INDIA Manufacturing REVIEW
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HEFT Energy

NOVEMBER INDUSTRY SPECIAL 2025

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Founder & Director,
Iqra Quality Services

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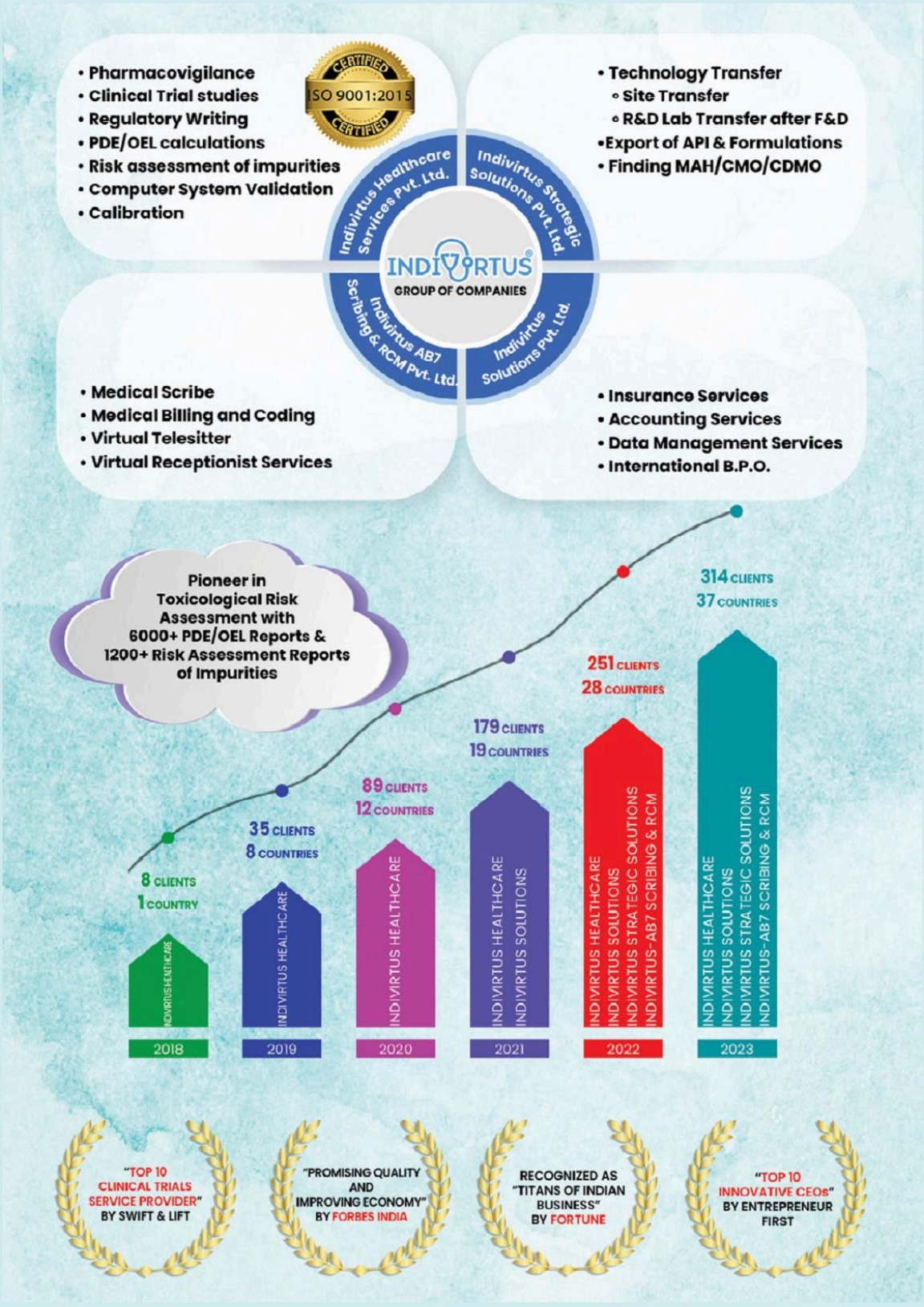
Chief Operating Officer,
Shoolini Life Sciences

