India. Almost 90 per cent of the products we sell are manufactured in-house. We believe in starting with imports or outsourcing to test and learn about the market, but we quickly move to establish our own manufacturing once we understand the market dynamics. For example, we started importing water heaters, but today we are market leaders with our own state-of-the-art manufacturing unit for water heaters, which we launched in 2015 and expanded in 2019.



To combat the issue of counterfeit products, we have implemented several measures. We use advanced 3D QR codes on our products, which are difficult to replicate.

How do you see the market at the moment?

The market is quite dynamic and varies across different sectors. In the cables and wires industry, there is a lot of traction due to the ongoing infrastructure development. Both the cable and wire industry and the switchgear industry are seeing significant demand. The consumer market, on the other hand, is slowly picking up. Last year was not particularly strong for the consumer industry, but we are starting to see improvements. The infrastructure projects and building segments are driving growth in the switchgear and lighting markets, and we expect this to continue over the next few years.

Can you share some recent innovations?

In the cables and wires division, one of our key innovations is the development of HFFR (Halogen-Free Flame Retardant) wires, which are smokeless wires designed to reduce smoke production during fires. This is important because smoke inhalation is a major cause of fatalities during fires. We have also focused on improving the quality of our wires to reduce energy

wastage and increase efficiency.

In the switchgear division, we have introduced surge protection devices (SPDs) that protect appliances from voltage spikes, especially during lightning strikes. We are also promoting earth leakage protection devices (RCCBs), which protect lives by preventing electric shocks. These innovations are aimed at enhancing safety and efficiency in electrical systems.

What role does IoT play in Havells' product offerings?

IoT plays a significant role in our consumer durables category. We have integrated IoT features into products like fans, water heaters, and kitchen appliances. For example, you can control your water heater remotely using a smartphone app, setting it to turn on and off at specific times. We offer IoT functionality either through the product itself or through a smart switch that can be connected to any device. This makes our products more convenient and energy-efficient for consumers.

How does Havells ensure the quality and authenticity of its products in the market?

To combat the issue of counterfeit products, we have implemented several measures. We use advanced 3D QR codes on our products, which are difficult to replicate. We also conduct regular raids to identify and eliminate counterfeit products from the market. Additionally, we invest in training electricians and raising awareness about the importance of using genuine, high-quality products. These efforts help us maintain the integrity of our brand and ensure that consumers receive safe and reliable products.

How important is consumer education in promoting high-quality products?

Many consumers are not aware of the importance of using high-quality wires, switchgear, and other electrical components. By educating consumers about the benefits of high-quality products, such as enhanced safety and efficiency, we can drive demand for better products. We also work with developers and builders to ensure that high-quality products are used in construction projects. Consumer awareness and education are key to creating a safer and more efficient electrical environment.

How does Havells approach sustainability and environmental responsibility?

We focus on developing energy-efficient products that reduce power consumption and lower carbon emissions. For example, our HFFR wires are designed to be environment-friendly by reducing smoke and toxic emissions during fires. We also prioritise the use of recyclable materials in our manufacturing processes. We

have also implemented several green initiatives across our manufacturing plants to reduce waste and improve energy efficiency.

What are some of the key challenges facing the electrical industry?

One of the major challenges in the cables and wires division is the availability of raw materials like copper and aluminium, which are subject to market fluctuations. This affects our ability to plan and price our products effectively. In the switchgear division, a significant challenge is the lack of regulation and standardisation in the industry. For instance, the installation of safety devices like RCCBs can be bypassed by untrained electricians, compromising safety. We need stronger monitoring standards and better consumer awareness about the importance of high-quality electrical products.

What trends are you seeing in the market from the consumer and industrial perspectives?

From a consumer perspective, there is a growing trend towards upgrading electrical products for better aesthetics and efficiency. Consumers are becoming more aware of the importance of quality electrical products, although there is still a long way to go. In the industrial sector, there is increasing demand for advanced electrical solutions due to the ongoing infrastructure development. There is also a trend towards integrating IoT and smart technologies in both consumer and

industrial electrical products.

What can we expect from Havells in the coming years?

In the switchgear division, we are working on solid-state switchgear, which operates much faster than traditional electromechanical switchgear. This will provide better protection for electrical circuits. We are also developing combined MCCB and RCCB units, known as RCBs, which are already popular in Europe. Additionally, we are promoting the use of arc fault detection devices (AFDDs) to prevent electrical fires caused by arcing. These innovations reflect our commitment to enhancing safety, efficiency, and reliability in electrical systems.

What are Havells' future plans and growth strategies?

Our future plans and growth strategies focus on extensively expanding our product portfolio, enhancing our manufacturing capabilities, and increasing our market presence. We also aim to introduce new and innovative products that meet the evolving needs of consumers and industries. We will continue to invest in manufacturing facilities to ensure high-quality production.

Additionally, we plan to strengthen our distribution network and enhance our brand visibility through targeted marketing campaigns. Our goal is to maintain our position as a leading player in the electrical industry and drive sustainable growth in the coming years. 

News Snippet

Waaree bags EPC contract for Juna Renewable's 412.5 MWp solar project

Waaree Renewable Technologies Limited, a subsidiary of Waaree Energies Limited, has been awarded the Engineering, Procurement, and Construction (EPC) contract for ACCIONA Energy's subsidiary Juna Renewable Energy Pvt Ltd's 412.5 MWp/335 MW photovoltaic project in Rajasthan. The project, located in Kawani

Village, Bikaner district, is a utility-scale solar plant that will deploy bifacial solar modules supplied by Waaree Energies Limited. These modules will be installed on horizontal single-axis trackers, and are expected to maximize energy yield through enhanced light absorption and tracking capabilities. As the EPC contractor, Waaree Renewable Technologies Limited



will provide comprehensive services, including design engineering, procurement, construction, and commissioning of the project. The scope includes the installation of a 33/220 kV plant substation, power transformers, and a combination of automatic and semi-automatic module cleaning

robots and spares.

"With our engineering capabilities and track record, we believe that we are well-equipped to deliver this project efficiently, ensuring seamless integration of radical technologies and sustainable practices," commented Viren Doshi, Executive Director, Waaree Renewable Technologies Ltd. 



“Sudhir Power Leads the Eco-friendly Gensets Market.”

Diesel gensets are the preferred choice for backup power solutions due to their scalability and durability. Leading the way in this field, Sudhir Power Ltd is pioneering the development of eco-friendly, high-performance gensets designed to minimise carbon footprints. In this interview, **Mukesh Khandelwal**, Sr. Vice President of Sudhir Power Ltd, delves into the company's innovative solutions in power generation equipment and discusses emerging trends in the industry.

Kindly brief us about Sudhir Power Ltd.

Sudhir Power Ltd is a distinguished 50-year-old business group that specialises in delivering comprehensive power generation solutions across various industrial segments. The company offers a diverse range of power generation and transmission equipment, with a primary focus on diesel gensets, packaged substations, and transformers. Sudhir Power's products are renowned for their reliability, efficiency, and robust performance, catering to a wide array of applications in industrial manufacturing, commercial enterprises, infrastructure, and residential sectors.

Sudhir Power's state-of-the-art manufacturing facilities, located in Jammu, Manesar and Silvassa are designed to meet international standards for quality and efficiency. These facilities are equipped with advanced machinery and cutting-edge technology, enabling the company to consistently produce high-quality power generation equipment. Additionally, Sudhir Power is expanding its manufacturing capabilities with the development of a new, state-of-the-art, and its largest manufacturing facility in Bhiwadi. This new facility underscores the company's commitment to innovation and excellence, ensuring that Sudhir Power remains a trusted name in the power solutions industry.

How has the genset business grown over the years? What factors are driving this business?

The genset market in India has grown significantly over the past few years, evolving from basic backup power supplies to sophisticated systems that serve a wide range of industries. Sudhir Power, with its decades of experience in manufacturing power generation



equipment, has played a pivotal role in this development.

Several factors are driving the growth of the genset industry. One of the primary drivers is the increased demand for reliable power supply. Industries across the globe rely heavily on uninterrupted electricity to maintain smooth operations. During grid outages, gensets provide essential backup power, ensuring that critical processes continue without disruption. Additionally, the rapid industrialization and urbanization in India have led to a higher demand for power, further fuelling the growth of the genset market. The rising need for decentralized power generation and the expansion of commercial and residential sectors also contribute to the increasing adoption of gensets.

Sudhir Power's commitment to innovation, quality, and customer satisfaction has enabled it to cater to this growing demand effectively, positioning the company as a leader in the genset market.

With emission standards getting stringent in India, how is your company gearing up to thrive in the evolving regulatory environment?

At Sudhir Power, we place a high value on regulatory compliance and environmental sustainability, recognizing the importance of adapting to evolving emission standards. Our company has been proactive in integrating cutting-edge technology and procedures across all our manufacturing plants.

We have made significant investments in our manufacturing facilities, including the development of a mega plant in Bhiwadi, which is set to become operational in the upcoming months. This state-of-the-art facility will enhance our ability to produce more

efficient and cleaner power solutions.

Additionally, we actively collaborate with regulatory authorities to stay ahead of future regulations. Our commitment is to ensure that our products not only comply with the stringent emission standards but also contribute positively to reducing environmental impact. By prioritising innovation and sustainability, Sudhir Power is dedicated to creating a more sustainable future while thriving in the evolving regulatory landscape.

What are the key emerging trends in the genset sector?

There is a noticeable shift towards integrating smart technologies such as IoT (Internet of Things) and AI (Artificial Intelligence) into gensets. These technologies enable remote monitoring, predictive maintenance, and optimization of genset performance. For instance, our CPCB IV+ gensets are equipped with telematics solutions, allowing customers to monitor performance at their fingertips.

The overall volume of demand for diesel generators is increasing as the industry grows both in terms of volume and value. There is also a rising demand for higher kVA gensets, which is driving market growth. Despite the advancements in alternative fuels, diesel generators remain the most popular and occupy the highest market share among other fuel-based generators. This popularity is due to continuous technological innovations and the ability to provide long hours of power backup.

Additionally, with growing awareness of

environmental impact, there is an increasing demand for gensets that are more fuel-efficient and comply with stringent emission regulations. Sudhir Power is at the forefront of manufacturing eco-friendly gensets that minimise carbon footprint while maintaining high performance standards. These innovations not only enhance operational efficiency but also contribute to a more sustainable future.

What are the advantages of gensets compared to other alternative backup power solutions?

Contemporary gensets are renowned for their quick start capabilities, restoring power within seconds of an outage. This rapid response is crucial for maintaining productivity across various sectors, including manufacturing, commercial, industrial, infrastructure, and residential applications.

Gensets are the preferred choice for backup power solutions due to their scalability and durability. They can operate continuously and uninterrupted, making them highly reliable. This versatility allows gensets to be used in a wide range of applications, from small portable devices to large industrial installations.

Their adaptability and ability to provide long hours of power backup ensure that gensets remain an ideal choice for diverse power needs. Additionally, technological innovations have enhanced their efficiency and performance, further solidifying their position as a versatile and dependable power source for both industrial and residential applications.

SME

News Snippet

Gruner Renewable Energy secures \$60 million to expand CBG projects in India

Gruner Renewable Energy, a leader in sustainable biogas solutions in India, has secured \$60 million in funding.

This investment will enable Gruner Renewable Energy to further expand its presence in the green energy domain as it moves ahead to establish new Compressed BioGas (CBG) plants across the country.

