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Electronics Industry's Mission \$ 500 bn

Indian electronics industry is aiming to achieve \$500 billion in output by 2030, from present \$ 101 billion. Is the industry geared up for a five-fold growth?

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“While domestic growth is promising, competitors like Taiwan and South Korea are far ahead in terms of production scale and technological advancements.

Chips are up!

In December 2024, India's electronics exports surged by 35.1 per cent to reach a two-year high of \$3.58 billion, up from \$2.65 billion in December 2023, according to the Ministry of Commerce and Industry, Government of India. Similarly, electronics exports rose by 27.4 per cent during April-November 2024, hitting \$22.5 billion compared to \$17.66 billion during the same period in 2023. Despite global challenges like high-interest rates and geopolitical conflicts, India's electronic goods exports in FY24 reached \$29.12 billion, marking a 23.6 per cent growth over FY23. This reflects rising foreign demand for Indian electronics and expanding domestic production capacities.

The Indian electronics manufacturing landscape has seen remarkable growth over the last 5-6 years. Initiatives like *Make in India* and Digital India have established a strong foundation, while the Production-Linked Incentive (PLI) scheme has proven to be a transformative measure, boosting local production and reducing reliance on imports. However, local value addition in electronics manufacturing remains low. Despite rapid growth in final assembly, key components still rely heavily on imports. Local value addition currently accounts for less than 20 per cent of production. With India's demand for electronic components expected to rise from \$45.5 billion in 2023 to \$240 billion by 2030 (as per a CII report), establishing a robust domestic supply chain is critical.

One of the key challenges is the heavy dependence on imported semiconductors, which poses supply chain vulnerabilities. As the core of all modern electronic devices, semiconductors play a vital role in the digital infrastructure. To address this, India has introduced some of the world's most attractive incentives for semiconductor manufacturing, covering 70-75 per cent of project costs through combined support from the central and state governments. These efforts have secured investments of over ₹1.5 trillion from domestic and global firms. Still, India currently accounts for just 0.25 per cent of the global semiconductor manufacturing output. While domestic growth is promising, competitors like Taiwan and South Korea are far ahead in terms of production scale and technological advancements.

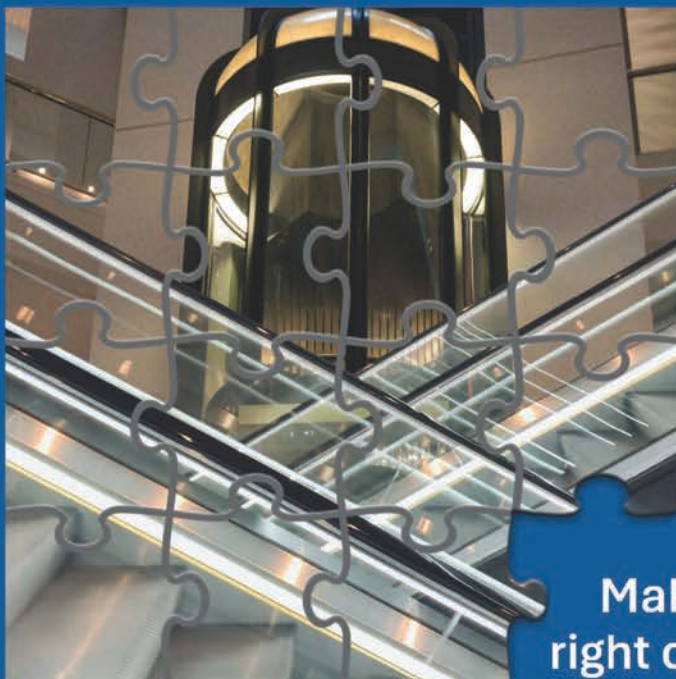
The ongoing geopolitical tensions between China and developed countries present India with a strategic opportunity to establish itself as a reliable alternative in electronics and semiconductor manufacturing. To achieve this, India must work towards creating strategic autonomy through technological ownership and expanding its role beyond final assembly into design and component manufacturing.

Although domestic brands and design-led manufacturing remain underdeveloped, India's strengths—such as R&D centers for leading global semiconductor companies and its large pool of design engineers (20 per cent of the global total)—position it well for long-term growth. Scaling up value addition, fostering innovation, and developing domestic brands will be the key to unlocking the sector's full potential.

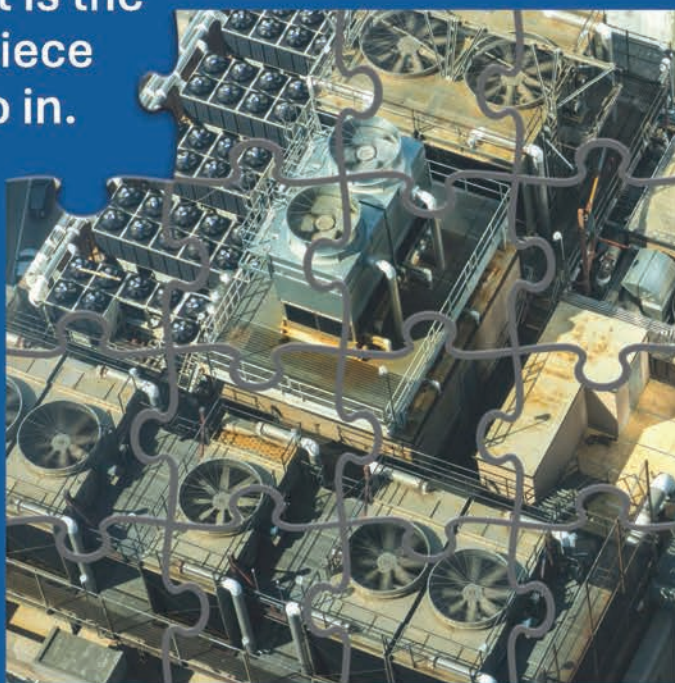
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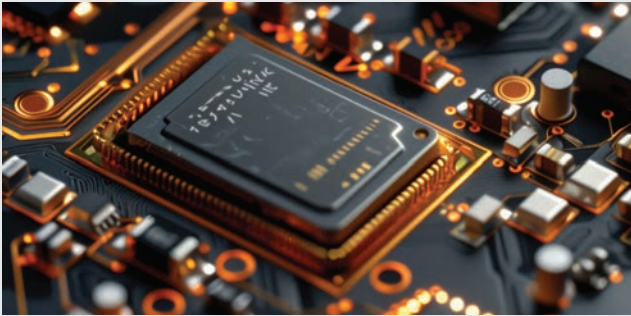
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COVER STORY



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Indian electronics industry has set an ambitious target of \$500 billion by 2030 from present \$ 101 billion. The task is challenging, but not insurmountable. As a result, the industry is on the cusp of unprecedented growth, says Rakesh Rao.

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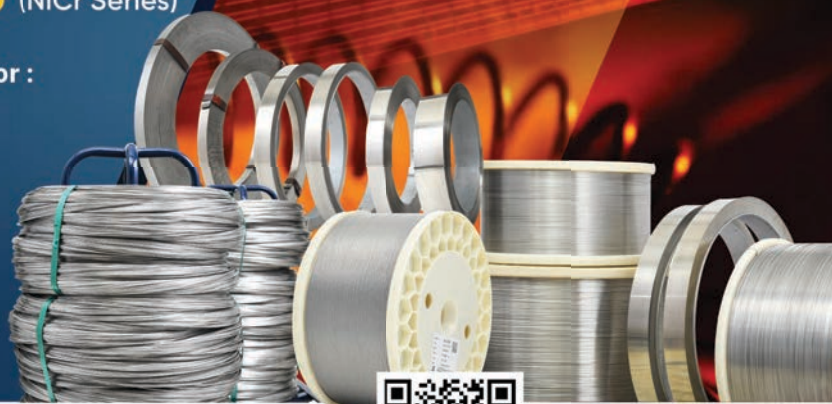


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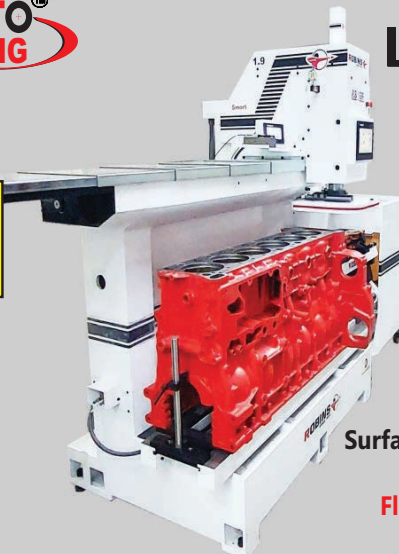


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Renewable Energy

Godrej Group targets over 20 per cent growth for power infra business with expansion

The energy solutions business of the Godrej Enterprises Group, plans to focus on driving significant investments towards power infrastructure projects supporting India's clean energy drive. Aligning with company's broader vision of 'Nation Building' to accelerate the adoption of renewable energy solutions, the business will prioritise Maharashtra, Gujarat, Rajasthan, Haryana, and Madhya Pradesh for its power infrastructure and green energy projects. With a strong focus on these states, Godrej Enterprises Group seeks to play a key role in building power infrastructure for renewable energy, reducing reliance on fossil fuels, and supporting the country's commitment to achieving 500GW of non-fossil fuel-based power by 2030. The business is targeting to grow at a CAGR of over 20 per cent in the next 3-5 years, driven by its growing portfolio of extra high voltage power transmission projects up to 765kV and strategic investments in solar power and



green energy infrastructure.

Maharashtra, one of the states in focus, has already seen a major boost in renewable energy initiatives. Godrej Enterprises Group recently commissioned a 25MW AC solar project in Dhule, in partnership with the Maharashtra State Power Generation Company Limited (MahaGenco). The business is executing one of the largest greenfield 765/400kV GIS in Maharashtra.

Gujarat has set a target to achieve 50 per cent renewable energy capacity by 2030, and in line with this goal, GEG is executing a 765kV GIS & 400kV GIS substation projects in Khavda.

Madhya Pradesh state also aims to generate 50 per cent of its electricity from renewables by 2030, with a focus on solar. In line with this vision, GEG has already commissioned a 12.5MWp rooftop solar project at a textile facility in Madhya Pradesh which covers over 1 million square feet.

Auto Components

Panasonic Automotive Systems India to offer tech solutions for safe-driving

Panasonic Automotive Systems India (PASI) – subsidiary of Panasonic Automotive Systems Co. Ltd- is providing systems that support safe driving, and offers optimal in-vehicle systems and solutions for environmentally friendly vehicles.

PASI focuses on the development, manufacturing, and sale of automotive components and parts like infotainment solutions (audio, video and navigation), sensors, relays, cameras, parking assistance systems, telematics control units, smart entry systems, LED solutions for headlamps and batteries. PASI offers the latest technologies such as Head-up Displays (HUD), Telematic Control Units (TCU), Temperature Oil Sensor, and in-car infotainment to name a few that are used across global markets to advance India's automotive industry.

Bhupesh Kanyal, Director, Panasonic Automotive Systems India (PASI) said, "Indian motor vehicle industry is the fourth largest in the world, and continues

to grow rapidly. In the two wheeler segment, India is the largest manufacturer. The strong economic growth of India and with rising income of Indian households, the potential of growth in the automotive industry is significant. With the advent of new-age technologies, newer form of mobility such as electric vehicles, consumer aspirations continue to evolve too. Indian consumers today are looking for such, premium commuting experience as well as passenger and environmental safety. This has resulted in demand for an improved passenger vehicle experience. Keeping that in mind we at Panasonic, are in the process of transforming the in-car experience by harnessing new technologies such as connected devices, head-up displays, wireless chargers and 360° camera solutions that are simple to use, safe and durable, and cost-effective. Through our wide range of products and solutions we are currently catering to the top OEMs of automotive industry and would like to expand the gamut."

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TOOLINGS



APPLICATION



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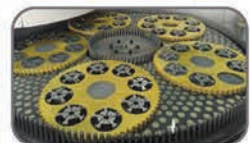
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Renewable Energy

JIRE bags 180 MW solar-BESS order from NHPC

BC Jindal Group's renewable energy arm, Jindal India Renewable Energy (JIRE) has won a 180 MW solar plus storage project from state-owned, NHPC. The group is India's leading conglomerate with over ₹180 billion turnover. The project is part of NHPC's 1200 MW inter-state transmission system-connected solar power projects tender with 600 MW/1200 MW energy storage systems.

JIRE has bagged 180 MW of solar power capacity from NHPC at a tariff of ₹3.09/kWh. As per the stated terms, the company will be executing a solar project on a build-own-operate basis. In addition, the green-field project will have to be completed within 24 months from signing of the power purchase agreement (PPA).

Amit Kumar Mittal, CEO, Jindal India Renewable Energy said, "Winning the competitive bid for this crucial project is a reflection of JIRE's proficiency and capabilities in the renewable energy space. This also gives impetus to our goal of expanding the company's capacity to 5 GW from solar, wind, hybrid, hydro and FDRE modes, within the next four years. We aim to take



this momentum forward in the upcoming quarters as well."

NHPC will enter into an agreement with JIRE for a period of 25 years. The Navratna Company will purchase solar power from JIRE and sell it to state utilities and others. As part of the contract, JIRE will have to deploy an ESS

of at least 0.5 MW/ 1MWh capacity for 1 MW contracted capacity.

In 2025-2026, JIRE is looking to strategically expand its capacity portfolio by acquiring key operational assets within the country and across geographies. The company has set sight on augmenting its presence and is actively pursuing aggressive acquisitions of operational assets both domestically and abroad. These acquisitions are anticipated to be finalised in 1-2 years and will be funded through a mix of internal accruals and debt.

The BC Jindal Group had recently floated its dedicated entity, JIRE, to hold the renewable venture of the group. This company will oversee the renewable power generation, solar cells and module manufacturing businesses.

Warehousing & Logistics

JEM and Porter sign a MoU to empower drivers through Udaan program

Jupiter Electric Mobility, a subsidiary of Jupiter Wagons Limited, entered into a strategic partnership with Porter a leading goods transport agency offering a wide range of intra-city and inter-city logistics solutions. This collaboration focuses on fostering entrepreneurial opportunities and promoting sustainable electric mobility through JEM's innovative JEM Udaan program.

Through this partnership, Porter will provide guidance to drivers and small business owners who select JEM Tez as their platform to switch to electric commercial mobility, JEM's flagship electric light commercial vehicle. Porter will support in onboarding of JEM drivers and help them unlock business growth opportunities through various initiatives which will help maximise revenue earnings for driver entrepreneurs.



These tools are designed to support drivers in scaling their operations, boosting earnings, and contribute to a greener, more sustainable logistics ecosystem while uplifting communities.

As part of this commitment, JEM introduced the JEM Udaan program, a transformative initiative designed to empower local small entrepreneurs and

drivers to establish and grow their businesses in the electric logistics segment. The program provides comprehensive business support, professional training and access to essential EV resources, guiding entrepreneurs through its dealership network.

By facilitating connections between drivers, small businesses and companies seeking sustainable logistics solutions, JEM promotes electric mobility while fostering societal growth.



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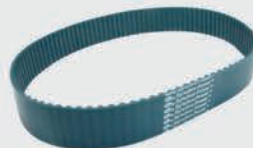
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Electric Vehicles

Jitendra EV to use Battery Smart's rapid battery swapping in fleet

Jitendra New EV Tech Pvt. Ltd, one of India's leading electric two-wheeler manufacturers, entered a strategic partnership with Battery Smart, India's largest and fastest-growing battery swapping network for electric two- and three-wheelers. This collaboration aimed to revolutionise the electric vehicle ecosystem by integrating Battery Smart's cutting-edge battery-swapping technology into Jitendra EV's fleet. The collaboration will connect Jitendra EV with Battery Smart's extensive network of over 1,400 battery-swapping stations across more than 40 cities in India, allowing riders to swap depleted batteries for fully charged ones in fewer than two minutes.

Jitendra EV sought to lower the upfront costs for fleet operators by decoupling the battery from the vehicle purchase.

This partnership marked a significant leap in overcoming two major hurdles in EV adoption: Range anxiety and charging downtime. With Battery Smart's



dense pan-India battery-swapping infrastructure, Jitendra EV users were able to access fully charged batteries on the go, at numerous locations, eliminating the need for long charging stops, making electric mobility both affordable and accessible.

By integrating Battery Smart's innovative swapping ecosystem, Jitendra EV riders will benefit from, fully charged batteries in under two minutes, purchasing scooters without owning the batteries, an expansive network of swapping stations in urban and semi-urban areas and a flexible and affordable subscription-based battery swapping option.

Battery Smart has cemented its position as a leader in the battery-swapping space with its strong infrastructure and technology-driven model.

By decoupling the cost of the battery, Battery Smart reduces upfront EV cost by up to 40 per cent. This collaboration will further enable Jitendra EV to meet the increasing demand for high-performance, seamless, and affordable electric mobility solutions.

Railways

Alstom to supply traction components and services for Vande Bharat sleeper trains

Alstom, a global leader in smart and sustainable mobility, has been awarded a contract worth €144 million to supply Mitrac traction components and other electrical equipment for 17 Vande Bharat Sleeper trainsets (408 cars). The systems will be supplied to Indian Railways' Integral Coach Factory (ICF) in Chennai. The contract also includes preventive and corrective maintenance of the traction and major electric equipment, as well as support services, for a five-year period, after completion of warranty, at various railway depots. The equipment will be installed in 24-car sleeper trainsets on the Vande Bharat platform, designed to run at a maximum speed of 180 km/h, with a service speed of 160 km/h.

Olivier Loison, Managing Director, Alstom India



said, "The Vande Bharat trains represent the modern face of rail-based mobility in India, and it is a matter of pride for us to yet again partner with Indian Railways in furthering their vision. Alstom has the widest components portfolio in the rail industry, which has been

developed at the back of decades of experience in delivering rail solutions across the globe. Our strong manufacturing and engineering presence in India, will allow us to deliver the world-class products."

In India, Alstom has engineering and industrial presence for components with the sites of Savli, Coimbatore and Maneja. The prototype delivery expected to begin by August 2026 followed by serial production; due to commence in 2027.

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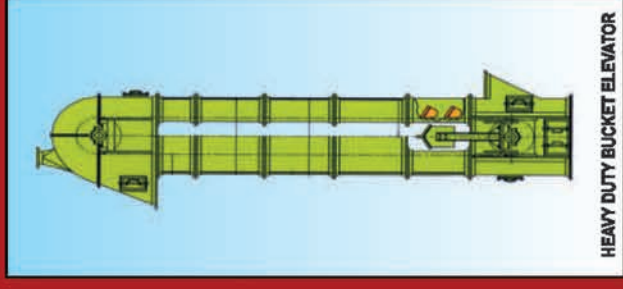
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Auto Components

Minda Corporation and Flash Electronics to create fastest growing EV platform

Minda Corporation Limited, the flagship company of Spark Minda Group, has come into a strategic partnership with Flash Electronics to create the fastest growing EV platform in the country.

Both companies have a diversified, yet synergised, product portfolio where Minda Corporation is into Automotive body electronics and Flash is in automotive Engine and Powertrain electronics. This partnership going forward will create a synergetic and wide portfolio for both partners.

Through its differentiated innovation, Flash has been at the forefront in electricals and electronics for two and three-wheeler ICE specialising in ignition electricals and electronics. Being among the early entrants in the field of EV powertrain, Flash is among the market leaders for motor, motor controllers, vehicle control units, etc. Flash has developed innovative solutions for electric powertrain, and would be soon launching the same for passenger cars and commercial vehicles. On the EV Side, MCL has developed products like battery chargers,



DC-DC converters, power electronics products, battery telematics, etc. This move aligns with Minda Corporation's long-term business strategy aimed at expanding our presence in the auto components industry as a complete systems solution provider and capturing a greater share of the fast-growing

automotive segment in India.

Flash Electronics is expected to achieve revenue over ₹15 billion in FY 25 and have been impressively delivering a CAGR of over 17 per cent during past years. The company is expected to deliver EBITDA margin of around 14 per cent and with a steady ROCE of over 22 per cent. As a part of the partnership, Minda Corporation will acquire 49 per cent equity stake in Flash electronics for a cash consideration of ₹13.72 billion.

This collaboration aims to bolster both organisations' positions in the automotive industry. The products and technology of the partners will be showcased at Bharat Mobility Expo being held in New Delhi from 18-21 January 2025.

Wires & Cables

Finolex Cables unveils wire powered by electron beam technology, FinoUltra

Finolex Cables, India's leading manufacturer of electrical and communication cables, has launched FinoUltra, a cutting-edge range of wires designed to deliver unmatched safety, durability, and performance. The product leverages advanced Electron Beam (E-Beam) technology to meet the growing demands of modern infrastructure across residential, commercial, and industrial applications.

FinoUltra wires utilise E-Beam technology to enhance mechanical and thermal properties, allowing them to sustain higher voltages with reduced radial thickness and extending their lifespan to over 50 years. The wires advanced E-Beam cross-linking technology delivers 75 per cent higher current capacity, compared to standard wires, thus reducing energy loss, minimises overheating and optimises performance. It also



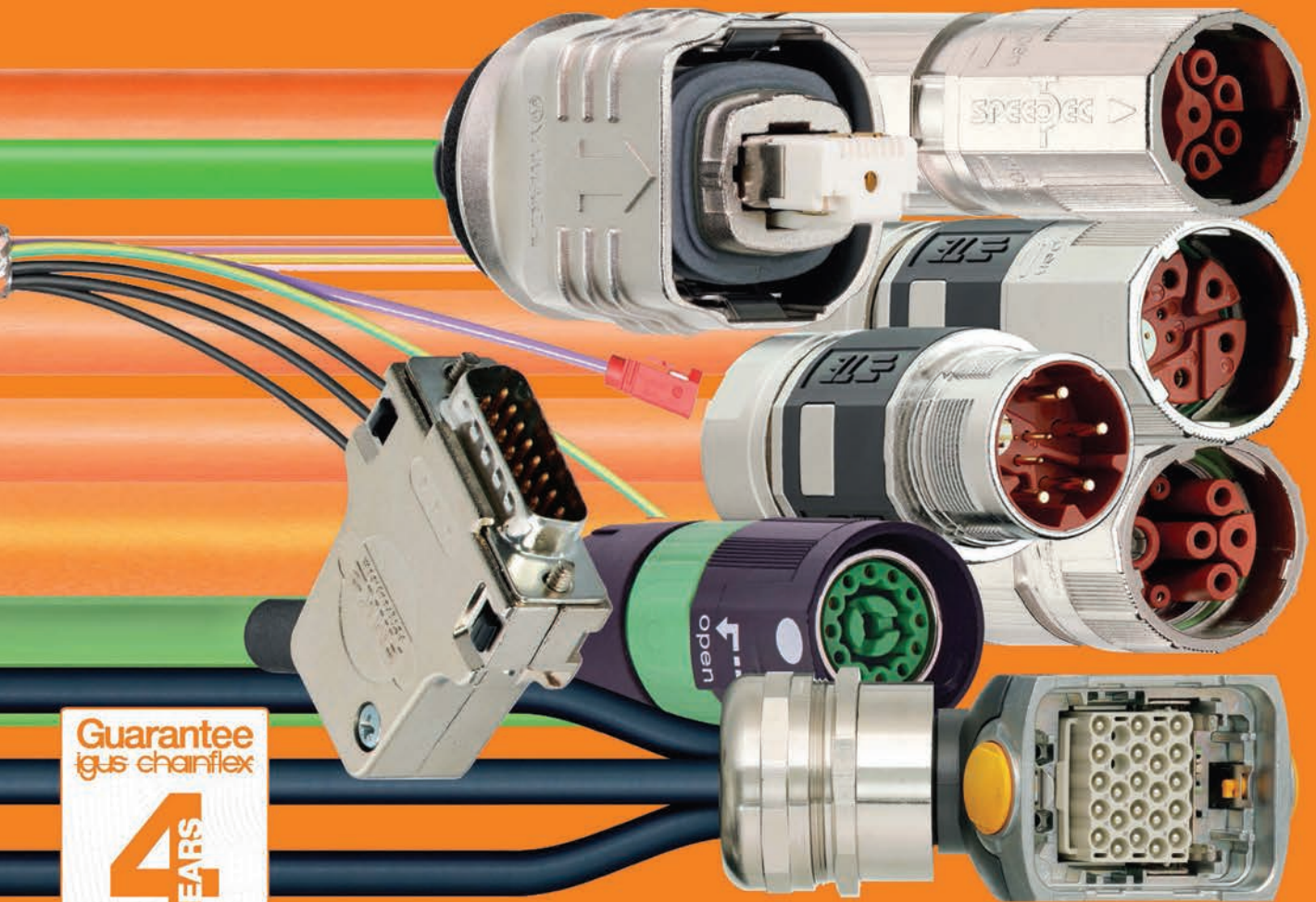
maintains operational integrity at temperatures up to 125°C, making them ideal for use in outdoor and extreme environments.

The wires are engineered to resist temperature fluctuations, UV radiation, and chemical exposure, ensuring reliable performance in challenging conditions. With safety as a priority, FinoUltra wires emit negligible smoke during fire incidents, reducing hazards compared to conventional PVC wires. Their pest- and termite-resistant properties further lower risks of electrical damage and potential fire hazards, making them a safe and durable choice.

To promote FinoUltra, Finolex Cables is rolling out a nationwide brand campaign across TV and digital platforms to raise awareness and highlight the unique features of the product.

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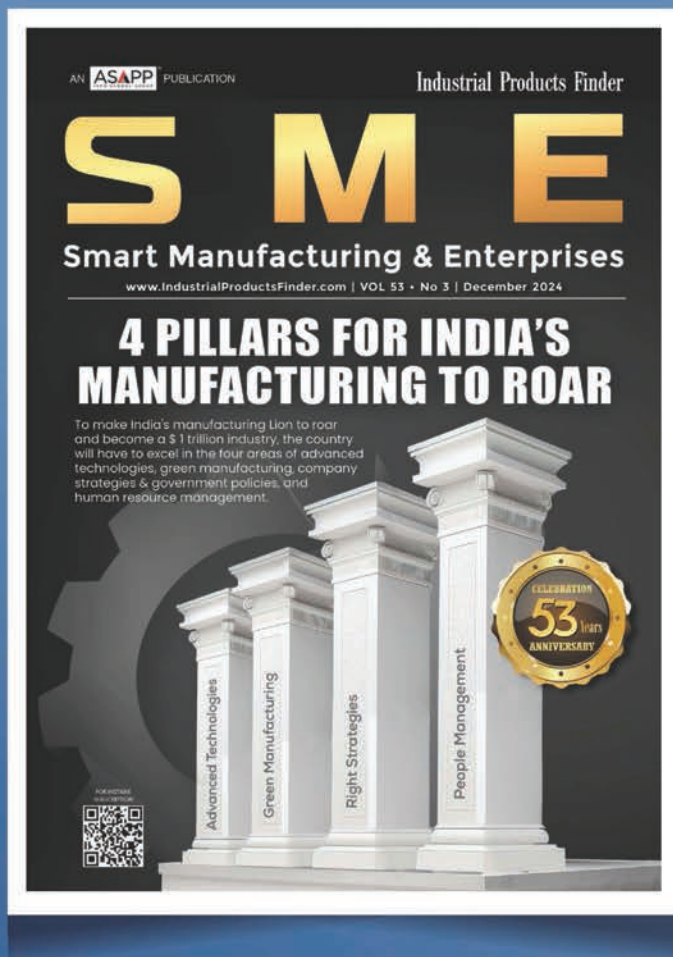
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Mr. Amitabh Kant,
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Auto Componentes

Rosmerta to establish 21 testing stations

Rosmerta Technologies, a leader in mobility solutions, has secured a tender worth ₹4 billion to set up 21 automated testing stations (ATS) across Maharashtra, solidifying its position as a pioneer in road safety innovations. This landmark project aligns with the Government of India's commitment to ensuring road safety through technology-driven solutions. The tender entails that these stations will come up in the state over the next five years. India's vehicular population has grown significantly, reaching 354 million by 2022, according to MoRTH. In 2023-24 alone, 28.4 million vehicles were produced, contributing 6.8 per cent to India's GDP and 40 per cent to manufacturing GDP. In response, the government introduced Chapter XI in the Central Motor Vehicle Rules (CMVR) to mandate the establishment of ATS nationwide, requiring significant investments to standardize and automate roadworthiness testing.