Gaurav Maniyar
CEO,
Spark Placement

₹150


• Pharmacovigilance
• Clinical Trial studies
• Regulatory Writing
• PDE/OEL calculations
• Risk assessment of impurities
• Computer System Validation
• Calibration
CERTIFIED
ISO 9001:2015
CERTIFIED
• Technology Transfer
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• Export of API & Formulations
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Indivirtus Healthcare Services Pvt. Ltd.
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1 COUNTRY
INDIVIRTUS HEALTHCARE
2018
35 CLIENTS
8 COUNTRIES
INDIVIRTUS HEALTHCARE
2019
89 CLIENTS
12 COUNTRIES
INDIVIRTUS HEALTHCARE
2020
179 CLIENTS
19 COUNTRIES
INDIVIRTUS HEALTHCARE
INDIVIRTUS SOLUTIONS
2021
251 CLIENTS
28 COUNTRIES
INDIVIRTUS HEALTHCARE
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2022
314 CLIENTS
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2023
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India Manufacturing Review

Vol 2 • Issue 1 - 11 •November, 2025

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Magazine Price is Rs. 150 per issue

Printed and Published By Alok Chaturvedi on behalf of Biz Print Media Technologies Pvt. Ltd. and Printed at Precision Fototype Services at Sri Sabari Shopping Complex, 24 Residency Road Bangalore-560025 and Published At No. 124, 2nd Floor, Surya Chambers, Old Airport Road, Murugeshpalya, Bangalore-560017.

Publisher Alok Chaturvedi

EDITOR'S NOTE

Powering India's Industrial Future through Quality, Compliance, & Innovation

India's industrial landscape is undergoing a powerful transformation - one defined by precision, accountability, and a renewed commitment to global standards. As industries expand their horizons, the collective strength of FIBC bag manufacturers, food and beverage testing labs, factory audit consultants, industrial legal experts, and EPC contractors is shaping the foundation of a more efficient and responsible industrial ecosystem.

From ensuring safe and sustainable packaging to building compliant, future-ready operations, these sectors represent the pulse of India's manufacturing revival. FIBC bag manufacturers are reimagining packaging with eco-conscious, high-performance solutions that cater to global trade demands. At the same time, testing laboratories for the food and beverage industry uphold consumer trust by guaranteeing product integrity and adherence to rigorous international benchmarks.

Driving transparency and reliability across operations, factory audit consultants and industrial legal consultants are the guardians of quality and compliance - helping industries navigate evolving regulatory landscapes and ethical frameworks with precision. Meanwhile, EPC contractors stand as the architects of progress, executing large-scale industrial and infrastructure projects that embody India's vision for innovation-driven growth.

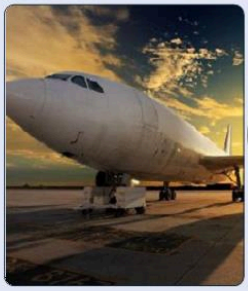
Together, these sectors exemplify the synergy between engineering excellence, legal accountability, and sustainable innovation. They form the pillars of an economy that is not just growing, but evolving - an India where industry, integrity, and innovation move forward hand in hand.

In this **'November Industry Special – 2025'** issue, we acquaint you with the top companies in this field. After studying the industry landscape in-depth, **India Manufacturing Review** has zeroed in on the top companies that have excelled in this field with their meticulous approach. Having proven their dedication in order to meet the customer's expectations in an end-to-end manner, these companies have stood out from the crowd.

We look forward to receiving your feedback and suggestions.