"Establishing CBG plants in India is crucial for fostering a self-reliant and sustainable future. By promoting clean energy production and reducing dependence on imported compressed natural gas (CNG), we contribute significantly to India's vision of energy independence. The Union Budget 2023-24 announcement to establish



Utkarsh Gupta,
Founder & CEO,
Gruner Renewable
Energy

500 new waste-to-wealth plants under the GOBARDHAN initiative has been a major boost for the sector. With 113 functional CBG plants, 667 in development, and 171 under construction, the growth is substantial. These policy enablers promote a circular economy and sustainable development. This investment in Gruner from like-minded partners will be essential for driving this transformation," said Utkarsh Gupta, Founder & CEO, Gruner Renewable Energy.

Gruner plans to utilise this funding to significantly enhance its operations and market presence. This investment is expected to increase Gruner's market share over the next five years.

SME



Hitachi Hi-Rel Partners with VGEC, Ahmedabad

This partnership seeks to offer Graduate Engineer Apprentices (GEAs) hands-on experience and industry knowledge, promoting skill enhancement and driving innovation in power electronics. One of the aims of this collaboration is to educate students by training them in future-ready skills by the best of the industry.

Hitachi Hi-Rel Power Electronics Private Limited (HHPE), a leading manufacturer of industrial ups, it & infra ups, medium & low voltage drives, solar central & string inverters, and air compressors, has established a partnership with Vishwakarma Government Engineering College (VGEC), Chandkheda-Ahmedabad, an Engineering College of Ahmedabad. This collaboration aims to enhance the knowledge and skills of recently recruited Graduate Engineer Apprentices (GEAs) within the Customer Support Division (CSD) of Hitachi Hi-Rel Power Electronics.

The MoU signing ceremony took place at the Auditorium of Vishwakarma Government Engineering College (VGEC) on July 5, 2024. In the gracious presence of Shri Banchhanidhi Pani (IAS), Commissioner of Technical Education, Government of Gujarat, and Darshan A Shah, Managing Director, Hitachi Hi-Rel Power Electronics along with Dr V. S. Purani, Principal, VGEC, the event signified a joint commitment to knowledge sharing, practical exposure, and industry-academia collaboration, in presence of VGEC staff, Hitachi Hi-Rel senior officials and students.

The formal signing & exchange of the Memorandum of Understanding (MoU) between Dr V. S. Purani, Principal, VGEC and Kapil Bijani, CHRO & President – IT, Hitachi Hi-Rel during the event solidified the commitment to skill development, collaboration, joint research and knowledge exchange.

Banchhanidhi Pani, Commissioner, Technical Education, Government of Gujarat, emphasised the significance of this collaboration, stating that it marks a positive beginning and a significant achievement for both Hitachi Hi-Rel and VGEC.

Darshan A Shah, Managing Director, Hitachi Hi-Rel Power Electronics, expressed the belief that partnerships with educational institutions like VGEC are essential. He encouraged apprentices to embrace curiosity, innovation, and lifelong learning. He envisioned a collaborative journey wherein academia and industry shape the future development of power electronics



ecosystem. He also expressed that there is further need for industry & academia partnership of this kind in Gujarat for mutual benefit and for instilling practical knowledge in new breed of engineers.

Kapil Bijani, CHRO and President - IT, Hitachi Hi-Rel vibrated this sentiment, emphasising the importance of taking such programs seriously. Strengthening their power electronics knowledge base will undoubtedly benefit the GEAs in their future endeavours. He also expressed that industry and academic institutes should work towards gaining patents for their work and that way India as a nation will be acknowledged in the global space.

J. K. Soni, VP - Customer Service Division, Hitachi Hi-Rel provided insights into the program's structure and benefits, highlighting how practical exposure and expert guidance will empower the next generation of engineers. He emphasised the need for Safety during the program also welcomed the new GEAs into this maiden program between HHPE & VGEC.

N.N. Wadode, Deputy Director of Training, Board of Apprenticeship Training (WR region, Mumbai), emphasised the significance of Graduate Engineer apprenticeships in preparing students for the professional world through hands-on experience.

This collaboration marks a step toward empowering GEAs through practical exposure and expert guidance. Hitachi Hi-Rel looks forward to a fruitful partnership with VGEC.



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“Global OEMs are Revisiting Their Sourcing Strategies.”

In the last five years, traditional procurement models are struggling to keep pace with advancements, shifting consumer expectations, and geopolitical disruptions. As businesses navigate these challenges, they are re-evaluating their approaches to stay resilient in an interconnected world, says **Shubhankar Chatterji**, Chief Supply Chain Officer, Cummins India in conversation with Rakesh Rao.

How have the dynamics of sourcing changed in the last 5 years?

In recent years, conventional procurement models have encountered challenges in keeping up with the demands of a fast-paced and interconnected business world. Driven by a combination of rapid technological advancements, shifting consumer expectations, geopolitical factors, and evolving market conditions, the dynamics of sourcing have undergone significant changes. Suppliers play a critical role in enabling business strategies in these disruptive environments. Some key trends that have impacted sourcing strategies are:

- 1. Increased supply chain complexities:** With shortened time-to-market and complex product life cycles, business supply chains have become more intricate. Companies today face challenges related to managing multiple suppliers, navigating international regulations, and addressing logistical hurdles. Customer expectations have changed over the last few years and demand products in the shortest time with the lowest possible cost and customised service levels.
- 2. Geopolitical disruptions:** Recent global supply chain disruptions have underscored the importance of supply chain resilience and robust risk management strategies. As a result, many companies are diversifying their sourcing strategies with near-shoring and reshoring sourcing initiatives to reduce lead times and transportation costs and mitigate risks associated with long supply chains. Global OEMs are revisiting their sourcing strategies considering risks associated with trading with suppliers in



China and this situation is providing opportunities to countries like India, Vietnam, and Thailand.

- 3. Technological transformations:** The adoption of digital technologies has transformed sourcing practices. Data analytics and cloud-based platforms have enabled organisations to make data-driven decisions, enhance supplier relations, and optimise sourcing strategies based on real-time data. Additionally, automation in procurement has upgraded task-handling processes making them more efficient and faster. Advanced Analytical capabilities like Gen AI, Blockchain, and Machine learning will enable the supply chain to be more resilient through predictive analytics.
- 4. Focus on sustainability:** Supply chain sustainability strategies have long been integral to achieving corporate environmental, social, and governance (ESG) initiatives. There is a growing emphasis on sustainability within sourcing. Companies are increasingly adopting sourcing strategies that prioritise sustainability and are prioritising suppliers that adhere to ESG criteria. Countries are adopting regulations to improve compliance with sustainability across the value chain. SEBI brought the BRSR (Business Responsibility and Sustainability Reporting) code in India and Suppliers are improving capabilities to comply with the ESG requirements.
- 5. Talent and skill evolution:** Role of procurement professionals have evolved, with greater emphasis on strategic thinking, negotiating skills, and data analysis. Hence, talent management becomes vital to attract top talent across the specialties, while continuous learning and upskilling have become essential for existing procurement professionals

to remain competitive and develop a future-ready workforce.

What are key challenges before supply chain managers today?

Supply chain managers today face a multitude of challenges that have evolved due to recent global events, technological advancements, and changing market dynamics. Some are:

- 1. Technological integration:** Replacing complex operations with the implementation of advanced technologies such as AI, Internet of Things (IoT) and automation presents wide-ranging challenges. Many organisations struggle to operationalise these technologies effectively, leading to inefficiencies and potential cybersecurity risks. Further, poor data quality and governance can hinder analytical capabilities, impeding real-time decision-making capacities.
- 2. Skilled workforce constraints:** The supply chain sector is grappling with a significant shortage of skilled labour and a lack of qualified candidates. This shortage impacts operational efficiency. Further high turnover rates in logistics and warehousing can disrupt operations leading to delays and increased costs.
- 3. Increased costs:** Rising freight prices and logistics expenses have become a significant concern, driven by increased demand and limited shipping capacity. Additionally, a shortage of critical materials is one of the most pressing challenges faced by supply chain professionals. These shortages can increase costs for supplies, cutting into profits and often leading to increased production timelines.
- 4. Demand forecasting challenges:** Modern businesses often use a combination of historical data and market research to forecast demand accurately and prepare for any fluctuations. However, rapid changes in consumer demand make accurate forecasting difficult. Effective and complex demand forecasting can reduce the likelihood of overstocking, which can accrue higher carrying costs, and stockouts, which can lead to hampering production.
- 5. Increased risk profile across the value chain:** Supply chain managers today must navigate a complex landscape filled with labour shortages, technological challenges, rising costs, and sustainability goals. Addressing these challenges requires strategic planning, effective risk management, and a commitment to continuous improvement.

How can companies ensure a resilient supply chain amid an uncertain global environment?

To ensure a resilient supply chain amid a highly uncertain global environment, companies must adopt advanced technologies and prioritise workforce development. AI-enabled forecasting, control towers, and end-to-end visibility tools are essential for anticipating disruptions and managing supply chain complexities. These technologies provide real-time insights and predictive analytics, allowing companies to respond swiftly to changing conditions and maintain operational continuity. Additionally, companies should focus on building a skilled workforce capable of managing these advanced technologies. Diversification of suppliers, strengthening relationships with logistics providers, risk assessment, effective scenario planning, and integrating sustainability into supply chain practices are some of the other strategies that companies can deploy to ensure enhanced resiliency in supply chains.

With factories aiming to become smarter, what are its implications on supply chain management (SCM)?

As factories evolve to become smarter, the implications for supply chain management (SCM) are profound and transformative. With Industry 4.0, companies are transitioning to IoT-based technologies, smart manufacturing, condition monitoring systems with remote access, and so on. Cummins is making progress in this area by connecting machines to access real-time information pertaining to machine downtime/ idle time to improve OEE (overall equipment efficiency). With continuous monitoring of critical machine health-related parameters, we plan to implement proactive maintenance practices using CBM (condition-based maintenance) methodologies.

Deploying the right talent at the critical machines is critical in achieving best in class quality performance. Combining machine data and quality systems information helps in planning the talent management and deployment of the right skills at the required machines in a timely manner. We expect RFT (Right First Time) throughput increase with the use of these technologies on the shop floor.

Moreover, edge computing minimises latency and enables real-time data analysis, allowing for faster and more accurate responses to supply chain disruptions. Technologies like AR and VR improve training, maintenance, and assembly process design, leading to more skilled workers and optimised processes. These advancements drive efficiency, innovation, and competitiveness, making SCM more resilient and adaptive in the dynamic manufacturing landscape.



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Reconciliations Under the GST

The Goods and Services Tax 'GST' was introduced in India on July 1, 2017, as a comprehensive indirect tax to replace multiple cascading duties and taxes levied by the central and state governments. It has transformed the tax structure by creating a single, unified market across the country. However, with the new tax regime, came the need for stringent compliance measures, one of which is the reconciliation process say **Vishal Sharma and Ankit Tibrewal** of Ernst and Young LLP, India.



Reconciliation under the GST is a critical activity that ensures the accuracy of the tax amounts credited or debited in the accounts of businesses. It involves matching the data of different ledgers, data filed by the suppliers with the recipients and rectifying any discrepancies that may arise.

Understanding the various reconciliations under the GST:

There are some reconciliations mandated by the GST law, such as Reconciliation of Form GSTR-2B with Purchase Register, Reconciliation of goods sent to and received from the job worker, Reconciliation of financial

turnover with GST turnover, Reconciliation of GST input tax credit ('ITC') and so on.

However, the taxpayers must do several other reconciliations which are although not mandated by the GST law directly, but the same are necessary for effective compliance or are required by the GST authorities during audits and assessments.