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Aerospace & Defence

Paras Defence to establish optics park

Paras Defence has plans to invest ₹120 billion in developing India's first optics park in Maharashtra. An initial agreement for the project was signed with the state government at the World Economic Forum in Davos.

Slated to commence operations in 2028 and continue until 2035, the optics park aims to serve as a technology hub for applications in defence, space, automotive, semiconductors, and other critical sectors. The initiative underscores Paras Defence's commitment to the 'Make in India' campaign while bolstering India's push for technological self-reliance.

The project is expected to create over 2,000 direct employment opportunities. The Maharashtra government has pledged its support for the endeavor, including assistance with land acquisition, approvals, and various incentives to ensure its successful implementation.


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Industrial Automation

Schneider to automate water treatment plant

Schneider Electric has secured a contract to automate the Bhandup water treatment plant in Mumbai, which processes 2,000 million litres per day (MLD) of water.

The initiative aligns with the Maharashtra government's mission to ensure potable water access for 22 million residents.

The automation will leverage Schneider Electric's EcoStruxure solutions, including the EcoStruxure Process Expert M580-EPA Automation platform, Altivar Process Drives, PRISMA LV panel boards, power quality solutions, Easergy relays, transformers, MV switchboards, and UPS systems.

This upgrade will make the Bhandup facility a critical part of India's largest single water treatment complex, with a total capacity of 4,500 MLD. It will also integrate seamlessly with Schneider Electric's existing Water Command and Control Centre.



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Electric Vehicles

Tata Power unveils EV charging solutions

Tata Power EZ Charge, India's leading provider of EV charging solutions, took centre stage at the Bharat Mobility Global Expo 2025, showcasing its vast infrastructure network and various offerings across customer segments.



At the event, Tata Power EZ Charge highlighted its unwavering commitment to ensuring seamless EV adoption in India through a multifaceted approach that combines technological innovation, green energy integration, and strategic network expansion. The company's EV charging solutions are dedicated to removing range anxiety by offering a robust and expansive charging network that spans city locations, residential societies, highways, commercial hubs, and beyond. The company showcased its offering across various segments covering passenger cars, buses, trucks, fleets and others.

The company's EZ Charge mobile app, a key focus at the event, empowers users with real-time updates, enabling them to locate chargers, check availability, and manage charging sessions effortlessly—a significant step towards reducing range anxiety among EV owners.

The company also offers RFID cards RFID enabled cards to EV owners in India. Tata Power EZ Charge enabled RFID cards can make charging at any Tata Power charging outlet considerably easier, removing the need to launch a charging session via a mobile application. The RFID card may be used by any EV owners, regardless of brand.

The stall featured innovative solar-powered chargers and advanced charging solutions that emphasise renewable energy utilisation. Working prototypes of these chargers, alongside other breakthrough innovations such as fast-charging solutions and AI-driven monitoring systems, demonstrated Tata Power's capability to push the boundaries of EV charging technology.

Tata Power's expansive EV charging network now boasts over 5,500 public chargers across 550 cities & towns, complemented by 120,000+ home chargers and 1,100 bus charging points. Strategically placed along 550+ of India's national highways and key routes connecting major metros, business hubs, tourist & religious destinations that are frequently used by road travellers.



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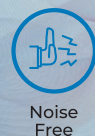
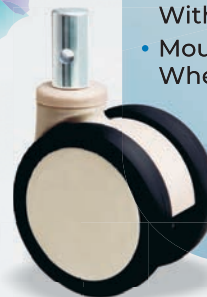
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ELEC RAMA

Powering the **Future of Energy**

22-26 February, 2025

India Expo Mart, Greater Noida

POWERING INDIA'S GROWTH SUSTAINABLY

IEEMA will host the 16th edition of ELEC RAMA, one of the world's largest trade fairs for the electrical and electronics industry, from **February 22-26, 2025, at India Expo Mart, Greater Noida**. Centered on "Reimagining Energy for a Sustainable Future," the event promotes collaboration for a greener energy ecosystem. As the media partner, Smart Manufacturing & Enterprises (SME) will release a special supplement on ELEC RAMA 2025, showcasing the potential of India's electrical and allied electronics (E&E) sector to exhibitors and visitors.

Focus topics include:

- **Renewable Energy:** Solar, Wind, Green Hydrogen, Biomass, Ethanol.
- **E-Mobility & Charging Infrastructure:** EVs, Batteries, Charging Solutions.
- **Energy Sector Automation:** Software, AI, IoT, Robotics, Motion Control.
- **Power Transmission & Distribution:** Transformers, Switchgears, Smart Grids.

Issue Highlights:

- Insights from Industry Leaders
- Latest Trends & Updates
- New Products & Technologies

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Aerospace & Defence

Garuda wins contracts from mining firms

Garuda Aerospace, India's leading drone manufacturer and drone-as-a-service (DAAS) provider, is soaring to new heights with significant wins in the mining sector. The company has recently secured contracts with several prominent mining corporations across India, including the Gujarat Mineral Development Corporation (GMDC), Central Mine Planning and Design Institute (CMPDI) in Jharkhand, Odisha Mining Corporation, and various private mining companies. Garuda Aerospace will provide advanced data analysis and improve mining efficiency by deploying cutting-edge drone technology.

Garuda Aerospace's drones are revolutionising mining operations by providing encompass volumetric analysis of stockpiles, accurate 2D and 3D terrain mapping, and detailed project monitoring. This technology allows for precise measurement of extracted materials, efficient resource management, and enhanced safety by providing detailed aerial views of mining sites. These drone-based solutions offer significant advantages over traditional methods, providing faster data acquisition, improved accuracy, and reduced operational costs.

The mining sector is fundamental to India's economic progress, supplying crucial raw materials across industries. Efficient and sustainable practices are essential for maximising resource use while minimising environmental impact. Garuda Aerospace's drone technology empowers mining companies to optimise operations, enhance safety, and gain valuable site insights. This data is critical for mine planning and informed decision-making, enabling process optimisation. Drones conduct vital safety inspections, accessing hazardous areas like high walls and pit bottoms to identify and mitigate potential risks, ensuring worker safety and contributing to a more efficient and responsible mining industry.

Garuda Aerospace is dedicated to delivering optimal drone solutions, collaborating closely with clients to understand their unique needs and develop tailored applications. The company's experienced engineers and pilots provide comprehensive training and support, ensuring safe and effective drone operations. Beyond mining, Garuda's drones are deployed in agriculture for precision farming, infrastructure for critical asset inspection, disaster management for aerial surveys, and even defence applications.



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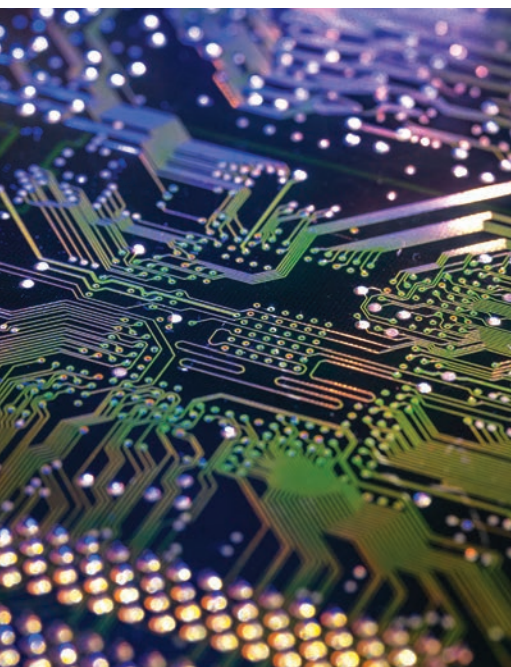


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Electronics Industry's Mission \$ 500 Billion

Indian electronics industry has set an ambitious target of \$500 billion by 2030 from present \$ 101 billion. The task is challenging, but not insurmountable. As a result, the industry is on the cusp of unprecedented growth, says **Rakesh Rao**.



Source: FREEPIK

Electronics (especially mobile manufacturing) has been a successful turnaround story for India. The electronics manufacturing landscape in India has undergone a remarkable transformation in the last 5–6 years. With initiatives like Make in India and Digital India, the government has laid a strong foundation for boosting domestic manufacturing capabilities. **Sanjeev Srivastava, Automation Head, Delta Electronics India**, explains, “The introduction of the Production-Linked Incentive (PLI) scheme has been a game-changer, incentivising local production and reducing dependency on imports. Investments in technology, infrastructure, and

skill development have further enhanced India's global competitiveness. The growth of the manufacturing ecosystem and partnerships between global players and local manufacturers have fostered innovation, leading to an increasingly sophisticated manufacturing environment that supports high-quality production and exports.”

In 2020, Prime Minister Narendra Modi gave a kick-start to India's vision of self-reliance (Atmanirbhar Bharat) through economic policies and incentives that included a focus on electronics and semiconductors. The end goal was to make India a product nation. **Sanjeev Keskar, Chief Executive Officer, Arvind Consultancy**, observes, “Progress in electronics manufacturing is very good. Five years back almost 2/3rd of electronics products were finish good imports and 1/3rd was domestically manufactured. In 2022–23, India's total consumption of electronics was

\$ 120 billion and we had \$ 80 billion domestic manufacturing and \$ 40 billion in finish good imports. So, 2/3rd was manufactured in India. This is mainly due to PLI scheme. Mobile phones contribute to around 45–50 per cent of the total market and due to PLI scheme most of the mobiles are now getting manufactured in India.”

Fuelled by the expansion of new manufacturing facilities driven by the GoI's successful PLI scheme, electronics goods have become the fastest-growing segment in India's export portfolio. Climbing from sixth place last year, electronic goods now rank third among India's top export performers, trailing only engineering products and petroleum.

In FY24, a year that saw subdued global demand due to high interest rates and geo-political conflicts, India's electronic goods exports (worth \$ 29.12 billion) witnessed highest increase of 23.6 per cent compared with FY23. Drugs & pharmaceuticals showed the second best performance of 9.73 per cent growth. In December 2024, India's electronics exports surged by 35.1 per cent to touch a two-year high of \$3.58 billion from \$2.65 billion in December 2023, according to the Minister Commerce

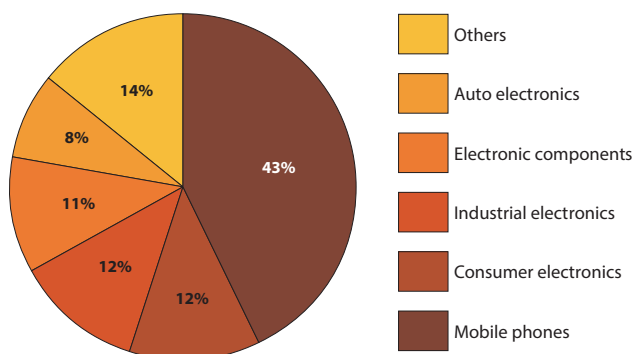


Figure 1: India's electronics production (\$ 101 billion)

Source: Teamlease Degree Apprenticeship



“India should focus on being a product nation in both systems and chips to replace an untrustworthy China in the near future. In this increasingly unipolar world, we need to create strategic autonomy by owning technologies.”

Dr Ajai Chowdhry, Founder HCL and Chairman MGB, National Quantum Mission of India

and Industry, Government of India (GoI). Similarly, exports of electronics witnessed a jump of 27.4 per cent in April-November 2024 to \$22.5 billion, from \$17.66 billion during the same period in 2023. This data reflects the increase in foreign demand for high-value Indian electronics goods and rising domestic production capacities.

Despite this success, it is still a long road ahead for India. “We have done well in creating scale in phone manufacturing albeit with low value added. Rest is still a work in progress. We have not helped create domestic brands and design-led manufacturing is totally missing. The government PMA (Preference for Domestically Manufactured Electronic Goods) scheme for preference for the Make in India scheme is ignored by all states and most central government offices. This does not help in-depth in manufacturing,” says **Dr Ajai Chowdhry**, Founder HCL, and a strong advocate of self-sufficiency in electronics. He is also the **Chairman of EPIC Foundation and Mission Governing Board (MGB), National Quantum Mission of India**. The PMA scheme - administered by the Ministry of Electronics and Information Technology (MeitY) - is a policy that encourages the purchase of electronic products made in India for government use.

Energised growth

The India’s electronics manufacturing landscape has evolved significantly in the last few years driven by government initiatives and increased investments. “In the 80s and 90s, we had Indian products like Videocon and Onida. But with the relaxation of import tariffs on foreign goods, Western companies gained a stronger presence, and as a result, many Indian brands gradually lost their market share. Thanks to the new Make in India program promoting domestic manufacturing, we are back to a point where India wants to build its own products, and the government is fostering an ecosystem to make that happen. The drive towards self-reliance and to also make India a product nation is catalysing the electronics industry with the semiconductor design and manufacturing playing a key part of that,” opines **Malini**

Narayanamoorthi, India Country Manager and Vice President of MID (Memory Interface Division) Engineering, Analog & Connectivity Group, Renesas Electronics.

India’s electronics sector has experienced significant growth, driven by key initiatives like Make in India, National Electronics Policy, PLI schemes, and Digital India.

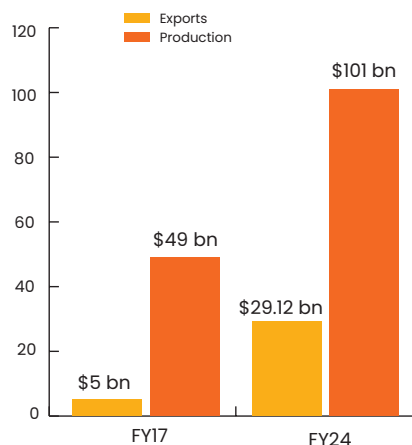


Figure 2: Rising exports & domestic electronics production

Source: Minister Commerce and Industry



“The Indian semiconductor industry is projected to grow at a CAGR of over 19 per cent between 2023 and 2027. This progress is propelling India into a key position in the global semiconductor value chain.”

Hitesh Garg, VP & India MD, NXP Semiconductors

Nikhil Rao, Vice President-Operations at Flex India, elaborates, “The PLI scheme has been a game changer for India’s electronics manufacturing industry. These government incentives have made India a globally attractive destination for manufacturing, especially for OEMs looking to diversify their supply chains. The scheme addresses cost challenges, providing financial incentives that reduce production costs and improve competitiveness. For example, PLI scheme initially focused on mobile phone manufacturing, it has since broadened to include IT hardware, telecommunications, and component manufacturing.”

India’s electronics manufacturing market surpassed \$100 billion in March 2024, doubling from \$49 billion in 2017, highlighting the industry’s rapid expansion. Valued at \$101 billion, the sector is rapidly emerging as a global electronics hub, accounting for 3.3 per cent of global manufacturing and 5.3 per cent of India’s total merchandise exports in FY24.

Electronics manufacturing has taken off in a big way in India in the last 10 years, it now needs to be ready for the next leap. “Most mobile phones for domestic use are currently being manufactured in India, and the export of phones made in India has also taken off. Most of it

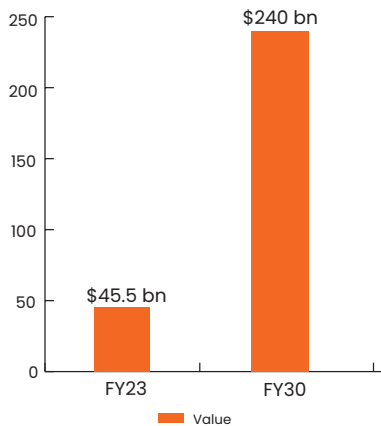


Figure 3: Soaring demand for electronic components in India

Source: CII

is at manufacturing level and part of it is at assembly level and it is being done as contract manufacturing for global brands like Apple, Samsung, Xiaomi, One Plus etc. The PLI incentives and selective application of tariffs has helped in growing this ecosystem tremendously. The next challenge for growing electronics manufacturing in India is to increase the value addition in manufacturing by making mechanicals, connectors, cables etc. and then move on to passive components, submodules and semiconductor chips for these products,” comments **Dr Satya Gupta, President, VLSI Society of India.**



“The success of mobile phone manufacturing has demonstrated the country’s potential, and this success is now being

replicated across other sectors. Key growth areas include IT hardware, automotive electronics, and semiconductors. 🗣️

Nikhil Rao, VP-Operations, Flex India

Increasing value addition

Though final assembly of

electronics has scaled at a rapid pace in India, local value addition has lagged behind. Components like printed circuit boards (PCBs), camera modules, display sub-assembly, lithium-ion cells, speakers, vibrator motors and mechanics make up around 50 per cent of the bill-of-materials in a mobile phone or a laptop. India’s demand for electronic components is projected to surge from \$45.5 billion in 2023 to \$240 billion by 2030, fuelled by the rising domestic production of mobile phones, as per a CII report.

The report has identified components and sub-assemblies of batteries, camera modules, mechanicals, displays, and PCBs as high priority for India. These components have either a nominal production in India or are heavily import-dependent. Thus, building a robust domestic supply chain is crucial for India’s electronics manufacturing industry.

Nikhil Rao explains, “Dependence on imports not only increases costs but also introduces logistical complexities and vulnerabilities. To address this, we must focus on developing a local supplier ecosystem that can meet the industry’s demands. Government initiatives, such as the upcoming PLI schemes for components, are critical for building a strong local supply chain. These programs provide financial incentives to suppliers, encouraging them to invest in localisation and advanced manufacturing capabilities. The government has learned valuable lessons from the success of the mobile phone PLI scheme and is applying these insights to other segments. By engaging closely with industry stakeholders, the government ensures that its policies address real-world challenges and opportunities.”

The Finance Ministry is reportedly planning to roll out a ₹250 billion incentive scheme aimed at stimulating local manufacturing of

electronics components. Through the scheme, the government is targeting to boost local value addition in electronics manufacturing to 35-40 per cent from 15-18 per cent at present and eventually covering 50 per cent of the entire non-semiconductor bill of materials.



“With opportunity comes the challenges as well. We do have to steadily build up every piece of the puzzle. Setting

up manufacturing for semiconductors takes time, resources like uninterrupted electricity and trained manpower. 🗣️

Malini Narayanamoorthi, India Country Manager, Renesas Electronics

Semiconductors: Ready for a take-off

Semiconductors are at the heart of every electronics device today and most advanced gadgets and products for digital infrastructure worldwide would not be possible without the advances in semiconductors. According to Dr Satya Gupta, in the last three years, phenomenal progress has been made in semiconductor manufacturing. “Today, India offers the best incentives in the world for semiconductor manufacturing which totals up to 70-75 per cent of the project cost between government of India and various states. This has helped in getting investments of more than ₹1.5 trillion from domestic and global companies, namely Micron Technology, Tata Electronics, CG Power and Kaynes Technologies with one ATMP plant, three OSAT plants and one wafer manufacturing plant. Most of these facilities have started building these

facilities and the chip production should start as early as second half of 2025 by Micron, with others following up in next few years,” he says.

Local production of semiconductors is considered to be pivotal for the success of India’s domestic electronics manufacturing goals. For this, the Union Government launched the India Semiconductor Mission (ISM) and incentive scheme for the display manufacturing ecosystem with an outlay of ₹760 billion in December 2021. “The Indian semiconductor industry has made remarkable strides in 2024, with the government’s transformative India Semiconductor Mission and cumulative incentives surpassing ₹760 billion, attracting investments in state-of-the-art fabrication facilities and design ecosystems. The sector is projected to grow at a CAGR of over 19 per cent between 2023 and 2027, reflecting the nation’s commitment to becoming a global semiconductor powerhouse. This progress is propelling India into a key position in the global semiconductor value chain,” said **Hitesh Garg, Vice President and India Managing Director, NXP Semiconductors** (one of world’s largest semiconductor manufacturers), in a statement.

India Semiconductor Mission has approved five semiconductor units, with the foundation stone for India’s first commercial semiconductor fab being laid in March 2024. “Yes, good progress in ISM for silicon fabs but we need a top global brand in compound semiconductors. This should have happened in phase 1,” opines Dr Ajai Chowdhry.

Global semiconductor landscape

The nature of the semiconductor market is extremely cyclical and this often results in extreme highs and lows. Global production of semiconductors over the last two

Fab or fabless: Find the right balance

Electronic products depend on supply of semiconductor chips, which are primarily developed by the fabless companies like Qualcomm, Broadcom, Nvidia, AMD etc. “These fabless companies manufacture chips in a contract manufacturing model at various fabs across the world like TSMC, Global Foundry, UMC, PSMC etc. But, the product is owned by the fabless company and not the semiconductor manufacturing company,” explains Dr Satya Gupta.

Today, fabless chip product companies are larger than the semiconductor manufacturers. For example, Nvidia (the largest fabless company) has more than \$3.5 trillion market cap compared to \$1.2 trillion market cap of TSMC, the largest semiconductor manufacturing company. “When we talk about a robust ecosystem for supply of chips, it is important to develop both fabless chip product companies and semiconductor manufacturing companies. In last three years, after India Semiconductor Mission was launched, more than 95 per cent of the investments and incentives have gone rightfully for the manufacturing. As we move forward, in the next phase the incentives for semiconductor manufacturers have to be more balanced, like 80 per cent for the manufacturing and 20 per cent for the fabless semiconductor product companies,” he suggests.

years has been highly variable depending on the country. The key end user sectors for the industry are primarily electronics and automotive. According to the World Semiconductor Trade Statistics (WSTS) forecast, primary areas of growth are memory and logic integrated circuits. These categories cover chips used in everything from computers and smart phones to MRI machines and smart refrigerators.



“The next challenge for growing electronics manufacturing in India is to increase the value addition in manufacturing by making mechanicals, connectors, cables etc. and then move on to passive components, submodules and semiconductor chips for these products.”

Dr Satya Gupta, President, VLSI Society of India

Regions in Asia – China, South Korea, Taiwan, Singapore and Japan – dominate the global semiconductor

manufacturing space with more than 78 per cent market share. In recent years, the smaller regions - namely Taiwan and Singapore - have been making big gains with a dedicated focus on the semiconductor market. “This focus on semiconductors has slowly enabled these territories to overtake Japan in the production of chips. Both Singapore and Taiwan have strong government support, well trained workforces, a focus on research and development and have received large amounts of investment in the sector from both domestic and international companies. Taiwan has TSMC, which is a global leader in advanced chips, while Singapore has carved out a niche for itself as a packaging and testing hub,” explains **Tim Dawson, Vice President – Industrial Automation, Interact Analysis**.

With the AI boom taking off, one can expect to see even more investments in the semiconductor industry, as technology evolves and the complexity and need for more chips continues. This is likely to drive more assembly and testing capacity at a global level. Another thing to consider is the geopolitics of semiconductor production. Dawson says, “One of the key reasons the US

is focusing so much of its resources on the semiconductor sector is that it does not want key infrastructure and supply chains to be reliant on Chinese-produced semiconductors. The US is not alone in this and I suspect we will see the smaller regions make inroads into China's market share as exports switch to these regions."

The electronics manufacturing landscape in India has undergone a remarkable transformation in the last 5-6 years. The introduction of the PLI scheme has been a game-changer, incentivising local production and reducing dependency on imports.

Sanjeev Srivastava, Automation Head, Delta Electronics India

With respect to India's chance to emerge as a major player in the global semiconductor manufacturing space, he says, "Anything is possible, but realistically probably not any time soon unless there are significant changes to the current market. India accounted for just 0.25 per cent of the Manufacturing Industry Output (MIO) value in 2024 for semiconductors and components. While it might grow rapidly internally, its competitors are simply too far ahead in terms of level and volume of production for India to make much headway. India does have strengths which could help it in the longer term, such as R&D centers for many of the top semiconductor design companies and around 20 per cent of the world's semiconductor design engineers. On the other hand, India imports about 90 per cent of its semiconductors and is reliant on other regions for growth in the sector."

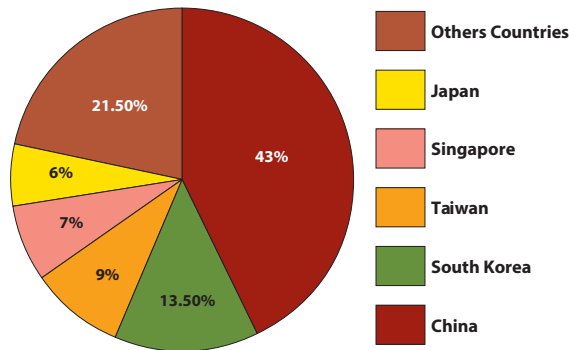


Figure 4: Major semiconductor manufacturing countries (2024)

Source: Interact Analysis

Hurdles on the road

The growth of the electronics industry in India also faces several challenges, despite its tremendous potential. Sanjeev Srivastava elaborates, "One of the primary issues is the dependency on imports for critical components such as semiconductors, which creates supply chain vulnerabilities. Infrastructure limitations, high logistics costs, and regulatory hurdles add to the complexity of scaling operations. The industry faces a shortage of skilled labour to meet the demands of advanced manufacturing processes. High raw material costs and intense global competition also pose significant challenges. However, consistent policy support, enhanced public-private collaboration, and a focus on innovation and technology can help overcome these barriers and unlock the industry's full potential."

There is a huge opportunity ahead of the country as building a complete electronics ecosystem with the government backing opens up a lot of windows ranging from materials, design, equipment, tooling manufacturing etc. "With opportunity comes the challenges as well. We do have to steadily build up every piece of the puzzle. Setting up manufacturing for semiconductors takes time, resources like uninterrupted electricity and trained manpower," observes Malini Narayanamoorthi.

Sanjeev Keskar believes that DLI scheme for fabless semiconductor designs needs lot of improvement. Against goal of 100 companies in three years, the government has managed to approve only 17 proposals. "The industry should also focus on

passive components/connectors and bare PCB manufacturing as they contribute to 15 per cent plus value of any product," he adds.

Unavailability of skilled workforce could hinder the growth of Indian electronics industry. According to a report by TeamLease Degree Apprenticeship, the electronics sector, which is expanding at a compounded annual growth rate of 25-30 per cent, is poised to generate 12 million direct and indirect jobs in the coming years. However, the industry could face a shortage of 10 million skilled professionals, which will be needed to maintain and accelerate growth in the electronics sector.

India has great design talent, but it works for either global companies or as design services companies. India has to focus on creating IP/technology/chips and products as it carries great value.

Sanjeev Keskar, CEO, Arvind Consultancy

Burgeoning demand

Electronics manufacturing is in a transformational stage with emerging technologies like artificial intelligence (AI), machine learning (ML), and 3D printing improving process quality, boosting efficiency, and optimising

resource utilisation. Sanjeev Srivastava explains, “Smart manufacturing, driven by Industry 4.0 technologies such as AI, IoT, and robotics, is set to revolutionise production processes, making them more efficient and sustainable. The push for green technologies, including the adoption of renewable energy sources and low-carbon manufacturing practices, will become a defining factor in the industry’s evolution. The growing demand for 5G-enabled devices, coupled with advancements in semiconductor technology, will further drive innovation. The integration of digital tools for predictive maintenance, supply chain optimisation, and quality control will redefine operational efficiency and product reliability.”

According to Hitesh Garg, as we step into 2025, the focus will shift towards system design and AI-driven innovations, with semiconductors at the heart of India’s transition into the intelligent age. “Initiatives like the India AI mission and advancements in edge computing, 5G, and IoT are creating unparalleled opportunities to integrate cutting-edge AI capabilities into system design. These innovations will accelerate industries such as automotive, healthcare, and telecommunications, enabling smarter, more efficient solutions. With a vibrant talent pool and robust digital infrastructure, India is well-positioned to leverage its semiconductor & ESDM (Electronics System Design and Manufacturing) ecosystem to shape a future defined by intelligence on the edge and connectivity,” he added in a statement.

The semiconductor industry is set to be propelled by key macro trends such as AI, autonomous vehicles, sustainable electronics, edge computing, and electric vehicles. In addition to technological advancements, geopolitical factors and the growing demand for supply chain self-reliance are influencing the

industry’s growth across various countries.

With the tension between China and developed countries (led by the US and European Union) increasing, India needs to take advantage of the situation to develop a robust domestic manufacturing ecosystem for electronics and semiconductors. Dr Ajai Chowdhry opines, “India should focus on being a product nation in both systems and chips to replace an untrustworthy China in the near future. In this increasingly unipolar world, we need to create strategic autonomy by owning technologies. With our vast pool of fabless designers, we should create RISC-V based chips for all our requirements to prevent problems due to actions of the US and China in controlling the export of their technology as has been reported today.” RISC-V (pronounced as ‘risk-five’) is an open-source instruction set architecture (ISA) designed to create custom processors for a wide range of applications, including embedded systems and supercomputers.