Janifha Evangeline
Editor
editor@indiamanufacturingreview.com

TOP STORIES



08 HAL, Russia's UAC Sign MoU to Produce SJ-100 Aircraft

09 India Clears ₹5,532 Cr Projects to Boost Electronics Production

India Manufacturing Review

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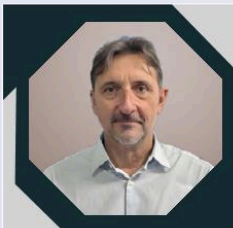


TOP STORIES

HAL, RUSSIA'S UAC SIGN MOU TO PRODUCE SJ-100 AIRCRAFT

- *HAL partners with Russia's UAC to produce SJ-100 aircraft, boosting India–Russia aviation ties*
- *HAL to manufacture SJ-100 in India, strengthening local aerospace capabilities*
- *The aircraft will support India's UDAN scheme and meet rising short-haul aviation demand*

Hindustan Aeronautics Limited (HAL) has signed a Memorandum of Understanding (MoU) with Russia's Public Joint Stock Company United Aircraft Corporation (PJSC-UAC) to produce the civil commuter aircraft SJ-100 in Moscow, Russia.

Prabhat Ranjan signed the MoU on behalf of HAL and Oleg Bogomolov signed on behalf of PJSC-UAC, in the presence of D.K. Sunil, CMD of HAL, and Vadim Badeka, Director General of PJSC-UAC, as reported by an official statement from HAL.

The MoU is for SJ-100 aircraft production, marking a major milestone in India Russia aviation through an Indo-Russian partnership that strengthens HAL civil aircraft capabilities and advances aerospace manufacturing in India.

The SJ-100, which is a narrow-body, twin-engine passenger plane, has a production count that exceeded 200 and over 16 different commercial airlines operating it all over the world

Hindustan Aeronautics Limited stated, "SJ-100 will be the game changer for short-haul connectivity under the UDAN Scheme in India. Under this arrangement, HAL will have the rights to manufacture SJ-100".

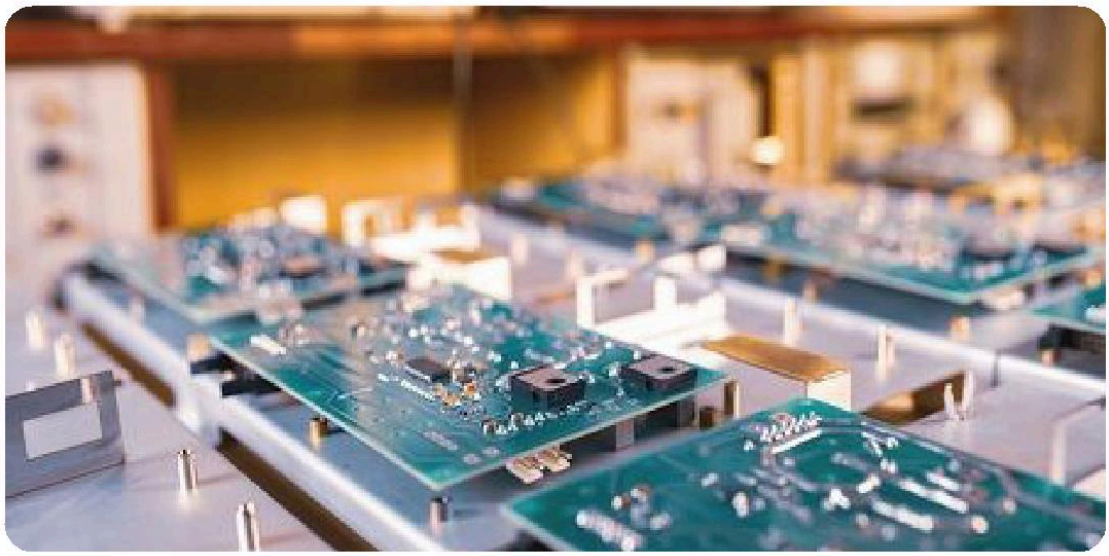
This joint venture is a significant event in the history of Indian aviation as it is nothing less than the production of a fully assembled passenger aircraft in India. The last time such a step was taken by the HAL was the assembly of the AVRO HS748 which started in 1961 and ended in 1988.