We have tabulated below some of the reconciliations being done by the taxpayers under the GST:

The above list is not an exhaustive list. It is imperative to note that taxpayers must do multiple reconciliations first to prepare and identify records for reporting in Form GSTR-1. Preparation of Purchase Register itself requires reconciliation between multiple accounting records and reports.

The need for reconciliation:

The primary reason for reconciliation under the GST

Reconciliation	Process	Required for	Frequency
Reconciliation of Form GSTR-2B with Purchase register	In this reconciliation, one needs to reconcile its purchases with the documents reported by the suppliers in their Form GSTR-1, which then appears in Form GSTR-2B of the recipient	Availment of ITC in Form GSTR-3B	Monthly and Annual
Reconciliation of Import Register with Bills of Entry data and Form GSTR-2B	In this reconciliation, one needs to reconcile their Import Register with Form GSTR-2B and details appearing on Bills of Entry	Availment of ITC in Form GSTR-3B	Monthly and Annual
Reconciliation of goods sent to and received from job worker	In this reconciliation, one needs to reconcile and check whether the goods sent out for job work have been received back or not within the statutorily prescribed time limit	Compliance with Form GST ITC-04	Half yearly
Reconciliation of financial turnover with GST turnover	In this reconciliation, one needs to reconcile and find the reasons for difference between financial and GST turnover	Compliance with Form GSTR-9C	Annual
Reconciliation of ITC as per the financial GLs with ITC availed in GST returns	In this reconciliation, one needs to reconcile and find the reasons for difference between ITC as per the financial GLs and ITC availed in GST returns	Compliance with Form GSTR-9C	Annual
Reconciliation of Form GSTR-1 details with E-invoice and E-way bill records	In this reconciliation, one needs to reconcile the outward supplies data to be reported in Form GSTR-1 with E-invoice and E-way bill records	Audit/ Assessment by the GST authorities	Monthly/ On demand
Reconciliation of Form GSTR-1 with Form GSTR-3B	In this reconciliation, one needs to reconcile and find out the reasons for differences, if any, between output GST liability reported in Form GSTR-1 and Form GSTR-3B	Adjudication and compliance with GST Annual Return (Form GSTR-9)	Annual/ On demand
Reconciliation of purchase register with expenses as per the Profit and Loss Account	In this reconciliation, one needs to reconcile the expenditure as per the Profit and Loss Account with the expense items as per the purchase register	Compliance with Clause 44 of Tax Audit report	Annual

is to validate the details reported in GST returns and to validate the ITC claims, as ITC is a mechanism that allows taxpayers to off-set the GST paid on inputs, input services and capital goods, from the GST liability to be paid on the output side. If the transactions appearing in

Form GSTR-2A/ 2B are not matching with the purchase register, then the ITC claims would be denied, leading to reversal of ITC and potential interest and penalties.

Moreover, reconciliation also helps in identifying any inadvertent errors or intentional tax evasion. It ensures

transparency and accountability in the tax system, thereby enhancing compliance and minimising the risk of audits and assessments by the tax authorities.

The process:

The reconciliation process under the GST can be bifurcated into several steps:

1. **Collection of data:** Businesses need to extract/collect the relevant data from their ERP system and the corresponding data reported in GST returns from the GST portal.
2. **Matching of transactions:** The next step is to match the data extracted from the system with the data extracted from the GST portal. For example - to determine the ITC eligibility, Purchase Register is extracted from the system and is matched with the data available in Form GSTR-2B downloaded from the GST portal. This matching includes reconciliation of various fields, such as - Invoice number, Invoice date, Supplier GSTIN, Taxable value, GST rate, GST amounts, Place of Supply among others.
3. **Identification of discrepancies:** Any mismatch in the data needs to be identified. Discrepancies can arise due to various reasons, such as - incorrect data entry, missing or unrecorded invoices, difference in tax amounts etc.
4. **Communication with relevant stakeholders:** In case of mismatches, businesses should communicate with the relevant stakeholders (can be internal or external) i.e. Mismatch between Purchase register and Form GSTR-2B needs to be communicated to the suppliers to rectify the errors. The suppliers are then required to amend their GSTR-1 filings to correct the discrepancies.
5. **Rectification and adjustment:** After identifying the mismatches, businesses should rectify the errors in their records and make necessary adjustments in their subsequent GST return filings.
6. **Documentation:** It is important to maintain proper and robust documentation of the reconciliation process for effective compliance, future reference and audit readiness.

Challenges in reconciliation:

The reconciliation process under the GST comes with its own challenges. Some of the common issues being faced by the businesses includes:

- **High volume of data:** Large businesses with multiple GST registrations and numerous transactions find it difficult to manually reconcile each entry.
- **Unstructured data:** Even after 7 years of GST

implementation, businesses are still struggling to have structured data which is required for reconciliations.

- **Single source of truth:** Accuracy and reliability of the data received from multiple stakeholders and different sources is crucial for reconciliations.
- **Time constraint:** The reconciliation process is time-bound, and delays can lead to missed ITC claims, heavy liabilities resulting in potential loss to the business.
- **Dynamic changes in GST law:** Frequent changes in GST rules and regulations can complicate the reconciliation process.

Best practices:

To overcome the challenges and ensure an efficient reconciliation process, businesses can adopt the following best practices:

- **Use of automation tools:** Automated reconciliation tool/ software can handle large volumes of data, reduce errors/ issues faced in manual reconciliation, saves time and provides management reports/ dashboards which helps in quick and effective decision making.
- **Regular reconciliation:** Conducting reconciliations on a regular basis can substantially reduce the pendency and helps in resolving errors/ issues on a near real time basis.
- **Training and awareness:** Keeping the finance, accounting and tax teams informed and updated about the latest GST amendments/ updates is very critical.
- **Supplier collaboration:** Establishing strong communication channels with suppliers can facilitate quick resolution of mismatches/ errors.

The way forward:

Reconciliations under the GST is a vital process that ensures smooth compliance, proper claiming of ITC and discharge of correct GST liability in a timely manner.

While there are several challenges, adopting best practices and leveraging the technology can make these processes more easy, effective and manageable.

As the GST regime continues to evolve, businesses must stay vigilant and proactive in their reconciliation efforts to avoid financial setbacks and maintain healthy compliance records.

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(Views expressed above are personal)

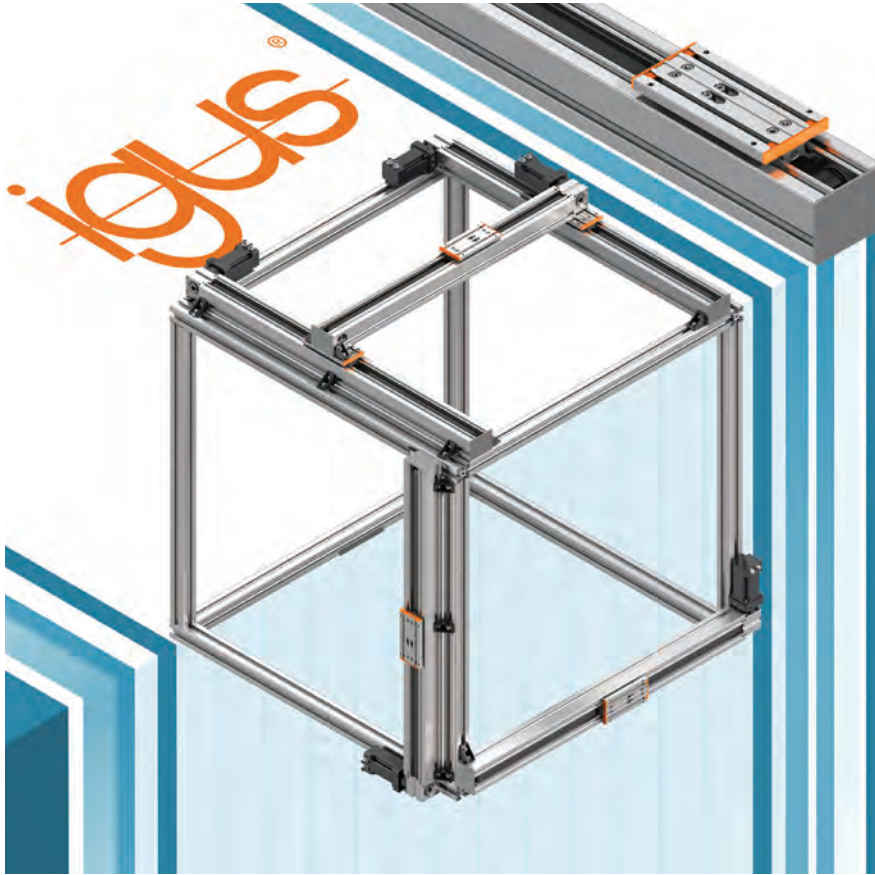
About the authors:

Vishal Sharma is a Consultant- Indirect Tax, at Ernst & Young LLP, India. Ankit Tibrewal is a Senior Manager- Indirect Tax, at Ernst and Young LLP, India.



Igus Expands Drive Range With New Toothed Belt Axes

The drylin ZLX series is suitable for all handling tasks up to a stroke length of 3,500mm and is available ready for connection.



It is easy to combine the drylin ZLX toothed belt axis quickly with standard mechanical engineering profiles in a kind of modular system.

The motion plastics specialist igus is expanding their drive technology range with new toothed belt axes: the compact, robust and lubrication-free drylin ZLX high-performance series. The anodised aluminium profile of the axes has been developed in a completely new geometric design. As a result, drylin ZLX not only looks like a mechanical engineering profile, but can also be quickly and easily integrated into a modular profile system. With a load capacity of 150N and speeds of up to 3m/s, the new toothed belt axis is suitable for automated production lines, pick-and-place systems and 3D printers, among others.

With drylin ZLX, igus relies on proven technology in

a new design: the heart of the new toothed belt axis is a linear guide system from the drylin W series, installation size 16, which is integrated into the interior of a robust, corrosion-resistant and clear anodised high profile. In contrast to the other igus axes, the toothed belt to which the carriage is attached runs inside the profile. As a result, the axis looks like a mechanical engineering profile. However, the design also has a technical advantage: “Classic aluminium profiles have very specific dimensions, and there are also standards for the grooves, which our drylin ZLX fulfils,” explains Stefan Niermann, Head of the drylin Linear and Drive Technology Business Unit at igus. “Thanks to commercially available slot nuts and connecting elements such as brackets, it’s easy to combine it quickly with standard mechanical engineering profiles in a kind of modular system. This is particularly useful for linear robot structures. And thanks to the new design, everything looks

as if it has been cast from a single mould.”

Customers therefore benefit from a standardised design and reduced assembly times. In addition, you can adjust belt tension on the new axis directly on the carriage without dismantling any components – simple and quick with an adjusting screw.

Quiet, lubrication-free, robust

drylin ZLX is quiet, robust and, like all igus axes, runs without lubricant over the entire stroke length. The company also relies on the principle of “sliding instead of rolling” for the new toothed belt axis. Guide systems work over a large area on the rail or shaft. Due to the

larger contact surface and lower surface pressure, it is possible to use plastic components and softer materials such as aluminium. This not only makes the design lighter, but also allows it to run quietly.

The carriage moves over lines made of the tribopolymer iglidur J200, which offer a long service life with fast and slow adjustments. The solid lubricants integrated into the high-performance plastic are released when the axis is running and enable maintenance-free dry operation. To improve performance, the designers have optimised the ratio between the dimensions of the guide system and the deflection. Larger deflection radii improve the wear resistance of the toothed belt as it is subjected to less bending and therefore less stress.