India does have strengths which could help it in the longer term, such as R&D centers for many the top semiconductor design companies and around 20% of the world’s semiconductor design engineers.

Tim Dawson, VP – Industrial Automation, Interact Analysis

Scaling new heights

India’s electronics exports are projected to gain further momentum with the establishment of semiconductor manufacturing facilities in the country. Nikhil Rao believes that India’s electronics

Table 1: Employment projections in electronics sector by 2027

Types	Jobs
Engineers	1 million
ITI-certified professionals	2 million
Specialists in AI, ML and data science	0.2 million
Indirect jobs	9 million

Source: Teamlease Degree Apprenticeship

manufacturing industry is on the cusp of unprecedented growth. “The success of mobile phone manufacturing has demonstrated the country’s potential, and this success is now being replicated across other sectors. Key growth areas include IT hardware, automotive electronics, and semiconductors. The government’s incentives, coupled with bilateral trade agreements, provide a favourable environment for both domestic and export-focused manufacturing. Additionally, advancements in semiconductor manufacturing will further strengthen India’s position as a global leader in electronics,” he adds.

The Indian electronics industry is aiming to reach \$500 billion by 2030. To achieve this objective, the industry must expand five times within the next five years, closing a \$400 billion production gap. Although the Indian electronics industry currently plays a limited role in global value chains, it has significant growth potential by expanding beyond final assembly to encompass design and component manufacturing. “India has a huge opportunity in investing in critical technologies of the future and create a leadership position with abundant talent available in the country. I see a bright future for semiconductor technology, products and manufacturing in India and we are on the right path to make the country a strong electronics and semiconductor product nation,” concludes Dr Satya Gupta.

SME



ELEC RAMA 2025: Charging the Future

Over 1,100 exhibitors, 400,000 business visitors, and 80 countries are participating.

As the global electrical industry converges for its flagship showcase, ELEC RAMA 2025 is set to redefine innovation and collaboration in the power sector ecosystem. Scheduled from February 22 to 26, 2025, at Greater Noida, this 16th edition promises to be the most expansive and impactful gathering yet, uniting thought leaders, policymakers, and industry trailblazers under one roof.

Billed as the largest standalone event in the electrical and allied equipment industry, ELEC RAMA has consistently been a cornerstone for advancing the sector's vision. Organised by the Indian Electrical and Electronics Manufacturers' Association (IEEMA), the event exemplifies India's emergence as a global leader in electrical manufacturing and technological innovation. It spans the full spectrum of electrical solutions, from generation to distribution, and from source to socket, delivering an unparalleled opportunity to witness the latest advancements powering the world.

Platform for unmatched networking and collaboration

ELEC RAMA 2025 is designed to be more than an exhibition—it is a gateway to the future of electricity. With participation from over 1,100 exhibitors, 400,000 business visitors, and representation from 80 countries, the event provides an unmatched platform for business and networking opportunities. B2B meetings, global buyer delegations, and country pavilions will allow stakeholders to explore partnerships, investments, and market expansion on a global scale.

The event will also host technical conclaves, innovation showcases, and thought leadership forums, addressing critical challenges and opportunities in the power sector. Industry summits on renewable energy integration, energy efficiency, and next-gen grid technologies will shape discussions on the future of sustainable electricity.

India's moment on the global stage

As the world's largest T&D show, ELEC RAMA 2025 underscores India's pivotal role in the global power landscape. With the country's electrical and electronics manufacturing industry scaling new heights, the event will serve as a springboard for showcasing indigenous



innovation and establishing India as a hub for cutting-edge electrical technologies.

Highlights for 2025

This year's edition promises to set new benchmarks with its scale and scope. 600+ hosted buyers from across the globe will participate, driving cross-border trade and fostering collaborations. Meanwhile, 10+ dedicated country pavilions will highlight international expertise, enhancing the event's global appeal.

Beyond its business potential, ELEC RAMA 2025 will also focus on knowledge sharing and innovation, providing a platform for the next generation of leaders and innovators. Through initiatives like the innovation zone and startup showcases, the event will spotlight transformative technologies and cutting-edge solutions that promise to revolutionise the power sector.

Siddharth Bhutoria, Vice-President, IEEMA and Vice Chairman, ELEC RAMA 2025 outlined the significance of the show, "ELEC RAMA has established itself as an essential platform for the Indian energy and power sector to engage with global audiences, reflecting the industry's growth and adoption of world-class technology. ELEC RAMA 2025 is set to be the largest, most dynamic, and impactful edition to date, featuring Germany as the Focus Country and France as the Associate Partner Country, further enhancing its international appeal. This landmark event will showcase India's leadership in the electrical and allied electronics sectors."

Road ahead

As the countdown begins, ELEC RAMA 2025 is set to be the ultimate celebration of all things electric, bringing together the best minds, solutions, and technologies that drive the planet. With its emphasis on collaboration, innovation, and sustainability, the event is more than an exhibition—it is a movement towards shaping a smarter, greener, and electrified future.

Stay tuned for ELEC RAMA 2025, where the world of electricity meets its future!



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EV Batteries Shaping the Future

Affordability and sustainability remain the biggest hurdles for EV adoption. Battery costs, driven by the prices of raw materials, have been a barrier. However, falling green metal prices are making EVs accessible, says **Ankit Sharma, CEO & Co-Founder, Vidyuta Materials Pvt Ltd.**

What if your car could charge in 10 minutes, drive 500 kilometers, and help create a greener future? Electric vehicles (EVs) are driving us toward this vision, and India is a key player in this global transformation. With EV sales growing by 20 per cent in 2024—reaching 100,000 units compared to 82,688 in 2023—electric vehicles now represent 2.4 per cent of total vehicle sales, according to the Federation of Automobile Dealers Associations (FADA). This rapid adoption highlights a significant shift in consumer preferences, propelled by advancements in EV battery technology.

At the heart of this transformation lies battery innovation; unlocking breakthroughs in sustainability, affordability, and performance. While lithium-ion batteries have been the backbone of this progress, emerging technologies and innovations in Cathode Active Materials (CAM) are poised to redefine the industry's future.

Li-Ion batteries: The foundation of EVs

Lithium-ion batteries have revolutionised the EV market with their high energy density, fast charging cycles, and long lifespans. Today, they power most EVs globally and have played a critical role in reducing reliance on internal combustion engines.

However, lithium-ion batteries come with limitations. Their reliance on scarce materials such as lithium, cobalt, and nickel has driven up costs and raised concerns about environmental sustainability and ethical sourcing.

To overcome these challenges, manufacturers are exploring alternative chemistries within the lithium-ion family:

- **Lithium-Iron Phosphate (LFP) Batteries:** These batteries eliminate cobalt and nickel, offering a safer and more cost-effective solution while aligning with sustainability goals.



- **Lithium-sulfur batteries:** Featuring a sulfur-based cathode, these batteries promise enhanced energy density and affordability, addressing range anxiety among EV users.

Emerging battery technologies

As the limitations of lithium-ion technology become evident, alternative battery chemistries are paving the way for the next generation of EVs:

- **Solid-state batteries:** Using solid electrolytes instead of liquid, these batteries promise faster charging, improved safety, and 25–50 per cent longer ranges. They are lighter, making them ideal for high-performance EVs.
- **Sodium-ion batteries:** With sodium being significantly more abundant than lithium, these batteries offer a low-cost alternative for mass-market EVs. The commercialisation of sodium-ion batteries by Natron Energy in 2024 demonstrates their growing potential.
- **Zinc-manganese oxide batteries:** By delivering higher energy density at a competitive cost, this chemistry addresses one of the largest barriers to



EV adoption—affordability.

- **Organosilicon electrolyte batteries:** These batteries prioritise safety by engineering liquid solvents at the molecular level, mitigating risks such as overheating and leakage.

Each of these technologies caters to different use cases, from cost-sensitive mass adoption to premium, high-performance vehicles.



The fast-paced adoption of EVs has raised concerns about waste management.

Driving innovation in batteries

Cathode Active Materials (CAM) are at the core of EV battery performance, directly influencing energy density, cycle life, and overall safety. Recent advancements in CAM technology are not only boosting battery efficiency but also addressing challenges related to sustainability and cost.

Some of the key innovations include:

- **Nickel-rich cathodes and cobalt-free alternatives:** Nickel-rich chemistries, such as NMC 811 (80 per cent nickel, 10 per cent manganese, 10 per cent cobalt), remain critical for delivering high energy density and long-range capabilities, particularly for premium EVs. While NMC 811 has reduced cobalt content compared to earlier formulations like NMC 622, it still relies on cobalt, which poses challenges around cost, supply chain risks, and ethical sourcing.

To address these limitations, manufacturers are exploring low-cobalt and cobalt-free alternatives to meet the industry's growing demand for sustainability and affordability:

- **NMC 9.5.5:** With nickel content exceeding 90 per cent and cobalt below 5 per cent, this formulation reduces costs while maintaining the high energy density required for long-range EVs.
- **Lithium Nickel Manganese Oxide (LNMO):** A promising cobalt-free alternative, LNMO offers high voltage operation, superior cycling stability, and environmental benefits, although commercial scalability remains a challenge.
- **Lithium Manganese Iron Phosphate (LMFP):** Building on the proven stability and affordability of LFP (Lithium Iron Phosphate), LMFP introduces manganese to achieve:
- **Higher energy density:** LMFP provides 15–20 per

cent greater energy density than LFP, making it suitable for mid-range EVs requiring longer ranges.

- **Enhanced safety:** Retaining the strong thermal stability of LFP, LMFP ensures safety during high-temperature operations, especially in regions with extreme climates.
- **Cost effectiveness:** Like LFP, LMFP eliminates cobalt and nickel, leveraging abundant and inexpensive materials like iron and manganese.
- **Sulfur-based cathodes:** Research into sulfur-based cathodes is making significant progress, offering the potential for batteries with dramatically lower costs and higher energy storage capacities. Sulfur is abundant, inexpensive, and environmentally benign, making it a promising alternative for large-scale adoption.

LMFP is rapidly gaining traction as a strong candidate for mass-market EVs, especially in applications requiring a balance between range, cost, and safety. By integrating advancements in nickel-heavy chemistries with cost-effective solutions like LMFP, battery manufacturers are expanding the range of options to cater to diverse EV segments—from premium vehicles to mass-market models.

India, under initiatives like Atmanirbhar Bharat, is focusing on building a sustainable domestic CAM manufacturing ecosystem to reduce its dependence on imports from China, which currently dominates 90 per cent of the global CAM supply. This shift will not only enhance energy security but also position India as a key player in the global EV supply chain.

Addressing cost and sustainability challenges

Affordability and sustainability remain two of the biggest hurdles for EV adoption. Battery costs, driven by the prices of raw materials, have traditionally been a barrier. However, falling green metal prices and advancements in production technologies are making EVs increasingly accessible. According to Goldman Sachs, these trends could soon bring EVs within reach of a broader consumer base.

Sustainability is equally critical. The fast-paced adoption of EVs has raised concerns about waste management. Current recycling technologies can recover up to 95 per cent of valuable materials like lithium and cobalt, fostering a circular economy. This reduces dependency on mining, minimises environmental impact, and supports the industry's transition toward greener practices.

India's role in the global EV transition

India's EV ecosystem is at a tipping point.

Government initiatives such as the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) program and the Production-Linked Incentive (PLI) scheme are creating a favourable environment for domestic EV and battery manufacturing. However, challenges like limited charging infrastructure and dependence on imported materials persist.

By investing in upstream and midstream activities—such as securing critical raw materials, expanding refining capacities, integrating recycling systems, and setting up facilities for cathode, anode, electrolyte, and cell manufacturing—India can significantly reduce its reliance on imports, enhance energy security, and establish itself as a global leader in the EV market.

Collaborative efforts among policymakers, manufacturers, and researchers will be crucial to addressing supply chain bottlenecks, fostering innovation, and driving sustainable, long-term growth.

Conclusion

The EV revolution is being fueled by rapid advancements in battery technology, from lithium-ion innovations to emerging chemistries like solid-state and LMFP. Addressing challenges around cost, sustainability,

and supply chain dependencies is critical to making EVs accessible and efficient for the global market.

India is uniquely positioned to lead this transition by focusing on upstream resource security, midstream infrastructure like cathode, anode, and electrolyte production, and robust recycling systems. Collaborative efforts among policymakers, researchers, and industry leaders will be vital in overcoming bottlenecks and fostering innovation.

With strategic investments and innovation, EVs can evolve from an alternative solution to a global cornerstone of sustainable transportation, driving economic growth and environmental progress for the future. SME



About the author:

Ankit Sharma, a dynamic entrepreneur and Co-Founder & CEO of Vidyuta Materials Pvt Ltd, brings a wealth of expertise and vision to the clean energy sector. Venturing into the realm of startups, Ankit founded Airific Systems Pvt. Ltd. in 2020, focusing on ultraviolet filtration in air applications. The onset of COVID-19 accelerated the company's growth. Joining his family's business, Advant IT Park Pvt Ltd, Ankit spearheaded the implementation of 3-D design modeling for construction projects, specialising in 3-D BIM Modeling.

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“We will launch T&M devices to meet growing demand.”

With electrification increasing across sectors, the demand for test and measuring (T&M) instruments is surging. For more than 40 years, Kusam Electrical Industries Ltd (KUSAM-MECO) has been supporting the country's electrification drive with its high-quality T&M instruments. In this interview, **Chandmal Goliya, Managing Director, Kusam Electrical Industries Ltd**, highlights on the industry trends and the company's plans for ELECHEMA 2025.

Kindly brief us about your company.

KUSAM-MECO is a four decade old company in the field of test and measuring instruments. KUSAM-MECO is the pioneer in India for the use of digital test and measuring instruments in India way back in 1996. At that time almost all instruments used were analog instruments. KUSAM-MECO was the first company in India to introduce hand held digital multimeters and clampmeters in India. We have in our range at present over 400 products, which is probably the largest range available from one source in India. Some of the multimeters and clampmeters are ‘UL’ listed which provide highest safety to the user and also to the instrument which is not available with any other brand including foreign brands in India. The major industries served by our company are the railways, steel plants, electrical utilities, chemical and pharmaceutical industries, cement industries, research laboratories, engineering colleges, ferrous and non-ferrous industries, petrochemical industries, etc.

How do you analyse the status of the Indian manufacturing sector in general and electrical and electronics (E&E) industry in particular?

The Indian manufacturing sector is going through a very important phase because there is good demand for products made in India. Many countries in the world have imposed restrictions for import of the goods from China, thereby giving a boost to the Indian industry. It is also applicable for electrical and electronic industry in India. Due to the favourable policy of Government of India for setting up electronic component industries in India, many multinational companies are taking



Chandmal Goliya,
MD, Kusam Electrical Industries

advantage of the facilities provided by the Government and setting up Industries in India. In a few years India will be the largest hub in the world for components.

What is driving the demand for your products / solutions and services? What are the USPs of your products / technologies?

Due to the vast range of our products and the high quality, the demand for our products is increasing. We have in our range ‘UL’ listed multimeters and clampmeters which no other company in India provides for the same. Moreover we provide after sales service for all our products which also leads to increase in demand for our products.

What kind of opportunities are you looking to tap in the domestic and export markets ?

With the emphasis by the Government of India on renewable energy and the increasing demand for electric vehicles, we are providing testing solutions for electric vehicle charging and also for testing of solar systems installed by the users. This market will grow tremendously in near future.

With electrification increasing across sectors, how it is helping your business to grow?

As electric supply reaches more and more customers, it needs greater facilities for transmission and distribution of electric energy. We provide all test instruments for transmission and distribution systems. Also with the railways increasing their lines to electrification, we provide many instruments for testing the railway systems for electrification of the lines.

How do you plan to tap end-user industries for future business growth ?

We have a large distributor network across India which helps us to tap end user industries. Moreover we participate in many exhibitions all over India to promote our products. Also we advertise in many magazines related to electrical industry so that the customers are updated with the latest products available in the electrical industry.

Which other trends are visible in the industry?

In the test and measuring industry manufacturers are trying to put in more and more features in one instrument, so that the user does not have to carry many instruments for doing his work. More over the emphasis is more on meeting safety standards such as 'UL'. By complying with 'UL' standards the instrument and the user are safe when using the instrument in the event of a fault in the circuit.

What are your plans for Elecrama 2025?

At Elecrama 2025, we are having a bigger booth than before and will display our new range of products. The



Several countries in the world have imposed restrictions for imported goods from China.

new range includes new multimeters and clampmeters for application in solar, new multifunction power meters, new acoustic partial discharge instruments, a new range of power transducers, new range of process calibrators, new 'UL' listed multimeters and AC/DC power clampmeters, new range of thermal imagers, etc. We request all visitors to visit our stall to witness our latest range of products.

What are your growth plans?

In the coming years KUSAM-MECO will add more and more test and measuring instruments to cater to the requirements of the users of these instruments. Our aim is to be a one stop solution for most test and measuring instruments requirements of the customers.

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ABB Celebrates 75 Years in India

From the first internet of things for the energy sector to introducing robotics solutions for industries three decades ago – ABB India is partnering the journey of new India since independence.

ABB India marks 75 years of operations, a journey underscored by technological innovation, sustainable solutions, and significant contributions to India's industrial and social development. Since its inception in 1949, two years after Indian independence, ABB India has played a pivotal role in enabling electrification, automation, and digitalisation across utilities, industries, infrastructure and transportation, aligning closely with the nation's growth priorities. ABB's predecessor companies individually, ASEA of Sweden and Brown Boveri of Switzerland, had a presence in India for over a century. Starting with products and offerings catering to a few sectors, ABB now operates across 23 traditional and emerging sectors in India.

With a legacy beginning shortly after Indian independence, ABB's Faridabad facility in Haryana has evolved into a manufacturing hub for energy-efficient motors. The Vadodara campus in Gujarat, a pioneer in electrical engineering, provides advanced technology solutions such as traction technology for railways, large motors for industries and irrigation, and protection equipment for electronics.

In Maharashtra, the Nashik facility specialises in medium voltage electrical distribution, manufacturing critical components for renewable energy projects, including vacuum circuit breakers and eco-efficient switchgear. ABB's Nelamangala campus in Bengaluru features an Industry 5.0 shopfloor for low-voltage electrical products, robotics applications, and smart building solutions, supporting sustainable urban and industrial growth. The Peenya site contributes energy-efficient drives, motors, precision equipment, and India's first smart instrumentation shopfloor. ABB emphasises local sourcing across its locations, fostering a robust ecosystem for medium enterprises. With innovative solutions for industries, cities, and transportation, ABB India is a pivotal player in advancing sustainable growth and energy efficiency.

Morten Wierod, CEO, ABB said, "Over the decades, India has evolved into one of ABB's most dynamic and fastest-growing markets, playing a pivotal role in driving global innovation and technological excellence. We have



been consistently investing in the country to build a deep and wide footprint. In the process, we have built our largest, single location R&D centre and a leading digital operation. Over the past four years, we have nearly doubled our workforce in India, harnessing the diverse talent and potential this nation has to offer. In its 75th year, ABB India is ever more relevant and critical to help industries run leaner and cleaner, partnering with India's next level of growth."

"As ABB celebrates 75 years in India, we take immense pride in our contribution to the country's industrial journey and growth story. Our commitment to 'Make in India' is reflected in the advanced technologies and sustainable solutions we deliver across industries. From enabling advanced manufacturing and energy transition to supporting emerging sectors like green hydrogen, battery storage, and data centres, ABB is at the forefront of driving sustainable progress. Our innovations are aligned with India's ambitious goals, and we look forward to continuing our journey as a trusted partner of choice in shaping a smarter, greener, and more resilient future for the country," added **Sanjeev Sharma**, Managing Director, ABB India.

ABB India has been instrumental in introducing several global technologies with local engineering including the first internet of things in the energy sector, AI enabled gas distribution networks, digital mining solutions and eco-efficient switchgear. In line with ABB's century-old electrification of transportation history, in India too, ABB has been a consistent partner of Indian Railways – from the days of introducing its first electric locomotive to now in the electrification of the entire system and high-speed rail technology. About 80 per cent of Indian metro railway projects also deploy ABB technology.



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Digital Revolution in Transformer Substations

In collaboration with Eplan and entegra, naturenergie netze is working on a digital twin that will greatly speed up the planning and further development of transformer substations.

The energy sector is under a lot of pressure. German distribution grid operators need to get their infrastructure ready for the energy transition and fast. By 2030, approximately 80 per cent of electricity is to be generated from renewable sources. A pilot project at naturenergie netze GmbH is demonstrating how transformer substations can be modernised more quickly. In collaboration with software suppliers Eplan and entegra, this southern German distribution grid operator is now working for the first time on a digital twin that will greatly speed up the planning and further development of transformer substations.

New start at the transformer substation: “The digital twin forms the basis for our planning,” says **Rainer Beck**, Grid Development Coordinator, naturenergie netze.

In the past, there was distribution. For decades, energy was simply distributed in one direction – from continuously operating coal and nuclear power stations to transformer substations, and from there (once the voltage had been stepped down several times) to end consumers. To use a road traffic analogy, this quiet ‘one-way street’ has now become a busy city-centre road



network. Nowadays, the energy mix changes hourly with the wind and weather, so there essentially isn't a reliable base load any more. In addition, wind farm and solar system operators feed in energy decentrally at medium- and low-voltage levels, so power grids now work in two directions. Heat pumps and electric vehicle charging stations mean higher consumption, while the long-familiar load profiles that peak in the early evening are now a thing of the past. However, both the quality of the supply and the 50 Hz frequency must be guaranteed at all times.

When modernising secondary technology - naturenergie netze relies on 3D software from Eplan.

Grid operators are facing a mammoth task – they need to make their grids fit for these complex requirements. For naturenergie netze, this involves new construction work as well as modernising a number of existing transformer substations. The plants need to be adapted to suit the increasing demand for electricity, but that isn't the only challenge. A bigger challenge is that they need to be adapted to cope with a much higher level of flexibility in terms of energy sources and flows and the precise control of electricity.



The plants need to be adapted to suit the increasing demand for electricity, but that isn't the only challenge.

A digital twin

naturenergie netze was quick to address these challenges and is currently working on a pilot project as it modernises one of its systems. The grid operator is using a digital concept to plan and configure its conversion of the Rheinfelden transformer substation. The new approach applies even to the preliminary work. Rainer Beck, explains, “Before we start planning, we create a digital twin of the transformer substation, i.e. a virtual representation with all the data for both the live components (the primary technology) and the control level (the secondary technology) and, of course, for the buildings and all the peripherals. We then plan the conversion on the basis of this digital twin.”

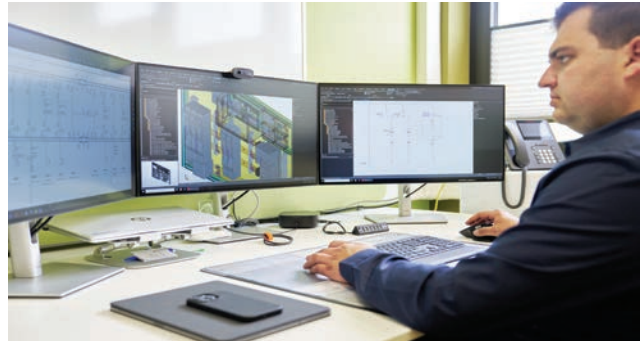
Another reason why this is a challenging task is that the primary and secondary technology are planned using different CAD software tools. In this pilot project, this issue was resolved by a very special collaboration. As members of the VDE ETG “Digital twins for electrical energy systems” task force, two leading suppliers – entegra with its primtech software solution for the primary technology and Eplan for the secondary technology – had prepared for precisely what naturenergie netze needed for the first (preliminary) planning stage, namely combining primary and secondary technology in a single model.



Grid operators are facing a mammoth task – they need to make their grids fit for these complex requirements. For naturenergie netze, this involves new construction work as well as modernising a number of existing transformer substations.

Major efficiency gains

For this unique project, entegra and Eplan were looking for an innovative distribution grid operator with a suitable pilot project to get involved as the third party in this collaboration. Contact with naturenergie netze came at exactly the right time – especially since the project in question was a complex one. As Rainer Beck explains, “The aim of the project is to renew all the secondary technology in an existing, highly complex transformer substation – and during ongoing operations.” It’s easy to understand why involvement in



The grid operator is using a digital concept to plan and configure its conversion of the Rheinfelden transformer substation.

this project was appealing. “It would normally take two to three years to plan and implement the modernisation, but the new planning methodology will really speed things up.” Everybody involved in the project agrees.

Matthias Schuy, Business Development Manager, entegra, explains, “What we’re doing here – integrating a transformer substation’s primary and secondary technology into one digital twin – has never been done before, but promises major benefits.” We asked him if he could give us a bit more detail. Rainer Beck, “Of course. Ultimately, we need to prove that the one-off investment will pay off quickly. After the first project phase – the preliminary planning – we see considerable time savings during the actual conversion of the transformer substations. What’s more, that applies to every project.”

One model for all users

During the first stage of the project, the transformer substation was scanned, photos were taken of the rating plates, and the primary technology data generated was compared with the data from the asset management system.

The result was a valid, functional primtech 3D model of the transformer substation. During a fully automated process, the datasets created in primtech were then exported to Eplan via an interface and used as the basis for planning the secondary technology in Eplan. Finally, the data from the secondary technology was integrated into the digital twin.

This work is almost complete. By documenting the scenario as it currently stands, the basis has been provided for replacing the transformer substation’s secondary technology efficiently. “This is a really important step. All the data is verified. We basically follow the ‘single source of truth’ principle. The data in the original systems is left untouched and linked to the digital twin. This prevents redundancies that could prove problematic in the future,” explains **Jan Oliver Kammesheidt**, Global Vertical Market Manager Energy, Eplan.

T130 RIDE ON FLOOR SCRUBBER DRYER

Soma Specialities Pvt Ltd offers a wide range of T130 ride on floor scrubber dryer.



Features:

- This machine scrubs and cleans the floor and dries the wet floor simultaneously by sucking the dirty water through vacuum action. With a large scrubbing width of 860 mm, it can provide productivity upto 5590 sqm/hr. Thus it cleans large areas in a short span of time and also saves on labour costs as one machine can do the job of 10-15 people and provides better results compared to manual cleaning.
- The tanks are made of tough rotomolded plastic and have large capacity of 120 Ltrs & 130 Ltrs for the solution tank and recovery tank respectively so that it can cover a larger area without needing intervals for tank refill & discharge.
- Cleaning solution discharge is controlled electronically to regulate output and save water efficiently when not in use. Seating is designed for operator to work longer hours comfortably and also comes with a pressure sensitive switch which only activates the machine to start when the operator is seated on it and prevents machine movement caused by false triggering by anyone else other than the operator.
- The squeegee can be mounted quickly and the rubber strips can be used on all four sides to reduce consumables cost.
- The machine decelerates automatically when turning or reversing to protect people, objects and the machine also from toppling over. The soft start of the brush reduces the burden on motor and batteries. Traction motor is quite powerful and offers speeds upto 6.5 km/hr and climbing gradient up to 15%. Brakes are also powerful and stop the machine immediately when applied to avoid any accidents. The anti-collision wheels are added to the brush disc cover to protect the machine and objects in case of impact. The T130 is highly useful for all types of large spaces such as in large spaces such as warehouses, factories, shopping malls, airports, railway stations, educational institutions, hospitals, residential & commercial complexes.

About the Company: Soma Specialities Pvt. Ltd., the pioneer in introducing cleaning machines in India since 1992 has launched the T130 battery operated ride-on scrubber dryer used for cleaning large floor spaces.

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KUSAM-MECO 1000A AC DIGITAL CLAMPMETER WITH INRUSH CURRENT MODEL - KM 9999A+

'Kusam-Meco' has introduced a new AC/DC Clampmeter Model KM 9999A+.



Features:

- The display is 6000 counts LCD display. It has a jaw opening of 42 mm. All functions are Auto ranging.
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- The AC current measuring range can be increased to 3000 Amps. using iFlex Current Coil.
- It also has low battery indication and Auto Power Off.

About the company: Established in 1983, Kusam-Meco, an ISO 9001:2008 certified company, introduced and pioneered the use of digital multimeters and clamp meters in Indian industry.

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“Flex is at the forefront of circular manufacturing.”