HAL has mentioned that the project supports the demand for civil aviation in India and the government's intention to develop local aerospace manufacturing.

Over 200 aircraft of this kind are likely to be needed in India's air transport sector over the next ten years for improving regional connectivity, in addition to the 350 aircraft required for the Indian Ocean region, which would serve mainly tourism and economic integration purposes. IMR

TOP STORIES

INDIA CLEARS ₹5,532 CR PROJECTS TO BOOST ELECTRONICS PRODUCTION



- *Cabinet approves Rs 5,532 Cr ECMS projects for 24 initiatives in 10 states.*
- *Dixon, Tata Electronics lead investments; 1.2 lakh jobs, Rs 22,919 Cr capacity.*
- *Reduces imports 20-25%; boosts Atmanirbhar Bharat in electronics.*

The Union Cabinet, led by Prime Minister Narendra Modi, has given its approval to projects worth Rs 5532 crore under the Electronics Component Manufacturing Scheme (ECMS) aimed at strengthening India's domestic production of vital electronic components and cutting down import dependence. The move under the PLI framework is focusing on mainly high-value items such as printed circuit board assemblies (PCBAs), lead frames, and capacitors thereby creating a stable supply chain ecosystem in the local market.

The sanctioned expenditures entail 24 projects spread over ten states with 20 companies involved. The main beneficiaries are Dixon Technologies (Rs 1,117 crore for PCBA manufacturing), Tata Electronics Private Ltd (Rs 1,764 crore for semiconductor-related components), and PG Electroplast (Rs 1,200 crore for electronic assemblies). Besides, Kaynes Technology (Rs 1,000 crore) and Syrma SGS Technology (Rs 800 crore) have also come up with notable investment plans in the areas of capacitors and connectors. The reasons for these project suggestions include generating Rs. 5,532 crores in non-public direct projects, creating 120,000 direct and indirect employment opportunities, and establishing an annual production capacity worth Rs. 22,919 crores. To encourage the production of such components locally, the plan grants a concession of up to 25% of the incremental sales for a period of six years.

The Minister of Electronics and Information Technology, Ashwini Vaishnaw, conveyed that: "This clearance is an important milestone in the electronics journey of Atmanirbhar Bharat. With ECMS, we aspire to create a self-sufficient supply chain that leads to a 20-25% drop in imports and establishes India as a global hub." The decision is quite consistent with the growth of electronics manufacturing India has achieved. The country managed to scale up its electronics manufacturing base from $75 billion in 2021 to a target of $300 billion by 2026 with the India Semiconductor Mission worth Rs 76,000 crore as one of the main enablers. IMR

VISTA

ADVANCED HIGH-STRENGTH STEEL: THE KEY TO FUTURE-READY MANUFACTURING

One of the major players in the steel & mining industry ArcelorMittal finalized an agreement on acquiring Nippon Steel Corporation's 50 per cent equity interest in AM/NS Calvert joint venture (JV). The deal comprises a nominal consideration of only $1, while Nippon will be contributing cash as well as forgive partner loans that amount to $900 million approximately and this strategic move is a part of the effort of Nippon for addressing regulatory concerns that surround its planned acquisition of US Steel.

Industries today are facing increasingly complex challenges in the quest for future-ready manufacturing and to achieve this they should meet stringent sustainability goals, enhanced product performance, adhering to ever-evolving regulations as well as maintaining cost-effectiveness. In this context, AHSS (Advanced High-Strength Steel) has emerged as one of the critical materials as it offers a solution to numerous challenges. Right from automotive to construction & aircraft, Advanced High-Strength Steel helps manufacturers in manufacturing products which are not only stronger & durable but also lighter as well as more efficient and sustainable.