At the same time, the installation size 16 of the drylin W linear guide ensures longer axis service life. “We have optimised the guide system for the installation space. Large gliders mean a larger contact surface, which in turn enables a higher load capacity,” says Niermann. drylin ZLX is suitable for loads of up to 150N and has a stroke length of 3,500mm. Tests have also revealed that it achieves a running performance of up to 20,000km without maintenance with a horizontal load of 5kg and

0.5m/s, for example. The service life is predictable online.

Gearbox and electric motor

The new toothed belt axis can be used in combination with various linear robot structures as well as in stand-alone operation. A large number of grooves offer various options for attaching accessories such as sensor mounts or protective devices to the profile and carriage. igus supplies the toothed belt axes ready for installation with electric motors and offers a choice of three motor concepts: stepper, EC/BLDC or DC motors. These can all be operated with the D1 universal control system, or with cost-effective drives such as D3, D5, D7, D8 or D9.

Thanks to the flexible design of the connection elements, customer motors from other manufacturers can also be attached on request. drylin ZLX is characterised by a precise and rigid motor connection. The drive can be realised via a double expanding mandrel or a plug-in shaft, which increases flexibility when adapting to different applications. Examples of suitable applications include automated production lines, pick-and-place systems and 3D printers. Use the drylin drive technology online configurator to configure the new linear guide in just a few minutes.

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News Snippet

Taplow Group S.A. hosts talk on ‘Unlocking the power of AI in manufacturing’

Leading executive search firm, The Taplow Group S.A., recently hosted a round table discussion on the transformative role of artificial intelligence in the manufacturing sector titled ‘Unlocking the power of AI in manufacturing’ in Pune.

Bringing together CEOs and MDs from leading manufacturing entities, the event served as a learning platform for industry leaders to exchange invaluable insights, experiences, and success stories in integrating AI and machine learning technologies within the manufacturing sector and in leveraging AI to drive innovation and competitiveness.

With an endeavour to initiate conversations on topics of criticality for business leaders, The Taplow Group S.A. regularly conducts learning sessions under the brand name ‘Vrittant’ across the country.

Moderated by Prashant Dahibhate, Head- Global Operations, Wipro AI and Automation, and Shailendra Abhyankar, Founder, FinSoftAi, the round table in question featured insightful conversations and valuable insights from senior leaders in the manufacturing industry across different sectors on compelling

narratives and solutions, sparking collaborative dialogues aimed at harnessing AI for sustainable progress and knowledge management.

The event highlighted the critical role of visionary leadership in driving AI adoption, emphasising that a top-down commitment combined with bottom-up innovation is vital to fostering a culture of continuous learning and advancement.

From navigating the phases of adoption to leveraging AI for enhanced efficiency, safety, and human-centric operations, the event underscored the transformative potential of AI in creating new job opportunities and driving organisational growth.

The Taplow Group S.A. has a longstanding reputation for delivering tailored executive search and leadership advisory services to clients across various industries. With a storied legacy spanning over 22 years, The Taplow Group S.A. orchestrates success through a team of over 150 astute search consultants across 45 offices, spanning 20+ countries and 6 continents. With the operational epicentre resting in London, the India headquarters are in the Delhi NCR region.

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The Emergence of Industry 5.0

While many businesses are still in the process of incorporating the concepts of Industry 4.0, Industry 5.0 – which operates basically on strategies of human centric approach, improved resilience and focussed sustainability – is only catalysing the advances with more traction towards achieving the goals.

As they say, change is the only constant factor, and industrial revolution is not an exception to this. There has been a constant evolution of industrial revolution right from Industry 1.0 beginning in around 1780 using Steam and Water, to today's times, when we have Artificial Intelligence (AI) growing at a sudden breakneck speed involving robots and super intelligence. We now are emerging sturdily and almost exponentially, with the fifth Industrial Revolution (Industry 5.0).

The objectives in this industrial revolution primarily focuses on sustainable and resilient human-centric growth, to enhance the throughput of workplace processes based on personalisation of AI powered robots for seamless man-machine interface.

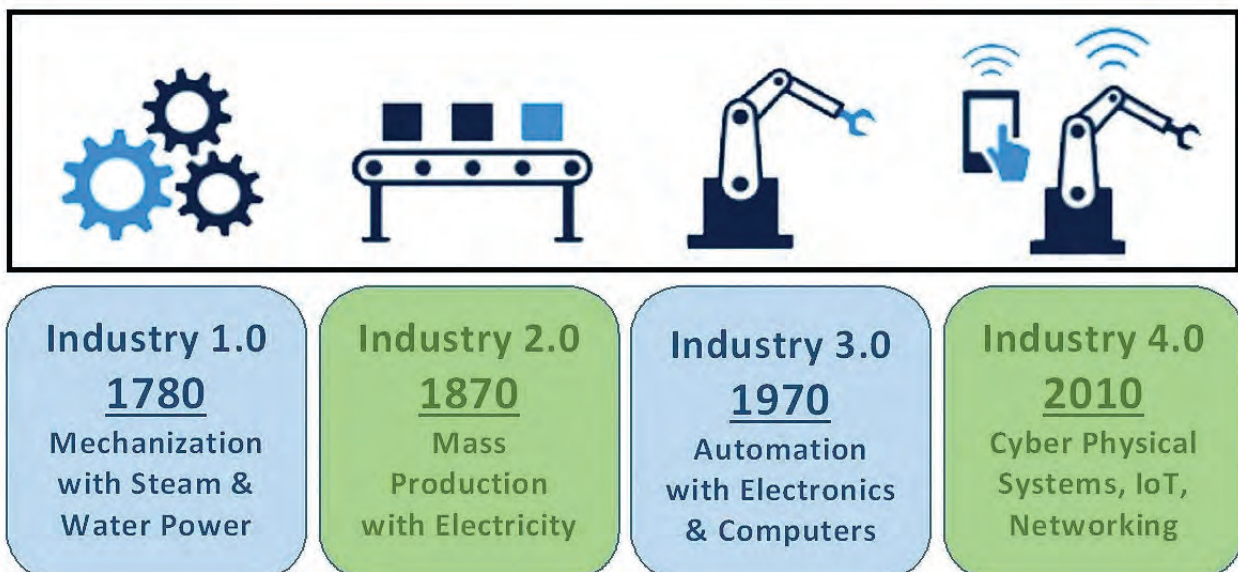
Rather than encompassing the concepts of just manufacturing and processes, the objectives of Industry 5.0 goes several steps ahead of Industry 4.0, distinctively, and inculcates

humans working alongside advanced IT developments such as AI, Machine Learning (ML), big data analysis, robotics, predictive analysis, smart systems and virtualization.

The European Union rightly describes this new revolution as, “A vision of industry that aims beyond efficiency and productivity as the sole goals, and reinforces the role and the contribution of industry to society. It places the wellbeing of the worker at the centre of the production process and uses new technologies to provide prosperity beyond jobs and growth while respecting the production limits of the planet.”

Evolution of industrial revolution

Industry 5.0 encourages intelligent service based model with higher value jobs to deliver custom-made products and solutions with a personalised and human touch, as businesses become more flexible and agile. Challenging times like Covid-19, natural calamities and global supply shortages have only accelerated the “Net Positive” goal to make the world a stable and better place by anticipating and collectively reacting to any



Evolution of industrial revolution from Industry 1.0 to Industry 4.0

unforeseen crisis. This transition from a highly materialistic objective to realisation of more humane and compassionate approach can be understood from the evolution of these 5 revolutions over the centuries.

Industry 1.0: The first revolution started its ride of industrial growth around 1780 on the newly discovered strengths of using steam and water to power the machines and wean away from manual production of goods.

Industry 2.0: This second industrial revolution in 1870, built further on its strength and ease of machine production. Powered with the discovery and usage of electricity, this revolution gradually graduated into mass production through assembly lines for the next 100 odd years.

Industry 3.0: Electronics and then computers engineered this third revolution in the 1970s by replacing human labour and focussing on efficiency and productivity. This also raised the intrinsic fear of machines taking over the human jobs and depriving them of their livelihood, resulting in offshoring of production to low-cost economies. This revolution also triggered the concept of globalisation in the form of Industry 3.5.

Industry 4.0: We are now in the peaking phase of the fourth industrial revolution, based around the concept of automation and digitalisation. Modern IT concepts like AI technologies, connected devices, data analytics, cyber-physical systems, digital transformation, etc. are evolving from their infancy.

Industry 5.0: This iteration is fast picking up its pace with a broader perspective on human centric approach, to balance the fast paced mechanisation for sustainable and resilient manufacturing processes with societal value and wellbeing, akin to a far refined Corporate Social Responsibility (CSR). This tends to put people and planets before economics and profits.

Industrial revolution with human centric approach



Industry 5.0 operates basically on strategies of human centric approach, improved resilience and focussed sustainability. Real talented people are considered as effective assets instead of mere head counts. Companies focus on developing flexible and agile strategies to mitigate unexpected challenges while strengthening their resilience. In a global



scenario, they tend to become more joined-up and become part of the solution for sustainability goals.

In a short period of time since the gradual evolution of Industry 5.0, there have been many instances where machines have been enabled to work collaboratively alongside human workers. Robots, for instance, have been trained to take over monotonous, exhausting and dangerous work from who would have been otherwise hapless workers. Medical science has jumped several strides to deliver precision and accuracy in micro and nano surgeries. These concepts have been extensively employed in grey areas like defence. Sports and games have greatly benefitted with the split-second information that they can derive from loads of real-time data.

The precision and repeatability of machines are complimented with the critical and adaptive thinking of humans. While many businesses are still in the process of incorporating the concepts of Industry 4.0, Industry 5.0 is only catalysing the advances with more traction towards achieving the goals.

However there are downsides for this revolution in terms of perception, willingness and acceptance in face of different kinds of anticipated and unexpected perils. Financial capabilities required for adaptation of the technologies is another major hurdle. Huge energy and extensive energy management is also necessary to power up the data guzzling machines. These challenges can be overcome with the solutions offered by the technology itself with smart and cognitive computing solutions.

Industry 5.0 is value driven and integrates humanity into the system to develop resilient processes to actively deliver solutions that can preserve resources, ensure social stability and create an overall worldwide sustainable environment.

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Article Courtesy: VBR Technologies Pvt Ltd

For details contact, Balaji Rao of VBR Technologies Pvt Ltd, Bengaluru, on Mob: +91 87222 22500, Email: balaji.rao@vbrtech.com, or visit www.vbrtech.com



Gandhi Automations' Dock Levelers For Safe Transition

Gandhi Automations offers complete logistics solutions by providing Dock Levelers, Dock Shelters, Sectional Overhead Doors and Dock Houses.



Electro-hydraulic Dock Levelers offered by Gandhi Automations are not only 'a bridge for connecting a vehicle', but also facilitate fast, smooth and safe transition by compensating the difference in heights between the loading bay and the vehicle. This contributes to minimising energy used and savings on heating and cooling costs resulting in maintaining the quality of the transported goods. Dock Levelers offered by Gandhi Automations are designed as per EN 1398 standard for the most demanding loading and unloading operations.

Efficient loading & unloading the goods:

The importance of efficiently loading goods has always been evident, and it has increased over the years, essentially for two reasons: the lesser availability and the higher cost of manpower. Consequently lesser qualified manpower is being utilised which leads to damage to the goods.

The cost of loading and unloading the goods can be calculated precisely and is exactly definable, which allows for a scientific approach to find out the investment that goes into the process. Gandhi Automations has always designed solutions based on such scientific approach and feedback from clients. The Dock Levelers offered by the company ensure loading and unloading with lesser effort and minimal cost.