As one of the early entrants in India, the global electronics major Flex Ltd has been contributing majorly to the growth of the country's electronics manufacturing services (EMS) sector. **Nikhil Rao, Vice President- Operations, Flex India**, has been playing a pivotal role in driving the company's strategic initiatives in India. In conversation with Rakesh Rao, he elaborates on India's fast-evolving electronics manufacturing sector and Flex's growth plans in the country.

Can you provide an overview of Flex India's operations?

Flex established its operations in India in 2001, beginning with a facility in Bangalore that initially focused on pager manufacturing. Over the years, we evolved, transitioning into electronics manufacturing services (EMS). In 2006, we launched the Chennai Industrial Park, a sprawling 150-acre campus with over 1 million square feet of built-up space. This facility includes a Special Economic Zone (SEZ) and a Domestic Tariff Area (DTA), enabling us to cater to both export and domestic markets. Flex India's operations are multifaceted. We handle manufacturing, post-sale services like repairs, field services, warehousing, and distribution. Additionally, we operate three global capability centres (GCCs) in Chennai, Coimbatore, and Pune. These centres provide critical support services, such as engineering, HR, procurement, and IT, for Flex's global operations.



Nikhil Rao,
VP- Operations, Flex India

automotive, and industrial products. Our contributions are not limited to manufacturing; we also focus on workforce development and supplier ecosystem enhancement. By working closely with local suppliers, we help them adopt advanced technologies and meet global quality standards, ensuring the industry's overall growth and self-reliance.

How has the PLI scheme aided the growth of India's electronics manufacturing sector?

The PLI scheme has been a game changer for India's electronics manufacturing industry. These government incentives have made India a globally attractive destination for manufacturing, especially for OEMs looking to diversify their supply chains. The scheme addresses cost challenges, providing financial incentives that reduce production costs and improve competitiveness. For example, PLI schemes initially focused on mobile phone manufacturing, they have since broadened to include IT hardware, telecommunications, and component manufacturing.

How has Flex supported the growth of the Indian electronics industry in recent years?

Flex has played a pivotal role in India's electronics manufacturing growth, being one of the first EMS companies to establish a significant presence in the country. With over two decades of experience, we have contributed to the industry's evolution from mobile phone manufacturing to a diversified range of high-technology products. In recent years, government initiatives like the Production-Linked Incentive (PLI) schemes have further accelerated growth, enabling India to attract global players. For example, while our initial focus was on mobile phone manufacturing, we have expanded into sectors such as telecommunications,

Beyond mobile phones, how has India's electronics manufacturing industry diversified?

Mobile phone manufacturing has been a cornerstone of India's electronics industry, showcasing the country's potential as a manufacturing hub to the world. This has inspired diversification into other segments, such as IT hardware, telecommunications, automotive products, and industrial electronics. While Flex initially focused on mobile phone production, we now manufacture a range of high-technology products, including advanced telecommunications equipment and automotive

components. These products require sophisticated processes and a highly skilled workforce, which we are committed to developing. The government has been instrumental in backing this diversification through targeted policies and incentives. By collaborating with industry stakeholders, the government ensures that India remains competitive across multiple sectors.

India still relies heavily on imported electronics components. How can we develop a strong domestic supply chain?

Building a robust domestic supply chain is crucial for India's electronics manufacturing industry. Dependence on imports not only increases costs but also introduces logistical complexities and vulnerabilities. To address this, we must focus on developing a local supplier ecosystem that can meet the industry's demands. At Flex, we have taken proactive steps to support local suppliers. Our dedicated supplier development team works closely with partners, helping them understand technology requirements, adopt best practices, and invest in advanced capabilities. For instance, we identify components that are currently imported and collaborate with suppliers to localise their production.

What role can government schemes play in strengthening the electronic components supply chain?

Government initiatives, such as the upcoming PLI schemes for components, are critical for building a strong local supply chain. These programs provide financial incentives to suppliers, encouraging them to invest in localisation and advanced manufacturing capabilities. The government has learned valuable lessons from the success of the mobile phone PLI scheme and is applying these insights to other segments. By engaging closely with industry stakeholders, the government ensures that its policies address real-world challenges and opportunities.

How are emerging technologies like AI, ML, and 3D printing transforming the electronics manufacturing sector?

Emerging technologies such as artificial intelligence (AI), machine learning (ML), and 3D printing are revolutionising the electronics manufacturing industry. These technologies enhance process quality, increase efficiency, and optimise resource utilisation. At Flex, we are leveraging these advancements to stay ahead of the curve. For example, AI and ML are used to improve predictive maintenance, ensuring that machinery operates at peak efficiency. 3D printing enables rapid prototyping, reducing the time and cost involved in product development. These technologies also support

sustainable manufacturing, an area where Flex is deeply committed. By minimising waste and improving energy efficiency, we ensure that our operations are both environmentally and economically sustainable.

Are companies shifting from linear supply chains to circular manufacturing models?

Yes, the shift from linear to circular manufacturing is gaining momentum, driven by the need for sustainability. In a linear model, products are manufactured, used, and discarded. Circular manufacturing, on the other hand, focuses on reuse, repair, and recycling. Flex is at the forefront of this transition. For example, we offer aftermarket services such as repair and refurbishment, extending product life cycles. End-of-life products are recycled, and materials like metals and plastics are reintegrated into the manufacturing process. Our facility in Brazil has successfully implemented a circular model, and we are working to replicate this in India. By adopting circular manufacturing, we not only reduce environmental impact but also align with our customers' sustainability goals.

What is the future of India's electronics manufacturing industry, including components and semiconductors?

India's electronics manufacturing industry is on the cusp of unprecedented growth. The success of mobile phone manufacturing has demonstrated the country's potential, and this success is now being replicated across other sectors. Key growth areas include IT hardware, automotive electronics, and semiconductors. The government's incentives, coupled with bilateral trade agreements, provide a favourable environment for both domestic and export-focused manufacturing. Flex is heavily invested in this future. We are focusing on skill development, training engineers, and upskilling the workforce to meet the demands of high-technology manufacturing. Additionally, advancements in semiconductor manufacturing will further strengthen India's position as a global leader in electronics.

Could you outline Flex India's growth plans and areas of focus?

Flex has been in India for over two decades, and our commitment to the country remains stronger than ever. We see significant growth opportunities in sectors like communications, telecommunications, automotive, and healthcare. Our focus is on high-technology products that require advanced manufacturing processes and a skilled workforce. We are investing in sustainable manufacturing practices, ensuring that our operations are environmentally responsible and aligned with our 2030 ESG goals.

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“PLI scheme has been a game-changer.”

The growth of the electronics industry in India faces several challenges, the primary issue being the dependency on imports for critical components such as semiconductors, which creates supply chain vulnerabilities, remarks **Sanjeev Srivastava, Automation Head, Delta Electronics India**, in conversation with Rakesh Rao.

How has Delta Electronics grown in India in the last 3-4 years? Which factors & end-use industries are driving demand?

Delta Electronics has achieved robust growth in India over the last 3-4 years, driven by a combination of technological innovation, strategic investments, and a growing demand for sustainable solutions. Our energy-efficient products and solutions have found increasing relevance in industries like telecom, data centres, electric vehicles (EVs), and industrial automation, all of which are undergoing significant transformations. The surge in demand for renewable energy solutions and the government's focus on green energy initiatives have further contributed to our growth. Moreover, rapid urbanisation, digitalisation, and infrastructure development have created new opportunities for our power management and energy storage solutions.

How has the electronics manufacturing landscape in India evolved in the last 5-6 years?

The electronics manufacturing landscape in India has undergone a remarkable transformation in the last 5-6 years. With initiatives like 'Make in India' and 'Digital India,' the government has laid a strong foundation for boosting domestic manufacturing capabilities. The introduction of the PLI (Production-Linked Incentive) scheme has been a game-changer, incentivising local production and reducing dependency on imports. Investments in technology, infrastructure, and skill development have further enhanced India's global competitiveness. The growth of manufacturing ecosystems and partnerships between global players and local manufacturers have fostered innovation. This has led to an increasingly sophisticated manufacturing environment that supports high-quality production and exports.



Sanjeev Srivastava,
Automation Head, DE India

Do you think the PLI Scheme is aiding the industry's growth?

Absolutely, the PLI scheme has been a significant catalyst for the growth of the electronics industry in India. By offering financial incentives linked to production output, the scheme has encouraged both domestic and international manufacturers to set up operations in India. This has not only boosted manufacturing capacity but also created jobs, spurred innovation, and strengthened the local supply chain. Furthermore, the scheme has reduced India's dependency on imports for critical components, making the country more self-reliant in electronics manufacturing.

The increased investment and collaboration it has attracted have positioned India as a competitive player in the global market.

What kinds of growth opportunities is Delta looking to tap in the electronics manufacturing space in India?

Delta Electronics is positioned to capitalise on several growth opportunities in the electronics manufacturing space. We are focused on expanding our portfolio of energy-efficient and sustainable solutions to meet the increasing demand across sectors like EV charging infrastructure, renewable energy, and industrial automation.

We are looking to enhance our manufacturing capabilities in India to support local production and cater to the booming domestic and international markets. By leveraging advanced technologies such as IoT, AI, and automation, we aim to deliver innovative products that aptly align with India's ambitious vision for a self-reliant and sustainable future. Partnerships, R&D investments, and a strong emphasis on skill development will also play a critical role towards our growth strategy.

What are the key challenges in the growth of the electronics industry in India?

The growth of the electronics industry in India faces several challenges, despite its tremendous potential. One of the primary issues is the dependency on imports for critical components such as semiconductors, which creates supply chain vulnerabilities. Infrastructure limitations, high logistics costs, and regulatory hurdles add to the complexity of scaling operations. The industry faces a shortage of skilled labour to meet the demands of advanced manufacturing processes. High raw material costs and intense global competition also pose significant challenges. However, consistent policy support, enhanced public-private collaboration, and a focus on innovation and technology can help overcome these barriers and unlock the industry's full potential.

What trends do you see shaping the future of the electronics manufacturing industry?

Smart manufacturing, driven by Industry 4.0 technologies such as AI, IoT, and robotics, is set to revolutionise production processes, making them more efficient and sustainable. The push for green technologies, including the adoption of renewable energy

sources and low-carbon manufacturing practices, will become a defining factor in the industry's evolution. The growing demand for 5G-enabled devices, coupled with advancements in semiconductor technology, will further drive innovation. The integration of digital tools for predictive maintenance, supply chain optimisation, and quality control will redefine operational efficiency and product reliability.

What are your growth plans for Delta Electronics in India in the next 2-3 years?

Over the next 2–3 years, Delta Electronics is committed to further strengthening its presence in India through strategic investments and innovative solutions. We plan to expand our manufacturing footprint by establishing new facilities and upgrading existing ones to meet the growing demand for energy-efficient and sustainable technologies.

Our focus will be on key sectors such as EV infrastructure, renewable energy, and industrial automation, which are aligned with India's development goals. We will also prioritise R&D initiatives to develop cutting-edge solutions tailored to local and global markets.

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“Semiconductors are the heart of all electronics.”

The next challenge for growing electronics manufacturing in India is to increase the value addition in manufacturing by making mechanicals, connectors, cables etc. and then move on to passive components, submodules and semiconductor chips for these products, says **Dr Satya Gupta, President, VLSI Society of India** in conversation with Rakesh Rao.

Kindly brief us about VLSI Society of India (VSI)

VLSI Society of India is 40 years old Society created to promote VLSI Design and Semiconductor technology in India. It was started by visionaries from Industry and Academia including Prof Vishwani Agrawal, Auburn University, Dr Prabhakaran, ITI, Prof Jacob Abraham, University of Texas at Austin, Prof H N Mahabala, IIT Madras and many others. Today it is the largest body in India promoting education, research, start-ups, product development and skilling in the area of VLSI design, semiconductor technology and embedded electronics system from K12 to PhD students and professionals. Some of the flagship programs of VSI are International Conference on VLSI Design, VDAT Conference, VSI Regional Chapters in 5 states which are aimed to build VLSI Design and semiconductor communities of students, researchers, faculty, entrepreneurs, institutes, industry and government at the regional and national level. The goal of VLSI society of India is taking semiconductor education to more than 500 colleges and create semiconductor ecosystem involving each of 800 districts in India towards fulfilling the mission of making India a strong electronics and semiconductor nation.

What were the key discussion highlights of VLSID 2025?

The theme of the conference was ‘Silicon Meet AI: Sustainable Innovations in Accelerated Computing, Secure Connectivity and Intelligent mobility’. As the theme suggests the focus was on computing, connectivity and mobility and also covered topics like advanced packaging for the AI era, risc-v design, quantum computing and semiconductor manufacturing. Since VLSID is a technical conference there was a lot of focus on research and connecting students and young



Dr Satya Gupta,
President, VSI

engineering to latest technology advances in industry thus bridging the gaps between Industry and academia. The conference was attended by almost 3,000 people with 450 Student fellows and featured 32 tutorials, 68 high quality papers, 20 posters, 20+ keynotes and panel discussions and several high-powered fire-side chats. The highlight was fire-side chat between Chris Miller the Author of CHIP War book and Dr Satya gupta and the Life-time Achievement award to Prof Arogyaswami Paulraj, Stanford University for his pioneering work on Sonar for Indian Navy and MIMO technology which is one of the key technology for wireless communications. VLSI Society also gave 1,500 CHIP War books to the participants and announced the 1-TOPS program, 1 Tape-out per student.

How has the electronics manufacturing landscape in India evolved in the last 5-6 years?

Electronics manufacturing has taken off in a big way in India over the last 10-15 years. Most mobile phones for domestic use are currently being manufactured in India, and the export of phones made in India has also taken off. Most of it is at manufacturing level and part of it is at assembly level and it is being done as contract manufacturing for global brands like Apple, Samsung, Xiaomi, One-plus etc. The PLI incentives and selective application of tariffs has helped in growing this ecosystem tremendously. The next challenge for growing electronics manufacturing in India is to increase the value addition in manufacturing by making mechanicals, connectors, cables etc. and then move on to passive components, submodules and semiconductor chips for these products.

How important is the role of semiconductors in the growth of the

electronics industry?

Semiconductors are at the heart of every electronics device today and most advanced gadgets and products for digital infrastructure worldwide would not be possible with the advances in semiconductors. For example, generative AI, which the hottest area would not be possible without fabulous advances in computing and storage both of which are primarily semiconductor products. The same is the case for mobile phone industry which is almost \$40 billion market in India where the semiconductors are the main engine of every phone.

What is the current status of semiconductor manufacturing industry in India? How is the PLI Scheme aiding the growth?

India announced the Semiconductor policy and formed India Semiconductor Mission in the beginning of 2022. In three years, phenomenal progress has been made in semiconductor manufacturing. Today's India has the best incentives in the world for semiconductor manufacturing which totals-up to 70-75 per cent of the project cost between government of India and various states. This has helped in getting investments of more than 1.5 trillion from domestic and global companies, namely Micron Technology, Tata Electronics, CG Power and Kaynes Technologies with 1 ATMP Plant, 3 OSAT plants and 1 Wafer manufacturing plant. Most of these facilities have started building they facilities and the chip production should start as early as second half of 2025 by Micron, with others following up in next few years.

What are the key challenges India faces in becoming a global hub for semiconductor manufacturing, particularly in areas like talent development, raw materials, and technology integration?

India started late in semiconductor manufacturing primarily because the earlier efforts in last 2 decade did not take-off for many reasons. Now we have made a solid start. The challenges like talent, raw materials, technology integration are part of every business and once the investment, incentives and technology partnerships are in place these are very solvable problems with right focus and efforts. For example, the raw materials like chemical and gasses, the vendors for these have already started coming to India when they sensed business opportunity with upcoming fabs and packaging units and obviously aided with right facilitation and support from the government. Technology integration is a technical problem and with right support from technology partner is very achievable task. Regarding the talent, some of the initial senior people have to be brought in from outside the country

with right experience and the rest can be developed both at engineering level and technician level. These are challenging yet very solvable problems.

With the global semiconductor industry evolving rapidly, how can India address supply chain dependencies and foster a robust manufacturing ecosystem?

Electronics products depend on supply of semiconductor chips and semiconductor chips are primarily developed by the fabless companies like Qualcomm, Broadcom, Nvidia, AMD etc. These fabless companies manufacture these chips in a contract manufacturing model at various fabs across the world like TSMC, Global Foundry, UMC, PSMC etc. but the product is owned by the fabless company and not the semiconductor manufacturing company. Today if you look at the semiconductor companies, the fabless chip products companies like Nvidia are the largest semiconductor companies and has more than \$3.5 trillion of market capital while TSMC, the largest semiconductor manufacturing company has the market cap of \$1.2 trillion.

When we talk a robust ecosystem for supply of chips, it is important to develop both Fabless chip product companies and semiconductor manufacturing companies. In last 3 years after Indian semiconductor Mission was launched, more than 95 per cent of the investments and incentives have gone rightfully for the manufacturing. As we move forward, in the next phase the incentives for semiconductors have to be more balanced, like 80 per cent for the manufacturing and 20 per cent for the fabless semiconductor product companies.

What trends do you see shaping the future of the semiconductor industry? How prepared is the Indian industry to tap these trends?

As the semiconductor technology and transistor scaling is reaching its physical limits there are several new trends have opened up. The most important one is true 3D packaging which is going to be critical for building more powerful chips for AI, data-centres and high-performance computing. Other significant trends are wireless capability into every product, heavy use of sensors in many products like automobiles & mobile phones such as Lidar, Radar, Imaging sensors, touch sensors etc., and display technology which is required in almost every product we use. India has a big opportunity in investing in these critical technologies of the future and create a leadership position with abundant talent available in India. I see a bright future for semiconductor technology, products and manufacturing in India. 



“India’s strength lies in design.”

Components account for nearly 50 per cent of the product value, yet most are imported due to a lack of domestic manufacturing capabilities. Despite having exceptional design talent, much of it supports global companies or operates as design services, explains **Sanjeev Kesar, Chief Executive Officer, Arvind Consultancy** in dialogue with Rakesh Rao.

How do you see India’s progress in the last 4-5 years?

India has made significant progress in electronics manufacturing. Five years ago, two-thirds of electronics products were imported as finished goods, while only one-third were manufactured domestically. In 2022-23, out of the \$120 billion total electronics consumption, \$80 billion was domestically manufactured, and \$40 billion comprised finished goods imports, reversing the earlier trend. This growth is attributed to the PLI scheme. Mobile phones, which account for 45-50 per cent of the total market, are now manufactured in India, thanks to the scheme’s success.



Sanjeev Kesar,
CEO, Arvind Consultancy

like silicon photonics, discrete semiconductors, analog chips, and silicon carbide, coupled with a focused outreach program to attract these companies. The DLI scheme for Fabless semiconductor design requires significant improvement, as only 17 proposals have been approved against the goal of 100 companies in three years. Additionally, greater emphasis is needed on manufacturing passive components, connectors, and bare PCBs, which account for over 15 per cent of any product’s value.

What are the key challenges India faces in becoming a global hub for electronics manufacturing?

India faces three key challenges. Local value addition is below 20 per cent, with mobile phones, consumer electronics, and IT hardware relying heavily on CKD kits and limited to EMS activities, contributing only 10 per cent value addition. This must improve to enhance local value recognition. Components account for nearly 50 per cent of the product value, yet most are imported due to a lack of domestic manufacturing capabilities. Despite having exceptional design talent, much of it supports global companies or operates as design services. India must focus on creating IP, technology, chips, and products to capture higher value.

India Semiconductor Mission (ISM) has approved five semiconductor units. Are you happy with this progress?

Currently, out of the five approved semiconductor projects, only one is a wafer fab, while four are ATMP/OSAT projects, with no display fab project yet. The ISM should prioritise compound semiconductor fabs for areas

How can India take advantage of the current tension between China and developed countries to develop a robust manufacturing ecosystem?

India’s strength lies in design, and with a robust EMS and OEM ecosystem now established, the focus should shift to two key objectives:

- Leverage India’s competitive labour costs to increase electronics exports and capture a larger share of the global market.
- Encourage design services companies to evolve into Original Design Manufacturers (ODMs) by setting up their own manufacturing units or partnering with Indian EMS companies. This shift will enable India to create end-to-end value, moving beyond just design work for global projects.

What trends do you see shaping the future of the industry?

Industry 4.0, AI / ML / IOT / robotics will change the future of electronics industry. India has excellent start ups working in this domain but support available to these start-ups is limited and their success rate is low. To tap new opportunity, we need to have special support both financial and technical mentoring for these start-ups to make them successful.

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“As AI takes off, we expect to see even greater gains.”

India accounted for 0.25 per cent of the Manufacturing Industry Output in 2024 for semiconductors and components. While it might grow rapidly internally, its competitors are simply too far ahead in terms of level and volume of production for India to make much headway, says **Tim Dawson, Vice President – Industrial Automation, Interact Analysis** in an interview with Rakesh Rao.

How has the global semiconductors market performed in the last 2 years? Which end-user industries and countries were the major drivers of demand for semiconductors during this period?

Production of semiconductors over the last two years has been highly variable depending on the country. The nature of the semiconductor market means it is extremely cyclical, and this often results in extreme highs and lows. Years of high growth naturally bring about periods of the market pulling back and slower production. The primary cause of this is end users not knowing which semiconductor supplier will deliver to them first. As a result of this supply chain uncertainty, customers have been known to make multiple orders to different manufacturers. When they receive the required semiconductors, they will either cancel the outstanding orders (which leads to semiconductor manufacturers having a glut of chips that are no longer required) or the end user may accept the existing orders but reduce the scope of any future orders. This inventory stockpiling is what causes negative growth in some years, as semiconductor manufacturers can simply send out inventory instead of manufacturing new chips.



Tim Dawson,
VP – Industrial Automation,
Interact Analysis

The key end user sectors for the industry are primarily electronics and automotive. According to the WSTS (world semiconductor trade statistics) forecast, primary areas of growth are memory and logic integrated circuits. These categories cover chips used in everything from computers and smart phones to MRI machines and smart refrigerators. The primary growth is in both Americas regions (specifically the US as a direct result of the CHIPS act) and in APAC.

As stated, the way the sector has been performing varies wildly from region to region. 2023 was particularly weak in APAC following particularly strong performance in 2021 and 2022. South Korea's

semiconductor industry, for instance, grew by 19 per cent in 2021 and 3 per cent in 2022. However, this was followed by a tough 2023, when the market shrank by 9.5 per cent. 2024 marked a return to form, with growth of around 20 per cent expected.

Similarly, Taiwan's semiconductor market grew 20.5 per cent and 13.2 per cent in 2021 and 22 respectively before shrinking by 13 per cent in 2023 and bouncing back strongly in 2024 similar growth to South Korea of over 20 per cent.

The picture in North and South America regions in general, is slightly different with fewer ups and downs. The sector has grown continuously due to heavy investment in the sector, as the US tries to make itself more self-sufficient and more competitive in the production of these key components. Europe has experienced tougher market conditions, and 2023 and 2024 growth is essentially flat, as the majority of semiconductors consumed in Europe are produced in Asia.

This is the result of a range of factors, including lack of available key materials, intense competition from established manufacturers in Asia, and the high set up



As a result of this supply chain uncertainty, customers have been known to make multiple orders to different manufacturers.

and maintenance cost of fabrication plants. To give you an idea of the scale, the whole of Europe produces around the same value of semiconductors as the US, which is the 6th largest producer globally. China is the world's largest producer of semiconductors and seems to be far less cyclical than its neighbours in the region, with consistent growth of around 5 per cent year-on-year.

Is semiconductor manufacturing increasingly shifting to Asia? Which Asian countries have gained the most due to this shift? And what are the reasons?

The top 5 manufacturing regions for semiconductors in 2024 were China (43 per cent), South Korea (13.5 per cent), Taiwan (9 per cent), Singapore (7.1 per cent) and Japan (6.2 per cent) and this split has been pretty consistent for almost the entirety of the MIO study (i.e. roughly the same split from the early 2010s onwards). Therefore, I wouldn't say production is necessarily shifting more towards the APAC region. Instead, I would suggest it has already shifted and those making big gains in recent years have been the smaller regions with a dedicated focus on the semiconductor market, namely Taiwan and Singapore.

This focus on semiconductors has slowly enabled these territories to overtake Japan in the production of chips. Both Singapore and Taiwan have strong government support, well trained workforces, a focus on research and development and have received large amounts of investment in the sector from both domestic and international companies. Taiwan has TSMC, which is a global leader in advanced chips, while Singapore has carved out a niche for itself as a packaging and testing hub.



India imports about 90 per cent of its semiconductors and is reliant on other regions for growth in the sector.

What are the emerging trends in the semiconductor industry?

As the AI boom takes off, we expect to see even greater gains in the semiconductor industry. It is comparable to the space-race in a similar way to different countries aiming to reach the moon first. Now different countries want to reach artificial general intelligence first. Whether they will or not, and whether it is a good thing or not, is a different debate. The point is that this

will drive more and more investment in the semiconductor industry, as technology evolves and the complexity and need for more chips continues.

This is likely to drive more assembly and testing capacity at a global level. Another thing to consider is the geopolitics of semiconductor production. One of the key reasons the US is focusing so much of its resources on the semiconductor sector is that it does not want key infrastructure and supply chains to be reliant on Chinese-produced semiconductors.

The US is not alone in this and I suspect we will see the smaller regions make inroads into China's market share as exports switch to these regions.



This focus on semiconductors has slowly enabled these territories to overtake Japan in the production of chips.

Can India become a major player in the semiconductor manufacturing space? What are the key hurdles in its path?

Anything is possible, but realistically probably not any time soon unless there are significant changes to the current market. India accounted for just 0.25 per cent of the Manufacturing Industry Output (MIO) value in 2024 for semiconductors and components.

While it might grow rapidly internally, its competitors are simply too far ahead in terms of level and volume of production for India to make much headway. India does have strengths which could help it in the longer term, such as R&D centers for several top semiconductor design companies and around 20 per cent of the world's semiconductor design engineers. On the other hand, India imports about 90 per cent of its semiconductors and is reliant on other regions for growth in the sector.

What is your outlook for the global semiconductors market in the next 2 years?

Our outlook for the next two years is for high single-digit to low double-digit growth in 2025 and double-digit growth in 2026. The regular downturn is anticipated sometime after this but this will be highly dependent on how quickly the market for advanced semiconductors continues to grow over the next few years.



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Energy Management as an IIoT Solution

Following the dramatic rise in electricity prices, energy consumption is becoming an increasingly important variable that needs to be carefully influenced. Energy management systems have long offered a solution. But only now is there an IIoT-supported application for the capture and optimisation of energy consumption, which – as in many other areas of digitalisation – promises considerable added value.