Enhanced Strength and Durability:

The ability of Advanced High-Strength Steel is to offer high tensile strength without significantly increasing the weight of the material and this is one of its compelling features. In sectors such as aerospace, construction & automotive, this property is very advantageous as characteristics such as strength and durability are paramount.

What has made high strength materials indispensible is for instance in the automotive manufacturing industry, the shift towards lighter vehicles for enhancing fuel efficiency as well as decreasing emissions. Advanced High-Strength Steel facilitates automakers in meeting these objectives through decreasing the overall weight of the vehicle, while maintaining or even improving its structural integrity. Hence, the result is a vehicle which can meet stringent safety as well as environmental standards which include lower carbon emissions, better fuel economy as well as decreased environmental impact.

In the aerospace industry, Advanced High-Strength Steel provides significant potential where weight reduction is one of the crucial factors for enhancing fuel efficiency. The high

strength-to-weight ratio helps manufacturers for building components which are lighter than yet just as strong as the ones manufactured using traditional steel, enhancing fuel efficiency while still rendering the durability which is needed for the extreme conditions that are experienced during flight. Advanced High-Strength Steel is used for building material such as reinforcing bars, panels as well as steel beams, in the construction industry. The high tensile strength helps in obtaining thinner, lighter structures without compromising on durability & safety. And this can lead to cost savings for contractors as well as builders since less material is needed for a given strength as well as durability level.

"AHSS and similar advancement in steel industry has revolutionized the construction industry by making it sustainable, profitable, and efficient. The potential of AHSS is seen across many industries," states Trissa Joseph, Vice President, Everest Industries.

"The positive environmental impact AHSS has on reducing the carbon footprint has given a new dimension to design and manufacturing especially in construction industry. AHSS is pivotal in moving the needle towards greener and environment friendly construction practices," she adds.

Lightweight Design with Safety

An important advantage of Advanced High-Strength Steel is its ability of combining lightweight design with superior safety characteristics. For instance, in the automotive sector, the ability of a material for absorbing energy during a collision is highly critical in order to protect passengers in the aircraft. The excellent energy absorption property of Advanced High-Strength Steel facilitates in mitigating the impact forces during a crash and this leads to decreasing the likelihood of injury while keeping the vehicle lightweight.

"Steel is a wonder material from a lightweighting perspective," says Kinshuk Roy, Executive Vice President - Application Engineering & New Business Development, JSW Steel.

Emphasizing its unique ability to maintain strength and durability while reducing weight, Roy added that "With advancements in high-strength and advanced high-strength steel, manufacturers can achieve significant weight savings without compromising structural integrity—a crucial factor for enhancing driving dynamics and extending the range of both traditional and electric vehicles."

The need for safety in automotive design has resulted in increased regulations in crashworthiness specifically in light of growing consumer demand for safer vehicles. Advanced High-Strength Steel allows automakers in meeting regulatory requirements by offering an optimal solution without increasing the weight of the vehicle. This not only helps in enhancing fuel efficiency but it also facilitates vehicles in meeting more stringent emission standards. Furthermore, lightweighting through Advanced High-Strength Steel also facilitates better handling as well as performance, as less weight can enhance the maneuverability as well as braking efficiency of the vehicle.

The balance of strength and weight reduction provided by Advanced High-Strength Steel is also critical when it comes to the construction industry. This helps the design of buildings & infrastructure which is resilient to natural disasters such as earthquakes or even hurricanes, all while decreasing the usage of the materials and the cost. For instance, structural beams that are manufactured using Advanced High-Strength Steel can withstand higher loads as well as stresses, decreasing the requirement for additional support structures & enhancing the overall safety while saving on material costs.

Sustainability through Recyclability

A critical driver for the adoption of advanced materials such as Advanced High-Strength Steel is the shift towards more sustainable practices. Advanced High-Strength Steel's property of high recyclability is one of the most compelling reasons why it is highly integral to future-ready manufacturing. One of the most recycled materials globally is steel and Advanced High-Strength Steel is not an exception. AHSS can be recycled repeatedly without significant degradation in quality which makes it one of the prime components for buttressing circular economy principles.