It is possible to load and unload your products in a safe way and in the process, obtain remarkable energy savings. The Dock Leveler remains with the Loading Bay in rest position and the Sectional Overhead Door closed, until the vehicle is positioned. The driver drives back centring to the Dock Shelter and stops the vehicle the moment it gets in contact with the bumpers.

The Sectional Overhead Door is then opened only when the vehicle is positioned, brakes are applied and engine is shut off. This eliminates the exit of hot

air, intake of cold air (or the opposite in hot areas and inside air conditioned places). After the Sectional Overhead Door opens, the lip of the Dock Leveler connects to the truck bed for loading / unloading to take place.

At the end of the loading/unloading the Dock Leveler is put in rest position and the Sectional Overhead Door is closed, without moving the vehicle. The vehicle then departs at the end of the process. Following are the four types of Dock Levelers

a) Radius Lip Dock Levelers

Radius Lip Dock Levelers are available in multiple sizes and capacities. It allows the dock to connect with the truck bed, thus making it convenient to drive directly on and off with forklift trucks etc. Also the Self-Cleaning Lip – Hinge System does not retain dust and dirt which allows a smooth operation.

b) Telescopic Lip Dock Levelers

Telescopic Lip Dock Levelers are ideal for connecting vehicles unable to drive near dock i.e. sea containers, side loading railway wagons etc. These Dock Levelers can be supplied with a lip extending up to 1 m.

c) Edge-of-Dock Levelers

Edge-of-Dock Leveler is developed in compliance with the latest European safety standard, EN 1398. It has a capacity of 6000kg and is suitable for use with all types of material handling equipment.

d) Forklift Roll-Off Barrier Lip Dock Levelers

The newly introduced product Forklift Roll-Off Barrier Lip Dock Leveler add a run-off protection which prevents accidental forklift roll-off when the Overhead door is open and no trailer is stationed at the dock. These dock levelers are designed and built to provide all the benefits of the hydraulic dock leveler along with the additional benefit of providing a formidable barrier.

Entrance door with automations:

Gandhi Automations Pvt Ltd offers Porto and Max Vista – Automatic Sectional Overhead Doors – the ideal solution for all industrial and commercial needs.

Porto: Porto Sectional Overhead Doors are ideal for all industrial and logistics needs. The design and different solutions offered ensure the door to be aesthetically pleasing and perfectly suited to any architectural environment – from modern and traditional industrial buildings to fine commercial buildings. As these doors slide vertically, stopping in the proximity of the ceiling, they blend in with the architectural features of the



building. Porto doors are built to ensure the highest ease and flexibility of use which, in turn ensures a quick, hassle free and accurate replacement of old doors. Their compact size ensures more available space both inside and outside the premises. Depending on the structure of the building and the requirement, a choice can be made from a standard lift, vertical lift, horizontal lift, low headroom or inclined lift. Porto range comprises of a wide series of track systems, panel options and safety features. Special glazed doors provide excellent lighting and vision into the building.

Max Vista: Max Vista Sectional Overhead Doors are ideal for industrial and commercial buildings. The doors are made with a combination of aluminium panels and transparent acrylic, gridded or meshed windows giving it a distinctive look and enhancing the look of a building. Max Vista Doors make the environment bright and pleasant to work in as it allows natural light to pass through the large clear areas.

Gandhi Sectional Overhead Doors provide heat insulation and soundproofing thus improving the working conditions on the premises and saving energy. The products are affixed with a CE mark making them reliable and safe.

Gandhi Automation's Dock Levelers & Sectional Overhead Door are equipped with the most secure safety devices and accessories.

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For details, contact Gandhi Automations Pvt Ltd, Mumbai on
Tel: +91 22 66720200 / 66720300 (200 Lines),
Email: sales@geapl.co.in, or visit : www.geapl.co.in

(Communication provided by the management of the company)

THREE POLE, NON-DIRECTIONAL 3 O/C OR 2 O/C + 1 E/F RELAY

JVS Electronics Pvt Ltd offers a wide range of three pole, non-directional 3 O/C or 2 O/C + 1 E/F relay JRC 053P/ JRC 053.



Features:

- The relay measures the line current from each of the phases and if exceeds the set operating current, then relay extends a trip signal after the operating time. The relays operating time is determined by selecting one of the four inverse time current characteristics. The relay has facility to active / inhibit the high set protection feature. The relay output contacts are self reset type. Relay operation without any fault current is determined by trip test facility.
- It features include:.. Software based design; Programmable me current characteristics; Choice of four IDMT curves; Draw out case; Wide range auxiliary supply; Low burden.

About the Company: JVS Electronics Pvt Ltd is an exporter, manufacturer and supplier of audio indicating instruments, visual indicating instruments, electrical indicating instruments, etc.

Scan the QR Code for instant product enquiry



Contact:

JVS Electronics Pvt Ltd, Bangalore
Mobile: 09448288863
Email: bangalore@jvselectronics.in

BELT GRINDER ATTACHMENT ARMS BSVA

PFERD offers a wide range of belt grinder attachment arms BSVA.



Features:

- The belt grinder attachment can be pivoted on the corresponding drive system or hand piece, allowing flexible adaptation to each individual work situation.
- Its advantages are: Easy, quick belt replacement due to spring clamping. Highly precise belt guidance due to adjustable belt clamping force and fixable belt arm. Sturdy steel design.
- Allows for use of the full roller width. Extremely slim fixing lugs on the facing roller. Asymmetrical arms allow for flush lateral grinding.

About the Company: PFERD engages in development, production and support and distribution of tool solutions on jobs for surfaces and material cutting.

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Contact:

PFERD, Bengaluru
Tel: 080-42187117
Mobile: 09880665415, 09741481117
Email: sales@swit.in

INTERNAL RECIRCULATION TYPE BALLSCREW

IBK Engineers Pvt Ltd offers a wide range of internal recirculation type ballscrew.



Features:

- HIWIN uses precise procedure to create groove profiles, either by grinding or rolling. Accurate heat treatment is used to ensure the hardness of ballscrews. These result in maximum load capacity.
- The internal recirculation type has the smallest nut size compared to the other recirculation type. Suitable for installations where there are space limitations.

About the Company: Established in 2014, IBK Engineers Pvt Ltd, is engaged in the wholesaling, supplying, distributing and trading of deep groove ball bearing, mechanical bearing, roller chain, steel rear sprocket, safety equipment, automotive components, electric equipment, etc.

Scan the QR Code for instant product enquiry



Contact:

IBK Engineers Pvt Ltd, Bengaluru
Tel: 080-26321112 Mobile: 09880566644
Email: raju.kn@ibizkart.com

CELSIO HEAT SHRINKING TOOLHOLDER

Schunk Intec India Pvt Ltd offers a wide range of Celsio heat shrinking toolholder.



Features:

- The CELSIO heat shrinking system provides an economical clamping system for individual machining cases. The optimum ratio of radial rigidity, interfering contour, and holding torque ensure top quality.
- Secure and friction-locked clamping for transmission of high torques. Good ratio between radial rigidity and interfering contour. Universally applicable.
- CELSIO is a heat-shrinking system that is suitable for different shrinking devices. It uses induction heat from eddy currents to heat the heat shrinking toolholder, which clamps the tool shank firmly. The unit of toolholder and tool forms an almost homogeneous connection.

About the Company: Schunk Intec India is engaged in products distribution and supply of industrial automation systems, automation work holding, tool holding, heat shrink tool holder, etc.

Scan the QR Code for instant product enquiry



Contact:

Schunk Intec India Pvt Ltd, Bangalore
Tel: 080-40538999
Email: rakhi.singh@in.schunk.com, info@in.schunk.com

PROPORTIONAL ROTARY SOLENOIDS

Magnets India offers a wide range of proportional rotary solenoids.

Features:

- These proportional rotary solenoids proportional rotary solenoid according to DIN VDE 0580 Horizontal torque vs. rotation angle characteristic constant torque in the working area Proportional relation between torque and current Short correcting times through per-magnetized system clockwise and anti clockwise.
- Drive for industrial control units, control technology, rotary slides and flap valves in fluid technology.
- By reversing the polarity armature guided in ball bearings Insulation materials of excitation winding correspond to thermal class B Electrical connection and protection class with duly executed installation free flexible lied ends Protection class according to DIN VDE 0470-1/DIN EN 60529 - IP 20.

About the Company: Established in the year, 1997, we 'Magnets India', are one of the leading trader, distributor & suppliers of an extensive range of Electromagnetic Actuators and Electromagnetic Products.

Scan the QR Code for instant product enquiry



Contact:

Magnets India, Chennai
Tel: 044-42833346
Mobile: 09840091969
Email: info@magnetsindia.net



LADDER TYPE CABLE TRAY

Rama Enterprises offers a wide range of ladder type cable tray.

Features:

- Its robust and long-lasting design guarantees effective and secure cable management. Our precisely crafted cable tray easily manages large load.
- It is simple to install in commercial and industrial environments. Maximum ventilation is made possible by its ladder design, which keeps wires cool. It provides long-term dependability and is rust-resistant.

About the Company: Rama Enterprises an ISO 9001-2000 certified company. Take this opportunity to introduce as a manufacturing organization, that the production based in Ghaziabad, Uttar Pradesh in Year 2000 having manufacturing facilities for cable tray, slotted angle, raceways & earthing material.

Scan the QR Code for instant product enquiry



Contact:

Rama Enterprises, Ghaziabad
Tel: 0120-6531212 Mobile: 08800566900
Email: info@ramaenterprises.co.in



78 SERIES DIN RAIL TERMINAL BLOCKS

Werner Electric Private Limited offers a wide range of 78 series din rail terminal blocks.

Features:

- Mount on standard 35 mm Din rail. Terminal blocks are explosive resistant. Shock resistant, easy mounting & dismantling. Sleeves & shorting links screws for cross connection available.
- Marker holding to accept marking tags for circuit identification. Standard industrial color coding of green / yellow in this range. Terminal blocks suitable for grounding / earthing wires available. Ideal block to terminate control wiring of PLC's, contactors & relays.

About the Company: Werner Products are created by top industry leaders in mechanical design and with extensive feedback of user experience. They are obsessed with their customer's success and take pride in their achievements.

Scan the QR Code for instant product enquiry



Contact:

Werner Electric Private Limited, Mysore
Mobile: 7353947299
Email: info@wernerelektrik.com



SUPERBOLT TOOL

Nord-Lock India Pvt Ltd offers a wide range of Superbolt tool.

Features:

- Superbolt multi-Jackbolt tensioners (MJTs) allow users to tighten large bolts accurately with simple hand tools. The new Superbolt Tool adds an extra layer of speed to this solution by tightening all the jackbolts simultaneously.
- Although Superbolt tensioners are already quick and easy to use, the added speed of the Superbolt Tool can benefit those who use a high number of MJTs and/or those who have frequent maintenance schedules, as the Tool reduces installation and removal times considerably.

About the Company: The Nord-Lock Group has been providing customers with high-quality, safe and innovative bolting solutions since 1982. The Nord-Lock Group is wholly owned by Investment AB Latour, a company listed on the Stockholm Stock Exchange. Investment AB Latour is dedicated to the expansion of the group and has supported our goals to continuously provide our customers with the best bolting solutions in the industry.

Scan the QR Code for instant product enquiry



Contact:

Nord-Lock India Pvt Ltd, Mumbai
Tel: 022-49743518
Email: info@nord-lock.in



HIGH PERFORMANCE STRUCTURAL ADHESIVES

Parson Adhesives India Private Limited offers a wide range of high performance structural adhesives.