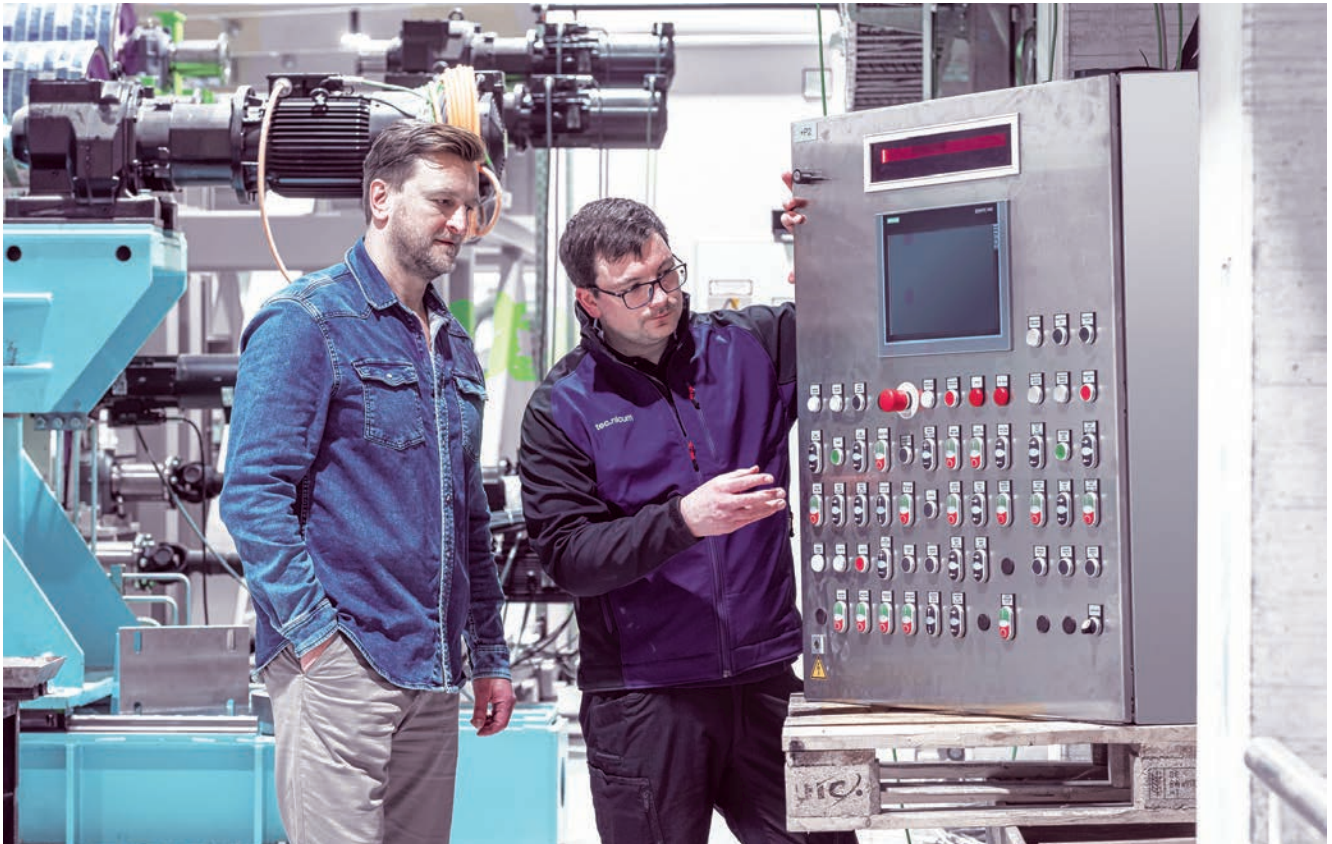


Figure 1: tec.nicum, Schmersal's service division, offers an enhanced range of services, which include energy management and the capture and calculation of KPIs.

For decades, energy costs were a reliable and predictable variable in production and with competitive costs of around 5 cents per kWh, they were easy enough to calculate. There are a number of reasons this calculation is no longer reliable, the war in Ukraine and the energy transition prompted by climate change are perhaps the most significant. In any event, organisations should now budget around 25 cents per

kWh, which means that energy costs have a much greater impact on production costs, and energy-intensive companies in particular face major problems.

Most importantly, there is no improvement in sight. Quite the opposite in fact. CO₂ pricing will cause energy costs to climb higher, and the urgent need to renew and expand electricity grids will mean that electricity costs will need to be passed on to users.

Managing energy: A task for today and tomorrow

What is scarce, expensive and essential needs to be ‘managed’, which is why energy management is the current watchword. Appropriate IT tools are available and are frequently used. These use energy meters to capture consumption (for electricity, gas, compressed air, etc.), which users can then trace to individual areas of production, systems or even production quantities.

These systems are especially useful when they are full integrated into the organisation’s or production department’s data environment, and not operated as stand-alone devices. This way, the ‘adjustment screws’ for targeted optimisation and clear allocation of energy costs to individual products or production steps will be transparent (in the best case scenario).

EMS 4.0: Comprehensive database for optimising energy consumption

Tec.nicum, the Schmersal Group’s newly established service division, has developed a modular solution in the form of the Energy Management Solution 4.0 (EMS 4.0). It is part of a comprehensive IIoT platform whose task is to bring transparency to production and provide users with a comprehensive database for far more than just energy consumption.



Figure 2: Energy consumption is accurately captured and broken down into its constituent elements.

As a plug-and-play module within this solution, EMS 4.0 makes it easy to set up and assign energy meters. A dashboard visualises the consumption of all systems and their development. A range of evaluation functions allows for the generation of detailed reports on energy consumption, including to individually defined parameters. Limit values can be defined and an (alarm) message emitted if these values are exceeded.

This provides users with a solid basis for energy efficiency initiatives, allowing them to test and evaluate the efficacy of individual measures and to prepare the data for CSR reporting, something that is already

compulsory for larger companies across the EU. This requirement will gradually be rolled out to smaller companies.

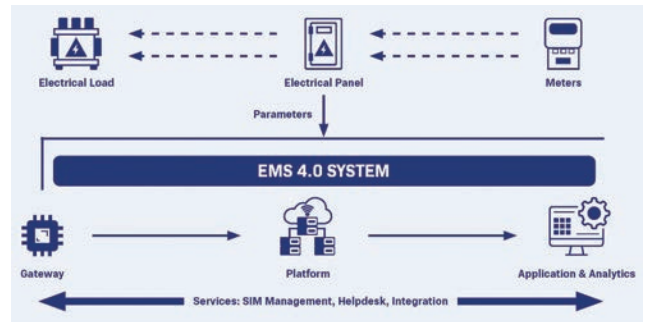


Figure 3: Electricity meters’ most important parameters are captured and forwarded for further processing. EDGE gateways collect the data of all parameters that are forwarded to the platform. The data are stored and processed on the Schmersal IIoT platform and forwarded to the EMS 4.0.

Energy efficiency as a KPI factor

Where EMS 4.0 differs from other energy management systems is in its integration into the comprehensive IIoT concept developed by the Schmersal Group, which it makes available to its customers as a platform. This IIoT platform was essentially developed for the task of ‘Safety as a Service’ and for IIoT-supported service concepts (condition monitoring and predictive maintenance), but as it captures and analyses wide-ranging production) data, it is also suitable as a basis for energy management.

Task: To capture OEE

And because calculating KPIs is also part of the IIoT concept developed by tec.nicum (as are condition monitoring and predictive maintenance), energy efficiency can be related to KPI-relevant data. More specifically, as the IIoT platform captures central KPIs for production, energy-related data may be incorporated into these KPIs, something which applies to the overall equipment effectiveness (OEE) KPI, for example. It captures the productivity and effectiveness of a production system, thereby allowing systems (in the same or in different production facilities of an organisation) to be compared, as well as targeted optimisation of this KPI.

First usage example: Production of household appliances

The first user of the Schmersal’s ‘Energy Management Solution 4.0’ is making use of exactly this option. Plant management at the Indian production facility of a global manufacturer of household appliances had set itself the goal of increasing energy efficiency in



Figure 4: The ‘Energy Management Solution 4.0’ is part of a comprehensive IIoT platform whose task is to bring transparency to production and provide users with a comprehensive database for far more than just energy consumption.

production year on year, with a 2 per cent to 5 per cent reduction in energy consumption in relation to production volume each year – and a matching positive impact on the carbon emissions from the site (which are also accurately recorded).

The company was looking for a comprehensive, IT-supported solution to bring transparency to the current status, while also allowing KPIs such as OEE to be captured. The third requirement was for the database to document progress – in part for international ESG reporting.

The site’s managers approached the Schmersal Group’s IIoT Global Competence Centre, which also happens to be based in India, with their list of requirements. The Competence Centre was already planning the market launch of the ‘Energy Management Solution 4.0’ and was able to use the manufacturer as an initial ‘use case’.

Hardware: Failsafe edge solution

When selecting hardware components, particular care was taken to ensure that components are able to maintain communication with the web server for a defined period of time, even if there is a power failure. The data captured from machinery and drive systems and recorded by energy meters and other sensors are initially collected at edge level, i.e. in the immediate vicinity of production, and analysed in real time. 4G

Modbus IoT gateways are just one of the devices used for this.

This means that users have access to almost current data at all times, which can also be used directly to control the energy supply and generation (solar systems, generators, etc.). Comprehensive reports are also generated in parallel to document the progress made in reducing energy consumption and carbon emissions.

The benefits of digitalisation: Fusing energy and production data

The household appliance manufacturer is fully satisfied with this solution: the personnel effort required to capture and analyse energy consumption has been drastically reduced and the OEE key figure has improved substantially. Operational safety has also been improved with close monitoring of critical energy consumers and generators. The same also applies to energy distribution systems. Irregularities are largely identified in real time and reported immediately, e.g. by SMS text message, to the person responsible.

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Gujarat Plug-In Devices offers a wide range of 3-phase AC induction motor protection relays. Motor protection relays are used for protecting 3-phase AC induction motors against adversities and hazards and these products eliminate.



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**Contact:**

*Gujarat Plug - In Devices Private Limited, Vadodara
Mobile: 09925042386
Email: info@gpd-transformers.com*

DISTRIBUTION TRANSFORMER

Nakoda Steel is offering distribution single phase transformer. A distribution or a service transformer provides the final voltage transformation in the electric power distribution system, stepping down the voltage used in the distribution lines to the level used by the customer.



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**Contact:**

*Nakoda Steel, Vadodara
Tel: 0265-2580663
Email: info@nakodaproducts.com*

HIGH QUALITY LT CONTROL PANEL

Bajaj Steel Industries manufactures high quality LT control panels. The LT panels come in quality construction finish and are suitable for operating voltages below 440 volts.



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**Contact:**

*Bajaj Steel Industries Ltd, Nagpur
Tel: 07104-238101, 238120
Mobile: 09325132311, 09325132306
Email: bsi@bajajngp.com, mks@bajajngp.com
Email: contact@lucsam.net*



Greasing India's Wheels of Progress

The industry is witnessing a paradigm shift towards the adoption of advanced lubricant technologies, including synthetic and bio-based lubricants.



India's lubricants market is on the cusp of transformative growth, driven by the rapid expansion of key industries and a shift toward advanced, sustainable technologies. This dynamic evolution promises to reshape the landscape, offering innovative solutions to meet the demands of a fast-changing economy.

The Indian lubricants market is poised for significant growth, with projections indicating an expansion from \$7.19 billion in 2023 to \$9.70 billion by 2030, reflecting a compound annual growth rate (CAGR) of 4.4 per cent during the forecast period. This growth trajectory is primarily driven by the rapid expansion of the automotive and industrial sectors in India.

Market segmentation and product insights

The lubricants market in India is segmented into four primary product categories:

- **Automotive lubricants:** This segment dominated the market, accounting for approximately 57 per cent of the total share in 2023. The burgeoning automotive industry, fuelled by increasing vehicle ownership and rising domestic demand, has significantly bolstered the consumption of automotive lubricants. Notably, the passenger vehicles segment surpassed 4 million units in sales in 2023.
- **Industrial lubricants:** With the manufacturing sector's expansion, there is an escalating need for lubricants in applications such as transmission

fluids, gear oils, compressor oils, metalworking fluids, and greases for heavy machinery. This demand is further amplified by the government's initiatives to promote industrial growth and infrastructure development.

- **Marine lubricants:** India's geographic location and extensive coastline have fostered a growing maritime industry. The increasing volume of maritime trade necessitates the use of specialised marine lubricants to ensure the efficient operation of vessels and related equipment.
- **Aerospace lubricants:** This segment is anticipated to experience the fastest growth rate over the forecast period. The Indian aviation industry recorded 152 million domestic passengers in 2023, reflecting a surge in air travel. Consequently, the demand for high-quality lubricants for aircraft maintenance and performance optimisation is on the rise.

Technological advancements and sustainability trends

The Indian lubricants market is characterised by intense competition, featuring both global giants and domestic players. Major international companies like Shell, ExxonMobil, and BP compete alongside prominent Indian firms such as Indian Oil Corporation, Bharat Petroleum, and Hindustan Petroleum. This competitive environment fosters innovation and ensures competitive pricing, benefiting consumers and industries alike.

The industry is witnessing a paradigm shift towards the adoption of advanced lubricant technologies, including synthetic and bio-based lubricants.

Future outlook

The emergence of EVs presents new opportunities for the lubricants industry. There's a growing demand for specialised lubricants tailored for EV components, including battery coolants and greases for moving parts. Companies like TotalEnergies are investing in the development of lubricant fluids specifically designed for EVs, aligning with the global shift towards sustainable transportation solutions.

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Source: Grand View Research & Vision Research Reports

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Celeros's Plenty Triro Pumps Deliver Best Performance

The axial pulse-free pumping action used by the Plenty Triro means there are no pulsing hydraulic shock characteristics.



Plenty Triro rotary triple screw pumps from Celeros Flow Technology offer high-speed operation and compact design in a low cost, space saving unit.

The Plenty Triro rotary triple screw pump from Celeros Flow Technology is primarily designed for handling clean lubricating liquids. It ensures consistent flow and prevents the liquid becoming emulsified, making the Plenty Triro the pump of choice for forced lubrication and seal oil circulation applications.

The axial pulse-free pumping action used by the Plenty Triro means there are no pulsing hydraulic shock characteristics.

The action, which is similar to that of a piston moving constantly in one direction, returns a very low shear characteristic, all of which means that the lubricating fluid being pumped does not degrade during transfer.

The Plenty Triro also has a low cost of ownership as it has only three moving parts: a power rotor and two idler rotors. This elegant and simple design makes the pump highly reliable and simplifies maintenance requirements.

The high-speed operation and compact design of the Triro pump results in a low cost, space saving unit that is suited to a wide range of applications, including as a main oil pump (directly driven from the main machine), AC auxiliary oil pump, DC run down or DC emergency pump, and control oil pump. The Plenty Triro is the preferred pump for API 614 oil systems and can be used on a wide variety of compressor, turbine, gearbox, pump seal oil, and sealing system circulation systems. The pumps can be supplied to API 676 standards, or to individual customer project requirements.

The Plenty Triro can handle flow rates of 0.1 to 300m³/hr and fluids with viscosities ranging from 2 to 1750 cSt as standard. Custom designs to accommodate higher flow rates and viscosities can be considered. This highly reliable pump will also withstand operating pressures up to 137 bar and operating temperatures of -20° to 150° C.



The Plenty Triro is the preferred pump for API 614 oil systems and can be used on a wide variety of compressor, turbine, gearbox, pump seal oil, and sealing system circulation systems.

The versatile Plenty Triro pumps are available in 17 frame sizes with various pitch angles and length and can be specified in many different material combinations. 

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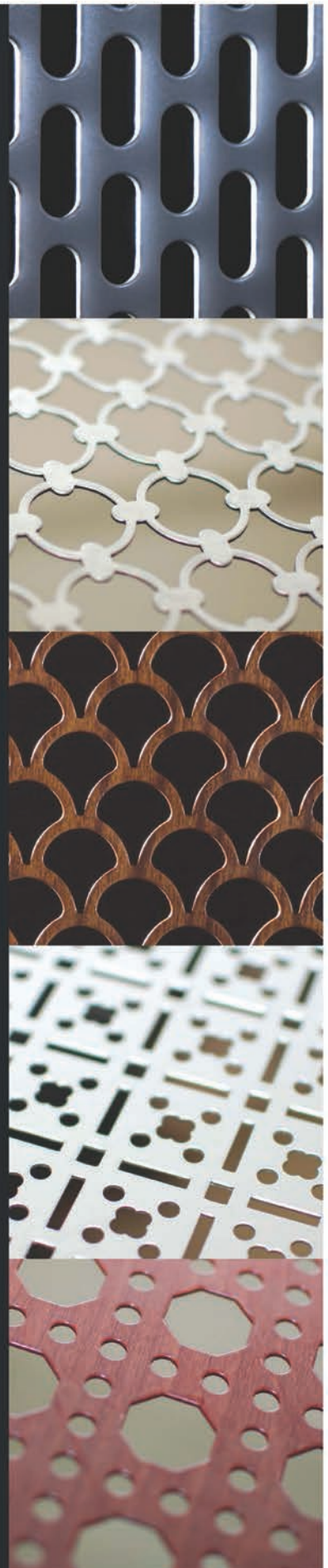
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Web: www.diamondscreens.com





Klüber Lubrication's Solutions for Modern Mobility

Furthering its commitment to 'Make in India', Klüber Lubrication recently announced a ₹1.42 billion investment to expand its Mysore facility.

Klüber Lubrication, a global leader in specialty lubricants, exhibited its solutions at the Bharat Mobility Global Expo 2025, at Yashobhoomi – IICC, New Delhi. The company showcased a range of advanced products designed to enhance automotive component performance and reliability. These innovations are set to reduce downtime, improve efficiency, and support the transition to a more sustainable future. By offering a comprehensive range of innovative lubricants, Klüber Lubrication continues to drive excellence and sustainability in the automotive industry.

Empowering India's automotive future with 'Make in India'

Klüber Lubrication India proudly supports the 'Make in India' initiative, strengthening local manufacturing capabilities and addressing the unique demands of the Indian automotive sector. Its advanced manufacturing facilities maintain the highest global quality standards, integrating cutting-edge technologies to meet local and international needs.

"Our mission at Klüber Lubrication is to create products that align with our customer's needs while contributing to India's economic growth. By manufacturing in India, it allows us to reduce lead times, lower costs, and strengthen partnerships with local suppliers. 'Make in India' is more than a slogan for us—it is a core principle that drives us to empower local resources, foster self-reliance, and uphold our global commitment to quality and innovation" said **Hitendra Bhargava, CEO and Regional Management Board Member Asia Pacific, Klüber Lubrication.**

With a dedicated R&D centre and tribology lab, Klüber Lubrication India adds significant value to the product validation process. This facility operates in alignment with the IATF 16949 standards, ensuring global compliance. By utilising local resources and expertise, the company reduces dependence on imports, enhances delivery efficiency across the nation, and supports India's Production-Linked Incentive (PLI) objectives. This commitment not only contributes to India's economic growth but also reflects Klüber Lubrication's mission to create solutions tailored to the needs of its customers.

Furthering its commitment to 'Make in India', Klüber Lubrication recently announced a ₹1.42 billion

investment to expand its Mysore facility. The upgrade includes a new production hall with advanced technology, improved R&D infrastructure, and faster product launches, set to be operational by early 2027.

The Mysore plant has already been pivotal in developing innovative products like Klübersynth LEB 94-81 BH, featuring integrated calcite technology for exceptional load-bearing capability in both high and low temperatures.

This product is ideal for applications such as constant velocity joints, electric seat adjustment mechanisms, and window regulators, providing reduced noise and outstanding wear protection. Additionally, the plant produces ISOFLEX TOPAS L 32 N BH, a flagship product for the automotive sector. The plant has also developed a new range of silicone-based greases that enhance reliability and performance in critical braking systems. This innovation improves safety and longevity, adding significant value to the automotive industry by ensuring better braking across various vehicle types.

By producing locally, Klüber Lubrication offers flexibility, reduces costs, and ensures timely delivery of high-quality products, strengthening its presence in the automotive market.

Advanced lubrication solutions for SUVs

As SUVs gain popularity in India, their larger size and weight place extra pressure on suspension systems, requiring superior lubrication for smooth and reliable performance. Addressing this critical requirement, Klüber Lubrication provides innovative and eco-friendly solutions tailored for these demands.

SUV components like ball joints, wheel bearings, brakes, and steering systems face high stress and tough conditions. Klüber Lubrication's high-performance greases and oils are designed to deliver exceptional durability, ensuring smooth operation for SUVs navigating diverse terrains across India.

KLÜBER
LUBRICATION

CUTTING OIL

Venlub Petro Products (P) Ltd offers a wide range of biodegradable cutting oil. This fine quality range of biodegradable cutting oil, which are available in various packaging. These products are used in different small as well as large scale industries.



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**Contact:**

Venlub Petro Products (P) Ltd, Chennai
Tel: 044-26251886
Mobile: 09087509509
Email: venlube@gmail.com

HENKEL TEROSTAT ADHESIVE

Popatlal & Company offers a wide range of henkel terostat adhesive - terostat MS 939. To fulfill the variegated requirements of the customers, they are engaged in bringing forth the clients a wide assortment of Terostat MS 939.



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**Contact:**

Popatlal & Company, Pune
Tel: 020-24472036, 24497126
Mobile: 09371014143, 09730144208
Email: sales@popatlalandcompany.in

WATER SOLUBLE CUTTING OIL

See Lube Technologies Pvt Ltd offers a wide range of water soluble cutting oil- ST Kool 629. They are a renowned organization, engaged in processing and exporting a comprehensive range of quality-tested water soluble cutting oil.



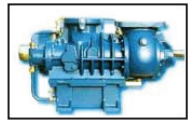
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**Contact:**

See Lube Technologies Pvt Ltd, Ludhiana
Tel: 0161-2675525, 5004600
Mobile: 08054101000, 09814005307
Email: info@seelube.in

MAK COMPRESSOR OILS

Interstate Supply Company offers a wide range of MAK compressor oils. These oils are specially developed for compressor lubrication under prolonged high temperature and load conditions.



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**Contact:**

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Tel: 033-25337211
Mobile: 09831384409
Email: info@interstatesupply.co.in

CARTRIDGE FILTER HOUSING

Filtereno Engineering Co, offers a wide range of cartridge filter housing. Backed by a diligent team of professionals, they have been able to manufacture and supply an excellent range of cartridge filter housing.



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**Contact:**

Filtereno Engineering Co, Mumbai
Tel: 022-65618854, 65618800
Mobile: 09819241506, 08452917256
Email: info@filtereno.com

LEVEL LEAF FILTER

Sharplex Filters (India) Pvt Ltd offers a wide range of level leaf filter. Sharplex level leaf filters are used for polishing filtration in post filtration stage to trap the fine particles from the filtrate of main filter.



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**Contact:**

Sharplex Filters (India) Pvt Ltd, Navi Mumbai
Mobile: 09136921232
Email: sales@sharplexfilters.com, svk@sharplexfilters.com

OIL FILTRATION UNIT

Smridhi Manufacturing Company Private Limited offers a wide range of oil filtration unit. The Micron filtration unit is a multi-purpose fluid cleaning and transfer rig, it is available in different models. The system can be used to clean most mineral oils such as hydraulic, gear and transmission oils, diesel type fuels.



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**Contact:**

Smridhi Manufacturing Company Private Limited, Delhi
Mobile: 09868265775, 09868103259
Email: micronfilters@yahoo.com

OIL RECIRCULATING SYSTEMS

Lubsa Multilub Systems offers a wide range of oil recirculating systems. In OCS, the gear pump/screw pump with discharge up to 500 LPM driven by electric motor is used; pump is connected with reservoir.



Scan the QR Code for instant product enquiry

**Contact:**

Lubsa Multilub Systems Pvt Ltd, Faridabad
Tel: 0129-6460247
Mobile: 09899451247, 09212566247
Email: info@lubsa.co.in



“We want India to account for 10% of Renesas’ sales.”

The Tokyo (Japan) headquartered Renesas Electronics Corporation is a global leader in microcontrollers, analog, power and SoC products. In India, it focusses on design and also supports the productising of chips for the market. **Malini Narayanamoorthi**, an experienced semiconductor professional with more than two decades of global experience in the semiconductor industry, is Renesas' India Country Manager and Vice President of MID (Memory Interface Division) Engineering, Analog & Connectivity Group. In this freewheeling interview with Rakesh Rao, Malini Narayanamoorthi elaborates on challenges and opportunities in the semiconductor space for India, and Renesas' growth plans.

How has been the journey of Renesas Electronics in India? How are you aiding the growth of the Indian electronics industry?

Renesas Electronics designs and manufactures a wide range of semiconductor products. Renesas focuses on embedded systems providing microcontrollers, system-on-chips (SoCs), analog semiconductors, power management ICs, and other solutions used in automotive, industrial, home electronics, edge computer and other sectors.

Renesas India focusses on design and also supports the productising of these chips for the market. Renesas was lesser known in India a few years ago, but that has changed significantly in the last couple of years as we focus on growth of high-performing engineering teams and continue to demonstrate our capabilities to the market. Given the significant growth potential of the Indian market, Renesas aims to expand its presence there, targeting it as one of its key markets. The goal is

to increase its sales in India to account for over 10 per cent of the company's total revenue in the medium term. Additionally, Renesas aims to double our headcount in 2025 and continue to contribute to both chip design and system design aspects of the industry.

In 2020, our Hon'ble Prime Minister gave a kick-start to India's vision of self-reliance (Athmanirbhar Bharath) through economic policies and incentives that included a focus on electronics and semiconductors. The end goal is to make India a product nation. Renesas is very well placed to support the growth of the electronics industry in India owing to our expertise in building embedded products. A good example is the joint venture announced in March last year with CG Power and Industrial Solutions, a subsidiary of the Indian conglomerate Murugappa Group, and Stars Microelectronics from Thailand for the construction of an OSAT facility. Construction of the factory in Sanand, Gujarat, has been underway since last year.

Recently, Renesas India also has partnered with a

number of universities to implement university curriculum programs and internship opportunities, including the partnership with IIT Hyderabad announced in June 2024, which help students prepare for real-world engineering challenges. Skilling, as you are aware is a critical for the growth of the India semiconductor industry.

How has the electronics manufacturing landscape in India evolved in the last 5-6 years?

The India's electronics manufacturing landscape has evolved significantly in the last few years driven by government initiatives and increased investments.

In the 80s and 90s, we had Indian products like Videocon and Onida. But with the relaxation of import tariffs on foreign goods, Western companies gained a stronger presence, and as a result, many Indian brands gradually lost their market share. Thanks to this new 'Make in India' program promoting domestic manufacturing, we are back to a point where India wants to build its own products, and the government is fostering an ecosystem to make that happen. The drive towards self-reliance and to also make India a product nation is catalysing the electronics industry with the semiconductor design and manufacturing playing a key part of that.

What is the current status of the semiconductors industry in India? Is PLI Scheme aiding the industry's growth?

Semiconductors are definitely a buzz word in Indian household today. This speaks to the focus from the governments that semiconductors play a key role in modern electronics and driving technological advancements. A few years ago, we were mostly looking at augmenting designs teams but today, we want to build self-reliance and build that ecosystem towards that goal. From a design standpoint, we are quite mature and there are Design Linked Incentive (DLI) schemes to help fast track indigenous designs. Through the PLI scheme, launched in 2020, we have been able to mobilise manufacturing in India and a few constructions are under way today including the CG Semi which is a JV that Renesas has with CG Power and Stars Microelectronics, as mentioned above. India also has a number of skilling programs burgeoning to address the talent challenges we may have in future.

The semiconductor industry in India is currently experiencing significant growth and transformation and the semiconductor market in India is projected to reach approximately \$110 billion by 2030. These initiatives are expected to create a robust semiconductor ecosystem in India, promoting local manufacturing and reducing

dependency on imports. Renesas is happy and proud to be a part of India's semiconductor growth journey.

What are the key challenges and new opportunities before the semiconductor industry in India?

There is a huge opportunity ahead of us. Building a complete electronics ecosystem with the government backing opens up a lot of windows ranging from materials, design, equipment, tooling manufacturing etc. The DLI and PLI schemes open up a number of avenues for companies to move forward faster. This infrastructure also opens up the capability to build products for India needs as opposed to back fitting.

With opportunity comes the challenges as well. We do have to steadily build up every piece of the puzzle. Setting up manufacturing for semiconductors takes time, resources like uninterrupted electricity and trained manpower.

What trends do you see shaping the future of the semiconductor industry?

The semiconductor industry will be driven by the macro trends that we see in the industry including AI, autonomous driving, sustainable electronics, edge computing, and electric vehicles, to name a few. Apart from technology, the geopolitics and the need for supply chain self-reliance is also driving the industry in different countries.

Renesas is very well placed in being able to serve all these markets with our vast offerings in the microcontroller, microprocessor, power, analog and connectivity spaces. The relationship between Japan and India is very collaborative and this enables progress.

What are your growth plans for Renesas in India?

Renesas in India has presence in Bangalore, NCR region, Hyderabad, and Pune with focus on both chip design teams as well as systems and application teams. We are also a minority stakeholder in a joint venture with CG Power, called CG Semi whose assembly, testing, marking, and packaging (ATMP) facility is being built in Sanand, Gujarat. Renesas is focusing on India as one of its most important markets.