Features:

- Partite & Parbond Series from Parson Adhesives In India today, Parson Adhesives India Pvt Ltd , A Business Unit of PARSON Adhesives, Inc.-USA , the manufacturer of High Performance Anaerobic, Cyanoacrylates, UV Curable ,Epoxy, Polyurethane , Methacrylates Adhesives and Silicone Sealants range of products.
- Their global Parson Philosophy is to work with our customers as a partner in their business, achieving technical and value selling benefit to their end product by the routes of engineering solution which is achieved by us working jointly with client's technical personnel. This is achieved by "the Engineering Adhesives" products having the most advanced features and highest quality levels available ,proposing only those applications that make reliable contribution to the customer bottom line and providing VALUE benefits.
- Parson adhesives can be found in a wide variety of manufacturing & structural applications such as automobiles, railways, aircrafts, marine structures & boats, windmills, solar power structures, consumer durables & appliances, medical devices and many more.
- Their products are a great choice for production and manufacturing engineers due to their time efficiency, fast curing schedules and energy saving nature.
- Wide range of our structural adhesives based on Methacrylate, Epoxy and Polyurethane technologies suit to many applications; for achieving faster production and ever-lasting durability.
- Benefits of Parson's Structural Adhesives over other common assembly methods: -Improved & even stress distribution; Outstanding fatigue resistance; Superior resistance to shocks, impact and vibration; Withstand water & chemicals; in submerged conditions also.

About the Company: As a leading manufacturer of variety of advanced adhesive products comprising of Anaerobic adhesives, Cyanoacrylate adhesives, UV Curable adhesives, Silicone sealants, etc. Parson Adhesives India Pvt. Ltd, is a subsidiary of Parson Adhesives Inc., USA.

Contact:

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Vadodara
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Mobile: 09428504143, 09408354185
Email: sales@parsonadhesives.co.in*



VIBRATORY FURNACE CHARGER

Elektromag-Joest Vibration Pvt Ltd offers a wide range of vibratory furnace charger.

Features:

- This vibratory furnace chargers are a cost effective method of increasing productivity and quality of melt.
- With constant improvement in technology, furnaces require rapid and uniform charging to keep pace with the melting power of the system for which the Furnace chargers are the optimum solution.
- By using the furnace charger, controlled vibrations the metal is uniformly fed into the furnace whereby the melting cycle is reduced and the furnace life and the bridging forming situation is avoided.
- The entangled pieces of scrap metal form a layer above and if unrecognized by furnace operator, bridging can lead to super heating of bath and failure of furnace lining and run out.

About the Company: Elektromag-Joest Vibration Pvt. Ltd., is a leading manufacture of Vibrating equipments for foundry, steel, mining, quarrying, etc.

Contact:

*Elektromag-Joest Vibration Pvt Ltd,
Mumbai
Tel: 022-66624444
Email: vibration@elektromag.com*



Scan the QR Code for instant product enquiry



CABLE DRAG CHAINS

Elektromag offers a wide range of metallic/plastic cable drag chains.

Features:

- This Elektromag drag chains enable the conveyance of flexible cables/ hoses, etc to movable units with maximum reliability.
- Its advantages of Elektromag cable drag chains is avoidance of mechanical strain on the cables/hoses.
- No tensile stress or compression, no frictional wear as there is no relative movement between the cables/ hoses and the cable drag chain, no bending below an established radius, no crushing, buckling or forming of loops or torsion strain.

About the Company: Established in the year 1958, Elektromag is engaged in manufacturing of metallic/ plastic cable drag chains and supplying to various steel plant, machine tools, cement, foundries, etc.

Contact:

*Elektromag Methods, Mumbai
Mobile: 09820192772
Email: cablereels@elektromag.com*



Scan the QR Code for instant product enquiry



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VOLATILE ORGANIC COMPOUNDS - VOC DETECTOR, MODEL: OTSM-1

Subtronics proudly presents its state-of-the-art model, the OTSM-1

Features:

- This fixed diffusion-based VOC detector is designed to detect a range of Volatile Organic Compound gases at parts per million (ppm) levels. Volatile organic compounds are chemicals with high vapor pressure and low water solubility, commonly found in paints, pharmaceuticals, refrigerants, and other industrial products. Some well-known VOCs include acetone, benzene, ethylene glycol, formaldehyde, methyl chloride, perchloroethylene, toluene, 1,3-butane, xylene, and more.
- The OTSM series, also known as the "On The Spot Monitor," utilizes advanced photoionization technology with a 10.6eV lamp. This cutting-edge technology enables the OTSM-1 to detect a wide range of VOC gases, surpassing industry standards with a lifespan of 5 years. With its IP68 ingress rating and an Ex'd' case, the OTSM-1 is suitable for use in Zone 1 and Zone 2 areas. It carries a Gas Group IIC classification and a T6 temperature class rating. Additionally, the intrinsically safe sensor housing allows for sensor servicing without the need for a hot work permit. The OTSM-1 guarantees reliable VOC measurements even in the harshest environments.
- Equipped with Three Status (Registered Mark) LEDs and a bright digital display, the OTSM-1 ensures easy visibility of its status, even under direct sunlight or from a distance. Five magnetic switches facilitate intuitive setup and adjustments, with the LED keys illuminating to confirm key presses.
- The OTSM-1 models offer multiple output options, including RS485 MODBUS, 4-20mA current loop, and two programmable relays. These versatile options cater to various applications such as manufacturing and processing, refineries and petrochemicals, pharmaceuticals, indoor air quality monitoring, industrial painting and coating, fence line monitoring, tank farms, and bunkering.

About the Company: Subtronics (India) Pvt Ltd is an ISO 9001 certified company with over five decades of experience, serving more than 4,500 clients. Throughout its history, Subtronics has received 34 prestigious awards in recognition of its outstanding contribution to safety.

The OTSM-1 VOC Detector is proudly made in India.

Contact:

Subtronics (India) Pvt Ltd, Mumbai
Tel: 022-24224461 or 24303047
Helpline: 09920821346
Email: service@subtronicsindia.com



PV SERIES VARIABLE DELIVERY PUMP

HTM Hydraulics Pvt Ltd offers PV series variable delivery pump.

Features:

- These pumps supply infinitely variable flow controlled by the linear movement of a volume stem control. On hydraulic variable delivery pumps, the output is regulated by an external low-pressure control signal supplied to control part in the cover.
- Variable delivery PV 6000 series pumps are used on drill rigs to power the drill rotation, drill pressure, mast movement and propulsion..

About the Company: HTM Group has been in the field of hydraulics since 1995. Their expertise in the industry makes us one of the leading competitive companies in the field of trading, marketing & servicing and straining for customers in India and abroad.

Contact:

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Tel: 080-41572101 Mobile: 09741165877
Email: info@htmhydraulics.co.in,
sales@htmhydraulics.co.in



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NON-DIRECTIONAL, INVERSE TIME, 2 POLE O/C RELAY WITH INSTANTANEOUS HIGHEST ELEMENTS

JVS Electronics Pvt Ltd offers non-directional, inverse time, 2 pole O/C relay with instantaneous highest elements-JRC 064.

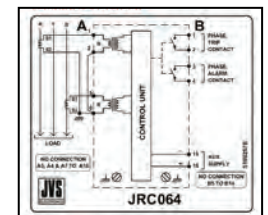
Features:

- The relay measures the line current from each of the phases and if it exceeds the set threshold, then relay extends a trip signal after an operating time.
- The relay provides time graded phase protection of Generators, Transformers, Feeder, capacitors, etc.
- Its features include: so ware based design; programmable time current characteristics choice of four IDMT curves; Draw out case; wide range auxiliary supply; Low burden.

About the Company: JVS Electronics Pvt Ltd is an exporter, manufacturer and supplier of audio indicating instruments, visual indicating instruments, electrical indicating instruments, etc.

Contact:

JVS Electronics Pvt Ltd, Bangalore
Mobile: 09448288863
Email: bangalore@jvselectronics.in



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SIPL 6 SMART BREATHALYSER WITH MEMORY & DATALOGGING

Subtronics introduced its latest addition to their range of Breath Alcohol Analysers: Model : SIPL 6 with memory and data logging features.



Features:

- Based on the latest XLP - Extreme Low Power chip with 16 bit ADC, this portable, light weight, single handed breath alcohol analyser accurately detects the presence of alcohol vapours in breath and activates an alarm when the BAC level exceeds the preset level before introducing intoxication and the user can be warned immediately.
- Reading can be saved to the micro SD Memory Card which also enables the data transfer to PC and can store upto 3 lakh readings. With the special dedicated 'Subtronics DataLogging' software, user can take evidential receipt prints with details like date, time, reading, device ID and even enter custom remarks such as Subject's name, your company's logo on receipts, etc.
- In addition to the present offering, the newer SIPL 6 host key features like: High performance 16 bit ADC for higher accuracy and faster response time; 32GB SD Card for memory storage; Store up to 3 lakh readings; Three Status indicators - safe, warn & alert; Password restricted menu access; Quick test mode with no delay; Guided test sampling process; Confidence beep for user alertness; Taptic vibrator feedback; Stealth mode for discreet checking; Dual line alpha-numeric display; Auto and On-demand Screen backlight Built-in battery cell for clock and date; Rechargeable easily replacable Li-Ion batteries; 12 hours operation with battery management; Optional : "Subtronics DataLog" software for easy PC transfer.
- With the "Subtronics DataLog" software, the recorded data from SIPL 6 can be transferred to the computer and archived, the transferred data can be viewed, edited, saved to different media, and reports can be received / printed.

About the Company: Subtronics is an ISO 9001 certified company and has been passionately manufacturing detection devices for over 46 years with over 4500 clients and is the recipient of 34 awards for its excellence and contribution to the field of safety. Subtronics has competent qualified staff & provides quality after-sales & maintenance services.

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Contact:

Subtronics (India) Pvt Ltd, Mumbai
Tel: 022-24224461 or 24303047
Helpline: 09920821346
Email: service@subtronicsindia.com

D C CHOKE

Miracle Electronic Devices Pvt Ltd offers a wide range of D C choke.



Features:

- A DC choke, also known as a DC reactor or DC inductor, is an electrical component used to limit or control the flow of direct current (DC) in an electrical circuit.
- Voltage Stabilization: In some cases, DC chokes are used to stabilize the voltage levels in a circuit. They can help reduce voltage spikes or surges, ensuring a steady and reliable power supply for sensitive equipment.
- Current Limitation: DC chokes can be used to limit the amount of current flowing through a circuit.
- Harmonic Mitigation: In AC/DC conversion systems, such as variable frequency drives (VFDs), DC chokes are used to reduce harmonics in the current waveform.
- Inrush Current Limiting: When electrical equipment is turned on, there can be a surge of current called inrush current. DC chokes can be used to limit this inrush current, protecting the equipment and preventing circuit breakers from tripping.
- DC Motor Control: DC chokes are used in DC motor control systems to smooth out the current supplied to the motor, reduce electromagnetic interference (EMI), and improve overall performance.
- Power Factor Correction: DC chokes can be used in power factor correction circuits to improve the power factor of electrical systems.
- Energy Storage Systems: In some energy storage systems like super capacitors, DC chokes are used to control the charging and discharging processes, preventing rapid current surges and ensuring safe and controlled energy storage.
- Power Electronics: In power electronic applications, DC chokes can be used in inverters, converters, and other devices to control and stabilize the flow of DC power, reducing electrical noise and improving the efficiency of these systems.
- Solar and Wind Power Systems: DC chokes are used in renewable energy systems to filter and stabilize the DC power generated by solar panels or wind turbines before it is fed into the grid or used in battery storage systems.