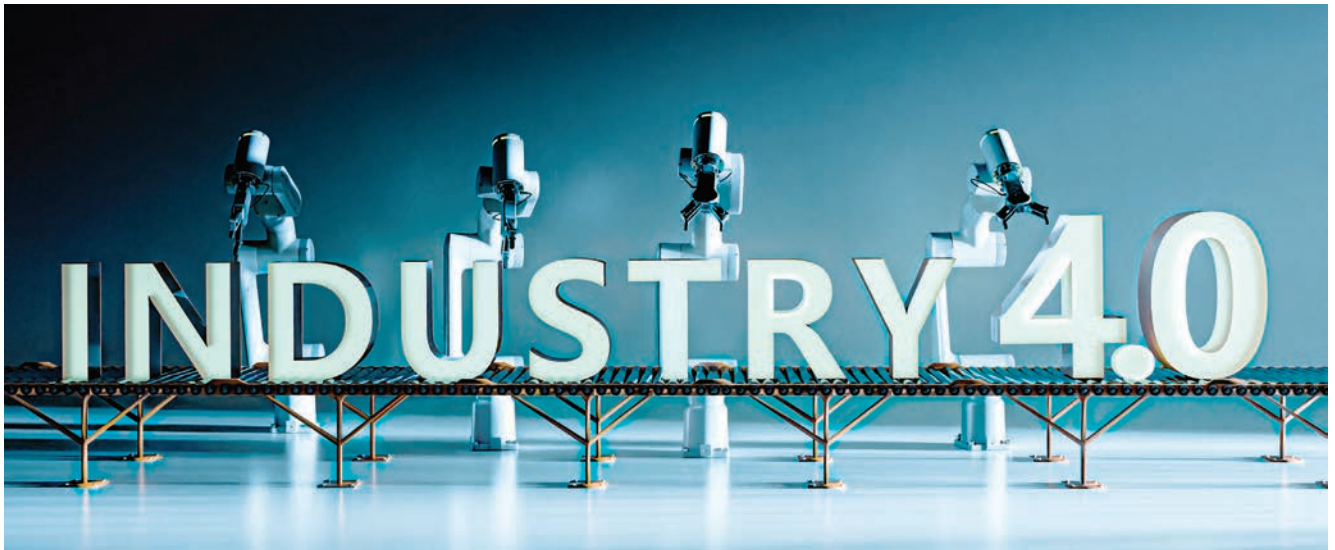
In line with our company's purpose, "To Make Our Lives Easier", we are expanding the provision of combinations of multiple products (Winning Combinations) as well as solutions that improve user experience (UX) through digitalization, including software and tools. Renesas India is growing across all locations, and we aspire to have doubled our head count by 2025, as mentioned above. We aspire to be an employer of choice in this growth journey.

SME



A New Future: The Advent of a 'Provice'

This is a new era, where each product is a combination of product and service, and hence, there is an urgent need of a new term for this new creature. My choice is 'provice', till a better name is found, says **R Jayaraman**.



Industry 4.0, which began in Germany in 2011/2012, is now celebrating its fourteenth anniversary. What began as 'accelerated automation' (the age of automation was kicked off in Industry 3.0, when computers were embedded into devices to control their operations) has reached a stage where it has revolutionised life in certain sectors and is yet to impact in others. First, let us see where the impact has been the greatest.

Without a doubt, the maximum impact has been on the services industry. And that's because of Internet of Things (IoT). The internet was the leader, the pioneer, the highway on which many new innovations have travelled. It all began with 'search engines', which could get any information anyone wanted in no time. This new toy elicited so much of interest that the volume overwhelmed the IoT industry. It was for the first time that the whole of the earth could get connected in real time. The common man in Indonesia could know easily what was going on in a remote corner of Bolivia, and a researcher in India could access the research works of peers in the USA in double quick time.

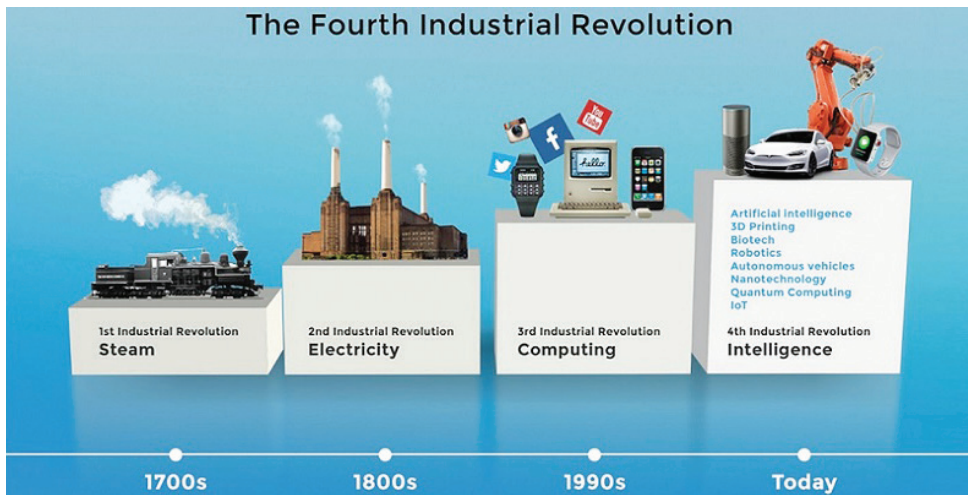
The volume of traffic generated far exceeded the expectations. Like a Frankenstein, the IoT took a shape of its own, as people from all walks of life added their bit

into it. No doubt Google, Yahoo and others became the biggest volume players, but there were many others who contributed to its development and usage. The one industry which made a significant use of IOT was eCommerce. Amazon led the way in revolutionising how things were bought and sold over the net, without even seeing the items that one purchased or ordered for.

The world discovered how volumes can bring down the prices of goods. The IoT increased the reach of



The volume of traffic generated far exceeded the expectations.



The IoT industry gave a new meaning to the word ‘speed’. The story of startups and unicorns is largely a result of the IoT thinking.

sellers like never before. A person in the US could buy something from India at the most competitive prices due to the volume of demand, as well as the number of suppliers offering to sell. In effect, the IoT created the ideal or perfect market for buyer/seller transactions.

The industrial revolution

Prices plummeted, volumes hit the roof, new sellers emerged, old sellers who loaded on the IoT bandwagon found new frontiers to conquer.

Those who could not afford to buy, could now do so. And those who could not sell to a larger audience, could now do so. The variety expanded on both the ends – buyers and sellers. All this happened at a minimum investment. All that one needed was to buy a laptop/mobile phone to connect to the IoT and start transacting. Companies could start businesses by simply creating websites, and then connecting with backend suppliers, and meeting the demands of an often unknown customer. It was not mandatory for the buyer and seller to meet. The world was open for business.

Amazon, currently a plus \$ 450-billion company, is perhaps the biggest icon. It has spawned many others in its wake, but still outdoes others in innovating new business models. Its cloud business was another blockbuster, which used the IoT to offer a safe and secure space for companies to transact electronic messages. For a fee, of course. The IoT has spawned many new concepts and businesses – cloud computing, eCommerce, channel selling, web-based commerce, electronic payments systems, remote controls and access, and so on. In fact, a whole new world has opened up. What are the reasons why the IoT succeeded the way it has?

For one, the infra was already in place. Years of work

had led to the creation of a worldwide satellite communications system. This was augmented by the developments in telecom. Undersea cables, fibre optic cables, wireless transmission were all well developed by the time IoT came into town. IoT was designed to ride on all these media. The creators were often not those who operated IoT based services. While they were telecom companies, satellite companies etc., they were not the Googles, Apples, Metas, who used the infra to connect the earth at the speed of light. IoT

promoters do not incur the infra cost, they merely use the available infra. They build on it, like the cloud servers. The data centres dotting the globe were all mostly built by telecom companies, which then were used by the IoT riders.

Second, because of the volumes and the reach, the cost of usage was low. This was a unique situation, where someone created the infra, someone else created the use cases, and the whole of the earth participated. This unprecedented development led to new business models.

Third, the IoT industry gave a new meaning to the word ‘speed’. The story of startups and unicorns is largely a result of the IoT thinking. While HP was a pioneer in startups, starting in 1931, there were many others too, following the footsteps of HP. Apple, Microsoft, IBM are all ‘started in the garage’ stories, on shoestring budgets. But the real kickoff for modern day startups came after IoT, in the 1970’s and 1980’s. According to a study by the Kaufmann Foundation, USA, startups account for a significant portion of new job creation in the US. Between 1980 and 2015, nearly all net job creation in the US came from firms less than five years old. Between 2015 and 2023, in India, 102 unicorns were created. India ranks number 3 and 2 in the world and Asia in the 2024 rankings of unicorns from startups.

Fourth, the development of IoT can be compared to that of electricity. When Edison invented electricity, it was not of much use. However, many others worked on it, and ‘socialised’ it, which then led to universal adoption of electricity as a bedrock of modern life. This ‘socialisation’ included the setting up of power plants, transmission lines, electric bulbs manufacturing, fans, motors and many such. The IoT, similarly, has been ‘socialised’, perhaps far more speedily than electricity.

Millions of users, thousands of applications developers, have led to the ubiquitousness of the IoT. The UPI, a stellar application of the IoT, has put India on the world map of the country with the maximum number of transactions per day, and made a cashless economy a reality, to a good extent.

Finally, IoT has been embraced by the manufacturing industry, with the advent of industry 4.0. It all began by a few automobile manufacturers in Germany who created an assembly line driven by Industry 4.0. It showcased how IoT and automation can improve productivity and reduce waste. These were made possible due to the usage of microprocessor-controlled devices embedded in the line, each talking to the other through the IoT, through inputs from sensors. Sensors formed the basis of collection and manipulation of data followed by actions triggered by the analysis of the inputs. Over time, development of algorithms to process the data and provide decisions based on rules, machine learning, feedback based continuous changes in the processing parameters (such as, speed, temperature, surface conditioning), were all possible due to the connectivity established by the IoT core. Connectivity was key, sensors were the eyes and ears, algorithms partially/ fully replaced human actions, and feedback loops enabled continuous control on the inputs and outputs.

Fusion Strategy will be the definitive way for industrial companies to win against new competitors.

Indra k. Nooyi,
Former Chairman and CEO, PepsiCo; Member of the Board, Amazon

An important application of IoT has been in the field of maintenance of equipment. While practices such as downtime maintenance, preventive maintenance, condition-based maintenance, life cycle maintenance, were all being practised to various degrees, the advent of IOT made the jobs much easier. Data gathering and storage in clouds, higher data processing speeds which could then handle big data, machine learning algorithms, all converged to make the process of maintenance a much more controlled and controllable job than in the past.

Piecemeal data, varying quality of analysis, delayed attention to online problems, became a thing of the past. The features of the IoT that have been much appreciated in the manufacturing include: connectivity, big data analysis capability, cloud storage, speed of analysis, learning machines, algorithms for decision making.

Another feature of IoT which the manufacturing

BENEFITS OF PROACTIVE HEAVY EQUIPMENT MAINTENANCE



An important application of IoT has been in the field of maintenance of equipment.

industry adopted liberally was the linking together of the entire supply chain. In fact, in certain applications, the entire value chain – end to end – has been stitched together through IoT. The automobile industry leads in this field, due to the advances made in JIT (Just-In-Time) by Toyota. The JIT is unique to the auto industry, as the entire value chain has been designed and operated to get the best results. In India, Maruti practices this system.

For high volume, highly diverse product mix output, the JIT, with connectivity at both the ends – the back-end supply chain coupled with the front end dispatch chain, with the manufacturing chain in the middle – is the ideal design. However, this design can be successfully operated for best results only if the JIT is operated to its optimum, which is not easy, as it demands co-ordination with various agencies of a high order. The application of IoT with the other paraphernalia can make the entire operation far easier to control.

Overall, the IoT and Industry 4.0 have benefited from each other, with Industry 4.0 becoming an embedment in the IoT. IoT and the ‘riders on IoT’ have changed the world like never before, and, as Dr Govindarajan has observed in their book ‘Fusion Strategy’, in future, ‘products’ will not be merely ‘products’, but a bundle of ‘products and services’, due to the embedment of IoT. This is a new era, where each product is a combination of product and service, and hence, there is an urgent need of a new term for this new creature. My choice is ‘provice’, till a better name is found (?).

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About the author:

R Jayaraman is the Head, Capstone Projects, at Bhavan's S P Jain Institute of Management & Research (SPJIMR). He has worked in several capacities, including Tata Steel, for over 30 years. He has authored over 60 papers in academic and techno economic journals in India and abroad. Jayaraman is a qualified and trained Malcolm Baldrige and EFQM Business Model Lead Assessor.



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Indian Mobility Market to Double by 2030: Report

Emerging revenue pools such as electric, shared, and connected mobility are poised to contribute a staggering \$100 billion.



L-R: Vikram Janakiraman, MD and Senior Partner, BCG; Deepti Matai, Head of Industry - Auto, Google India; Nitin Gadkari, Minister of Road Transport & Highways, Govt. of India and Monil Modi, Partner, BCG.

The Indian mobility industry is charting its unique course, poised to double and cross \$600 billion by 2030, according to the Think Mobility Report by Google and Boston Consulting Group (BCG). Unveiled at the Bharat Mobility Global Expo 2025, the report reveals that growth in the sector will be driven by both traditional and emerging revenue pools, marking a departure from global trends.

Notably, emerging revenue pools such as electric, shared, and connected mobility are poised to contribute a staggering \$100 billion, signalling a strong push toward cleaner, sustainable mobility.

The report highlights the need for industry players to recognise the unique and rapidly evolving preferences of India's diverse mobility consumer cohorts.

Natarajan Sankar, Managing Director and Partner, BCG, emphasised the importance of harnessing global advancements. "Already the third-largest automobile industry, India is on the cusp of transformative change

over the next few years. To succeed, they must align their offerings with the distinct demands of Indian consumers."

Key findings from the report

As electric vehicles (EVs) gain momentum, one in three consumers is considering them for their next purchase, with distinct preferences emerging between electric four-wheelers (E4W) and electric two-wheelers (E2W). E4W buyers prioritise sophistication, advanced technology, and exclusivity. In contrast, E2W consumers focus more on practicality, comfort, and affordability.

Notably, women now influence 52 per cent of decision-making in the EV space, surpassing the 38 per cent for internal combustion engine (ICE) vehicles. These shifts highlight the need for tailored marketing strategies, presenting a significant opportunity for brands to refine their messaging and better connect with these evolving consumer segments.

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“Titagarh is ready to support the expanding rail market.”

Titagarh Rail Systems is playing a pivotal role in the development of Vande Bharat trains. Through its consortium with Bharat Heavy Electricals Limited (BHEL), TRSL is set to launch India's first privately manufactured Vande Bharat sleeper train by late 2025, comments **Prithish Chowdhary, Deputy Managing Director, Titagarh Rail Systems Limited**. In this interview with Rakesh Rao, he delves into the technicalities of the Indian railway infrastructure.

How is GOI spending funds on railway infrastructure development creating opportunities for TRSL?

The Government of India's unprecedented capital expenditure of ₹2.652 trillion in FY25 for railway infrastructure is a game-changer for companies like Titagarh Rail Systems. This significant investment presents numerous opportunities for growth across both freight and passenger rail segments.

As a leader in freight rolling stock and one of India's largest wagon manufacturers, Titagarh is leveraging this surge in investment to scale its operations. The Aatmanirbhar Bharat and 'Make in India' initiatives further bolster this growth, enabling us to deliver innovative, cost-effective solutions tailored to the domestic market.

By blending advanced engineering expertise from Firema in Italy with our Indian manufacturing capabilities, Titagarh is uniquely positioned to support the expanding passenger rail market. Our focus on innovation, resource optimisation, and technological advancements positions us as a key player in the global market.

How different are Vande Bharats from conventionally built passenger coaches?

Vande Bharat marks a significant advancement in Indian rail manufacturing, combining cutting-edge technology with passenger-centric features that distinguish them from conventional coaches. Their integrated trainset design enhances aerodynamics and reduces energy consumption, while advanced air conditioning, noise insulation, and luxurious interiors set a new standard for comfort and convenience.

Technological innovations such as automatic sliding



Prithish Chowdhary,
Deputy MD, TRSL

doors, GPS-enabled passenger information systems, and bio-vacuum toilets further elevate the travel experience. Additionally, the Vande Bharat platform's design flexibility supports various configurations, including a sleeper version tailored for overnight travel, blending comfort with efficiency. Lightweight stainless steel construction also adds durability while optimising speed and fuel efficiency.

How is Titagarh Rail Systems assisting the development of Vande Bharat trains?

Through our consortium agreement with Bharat Heavy Electricals Limited (BHEL), we are set to launch India's first privately manufactured Vande Bharat sleeper train by late 2025.

The Uttarpara facility serves as our primary manufacturing hub for this project. Titagarh is responsible for mechanical coach building, integration, testing, and commissioning, while BHEL supplies critical electrical systems. This collaboration ensures a seamless blend of mechanical and electrical expertise to deliver world-class trainsets. In addition to the sleeper trains, Titagarh is keenly observing the development of the Vande Bharat Metro project and is exploring avenues to contribute to this initiative, further expanding our involvement in India's high-speed rail ecosystem.

What kinds of new opportunities are you exploring in the railways space for growth in the future?

Domestically, we are exploring opportunities in metro rail and semi high speed trains to enhance urban mobility across India. Additionally, we are establishing a Design Centre/Engineering Centre.



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Strategies for Resilient Supply Chains

As companies prepare to shore up against the various factors influencing global supply chains, they are increasingly looking at localisation as a way to build business resilience. This has created a complex environment for global players, says **Hitendra Mankani, Chief Commercial Officer, DB Schenker India.**



As the world gets increasingly interconnected, we are seeing how global supply chains are the cornerstone of international trade. Not only do they connect businesses and consumers across borders, but industries ranging from pharmaceuticals and automotive to consumer goods and technology rely heavily on them. However, as per the KPMG Future of Supply Chain survey conducted with more than 300 global supply chain professionals, only 55 per cent of the respondents described their supply chain as stable and 47 per cent believed they were vulnerable to disruption.

The last few years have been very volatile for global supply chains, with ongoing geopolitical developments presenting multiple challenges.

In particular, the trade tensions between major economies have caused companies to rethink their sourcing strategies.

As companies prepare to shore up against the various factors influencing global supply chains, they are increasingly looking at localisation as one way to build

business resilience. This has created a complex regulatory environment for global players. Industries must work towards complying with local laws, navigating differences in digital tax regimes and environmental standards, while maintaining global operational efficiency.

Challenges

Building a robust, agile, and resilient supply chain is a long-term mandate. However, global as well as financial pressures have a role to play in the strategies pursued by enterprises to ensure supply chain stability.

Modern supply chains bridging multiple countries and industries, lead to creation of intricate interdependencies. A single disruption in any one region or industry can have a domino effect,

cascading across the network, halting production, and impacting timelines.

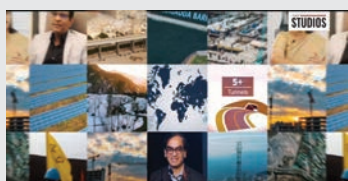
At the other end of the spectrum, for organisations going the digital way, it is important to note that digital supply chains, while efficient, are highly susceptible to cyberattacks. Incidents targeting critical infrastructure—such as transportation management systems or warehouse automation platforms—can cripple operations.

Add to this the rising raw material costs, labour shortages, and energy price volatility and you get profit margin erosion across industries. In such a scenario, for most organisations, balancing cost optimisation with the need for resilience is a continual challenge.

Last, but not the least, businesses need to deliver on consumers' and stakeholders' expectations for sustainable practices, prompting companies to reduce their carbon footprint, source responsibly, and maintain ethical labour standards. Delivering upon these expectations often involves significant upfront

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Strategies for 2025

As organisations prepare to step into 2025, they must recognise that traditional approaches will no longer suffice. They will need to explore different paths and embrace new trends to stay resilient.

Towards this end, a key strategy that companies can adopt to counter business uncertainties is to diversify their suppliers as well as manufacturing locations.

Next, technology is a critical enabler of resilient supply chains and businesses must evaluate new technologies to build resilience going forward. Some examples of technology enablement include predictive analytics powered by Artificial Intelligence (AI), which helps companies anticipate business disruptions and plan contingencies. Also, blockchain technology allows businesses traceability and transparency across supply chains, reducing risks of fraud and ensuring compliance. With the advent of Internet of Things (IoT), businesses have enhanced real-time visibility, enabling them to monitor goods at every stage and address potential concerns proactively. Automation, be it robotics or other advanced manufacturing technologies, accelerates productivity and reduces potential for human error. Take for example, the growing prominence of e-commerce that has spurred significant advances in last-mile delivery systems such as AI-driven route optimisation and drone technology that enhance efficiency and convenience.

Going forward, businesses need to build more sustainability into their operations as well as supply chains, be it adopting renewable energy sources or investing in electric vehicle fleets or biodegradable packaging materials. They can also incorporate carbon accounting tools and lifecycle assessments to help them measure and reduce environmental impact.

Road ahead

It would be prudent to assume that going forward geopolitical, economic, and environmental challenges will continue to persist. Therefore, companies must shift from reactive to proactive strategies. Adopting advanced technologies will enable businesses to undertake faster decision-making and be prepared for greater adaptability. Also, machine learning models will refine forecasting, allowing companies to address potential disruptions well before they occur.

In addition to technology, organisations that invest in green logistics will stand out in an increasingly eco-conscious market. Emphasis on recycling and reusing materials will drive innovation in product design and logistics. Furthermore, investing in green logistics with carbon-neutral supply chains will not only meet regulatory requirements but also align with consumer expectations for sustainable practices.

To conclude, the future of global supply chains lies in resilience, sustainability, and collaboration. Businesses must adapt to geopolitical shifts by diversifying networks, embracing technology, and prioritising ethical practices. As the global supply chain ecosystem evolves, the ability to adapt remains imperative for sustainable growth and competitive advantage.

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About the author:

Hitendra Mankani is the Chief Commercial Officer at DB Schenker India. He is a seasoned professional with extensive experience in the logistics and supply chain industry. He leverages his deep

knowledge and expertise to drive business growth and improve organisational communication, always prioritising customer satisfaction while aligning with company objectives. DB Schenker in India is one of the leading providers of integrated logistics services in the region. It offers a complete range of international air & ocean freight and contract logistics and global supply chain solutions from a single source.



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Chakr Innovation Pioneers Clean Air Solutions

Chakr Innovation is at the forefront of clean technology, revolutionising emission control with innovative solutions designed to combat air pollution. The company is focusing on addressing overlooked yet critical sources of pollution, particularly harmful emissions from diesel generators, says **Sanskriti Ramachandran**.



benefits. With a commitment to sustainability and cutting-edge technology, Chakr Innovation is not just shaping the future of clean air, but actively building it.

Chakr Innovation's journey began with the development of a single product, the Retrofit Emission Control Device (RECD), which aims to reduce emissions from diesel generators. Over the years, the company has expanded into a robust enterprise, establishing manufacturing plants in Pune and Gurugram, and achieving nationwide reach. The company's patented technology, which complies with CPCB standards, has been tested and certified by leading government labs, making it a trusted solution for emission reduction in India.

In a world where pollution is a growing concern, a group of IIT Delhi graduates envisioned a future where clean air is not just a hope, but a reality. Founded in 2016, Chakr Innovation was born out of a deep desire to tackle the often-overlooked causes of air pollution. As diesel generators silently contributed a significant portion to India's pollution levels, the founders decided to take action. While most discussions focused on the larger, visible impacts of air pollution, the team recognised a major contributor that was often overlooked: diesel generators. These essential backup power sources were silently responsible for nearly 18 per cent of air pollution, which led the founders to innovate and develop a solution with immediate, measurable

Today, Chakr Innovation with over 4,000 installations of its emission reduction technology- Chakr Shield, and more than 1500 satisfied customers, the company has contributed to reducing over 150,000 tonnes of CO₂ emissions. Their achievements have earned recognition from prestigious organisations, including the United Nations, IIT Delhi, and NITI Aayog.

Overcoming challenges

Despite its success, Chakr Innovation has faced its share of challenges, particularly around the adoption of its innovative technology. The introduction of a new emission control solution like Chakr Shield was met with resistance due to a lack of familiarity with the

technology. However, the team viewed these challenges as opportunities to educate the industry and regulatory bodies about the benefits of the Chakr Shield, its cost efficiency, and environmental impact.

“The team worked tirelessly to simplify the adoption process, ensuring the Chakr Shield was modular, customisable, and easy to retrofit into diesel generators. By collaborating with regulatory authorities and industry leaders, Chakr Innovation overcame these hurdles, positioning the Chakr Shield as a certified, trusted solution for emission control, says **Kushagra Srivastava, Founder and CEO, Chakr Innovation.**

The Chakr Shield, India’s first Type Approved Retrofit Emission Control Device (RECD), sets itself apart by reducing particulate matter emissions by up to 90 per cent, ensuring compliance with stringent environmental standards. The device’s passive regenerative trap technology and snap-fit installation make it one of the most user-friendly emission control solutions available.



“**For us, the most rewarding milestone has been the widespread adoption of the Chakr Shield. With over 4,000 installations across sectors and more than 1,500 customers, the company has helped prevent approximately 2.5 million metric tons of CO2 emissions. The technology’s endorsement by government authorities and accredited laboratories further validates its impact on the environment and its alignment with India’s net-zero goals’.**

Kushagra Srivastava,
Founder and CEO, Chakr Innovation

Sustainability is central to Chakr Innovation’s R&D and business philosophy. The company adopts a well-to-wheel approach, emphasising low-impact, recycled materials and energy-efficient technologies. The Chakr Shield exemplifies this commitment by reducing harmful diesel generator emissions and contributing to cleaner air. Over the past year, the company has successfully prevented 75 metric tons of CO2 from entering the



Chakr Shield: India’s first CPCB approved Retrofit Emission Control Device.

atmosphere, reflecting the tangible impact of their efforts.

Expanding horizons

Chakr Innovation is ready for further growth and market expansion. With a strategic focus on integrating material science with climate change solutions, the company is leveraging AI, machine learning, and data science to optimise operations and build data-driven systems. Chakr Innovation is also exploring opportunities to expand its international footprint, with several orders secured from global markets.

Looking ahead, the company is excited about the future of energy storage technologies, particularly aluminium-air technology. This technology offers higher energy density, safety, and recyclability, aligning perfectly with the company’s mission to advance material science. “Aluminium-air technology represents a transformative leap in clean energy innovation, harnessing the oxidation of aluminium to create electricity with an impressive energy density. While the technology is currently in the pre-pilot stage for applications such as Battery Operated Pallet Trucks (BOPT) and e-scooters, its potential is immense. By enabling mechanical recharging through recyclable aluminium plates, we’re paving the way for a sustainable and scalable energy solution. Over the next couple of years, we will continue refining the technology through focused pilots at the B2B level, with a vision to bring it to full-scale market release by early 2027. This marks a significant step towards a greener, more self-reliant India,” explains Srivastava.

By reducing reliance on traditional energy storage systems, Chakr Innovation aims to disrupt industries like electric mobility, drones, and material handling while supporting India’s ambitious vision of ‘Atmanirbhar Bharat’.

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Top Tips for Green Manufacturing

Eliminating carbon emissions in manufacturing is a challenge and an opportunity. In this article, **Emily Newton** delves into carbon-neutral techniques that can minimise environmental impact while still obtaining the benefits of more conventional operations.

Industrial automation has long focused on productivity and revenue increases, but these potentially exploitative motivations have led to adverse environmental impacts. Technicians and stakeholders need a greener perspective to reduce the carbon footprint of manufacturing. Delve into carbon-neutral techniques to minimise impact while still obtaining the benefits of more conventional operations.

1. Optimise energy consumption through automation

The manufacturing sector accounted for around 74 per cent of total industrial energy use in 2018, although this has decreased since 2022. Some of the world's largest greenhouse gas-emitting industries are under this umbrella, including mining, construction and general manufacturing. Many use legacy technologies and must undergo equipment overhauls and digital transformation to embrace automation.

Automation will optimise energy efficiency with real-time analytics and monitoring. The foundational technologies are the Internet of Things (IoT) and artificial intelligence (AI). Sensors gather the data AI synthesises with machine learning algorithms and predictive controls. The functions adjust the facility's energy consumption with minimal human intervention. This could control energy systems and peripherals and cut costs and use, including:



- Temperatures and humidity
- Water flow rates and pressures
- Lighting controls
- Hardware and software optimisations

2. Implement smart manufacturing for waste reduction

These resources automate optimisations, but they can also lead to energy waste reduction. Consider how technology can have big-picture impacts to reduce carbon footprints in manufacturing.

For example, automated guided vehicles (AGVs) are smart transportation systems. They are programmed to document, transport and track products, sending information to inventory management software. The constant oversight prevents unnecessary movement, wasted fuel and damaged materials from manual handling. This is one of many reasons why the AGV market is set to have a 6.9 per cent compound annual growth rate from 2023 to 2028.