About the Company: Miracle Electronics is a renowned Transformer manufacturer in India, engaged in manufacturing Power transformers, Toroidal transformers, EI transformers, SMPS transformers, Medical Isolation Transformers.

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Contact:

Miracle Electronic Devices Pvt Ltd, Bangalore
Tel: 080-28362750
Email: sales@miracle.net.in

QUICK RELEASE COUPLERS

Vijay Air Control offers a wide range of quick release couplers -New Generation - ST Series.



Features:

- Its valveless construction drastically saves pressure loss and achieves high flow rate.
- It is suitable for high viscosity fluids (such as grease).
- Available in various standard body materials, sizes and end configurations to cope with diversified and operating situations.

About the Company: Vijay Air Control is a one large workplace where work is done and then put on the market in the form of products and services. This work must be benefit if it is to hold its own in the face of competition. Only company based on sound economic, technical and organisation principles and which is in a position to have a say in future developments is a match for the challenges presented by the market and competition.

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Contact:

Vijay Air Control, Bengaluru
Tel: 080-23148871, 23141136
Mobile: 08951101436, 09880652082
Email: saivacblr@vacpneumatic.co.in

SHAFT & AXLE MEASURING MACHINES

Blum-Novotest Measuring & Testing Technology Pvt Ltd offers a wide range of shaft & axle measuring machines.



Features:

- The multipoint measuring machines for rotationally symmetric work pieces offer quick acquisition of component geometry during dynamic measurement.
- Loading is possible manually as well as automatically. Its loading position is easy accessible from above right on top of the final measuring position.
- Its features include: Post-process multipoint measuring system with independent PLC. Easy integration into existing automation system. Short, optimised feed motions. Flexibly configurable measuring unit using measuring forks/callipers with intelligent universal clamping system.

About the Company: Blum Novotest Measuring & Testing Technology Pvt Ltd has made a name for itself in the list of top suppliers of bore gauge, radio receiver in India.

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Contact:

Blum-Novotest Measuring & Testing Technology Pvt Ltd, Bangalore
Tel: 080-23185468 Mobile: 09075004435
Email: info@blumnovotestindia.in

POWER PRESS

Universal Machine Tools Corporation offers MS body, fixed/inclinable type power press.



Features:

- The frame is off all steel construction, fabricated from rolled steel plates with suitable ribbings.
- The clutch is of pin/rolling key type, crankshaft is made of special alloy steel, fitted with bronze bushes for smooth working, properly sized fly wheel gears all of steel cast / fabricated, table and ram made of heavy-duty cast iron, perfectly aligned to each other. Inclinable type presses are provided with inclining mechanism.
- These press are available in various sizes: 'C' type / inclinable – 3 tons to 300 tons; 'H' frame 20 tons to 300 tons.

About the Company: Universal Machine Tools Corporation, established in 1981, is one of the leading companies in the machine tool industry.

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Contact:

Universal Machine Tools Corporation, Bangalore
Mobile: 09845006959, 09844199559
Email: universalblr@gmail.com, info@universalblr.com

BELT DRIVE SPINDLES – MV0910

Secon Technological Solutions Inc offers a wide range of belt drive spindles – MV0910.



Features:

- Offered two types of high precision spindles for CNC machining centers; belt drive spindles and direct drive spindles for a versatile range of machining options.
- The five series of CNC machining center spindles are all very rigid and feature very low run out tolerances, with speeds up to 12,000rpm.
- These high precision, high speed spindles are available in a range of sizes and are guaranteed to offer smooth operations and a long service life.

About the Company: Secon Technological Solutions Inc. is engaged as a manufacturer, trader, service provider, distributor of CNC machines tools, preventive maintenance and consultancy services.

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Contact:

Secon Technological Solutions Inc, Bangalore
Telefax: 080-23575752
Email: secontech2000@gmail.com, secontech@hotmail.com

VOLTAGE TRANSFORMERS

Guru Nanak Electric Works offers a wide range of high voltage transformers. These voltage transformers are available in a wide range as per requirements and specifications. Manufactured from fine



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quality raw materials.

Guru Nanak Electric Works, Ludhiana

Tel: 0161-5027517, 3241427

Mobile: 09814090227, 09814090935

Fax: 0161-5027517.

Email: gnew_avtar@sify.com

SHOT BLASTING MACHINE

Guru Nanak Mfg Company offers a wide range of shot blasting machine, hanger type. These machines are used in finishing of industrial components and products.



Manufactured by experts using finest grade

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materials at par with industry norms.

Contact:

Guru Nanak Mfg Company, Jalandhar

Tel: 0181-5091321

Mobile: 09815496000, 09517511368

Email: metalfinishing@yahoo.co.in

HYDRO EXTRACTOR

Guruson International offers a wide range of cone hydro extractors. This machine comes with three-leg suspension to check vibrations created by unbalanced rotating fabric/material.



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Contact:

Guruson International, Ludhiana

Tel: 0161-5056246

Fax: 0161-5015297

Email: guruson@rediffmail.com,

info@guruson.com

HOT WATER SYSTEM

Haadi Enterprises offers a wide range of solar hot water systems. This solar hot water system has applications in both domestic and commercial areas. Manufactured using latest



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technology in compliance with international quality standards.

Contact:

Haadi Enterprises, Bengaluru

Mobile: 09845158011, 09620638110

Email: haadienterprises1109@gmail.com,

BARREL PUMP

Hacop Pumps offers electric barrel pumps. This electric barrel pump is used for removing the liquid contents from a standard barrel without spillage. The drive is particularly suitable for intermittent operation.



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Contact:

Hacop Pumps Pvt Ltd, Pune

Tel: 020-25431638, 25431639

Mobile: 08408033553 Fax: 020-25431639

Email: hacoppumps@gmail.com

INDUSTRIAL HDPE PIPES

Haffer Electro Plast offers a wide range of industrial HDPE pipes. These HDPE pipes in a high quality range for wide ranging applications. These tested high quality range of HDPE pipes are manufactured on modern machines, and are widely appreciated for accuracy in dimensions and sturdy construction.



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Contact:

Haffer Electro Plast Pvt Ltd, Chennai

Mobile: 09282168187, 09282168186

Email: hafferelectroplast@rediffmail.com

AIR COMPRESSORS

Hallmark Compressor offers single stage air compressors. These single stage air compressors are a reliable source of low pressure air for numerous applications. They are designed to meet the needs of a variety of users



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who demand a constant and reliable source of low pressure air.

Contact:

Hallmark Compressor Pvt Ltd,

Ahmedabad

Mobile: 09687643303 Fax: 079-25832627

Email: info@airhallmark.com

TEMPERATURE CONTROL WITH SOLDER BATH

Hallmark Electronics offers solder bath with temperature control. This is engineered for various operations like tinning-cum-deep soldering. The device has a pot meter for variable setting, and is available in an extensive range.



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Contact:

Hallmark Electronics, Pune

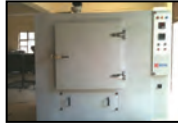
Tel: 020-24223188, 30423188

Mobile: 09822353694, 08888827810

Email: response@hallmarkelect.com

HEAVY INDUSTRIAL OVENS

Hansa Enterprises offers a wide range of heavy industrial ovens. The industrial ovens are manufactured in a wide range of sizes and specifications, using the best quality raw materials available and priced very reasonably.



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Available in standard models as well as customised options in various sizes.

Contact:

*Hansa Enterprises, Bengaluru
Tel: 080-28511454, 41158874
Mobile: 09845030900
Email: hansauv@yahoo.com*

HARDENED & GROUND

Hans Machineries offers a wide range of pins, hardened and ground. These pins are small but vital parts in industrial machinery and manufacturing activity. It is available in a wide range and materials of construction. Manufactured in compliance with the industry standards and quality tested across various parameters and norms.



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Contact:

*Hans Machineries Pvt Ltd, Howrah
Mobile: 09432357682, 09432357681
Email: machineries@hanspl.com*

INDUSTRIAL PLASTIC MOULDING DIES

Adith Plastic offers a wide range of industrial plastic moulding dies. Available in different specifications, these plastic moulding dies are manufactured with modern machinery.



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Contact:

*Adith Plastic, Mumbai
Tel: 022-65330980
Mobile: 09821230980, 09664093729
Email: adithplastics@gmail.com*

COMPONENT MOULDS

Innovative Moulds & Dies offers a wide range of plastic component moulds. These plastics component moulds manufactured for a wide variety of plastic products.



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Contact:

*Innovative Moulds & Dies, Chennai
Tel: 044-428521461
Mobile: 09840914445
Email: info@innovamoulds.in*

INJECTION MOULDINGS

Vikas Industries offers a wide range of plastic injection mouldings. These are in wide in demand, highly acclaimed for supreme strength, exceptional performance, compact design, and durability. The moulds are designed with accuracy and care, employing top-notch.



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Contact:

*Vikas Industries, Mumbai
Mobile: 09821036215, 09821666215
Email: response@vikasindus.com*

INDUSTRIAL CUSTOM BUILT MOULD BASES

Eltec Engineering offers a wide range of industrial mould bases, custom built. These mould bases are custom built for various products, in an excellent range. Manufactured using quality tested raw materials and progressive technology in adherence with quality standards.



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Contact:

*Eltec Engineering, Coimbatore
Tel: 0422-2645322
Mobile: 09500200069, 09500650999
Email: eltecengineering@gmail.com*

SPINNER DIES

Regal Carbide Dies offers a wide range of spinner dies. These high quality spinner dies are made in tungsten carbide and used in wire cutting and straightening



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industries. Manufactured using genuine raw materials procured from well known vendors.

Contact:

*Regal Carbide Dies Pvt Ltd, New Delhi
Mobile: 09811312738, 09311312739
Email: ankur@regaldies.com*

MOULDING DIES

Microcam Technoworld offers a wide range of rubber moulding dies. These dies are manufactured in an exclusive range to fulfil various application needs. Manufactured by



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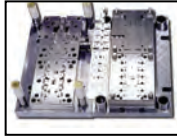
experts using high grade raw materials and latest methodology as per the set industry standards and norms.

Contact:

*Microcam Technoworld, Faridabad
Mobile: 09873700136, 09810847725
Email: micro_cam@ymail.com*

INDUSTRIAL COMPOUND DIES

Star Die Works offers a wide range of industrial compound dies. Manufactured from quality raw materials sourced from trusted vendors. The products, available in various sizes and specifications.



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Contact:

Star Die Works, Thane
Tel: 022-25466453
Mobile: 09321587008, 09594040362
Email: stardieworks@rediffmail.com

GRINDING SOLUTIONS

Farohar Engineering offers a wide range of surface grinding solutions. Grinding surface with assured accuracy in microns and degrees; also grinding facility to provide



bend removal using variable magnetic power setting.

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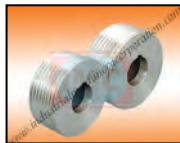


Contact:

Farohar Engineering, Navi Mumbai
Tel: 022-27600040
Mobile: 09819898970, 09819074557
Email: percykarani@hotmail.com

THREAD ROLLING DIES

Industrial Machinery Corporation offers a wide range of circular thread rolling dies. The circular thread rolling dies are manufactured as per customers' specifications and requirements.



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Contact:

Industrial Machinery Corporation, Ludhiana
Mobile: 09803987006
Email: industrialmachinerycorporation@yahoo.com,

STANDARD MOULD BASES

HM Tools & Dies offers a wide range of standard mould bases. These standard mould bases are manufactured from quality raw materials for a variety of industries. Robust in construction, these mould bases are resistant



to corrosion and dimensionally accurate.