The information AGVs and other smart technologies provide inventory management systems make them predictive. Some of the most prominent causes of downtime are material failure and supply loss, which can be addressed with AI. AI implementation lowers waste production by maintaining quality control, preventing outdated stock and determining demand forecasts to



AI implementation lowers waste production by maintaining quality control, preventing outdated stock and determining demand forecasts to move as many products as possible.

move as many products as possible. This prevents dust from collecting on shelves, inventory from using space, and warehouses from misplacing energy and materials in the process.

One case study explored smart technologies like additive manufacturing and generative AI to reduce waste when producing aircraft engines. The combination of these tools drafted a design that lowered its mass by 30 per cent and eliminated the need for over 100 parts. The long-term impact of these shifts is what will decrease carbon footprints.

3. Transition to renewable energy sources

Reducing reliance on natural gas, coal and oil is crucial for minimising manufacturing footprints. Additionally, many generators, like solar, geothermal and wind, can be automated to save even more resources. They also sync to smart technologies for data clarity, connecting to sitewide information systems.

For example, a compressor's energy use consumes 80 per cent of its life cycle, and this waste is hard to justify when some plants rely on compressed air so much that it uses 40 per cent of total electricity. Renewable power could reduce electricity costs while making this energy-intensive equipment less harmful despite its necessity.

Renewables also encourage manufacturers to connect to smart grids and become distributed energy resources (DERs). DERs facilitate widespread green power access, especially when linked to battery energy storage solutions to capture excess. This reduces the site's footprint and helps nearby power users lower theirs.

4. Use CCS technologies

Even if a manufacturer is carbon neutral, they could strive for more. Carbon Capture and Storage (CCS) could make a facility carbon-negative with smart implementation. If companies reduce energy and resource sources first by implementing closed-loop systems and monitoring, they must harness less carbon to mitigate its impact.

Therefore, expanding CCS technologies can accommodate other facilities by capturing even more. Facilities can also reuse the carbon they get to make economies more circular.

Constant monitoring and auditing are required for this to be effective. It will verify the technology's effectiveness and track how much carbon it captures. These numbers are critical for compliance reporting, especially when making promises to stakeholders and environmental, social and governance objectives. For example, the Sleipner project in Norway is an offshore natural gas initiative that needed to reduce its carbon dioxide from a max of 9.5 per cent to 2.5 per cent, which it achieved through CCS.



A compressor's energy use consumes 80 per cent of its life cycle, and this waste is hard to justify when some plants rely on compressed air so much that it uses 40 per cent of total electricity.

5. Improve supply chain efficiency

Supply chains are a deceptive source of carbon for manufacturers. Indirect emissions, described as Scope 3, account for around 84 per cent of an entity's carbon footprint. However, many do not report their emissions to clients because of compliance failures or nonexistent requirements.

Entities can start reporting by contacting compliance consultants for advice on which agencies they should receive an audit from. In the meantime, referring to laws from government agencies, like the Environmental Protection Agency, is the best intermediary solution.

Most of this massive contribution is caused by inefficiencies throughout supply chains that lead to shipping delays, waste through defective products and more. Here are a few innovations simplifying supply chain accountability, making communications between manufacturer and partner more transparent and sustainable:

- **Blockchain:** Traces inventory with immutable, authenticated transaction logs.
- **Transportation management systems:** Optimises routes for reducing fuel emissions.
- **Digital twins:** Visualises operational changes in programs before implementation to prevent waste from errors.

Carbon-neutral manufacturing strategies

Eliminating carbon emissions in manufacturing is a challenge and an opportunity. Many of the techniques associated with decarbonisation correlate with innovation. Facilities adopting these strategies are more likely to succeed because of new technological implementations, operational refinement and strategic optimisations. Enterprises will save the planet while promoting their thought leadership within their niches for competitive advantages.

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Emily Newton is a tech and industrial journalist and the Editor-in-Chief of Revolutionized magazine.



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Igus Unveils Bicycle Made From Recycled Ocean Plastic

Over the year, the igus: bike will travel across the globe to showcase how plastic waste can be transformed into valuable resources for future urban mobility.



Igus, a German manufacturing company, who are involved in the manufacturing of high-performance polymers unveiled a bicycle made from 90 per cent plastic on the occasion of its 25th year of igus India and 60th anniversary in igus Germany.

The igus: bike is made of recycled plastic waste are weather-resistant, corrosion-free, and requires no lubrication. With components such as ball bearings, drives, and freewheels that operate without oil, the bicycle is testimony to igus's commitment to innovation and sustainability.

The bicycle, which is currently on a global tour across 16 countries, arrived in India on January 27, 2025. The world tour officially started from the headquarters in Cologne, Germany. Over the year, the igus: bike will travel across the globe to showcase how plastic waste can be transformed into valuable resources for future urban mobility.

The technology

Igus innovates in polymers, designing and manufacturing components such as bearings, energy chains, and linear guides that offer a lightweight, maintenance-free, and corrosion-resistant alternative to traditional metal counterparts. These innovations not only enhance efficiency and durability but also significantly reduce energy consumption and carbon footprint during production and use.

These components do not require lubrication - a massive step in sustainability. Lubricants are

environmentally harmful, and often end up in water sources, creating issues.

The igus: bike is an example of how such polymers can work in real-world applications, and help promote sustainability, cost efficiency, and innovation.

Thilo Schultes, CEO- dry-tech new business, igus, commented, "igus: bike is a testament to the company's efforts in advancing the circular economy for plastics. As a company with 60 years of expertise in manufacturing industrial components for movement from plastic, we are committed to driving the transformation to a sustainable circular economy for plastic. The igus: bike represents a significant milestone in this journey. Through this world tour, we aim to inspire companies and consumers alike to embrace sustainable solutions."

Deepak Paul, Managing Director, igus, said, "igus: bike has proven that sustainability and innovation can go hand in hand. With this innovation, our team has proven that the circular economy is not just an aspiration but an achievable reality. This world tour is more than just a showcase of our technology, our goal is to show the world that plastics, when managed responsibly, have the potential to revolutionise industries and reduce environmental impact. We also aim to inspire consumers to see plastic as a resource, not waste."

Up to 50 per cent of the bicycle's components are manufactured from recycled materials, including plastic waste like fishing nets and shampoo bottles. Igus researchers are continuously working to increase this percentage, paving the way for a greener future.

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Partners in Progress

The optimism expressed by the panellists suggests that Indo-German collaboration is not only beneficial for both countries but also sets a powerful example for global partnerships, opines Sanskriti Ramachandran.

In a rapidly evolving global economy, strategic international collaborations are more important than ever. One such partnership that continues to gain momentum is between India and Germany. This collaboration spans a wide array of sectors—from trade and technology to sustainability and workforce development—and is already delivering impressive results. The recent First Construction Council webinar, titled ‘Indo-German Partnership: Collaborating for Growth’, provided an extensive look at this vital alliance. Moderated by **Rajesh Nath, Managing Director, VDMA India**, the session explored the evolution, opportunities, and challenges that define the Indo-German partnership, which saw an impressive \$33 billion in bilateral trade in 2023.



products at competitive prices, and now, we export machinery back to Germany and America,” said Sakthikumar, underscoring the mutual growth that has defined this partnership.

From trade to technology

The Indo-German relationship has undergone a remarkable transformation over the years, transitioning from basic trade to multifaceted cooperation. Rajesh Nath opened the session by underscoring the dynamic nature of Indo-German trade, with more than 1,800 German companies now operating in India. “Machinery accounts for nearly a third of our bilateral trade,” Nath shared, highlighting sectors such as renewable energy, digitalisation, and green hydrogen as key growth areas for the future.

V.G. Sakthikumar, Managing Director, Schwing Stetter India, reflected on his company’s own journey, which mirrors the broader evolution of the Indo-German partnership. When Schwing Stetter first set up operations in India in 1998, the country was considered a relatively small market. Today, India has become the largest manufacturing hub for Schwing Stetter, with exports flowing to markets in Europe, the U.S., and even China. “Germany trusted India to produce high-quality

India’s industrial modernisation

Germany has played a pivotal role in India’s industrial modernisation, particularly in advancing manufacturing capabilities. **Maanav Goel, Managing Director, Hoffmann Quality Tools India**, discussed how the historical and contemporary aspects of Indo-German cooperation have shaped both nations’ industries. “Before 1947, our interactions were largely limited to cultural exchanges,” Goel said, explaining how industrial cooperation became central after India’s independence. “Today, German companies like Hoffmann have developed high-quality tools tailored to industries such as automotive and aerospace.”

Goel also pointed out that German companies have been instrumental in advancing India’s Industry 4.0 ambitions. “Sustainability is not just a cost; it’s an investment,” he added, referring to the energy-efficient and precision-engineered solutions Hoffmann provides to enhance India’s manufacturing sector.

Research, innovation, and the role of technology

Innovation has always been the core of the Indo-German partnership. **Anandi Iyer, Director, Fraunhofer Office India**, highlighted how research and innovation are driving both countries toward a more sustainable future. As the world's largest applied research ecosystem, Fraunhofer has introduced technologies ranging from digital twins for manufacturing to waste-to-construction materials, all aimed at improving efficiency and sustainability in Indian industries.

Reflecting on Fraunhofer's work in India, Iyer noted that India is not just a market for technology, but a hub of entrepreneurship and rapid implementation. "We entered India in 2008, and today we earn over €70 million annually from Indian industry contracts," she shared. Iyer also stressed the importance of democratising technology, especially for India's small and medium enterprises (SMEs). "SMEs are crucial to the future of both India and Germany. By creating innovation clusters similar to Germany's, we can ensure that technology benefits all businesses, big and small," she said.

Cornerstone of growth

SMEs are a critical focus in the Indo-German partnership. **Manoj Barve, India Head, BVMW**, emphasised their importance in both countries. "In Germany, SMEs contribute 55 per cent to GDP and employ 60 per cent of the workforce," Barve said. "India's SMEs, which contribute 30 per cent to the country's GDP, are equally important for job creation and economic growth."

Barve also discussed the complementary strengths of India and Germany. India's prowess in IT, coupled with Germany's engineering expertise, provides a fertile ground for collaboration. "Germany's advanced technology can support India's 'Make in India' initiative, while India's cost-effective manufacturing can help Germany tackle its energy-led inflation," he explained.

Gender diversity was another issue Barve touched upon, pointing out that Germany's workforce is 62 per cent female, supported by policies such as parental leave and flexible working hours. "India, at 37 per cent, has room to grow in this area," he added. "Addressing issues like workplace safety and societal norms can help unlock the full potential of Indian women in the workforce."

Navigating challenges and expanding reach

The webinar also addressed the challenges that SMEs face when attempting to expand internationally. **Nitin Pangam, Managing Director, Maeflower Consulting**, emphasised the need for deeper market insights and

sustained engagement to succeed globally. "SMEs need to understand target markets better, whether it's leveraging the Inflation Reduction Act in the U.S. or tapping into infrastructure projects in Saudi Arabia," Pangam said.

He also stressed the importance of government support for SMEs. "Institutions like Invest India and VDMA India play a crucial role in guiding SMEs toward international expansion," Pangam added, suggesting that India could benefit from models like Enterprise Ireland's, which helps SMEs navigate global markets.

Shared responsibility

An often overlooked but vital aspect of Indo-German collaboration is skill development. Schwing Stetter's Sakthikumar discussed how the company has been proactive in training operators and welders, addressing the significant skills gap in India's construction machinery sector. "We have partnered with state governments to create training programs that produce highly skilled workers, and some of our welding schools have produced global champions," he shared.

Iyer also highlighted the potential for India to adopt Germany's dual education system, which sees 5 per cent of the workforce engaged in training at any given time. "This system can be a model for India, where industry-driven skill programs can help bridge the skills gap and align workers with evolving technologies," Iyer explained.

Looking to the future

The future of the Indo-German partnership lies in embracing sustainability, digitalisation, and workforce empowerment. Rajesh Nath summarised the webinar's discussions, emphasising that sustainability and supply chain resilience will play a defining role in the relationship moving forward. "Leveraging technology and deepening institutional collaboration are key to the future," Nath concluded, signalling the importance of continued cooperation in these areas.

The optimism expressed by the panellists suggests that Indo-German collaboration is not only beneficial for both countries but also sets a powerful example for global partnerships. As Iyer aptly remarked, "The future is bright, but it requires strategic steps to make SMEs and innovation the engines of growth."

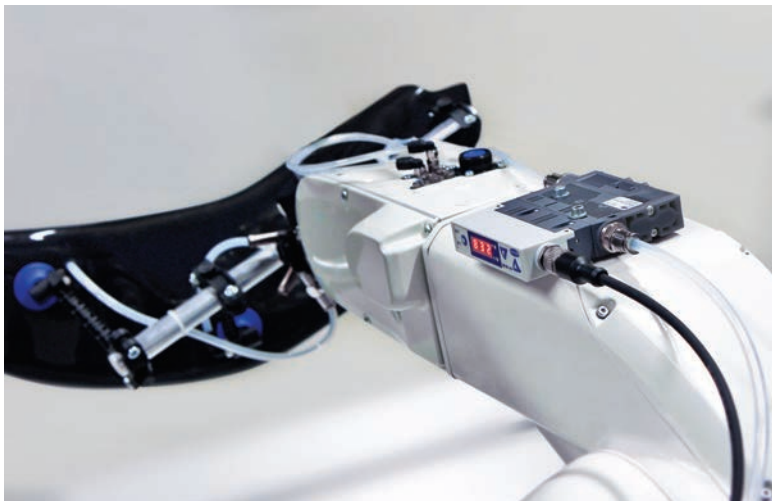
The Indo-German partnership represents a model of what strategic international cooperation can achieve. By focusing on trade, technology, sustainability, and workforce development, both nations have been able to create a mutually beneficial relationship that drives growth and innovation. As India and Germany move forward, their cooperation will serve as a blueprint for growth in the years to come.

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Sustainability in Automation: Schmalz Leading the Way

Compact ejectors play a critical role in a variety of industrial applications. They are particularly suited for handling airtight and slightly porous workpieces, ensuring high precision and efficiency.



and robust designs that extend their operational life. This minimises the frequency of replacements and reduces material waste, further contributing to sustainability goals.

Advancing automation with intelligent design

The compact ejectors are meticulously designed to meet the demands of modern automation. Their compact and lightweight construction allows for seamless integration into automated systems, particularly in applications with limited space or high dynamics. The SCPS series offers fundamental reliability, while the SCPSc and SCPSi models bring advanced features tailored to specific industrial requirements.

The SCPSc model includes a user-friendly 7-segment

In an era where sustainability is a global priority, industries are tasked with balancing operational efficiency and environmental responsibility. This challenge is particularly evident in manufacturing, where resource-intensive processes, such as the use of compressed air in automation, contribute significantly to energy consumption. Optimising these processes is essential to reduce environmental impact and achieve long-term cost savings. Schmalz has addressed this need by developing a series of compact ejectors SCPSc and SCPSi that combine cutting-edge technology with resource efficiency.

Sustainability as a design principle

Compressed air, though indispensable in vacuum systems, is often one of the most energy-intensive resources in automated operations. Recognising this, Schmalz has embedded air-saving technology into its ejector designs. This innovation optimises air usage, significantly reducing compressed air consumption by up to 80 per cent compared to conventional systems. Beyond energy savings, this reduction translates into lower greenhouse gas emissions, supporting the global push toward sustainable manufacturing. Moreover, the SCPSc and SCPSi models incorporate durable materials



Air saving technology in ejectors



SCPSc and SCPSi models

display that provides clear, real-time information about system status and vacuum parameters. This ensures ease of operation and simplifies configuration, even in complex setups. The SCPSi variant takes this a step further by offering digital connectivity via IO-Link. This enables real-time monitoring of vacuum levels, energy consumption, and cycle times, allowing for integration with Industry 4.0 systems.

Applications across industries

Compact ejectors play a critical role in a variety of industrial applications. They are particularly suited for handling airtight and slightly porous workpieces, ensuring high precision and efficiency. Industries such as automotive, packaging, electronics, and logistics rely on these ejectors for diverse applications, including robot handling, pick-and-place operations, and linear axis systems.

For example, in the automotive industry, ejectors assist in lifting and positioning car body panels with optimised air consumption. Similarly, in packaging operations, they excel in handling lightweight and porous materials, such as cardboard, ensuring smooth and reliable processes. These versatile devices are indispensable wherever precision handling and energy efficiency are required.

Enhancing sustainability through air saving

The air-saving function integrated into SCPSc and SCPSi is a defining feature that sets these ejectors apart. By actively monitoring vacuum levels, the system ensures that compressed air is used only when necessary, preventing waste and reducing operational costs. This function is particularly impactful in high-cycle operations where air consumption can quickly escalate without proper control.

The SCPSi model's advanced monitoring capabilities amplify these benefits. Its IO-Link interface not only facilitates seamless communication with automation systems but also enables users to track energy metrics in real time. This empowers businesses to make data-driven decisions, optimising their processes for both efficiency and sustainability.

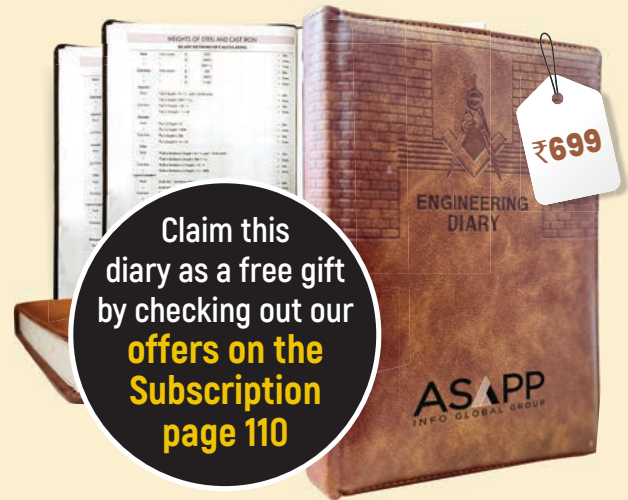
The intersection of technology and responsibility

Schmalz compact ejectors demonstrate how advanced engineering can contribute to sustainability goals. By minimising air consumption and integrating with modern digital systems, these ejectors not only improve operational efficiency but also align with environmental objectives. Manufacturers who choose these models benefit from a solution that enhances their performance and their sustainability efforts.

SME

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Redefine Operations with Gandhi Automations' Dock Levellers

Designed to meet EN 1398 standards the dock levellers are engineered for the most demanding environments.

Gandhi Automations Pvt Ltd, is recognised as India's No.1 entrance automation and loading bay equipment company. We possess certifications like, EN ISO 9001:2015, EN ISO 14001:2015, and ISO 45001:2018, accredited by TÜV Austria.

We offer electro-hydraulic, pneumatic, and mechanical dock levellers, each designed to ensure fast, smooth, and safe transitions between vehicles and loading bays. Designed to meet EN 1398 standards the levellers are engineered for the most demanding environments. The platform surface features an MS almond-shaped anti-slip checkered plate, with a robust 12+2 mm thickness, providing enhanced durability and safety for optimal performance. Available in capacities of 6, 9, and 12 tonnes, our dock levellers are versatile enough to meet a wide range of operational needs.

To meet diverse loading needs, we provide a comprehensive range of dock levellers:

- a) **Radius Lip Dock Levellers:** Available in various sizes and capacities, our Radius Lip Dock Levellers connect the dock with the truck bed, facilitating easy drive-on and drive-off operations for forklifts and other equipment. Their self-cleaning lip-hinge system prevents the accumulation of dust and dirt, ensuring smooth operation.
- b) **Telescopic Lip Dock Levellers:** Ideal for situations where vehicles cannot dock closely, such as sea containers or side-loading railway wagons, these levellers come with an extendable lip that can reach up to 1 meter, providing flexibility in various loading scenarios.



- c) **Edge-of-Dock Levellers:** Compliant with the latest EN 1398 safety standards, our Edge-of-Dock (EOD) Levellers are ideal for facilities without an existing pit, where the height difference between the loading dock and the truck bed is minimal. These levellers are particularly suited for environments with consistent truck heights, such as warehouses, distribution centres, and retail facilities. EOD levellers offer an efficient, space-saving solution for quick loading and unloading in locations where installing a pit-style leveler is not feasible. They offer reliable performance and safety for efficient loading operations.
- d) **Forklift Roll-Off Barrier Lip Dock Levellers:** Our newly introduced Forklift Roll-Off Barrier Lip Dock Leveller includes a run-off protection feature that prevents accidental forklift roll-off when the overhead door is open and no trailer is present. This leveller combines the benefits of hydraulic dock levellers with the added security of a robust barrier.

All our dock levellers can interlock with existing doors and vehicle restraint systems, ensuring top performance and security in every operation.

SME

For details, contact Gandhi Automations, Mumbai, on
Tel: +91 22 6672 0200, 6672 0300, or
Email: sales@geapl.com, or visit www.geapl.com

(Communication provided by the management of the company)

HARD ANODOZONG SERVICES

Metreat Engineers, Ahmedabad offers Aluhard Hard Anodizing services for Aluminum components and rollers.

Features:

- Aluminum is widely used in engineering machinery and in aerospace engineering but due to its properties, it wears out very fast. ALUHARD hard anodizing layer is a ceramic like layer developed by anodic oxidation process in a specially formulated electrolyte. The ALUHARD layer protects aluminum components, enhances the basic properties and offers following advantages:
- Excellent Hardness up to 550 VPN – High Wear Resistance.
- Excellent Corrosion Resistance.
- High Thermal & Ele Insulation.
- Excellent Adhesion With the base Material.
- Non-sticking, Good Antifriction Surface and Easy Cleaning,
- Can be Ground/Honed to Required Size.
- Layer Thickness – 30 to 60 Microns, Controlled In Close Tolerance,
- Used for Food application also.
- ALUHARD - Hard Anodizing is essential for varieties of applications in the engineering industries for the functional requirements. The application list includes:
- Textile Machinery Parts, Timing Pulleys, Rollers, Winding Drums and Bobbins
- Pneumatic Cylinders, Medical Instruments, Surgical Instruments, Actuators, Elevator Parts,
- Automotive Parts, Compressors Parts, Impellers, Turbine Parts, Hardware Parts.
- Data Processing Machinery Parts, Pressing Iron Bodies,
- Piston Valves, Nozzles, Camera Parts, Investment Casting Molds, Packaging Machinery Parts.
- Fire Fighting Equipments, Printing Machinery Parts, Blow Molding Dies and many more.

About the Company: Metreat Engineers operate the largest job shop unit in Gujarat for Hard Anodizing on aluminum parts and rollers. They have > 25 years of experience and they got the technology from the space application centre and are a registered supplier to ISRO & PRL. There are number of parts where our expertise can be used.

Contact:

Metreat Engineers, Ahmedabad.
Mobile: 09825070470
Email: metreatengineers@yahoo.com



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Y TYPE BALL VALVE

Shreeram Engineers offers a wide range of Y type ball valve.

Features:

- Shreeram Engineers is proud to introduce the Y-type ball valve, specifically engineered to enhance air distribution efficiency in mobile compressors. Key specifications of this high-performance valve include:
- Inlet Size: 32 MM NB (1 1/4" BSPF / NPT Female threads); Outlet Size: Two outlets, each 12 MM NB (3/4" BSP / NPT Female threads); Pressure withstanding capacity: 750 PSI.
- This durable, high-quality valve is designed to deliver reliable performance under challenging conditions, making it an ideal solution for mobile compressor applications where precise and efficient air distribution is essential.

About the Company: Shreeram Engineers is a registered SSI & NSIC company established in 1984 by highly qualified and experienced people at the prime industrial zone of GIDC, Odhav Ahmedabad,

accredited with ISO 9001:2015 certificate from BVQI.

Contact:

Shreeram Engineers, Ahmedabad
Tel: 079-29700701
Mobile: 8866055310
Email: info@shreeramahmedabad.com



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MOBILE FILTRATION SYSTEMS

S & C Invotek offers a wide range of mobile filtration systems.

Features:

- S & C Invotek manufactures a Mobile Filter System which is user-friendly for the shop floor requirements and it is easy to move from around different places on the shopfloor wherever batch filtration is required as there is no need for permanent installation.
- Their systems are designed for use with high performance filter bags, Strainers or cartridge filter.

About the Company: S&C Invotek is a pioneering company in the field of manufacturing filtration systems, also known as top auto components manufacturers in India. Based in Bangalore, South India, the company has earned a prominent position as a leading designer and manufacturer of custom-engineered filtration products. It boasts a wide range of filtration, separation, and purification solutions, making it one of the most diverse companies in the industry.

Contact:

S & C Invotek, Bangalore
Tel: 080-26665676 Mobile: 09844035677
Email: info@invotekfilters.com,
sales@invotekfilters.com



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ELECTRIC SERVO PRESS

Delta Electronics India Private Limited offers a wide range of electric servo press.

Features:

- The Electric Servo Press integrates Delta's self-developed key components such as the Human Machine Interface (HMI), Programmable Logic Controllers (PLC), servo drives and motors into the whole system, providing convenient machine maintenance and enhancing efficiency.
- The Delta Electric Servo Press is a high-performance and energy-saving machine with no traditional press parts (e.g. flywheel, pneumatic cylinder, press motor, clutch, or others).
- The press adopts AC servo motors that propel a low-backlash ballscrew and press punch, along with sensor and control parts, to precisely adjust load and achieve high-repeatability processing quality.
- The machine features multiple control modes with flexible combinations to perform real-time press monitoring that not only helps reduce press yield rate and damage, but also saves cost..

About the Company: Delta Electronics India has been at the EPI Center of shift that is needed for today's complex industrial ecosystem of interconnected equipment and smart industrial assets for over two decades.

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Contact:

Delta Electronics India Private Limited,
Bangalore
Tel: 080-68141800 Mobile: 09953882197
Email: sanjay.gupta@deltawww.com



CC-GRIND VIEW WITH VICTOGRAIN ABRASIVE GRAIN

PFERD offers a wide range of CC-Grind view with victograin abrasive grain.



Features:

- Special Line SGP includes products engineered for specific tasks that offer the user key advantages over conventional products. This quality line also includes products that, due to their particularly high performance, offer ultimate economic efficiency.
- Its advantages: Ultimate aggressive performance for fast results. Fiberglass-reinforced plastic backing pad facilitates a robust, reliable application. Significantly more ergonomic than a conventional grinding wheel: Noise, vibrations and dust are significantly reduced. A considerably superior surface quality is also produced. In contrast to flap discs, they can achieve flat surfaces due to their dimensional stability. The use of a special clamping flange set is not necessary due to the design.

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

E2 SELF-LUBRICATING BALL SCREW

IBK Engineers Pvt Ltd offers a wide range of E2 self-lubricating ball screw.

Features:

- The E2 series provides proper lubrication to extend the maintenance cycle, is easy to disassemble to save repair and maintenance time, prevents oil leakage, and is environmentally friendly.
- Its applications used in Industrial machinery; Electronic machinery; Transmission machinery.

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.

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Contact:

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



FACE MILL ARBORS

Schunk Intec India Pvt Ltd offers a wide range of face mill arbors.

Features:

- Face mill arbors are suitable for clamping end face mills and face mills, with crosswise slot in accordance with DIN 1880, from clamping diameter 40 mm in accordance with DIN 2079 (four threaded holes).
- Due to the enlarged contact surface, milling cutters with a crosswise slot can be clamped quickly.
- Face mill arbors with front side coolant supply are suitable for clamping end face mills and face mills with internal cooling. Face mill arbors with simultaneous taper and flat work surface close the interface-related gap between tool flange.

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

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Contact:

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



DUPLEX BAG/ STRAINER FILTRATION SYSTEMS

S & C Invotek offers a wide range of duplex bag/ strainer filtration systems.

Features:

- S & C Invotek manufactures a Duplex Bag/ Strainer Filtration System which is user-friendly, These systems are designed for use with high performance Bags Filters and Strainer Filters.
- The duplex system usually consists of two separate strainer/Bag housings. The system also contains a valve handle placed between the two Filters to divert the flow of liquid to one strainer/Bag while the other is being cleaned.

About the Company: S&C Invotek is a pioneering company in the field of manufacturing filtration systems, also known as top auto components manufacturers in India.

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Contact:

S & C Invotek, Bangalore
Tel: 080-26665676/26697112/26797001
Mobile: 09844035677, 09980775677
Email: info@invotekfilters.com,
sales@invotekfilters.com



CNC DOUBLE ENDED PIPE BORING MACHINE

Brisk Tech Engineers offers a wide range of CNC double ended pipe boring machine.