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Contact:

HM Tools & Dies, Surat
Mobile: 09904299116, 09924399116
Email: hmttools_himanshu@yahoo.co.in

GATE VALVE

Manek Investment Cast offers gate valve investment castings. These gate valve investment castings are available in a wide range for valve manufacturers. Castings are available in various grades, dimensions and sizes in order to meet the diverse requirements of users.



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Contact:

Manek Investment Cast Pvt Ltd, Rajkot
Mobile: 07567047001, 09586326808
Email: manekcasting2011@gmail.com

DIE CASTINGS

Supercast Industries offers a wide range of pressure die castings. These pressure die castings are manufactured for various industrial applications. They are appreciated for rust resistance, durability and perfect dimensions, and are checked thoroughly before shipping.



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Contact:

Supercast Industries, Mumbai
Mobile: 09665094970, 09326474970
Email: response@supercastind.com

CASTINGS

Gravity Cast offers a wide range of castings for pumps. Castings for pumps manufactured in standard and customised options Available for OEMs with various options and can be provided in support with internal or external threading as well as with different surface finishes.



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Contact:

Gravity Cast Pvt Ltd, Rajkot
Tel: 02827-253037
Mobile: 09375324868, 09909028121
Email: info@gravitycastindia.com

CAST IRON COUPLINGS

B K Tech Enterprise offers a wide range of cast iron couplings. Cast iron couplings manufactured in a wide range to meet a wide variety of end user applications. Highly versatile, of high quality, and available at very reasonable rates.



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Contact:

B K Tech Enterprise Inc, Rajkot
Mobile: 09662861959
Email: sales@bktechenterprise.com, bktechenterprise@rediffmail.com

INDUSTRIAL FORGING HAMMERS

Shree Somnath Forge And Fitting offers a wide range of industrial forging hammers. Manufactured by skilled technocrats using premium quality components and state-of-the-art technology.



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Contact:

*Shree Somnath Forge And Fitting,
Ahmedabad
Mobile: 09898458215
Email: somnathforgefitting@gmail.com*

INDUSTRIAL PLAIN WASHERS

Micro Metals offers a wide range of industrial plain washers. These washers come in different size options, dimensions, and finishes to suit different industrial



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applications. The product is preferred for dimensional accuracy.

Contact:

*Micro Metals, Mumbai
Tel: 022-66595495, 66159036
Mobile: 09930772998, 09773102209
Email: info@micrometals.co.in*

ULTRASONIC BRASS INSERTS

Kalyani Sales Corporation is offering a range of ultrasonic brass inserts. These ultrasonic brass inserts for plastic components are available in sizes ranging from M2 to M10 for all types of plastics, especially thermoplastics.



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Contact:

*Kalyani Sales Corporation, Kolhapur
Tel: 0231-2630143
Mobile: 09960550053
Email: kalyanisalescorp@bsnl.in*

SEAMLESS PIPES

Katariya Steel Distributors is offering a range of stainless steel seamless pipes. These pipes are manufactured with heavy machinery and skilled work force. A flawless product ranges that fulfills the expectations of clients.



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Contact:

*Katariya Steel Distributors, Mumbai
Tel: 022-22423168, 66363168
Mobile: 09833405433, 09823458877
Email: katariyasteel@yahoo.com*

HIGH QUALITY NICKEL FLANGES

Horizon Mercantile Associates Pvt Ltd offers a wide range of high quality nickel flanges. These flanges are known for stability, manufactured using best quality materials with international quality.



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Contact:

*Horizon Mercantile Associates Pvt Ltd,
Mumbai
Mobile: 09819679707, 09167250453
Email: info@horizontrade.in*

EXPANSION BOLTS

Pee Vee Enterprises is offering a range of expansion bolts. These expansion bolts offer an apt choice for a variety of fastening applications. Made in precise dimensions, with best raw materials. Manufactured in compliance with industry standards, free from defects.



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Contact:

*Pee Vee Enterprises, Delhi
Mobile: 09811150326, 09873250326
Email: pvent11@rediffmail.com*

DOWEL PINS

Bhagya Shri Sales Corp is offering a range of cylindrical dowel pins. The product is widely used in industry owing to strong structure. It is manufactured using the quality materials obtained from trustworthy vendors. All



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products are available in diverse sizes that meet customers' requirements.

Contact:

*Bhagya Shri Sales Corp, Delhi
Mobile: 09311696016, 09873897016
Email: bs_sc@ymail.com*

PREMIUM QUALITY REDUCED HEAD

Advance Hydrau Components Pvt Ltd offers an array of rivet nut, reduced head. These products are manufactured using premium quality basic parts and



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sophisticated technology as per the set industry norms.

Contact:

*Advance Hydrau Components Pvt Ltd,
New Delhi
Tel: 011-28353714/18 Mobile: 09313861011
Email: info@advancehydrau.com*

HIGH GRADE GI PIPES

Industrial Piping Products is manufacturers wide range of high grade GI pipes. These pipes are designed and developed from high-grade materials used in sanitary fittings in commercial and residential places.



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Contact:

Industrial Piping Products, Delhi
Tel: 011-23267475
Mobile: 09811377008, 09350290172
Email: industrialpiping2007@gmail.com

NON METALLIC CUT GASKETS

Citizen Metals Pvt Ltd offers a broad range of non metallic cut gaskets. These products use high-grade raw materials such as CAF sheets, insulation sheets, graphite, thermo plastics, non-asbestos sheet material, non-asbestos millboard and glass fibre.



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Contact:

Citizen Metals Pvt Ltd, Mumbai
Tel: 022-61905600
Mobile: 09819448843
Email: exports@citizenmetals.com

SOCKET SCREWS

Canco Fasteners offers a wide gamut of socket screws, countersunk. This countersunk socket screws are manufactured in a comprehensive assortment. It is available in various sizes, shapes, grades and materials.



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Contact:

Canco Fasteners, New Delhi
Tel: 011-42525500
Mobile: 09811063537, 09811315315.
Email: canco@vsnl.com

SILICONE SEALANT

Join Leader Chemtech Pvt Ltd offers join leader 550 mirror silicone sealant. It is a high modulus, neutral-curing, nor corrosive, weatherproof and anti-mildew sealant. Known for its adhesion, provides a permanent flexible bond for mirrors to plaster, metal, or wood.



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Contact:

Join Leader Chemtech Pvt Ltd, Delhi
Mobile: 09311145624, 09311145622.
Email: sales@joinleader.in

TWO-PART SYSTEM

Universal Adhesives is offers a wide range of epoxy two-part system. The product is used for patching and sealing applications on various substrates like concrete, wood, metal, fibre glass, etc. It is also used as potting compound and coating compound for waterproofing applications.



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Contact:

Universal Adhesives, Ahmedabad
Mobile: 09898598145, 09375811520
Email: uniadhesive@satyam.net.in

CYANOACRYLATES ADHESIVES

Priya Components offers a wide range of cyanoacrylates adhesives. Cyanoacrylates adhesives are one-part acrylate adhesives. They cure instantly on contact with mated surface through a reaction with surface moisture.



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Contact:

Priya Components, Vadodara
Mobile: 09925023362
Email: priyacomponents@yahoo.co.in

THREAD SEALANT

Glue Farm (India) Pvt Ltd manufacturers a range of piping thread sealant. This piping thread sealant is an effective solution for leaking pipes. It is widely used for sealing metal pipes and fittings. It is processed using the finest quality chemical compounds under the vigilance of skilled professionals.



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Contact:

Glue Farm (India) Pvt Ltd, Bengaluru
Tel: 080-25504889. Mobile: 09611871123
Email: info@gluefarm.in

SAFETY FIRE RETARDANT COATING

Marco Trading Company is offering a range of safety fire retardant coating. Fire retardant coating, a safety product that prevents rapid spread of fire allowing time for extinguishing the same before spreading rapidly.



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Contact:

Marco Trading Company, Surat
Mobile: 09638886161, 09726522888
Email: info@marcouae.com

Event	Date & Venue	Contact
AUTOMATION EXPO - MUMBAI	August 21 – 24, 2024 Bombay Exhibition Centre (BEC) NESCO, Mumbai	IED Communications Ltd Mumbai, India Tel: 022-22079567 Email: jyothis@iedcommunications.com
ADEX INDIA BOND EXPO - GREATER NOIDA	September 19-21, 2024 India Expo Centre & Mart Greater Noida	ADEX India India Expo Center & Mart Greater Noida Tel: +91 8177053335 Email: sales@theadexindia.com
IFAT INDIA - MUMBAI	October 16-18, 2024 Bombay Exhibition Centre (BEC) NESCO, Mumbai	MMI India Pvt Ltd Mumbai, India Tel: 022-42554700 Email: info@mmi-india.in
INDIA FASTENER SHOW - PUNE	October 17-19, 2024 Auto Cluster Exhibition Center, Mumbai Pune Road, Chinchwad East, Pune	FME (Future Market Events) Media Pvt Ltd Noida Email: eisha@futuremarketevents.com
LASER WORLD OF PHOTONICS INDIA – MUMBAI	November 07-09, 2024 Jio World Convention Centre, Mumbai	MMI India Pvt Ltd Mumbai Tel: +91 (2)2 42554700 Email: info@mmi-india.in
PUNJAB MACHINE TOOLS SHOW - CHANDIGARH	November, 21-24, 2024 Sub. City Center, Sector 34, Chandigarh	K AND D Communication Ltd. (KDCL) Ahmedabad Mobile: 09909041613 Email: info@kdclglobal.com
WIRE INDIA - MUMBAI	November 27-29, 2024 Bombay Exhibition Centre (BEC) NESCO Mumbai	Messe Düsseldorf GmbH Germany Tel: +49 (0)211 456001 Fax: +49 (0)211 4560668 Email: infoservice@messe-duesseldorf.de
IFSEC INDIA - NEW DELHI	December, 12-14, 2024 Pragati Maidan Exhibition Center New Delhi	Informa Markets India Private Limited Mumbai Tel: 022-6172 7000 Email: informamarkets@informa.com
GLOBAL INDUSTRIAL EXPO - PUNE	December, 13-15, 2024 Auto Cluster Exhibition Center, Mumbai Pune Road Chinchwad East, Pune	Global Media Communication Sanskriti Darshan Pune Email: satish@globalindustrialexpo.com
INTERNATIONAL		
SHANGHAI INTELLIGENT BUILDING TECHNOLOGY - SHANGHAI	September 03-05, 2024 Shanghai New International Expo Center - SNIIEC Shanghai, China	Messe Frankfurt (HK) Ltd. Hong Kong, China Email: info@hongkong.messefrankfurt.com
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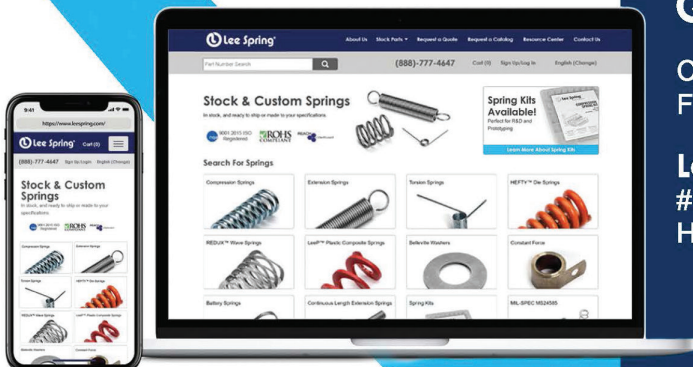
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