Features:

- Brisk CNC double-ended pipe boring machine also known as CNC double-ended horizontal idler pipe boring machine designed for high precision outcome of the components.

About the company: Brisk Tech Engineers, based in Bangalore, is a trusted name in the field of precision engineering. We specialize in delivering innovative CNC machining solutions that cater to diverse industries. With a strong commitment to quality, advanced technology, and customer-centric services, we have built a reputation for excellence in both product performance and client satisfaction. Our expertise ensures that we consistently

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meet the evolving needs of the manufacturing sector.

Contact:

Brisk Tech Engineers, Bangalore
Mobile: 09448479855, 07892743816
Email: info@brisktechengineers.com



AUTO RECLOSE RELAY - JRV 144

JVS Electronics Pvt Ltd offers a wide range of auto reclose relay - JRV 144.

Features:

- The relay receives the fault initiation from the protection relay and that triggers the auto reclose function. After tripping the circuit breaker (CB), the Auto reclose function can reclose the CB. Normally, the first reclose (or shot) is so short in time, that the consumer cannot notice anything. However, the fault will be cleared and the feeder will continue in normal service. Even though the basic principle of Auto reclose is simple, there are a lot of different timers and parameters that have to be set.
- The auto reclose function is normally used in feeder protection relays that are protecting an overhead line. Most of the overhead line faults are temporary in nature. Up to 85% can be cleared by using the auto reclose function.

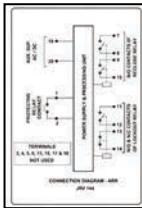
About the Company: JVS Electronics Pvt Ltd is an exporter, manufacturer and supplier of audio indicating instruments, visual indicating instruments, electrical indicating instruments, etc.

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Contact:

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



PARTITE 7425 METHACRYLATE ADHESIVE

Parson Adhesives India Pvt Ltd offers PARTITE 7425 Methacrylate Adhesive.

Features:

- Partite 7425 is a two component 100 % reactive, toughened structural Methyl methacrylate adhesive. It is specially formulated for bonding a wide variety of metals, thermoplastics, thermosets and composite assemblies.
- It is a combination of 10:1 mix ratio with non-sagging and thixotropic formulation. Excellent impact, peel and shear resistance. No surface preparation required and it is having excellent durability.
- Its applications: It is ideal for all types of Composites, PVC, Polycarbonate, Acrylic, Fiberglass, PBT, PPO, ABS, Styrene, Stainless-steel, Carbon steel, etc.

About the company: Parson Adhesives India Private Limited, is a Business Unit of Parson Adhesives, Inc. USA. Parson adhesives is one of the leading manufacturers of the manufacturer of High Performance Anaerobic, Cyanoacrylates, UV Curable, Epoxy, Polyurethane, Methacrylate Adhesives, etc.

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Contact:

Parson Adhesives India Private Limited,
Vadodara
Tel: 0265-2972191 Mobile: 09687373996,
Email: sales@parsonadhesives.in



AUDIO VISUAL ANNUNCIATOR FOR FEEDER - JAU-FD -1

JVS Electronics Pvt Ltd offers a wide range of audio visual annunciator for feeder - JAU-FD -1.



Features:

- The solid state annunciator, type JAU provides an audible and visible annunciation when the fault is present in the system.
- Its features include: Visual indication with audio output; Compact size; Priority level in identifying the faults.

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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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.
- Due to controlled feed, the hot metal splashing is avoided and the charger can be operated from a framed plate by the operator without actually being near to the furnace.

About the Company: Elektromag-Joest Vibration Pvt. Ltd., is a leading manufacture of Vibrating equipments for foundry, steel, mining, quarrying, chemical, food, recycling, air separation and thermal processing.

Contact:

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

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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.

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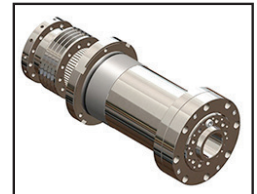


Contact:

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

Contact:

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

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DC CHOKE

Miracle Electronic Devices Pvt Ltd offers a wide range of DC 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. They are primarily used in various applications to achieve specific purposes, including: Filtering and Smoothing: DC chokes are commonly used in power supply circuits to filter out high-frequency noise and ripple voltage. By introducing a DC choke into the circuit, it can help to smooth the DC output, resulting in cleaner and more stable power for sensitive electronic equipment.
- Voltage Stabilization: In some cases, DC chokes are used to stabilize the voltage levels in a circuit.
- 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 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.
- 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, etc.

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Contact:

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



QUICK RELEASE COUPLERS - STRAIGHT THROUGH

Vijay Air Control offers a wide range of quick release couplers - straight through.

Features:

- Valve less construction drastically saves pressure loss and achieves high flow rate.
- Suitable for high viscosity fluids (such as grease).
- Available in various standard body materials, sizes and end configurations to cope with diversified applications 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



COMPACT TOUCH PROBES FOR TURNING MACHINES

Blum-Novotest Measuring & Testing Technology Pvt Ltd offers a wide range of compact touch probes for turning machines - TC54-10/TC64-10.



Features:

- The trigger signal is generated via shading of a miniature light barrier.
- Wear-free with long-term stability. The trigger signal is generated via shading of a miniature light barrier.
- Enables much higher measuring speeds and accuracy than with conventional probes. Touch probes by BLUM can be used for the most varied measurement and monitoring tasks in CNC machining centres.

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

DUSTBAG

Powertech Pollution Controls Pvt Ltd offers a wide range DustBag.



Features:

- DustBag dust collectors are fitted with non-woven polyester fabric of capturing dust particles as small as 10 microns. This equipment can capture large quantities of dust from any generating source with high capture efficiency.
- The DustBag uses non-woven polyester cloth as the filter media. It can incorporate additional safety features such as pressure differential switch fire retardant as well as antistatic filter media etc.

About the company: Powertech Pollution Controls Pvt Ltd was established in the year 1996, for the design and manufacture of a wide range of air pollution control equipment, specifically electrostatic filters, for the capture and control of most types of fumes, mist, smoke

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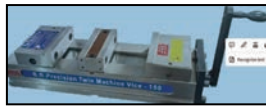


Contact:

Powertech Pollution Controls Pvt Ltd, Bangalore
Tel: 080-23452156, 23452256
Email: powertech@airtelmail.in

PRECISION TWIN MACHINE VICE - BR - TWIN - 150

B R Precisions offers precision twin machine vice model type BR - Twin - 150.



Features:

- B R Twin vice 150 made out of high tensile casting powerful with high absorption and has strong anti tension which can keep long durability for absorption and has strong rigidity with high precision Body surface are flame hardened and grounded tenon slot grounded machined and surface grounded to ensure maximum accuracy jaw plates are made out of tool steel hardened and ground.
- The function which permits first one work piece to be clamped and then the other enabling it to clamp the work piece, By turning the handle bring the moveable jaw 'A' towards the work piece situated in station 'A' until it is clamped. Maintaining the turn bring moveable jaw 'B' towards the work piece situated in the station 'B' until it is clamped.

About the Company: B R Precisions is dedicated to the manufacturing of clamping solutions; our main products are high pressure and precision vices.

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Contact:

B R Precisions, Bangalore
Mobile: 09845208854, 09449648171
Email: brvices@rediffmail.com

LINE INTERACTIVE UPS

Powerone Micro Systems Pvt Ltd offers a wide range of line interactive UPS.



Features:

- Line interactive UPS is used for small business, web and departmental servers. Powerone has the complete range of Line interactive UPS from 650 VA to 1000VA.
- Providing complete protection to your computers and electronic equipment against surges, blackouts and power fluctuation, these UPS are your perfect choice.
- For equipment with larger power requirement, their line interactive UPS system are the most reliable by providing solid battery backup to maintain sufficient power to save work when the power fails.
- These Line interactive UPS are being used by various small Industries, household works and IT sector around the globe. Its features include: high efficiency; wide input range suit for any condition; high reliability due to digital controller; change over time less than 4 milli seconds; sleek and low foot print.

About the company: Power-One Micro Systems Pvt Ltd is a leading manufacturer of power conversion technology in India..

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Contact:

Powerone Micro Systems Pvt Ltd, Bangalore
Tel: 080-28397832 Mobile: 09035010265
Email: poweroneups@poweroneups.com

SPECIALITY PAPER CHEMICALS

K-Tech (India) Limited offers a wide range of speciality paper chemicals. These paper chemicals, paper making chemicals, paper industry chemicals, etc.



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are made with the best available raw material.

Contact:

*K-Tech (India) Limited, Thane
Mobile: 08048704515
Email: response@ktechadditives.com*

DRY SYRUP POWDER FILLING MACHINE

Brothers Pharmamach (India) Pvt Ltd offers a wide range of the automatic single head linear augur type, dry syrup powder filling, model dryfill-30. It is suitable for filling dry syrup powder in various type and shape of bottles.



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Contact:

*Brothers Pharmamach (India) Pvt Ltd,
Ahmedabad
Mobile: 09825037971, 09825300706
Email: info@brothers.in*

POWDER FILLING MACHINE/AUGAR FILLER

Veena Pharma Machinery offers a wide range of powder filling machine/augar filler. These powder filling machine are versatile filling machine for free flowing as well as non free flowing powder. This powder filling machine can handle wide range.



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Contact:

*Veena Pharma Machinery, Thane
Mobile: 09323958996, 09004563628
Email: sales@veenapharma.com*

LIQUID / SYRUP / ORAL MANUFACTURING PLANT

Bombay Pharma Equipments Pvt Ltd offers a wide range of liquid/syrup/oral manufacturing plant. The automatic liquid manufacturing plant is designed to be operated only by one operator and one helper.



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Contact:

*Bombay Pharma Equipments Pvt Ltd,
Mumbai
Mobile: 09820124804, 09820120086
Email: bombaypharma@mtnl.net.in*

BAKERY BISCUIT MAKING MACHINE

Ahamad Associates Plant and Projects offers a wide range of bakery biscuit making machine. The bakery biscuit machine offered by Ahamad associates plant and projects are automatic biscuit making machines.



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Contact:

*Ahamad Associates Plant and Projects,
Bareilly, Uttar Pradesh
Mobile: 08006037771, 07300820345,
Email: watersystemsindia@gmail.com*

SOFTY ICE CREAM MACHINE - SI-825B

Sheth International offers a wide range of softy ice cream machine -SI-825B. It is equipped with the leading completely-sealed compressor, R22/R410A/R404A refrigerant.



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Contact:

*Sheth International, West Bengal
Mobile: 09800859856, 09641788835
Email: shethinternational09@gmail.com*

GINGER PASTE MAKING MACHINE

Sree Valsa Engineering Company offers a wide range of ginger paste making machine. It has constructed a sound manufacturing unit, where they manufacture and export a quality range of ginger paste making Machine.



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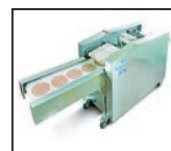


Contact:

*Sree Valsa Engineering Company,
Coimbatore
Mobile: 09843017172, 09787140064
Email: srvalsn@yahoo.com*

FULLY AUTOMATIC CHAPATHI MAKING MACHINE

Lakshmi Food Machinery offers a wide range of fully automatic chapathi making machine. This chapathi making machine made with full stainless steel (SS) food graded. This single unit can produce 2000 chapathi per hour. This machine is designed to performed following operations: chapathi ball cutting, etc.



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Contact:

*Lakshmi Food Machinery, Coimbatore
Mobile: 09787740500, 07540063500
Email: lfm.cbe@gmail.com*

CONTINUOUS FLUID BED PROCESSOR – R & D MODEL

Chamunda Pharma Machinery Pvt Ltd offers a wide range of continuous fluid bed processor – R&D model. This process equipment is designed to provide



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continuous output for free flowing powder.

Contact:

*Chamunda Pharma Machinery Pvt Ltd,
Ahmedabad*

Tel: 079-25840589, 25840591

Email: info@chamunda.in

DOUBLE ROTARY PRESS

Imperial Pharmachines Pvt Ltd offers a wide range of double rotary press. These double rotary press is available in both open and GMP model. Currently more than 300 of our machines are producing tablets



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across the globe. Key features of the double rotary press are: Drive shaft made of alloy steel to ensure longer working.

Contact:

Imperial Pharmachines Pvt Ltd, Mumbai

Tel: 022-25781989, 25770554

Email: sales1@pharmachine.in

CI TAPER LOCK PULLEY

Hasmukhlal & Brothers offers a wide range of CI taper lock pulley. Offering a quality assured assortment of CI taper lock pulley. These products are manufactured with advanced technology



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and equipment to assure the production of faultless products.

Contact:

Hasmukhlal & Brothers, Rajkot

Mobile: 09825340600, 9879760004

Email: bonnaflex@gmail.com

ELECON TYPE WORM REDUCTION GEARBOX

Micro Precision Works offers a wide range of elecon type worm reduction gearbox. It is designed in various adoptable models according to applications. Quick & easy



installation and adjustment of gearbox. .

Contact:

Micro Precision Works, Ahmedabad

Tel: 079-25893824

Mobile: 09924304636, 09824001570

Email: microgearbox@gmail.com

PVC CONVEYOR BELTS

A G Belting Pvt Ltd offers a wide range of PVC conveyor belts. They are actively committed towards manufacturing, exporting, importing and supplying PVC conveyor belts. The offered conveyor belts



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are highly acclaimed by our customers for its durability, flexibility.

Contact:

A G Belting Pvt Ltd, Ghaziabad

Mobile: 09810979977, 08800466515

Email: info@agengineers.net

INDUSTRIAL FLOW CONVEYOR CHAIN

Tripcon Engineering Pvt Ltd offers a wide range of industrial flow conveyor chain. They are one of the reputed organization engaged in offering high quality industrial flow conveyor chain to the customers.



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Contact:

Tripcon Engineering Pvt Ltd, Anand

Tel: 02692-236031

Mobile: 09825089070, 08347556104

Email: response@elevatorchains.com

PIV GEARBOX CHAINS

National Engineering Works offers a wide range of PIV gearbox chains. It is imported equivalent and import substitute quality PIV chains, designed to suit english, german, czech as well as Indian make PIV units, are available/developed in slat/laminated (Ao - A6, B, C, D, E, F, H1 - H4) & roller bearing bearing) type to mesh perfectly.



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Contact:

National Engineering Works, Kolkata

Mobile: 092318-20839

Email: nationalengg@bsnl.in

BELT DRIVEN TURNING SPINDLES

Capital Engineering Corporation offers a wide range of belt driven turning spindles. They are engaged in offering an extensive range of belt driven turning spindles which are playing an important role in many industries like production, mining, etc.



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Contact:

Capital Engineering Corporation, New Delhi

Mobile: 09810056849

Email: yogesh@capitalspindles.com

MECHANICAL SHAFT

Anar Rub Tech manufactures a wide range of mechanical shaft. It has in store a flawless quality of mechanical shaft (bladder less shaft) which consists of steel lugs, brass cam, ratchet and slotted pipe. The shaft is very beneficial with cores having uneven inside diameter.



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Contact:

Anar Rub Tech Pvt Ltd, Ahmedabad
Mobile: 09825405265, 09825047390
Email: sales@anarrubber.com

SPHERICAL PLAIN BEARING, SA1

Apex Precision Agencies manufactures spherical plain bearing. The spherical bearing is a heavy-duty self-aligning sliding bearing. Highly resistant to impact loads, this product is most fitted to the oscillating section under slow, heavy loads.



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Contact:

Apex Precision Agencies, Mumbai
Tel: 022-61464444, 25550900
Mobile: 09820040939
Email: sales@apexprecision.co.in

METALLIC BELLOWS

RMS Corporation offers a wide range of metallic bellows. This metallic bellows are the expansion controls in pipelines, ducting & vessels which carry hot or cold fluids or which are exposed to large variations in temperature is a major problem confronting designers.



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Contact:

RMS Corporation, Mumbai
Mobile: 09323804063, 09167245537
Email: rms_corp@vsnl.net

HELICAL SPEED REDUCER

MGM-Varvel Power Transmission Pvt Ltd offers a wide range of helical speed reducer. These helical speed reducers are made using best quality raw material that are sourced from reliable vendors of the industries.



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Contact:

MGM-Varvel Power Transmission Pvt Ltd, Chennai
Mobile: 08754470747
Email: info@mgmvarvelindia.com

PUMP SEAL

Global Sales & Engineering Company manufactures a wide range of pump seal. Pump seal are used in pumps to avoid the leakage from DE and NDE side of pumps. It can customize the seals as per client's requirement.



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Contact:

Global Sales & Engineering Services, Nagpur
Mobile: 07767817732, Email: globalsalesengineering@gmail.com

INDUSTRIAL CHAIN SPROCKET

A M Jeewajee & Sons offers a wide range of industrial chain sprocket. These chain sprockets are used in machinery either to transmit rotary motion between two shafts where gears are unsuitable or to impart linear motion to a track and tape.



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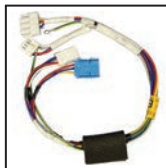


Contact:

A M Jeewajee & Sons, Kolkata
Tel: 033-22300957, 39855836
Mobile: 09830059710, 09830270753
Email: amjs_52@hotmail.com

CONNECTOR WIRE AND HARNESS

M D Cable & Harness LLP offers a wide range of connector wire and harness. In order to meet exact requirements of the clients without any hassle, they are engaged in manufacturing a broad array of connector & harnesses for a long time.



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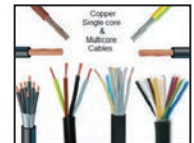


Contact:

M D Cable & Harness LLP, Greater Noida
Mobile: 09555870744, 09810708944
Email: sales@mdcablewire.com

COPPER SINGLE MULTICORE FLEXIBLE CABLE - new company

K M Cables & Conductors offers a wide range of copper single multicore flexible cable. Its manufacturing a new range of electrical wires known as PVC/FRLS/HR insulated single/multi core cables, which provides additional safety and security.



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Contact:

K M Cables & Conductors, Bangalore
Mobile: 09341285508
Email: info@kflexcables.com

INVERTER WIRE HARNESS

Sparsh Electronics offers a wide range of inverter wire harness. These products are widely used in various industries for assembling UPS, washing machine and inverters. Available in varied specifications, the offered products are highly admired by a large number of our clients.



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Contact:

Sparsh Electronics, Pune
Mobile: 08411022333, 07030955409
Email: sparshelectronics@yahoo.in, sales@sparshelectronics.com

BATTERY CABLES

Q-FLX Wires & Cables offers a wide range of battery cables. Q-FLX wires & cables is supplying a wide range of battery cables and ignition cables for use in heavy duty vehicles like buses, trucks, tractors, earthmovers etc. for the purpose of lighting, igniting, wiping, battery starter, steering column, horn, signaling, etc.



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Contact:

Q-FLX Wires & Cables, Chennai
Mobile: 09884522777, 07010753367
Email: enquiry@qflexcable.com

COAXIAL CABLES

Rashi Cables offers a wide range of coaxial cables. This cables have rich experience of manufacturing superior quality digital VSAT satellite telecom cables and radio frequency co-axial cables & RG series cables.



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Contact:

Rashi Cables, New Delhi
Tel: 011-41707151 Fax: 011-41707352
Email: hgsrashicables@gmail.com, hgs@rashicables.in

CONTROL CABLES

KEI Wires & Cables offers a wide range of control cables. KEI control cables encompass a large family of cables manufactured to various IS, BS, EN, VDE, and other international standards. These cables are designed for a wide range of application like industrial, signaling, transmission.



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Contact:

KEI Wires & Cables, New Delhi
Tel: 011-26818840/8642/0242
Email: info@kei-ind.com

LT PVC CABLES

Jigar Cables Ltd offers LT PVC cables. LT PVC cables are ensures complete safety and perfect insulation. Manufactured from premium quality raw materials, Some of the industries in which LT PVC cables are used are power plants, projects and other electrical systems.



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Contact:

Jigar Cables Ltd, Dist-Rajkot
Tel: 02825-221422 Mobile: 09099098809
Email: info@sigmacab.com

HOUSE WIRES / BUILDING WIRES, JAINFLEX-FR

Jainflex Cables Pvt Ltd offers a wide range of house wires / building wires, jainflex-FR. These cables are used for wiring domestic and commercial buildings. The multi strand / solid conductors make it ideal for concealed wiring.



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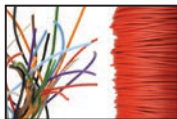


Contact:

Jainflex Cables Pvt Ltd, Ahmedabad
Tel: 079-27701899, 27506896
Mobile: 09898533000, 09898401000
Email: Sales@jainflex.com

PVC INSULATED WIRES & CABLES - ZHFR

Sanatan Cable Industries, offers sanflex wires are processed using a zero halogen flame retardant compound (ZHFR). The insulation is of superior quality, 100% PYC free and eco-friendly. In case of a fire situation ZHFR wires.



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Contact:

Sanatan Cable Industries, Ahmedabad
Tel: 079-25832972
Mobile: 09825190972
Email: info@sanatancable.com

LT PVC & XLPE CONTROL CABLES

Lumino Industries Ltd offers a wide range of LT PVC & XLPE control cables. It is solid/stranded annealed copper conductor & tinned / bare; general purpose / HR PVC insulation; cores laid up (filled if needed); FRLS / general purpose PVC inner sheath; armouring round galvanized steel wires.



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Contact:

Lumino Industries Ltd, Kolkata
Tel: 033-24412008-09
Email: lumino@luminoindustries.com

Event	Date & Venue	Contact
POWER2DRIVE INDIA - GANDHINAGAR	February 12-14, 2025 Helipad Exhibition Centre Gandhinagar, Gujarat	Messe Muenchen India Pvt. Ltd. Mumbai Tel: 022-425547-05 Email: harshal.gadda@mm-india.in
MECTECH EXPO - NEW DELHI	February 13-15, 2025 Pragati Maidan Exhibition Center New Delhi	Confederation of Indian Industry Gurugram Email: amit.sharma@cii.in
INDIA FASTENER SHOW SOUTH CHENNAI	April 24-26, 2025 Chennai Trade Center, Chennai	FME (Future Market Events) Media Pvt Ltd Noida Email: eisha@futuremarketevents.com
PROWAVE EXPO - CHENNAI	April 24-26, 2025 Chennai Trade Center Chennai	Sai Solutions, Chennai, India Email: operations@saisolutions.info
BLECH INDIA - MUMBAI	May 08-10, 2025 Bombay Exhibition Centre (BEC) NESCO Mumbai	Mack Brooks Exhibitions Ltd United Kingdom of Great Britain and Northern Ireland Tel: +44 (0)1727 814400 Email: info@mackbrooks.com
INDIA MACHINE TOOLS SHOW - NEW DELHI	May 15-18, 2025 Yashobhoomi Convention Centre New Delhi	K AND D Communication Ltd. (KDCL) Ahmedabad Mobile: 099090-41613 Email: info@kdclglobal.com
INDOMACH - HYDERABAD	May 23-25, 2025 Hitex Exhibition Center Hyderabad	Indomach Business Solutions Nagpur Email: info.indomach@gmail.com
AUTOROBOT - COIMBATORE	August 01-03, 2025 Codissia Trade Fair Complex Coimbatore	Midaas Touch Events & Trade Fairs LLP Chennai Mobile: 09600047460 Email: vivek@midaastouch.in
7TH IMS 2025 INDIA MANUFACTURING SHOW	November 06-08, 2025 BIEC, Bangalore	India Exposition Mart Ltd Mobile: 09743784166 Email: exhibition21@indiaexpocentre.com

INTERNATIONAL

DPES SIGN EXPO - CHINA GUANGZHOU	February 15-17, 2025 PWTC Poly World Trade Center Guangdong, China	Guangzhou Baoxuan Exhibition Co Ltd 510335 Guangzhou, China Tel: +86 (0)20 89089736 Email: sales@dpes.com.cn
IMEX - TIANJIN	March 06-09, 2025 Tianjin Meijiang Convention and Exhibition Center Tianjin, Tianjin, China	Zhenwei International Exhibition Group Guangzhou, China Email: hjn@zhenweiexpo.com
LASER WORLD OF PHOTONICS - CHINA	March 11-13, 2025 Shanghai New International Expo Center - SNIEC, Shanghai, China	Messe München GmbH 81823 Munich, Germany Tel: +49 (0)89 94920720 Email: info@messe-muenchen.de
AUTO MAINTENANCE AND REPAIR EXPO (AMR) - BEIJING	March 31- 02 April, 2025 Beijing Exhibition Center Beijing, China	Messe Frankfurt (HK) Ltd. Hong Kong, China Email: info@hongkong.messefrankfurt.com

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Ministry of MSME



Union Minister (MSME), @jitranmanjhi administered a pledge on 'TB Mukta Bharat' to various employees of the Ministry of MSME in Udyog Bhavan today. The campaign runs from December 3rd, 2024, to March 24th, 2025. He stated that the Ministry of MSME will provide support for such initiatives. He also stressed that there is a need to focus on factors like clean environments and habitation, nutritious food, and also a need to address the hesitation of people in taking treatment for TB, especially in rural areas. He wished this endeavor a great success. The pledge was taken by the senior officers of MSME, KVIC, NSIC, Coir Board, ni-msme, MGIRI, and the field offices under DC (MSME). #MSME #MSMEs



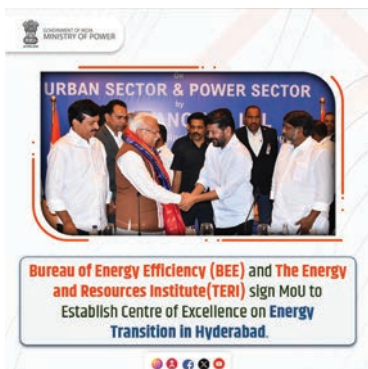
Bajaj Auto Ltd



10 THOUSAND MOTORCYCLES PRODUCED IN BRAZIL! Bajaj Auto Ltd celebrates a historic milestone with the accumulated production of 10 thousand motorcycles at the Manaus (AM) plant, inaugurated just 7 months ago. We continue to accelerate and grow even more! #Bajaj #BajajBrasil



Ministry of Power



The Bureau of Energy Efficiency (BEE), Ministry of Power, Government of India, and The Energy and Resources Institute (TERI) have signed a landmark Memorandum of Understanding (MoU) to jointly establish a Centre of Excellence for Energy Transition (CoEET).



Tata Projects



Tata Projects conquered extreme challenges with innovation, teamwork, and resilience to build the HPCL Rajasthan Refinery at Barmer, Rajasthan. Every obstacle became a lesson, shaping the future of engineering and paving the way for transformative infrastructure.



Adani Green Energy Ltd.

Reports that Adani's 484 MW wind power projects in Mannar and Pooneryn have been cancelled are false and misleading. We categorically state that the project has not been cancelled. The Sri Lankan Cabinet's decision of 2 Jan 2025 to reevaluate the tariff approved in May 2024 is part of a standard review process, particularly with a new government, to ensure that the terms align with their current priorities and energy policies. Adani remains committed to investing \$1 billion in Sri Lanka's green energy sector, driving renewable energy and economic growth.

- Spokesperson, Adani Group



Larsen & Toubro

L&T's Minerals & Metals (M&M) vertical has secured a significant order for setting up freight handling facilities in the Gulf Cooperation Council (GCC) region. This is a repeat order from a leading railway company in the GCC, which has ambitious plans for capacity expansion in multiple phases.



Ministry of Heavy Industries

BHEL, a CPSE under MHI, has significantly contributed to India's spacecraft docking capabilities. It supplied ISRO with 8 space-grade solar panels (0.62 sq.m, 150W each) and two 1KWh Li-ion batteries, enabling India to become the 4th nation to achieve successful space docking.



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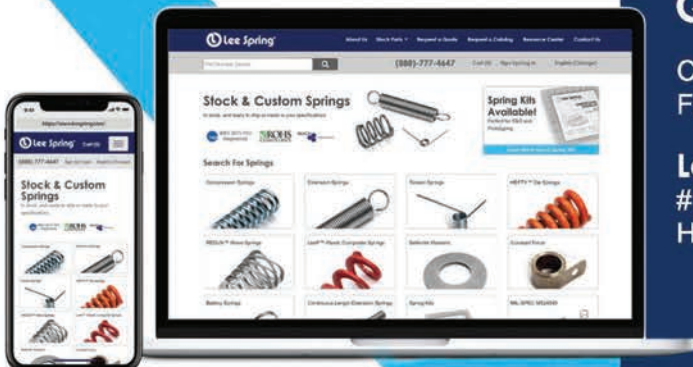
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