The ability of recycling Advanced High-Strength Steel facilitates manufacturers in decreasing their reliance on virgin materials that in turn helps in decreasing energy consumption as well as decreasing carbon emissions. Advanced High-Strength Steel can be melted down as well as reused in new applications which help in closing the loop effectively as well as decreasing waste. This ability of reprocessing steel also facilitates in decreasing environmental impacts that are associated with mining, processing as well as transporting raw materials, which contributes to a more sustainable manufacturing model.

Advanced High-Strength Steel provides a versatile as well as high-performance solution which supports long-term competitiveness & innovation as industries continue to face mounting pressure for decreasing environmental impact, enhance efficiency and safety. Advanced High-Strength Steel is making way for a future where manufacturing is more sustainable, resilient & efficient whether it is used in aerospace, construction or automotive sectors and the ongoing evolution of Advanced High-Strength Steel as well as its compatibility with advanced technologies ensures that it will continue to be a cornerstone of advanced manufacturing in the years to come. IMR

INDUSTRY OPINION

GLOBAL SUGAR MARKET TRENDS: WHAT INDIAN MANUFACTURERS MUST KNOW

● Atul Chaturvedi, Executive Chairman, Shree Renuka Sugars

Atul Chaturvedi, Executive Chairman, Shree Renuka Sugars, in a conversation with India Manufacturing Review, shared his views on how shifting global sugar prices and trade policies are influencing India's export competitiveness, the latest technological innovations that are transforming sugar processing, how India's ethanol blending programs and green energy initiatives can align with global decarburization trends and more.

Atul Chaturvedi, Executive Chairman

How are shifting global sugar prices and trade policies influencing India's export competitiveness in 2025?

India has not historically been a structurally surplus sugar-producing country, and thus it has never been a player in global sugar exports. Over the past few years, India has emerged as a large swing factor in the global sugar market. A few years ago, India had developed significant sugar stocks and the government granted export subsidies and allowed excess sugar to be exported. After that, the production rebounded, and India's sugar market is now structurally surplus. From a policy perspective, domestic market remains the foremost priority for the government. Ethanol production is the second primary key area and has become a major game changer in recent years. Thus, ethanol diversion is now the second most important after domestic supply.

Exports are the least prioritized and are only looked at after fulfilling domestic consumption and ethanol diversion targets. Last year, the government earmarked roughly one million tons of sugar for export, and around 0.7 million tons were actually shipped. However, in the context of the international market, export parity for Indian sugar does not favorably stand.

For mills located in Karnataka and Maharashtra, exports may still be marginally viable. For mills located in Uttar Pradesh, shipping sugar from northern India to port cities incurs high logistics costs that offset the value of trade, making the feasibility of exports very low. Thus, feasible exports are not an issue at the moment for Indian policymakers or the domestic sugar industry.

What are the latest technological innovations transforming sugar processing and refining efficiency worldwide?

The sugar sector has been actively utilizing technological and process advances to improve efficiency and sustainability. A significant advancement in several key aspects of production has emerged. The scraping and shredding processes have helped extract cane juice more effectively. Enzymatic clarification is also under investigation along with membrane-based micro-filtration. These innovations contribute to enhanced process efficiencies and the product quality.

The industry has also seen a major move towards automation and digitalization. AI-driven preventive maintenance has become a standard practice, and many mills are beginning to adopt this new technology to avoid downtime and provide more reliable operations. Furthermore, high-pressure boilers and bagasse drying systems are being utilized for better energy. Over years, the industry has also put the concept of zero discharge in practice to support the principle of a circular economy over the years. The zero-discharge method guarantees that no waste or effluent is expelled from the factory. Only finished products depart the factory, establishing sustainable and environmentally friendly production.

How can Indian manufacturers build resilience against volatile global demand and fluctuating crop output?

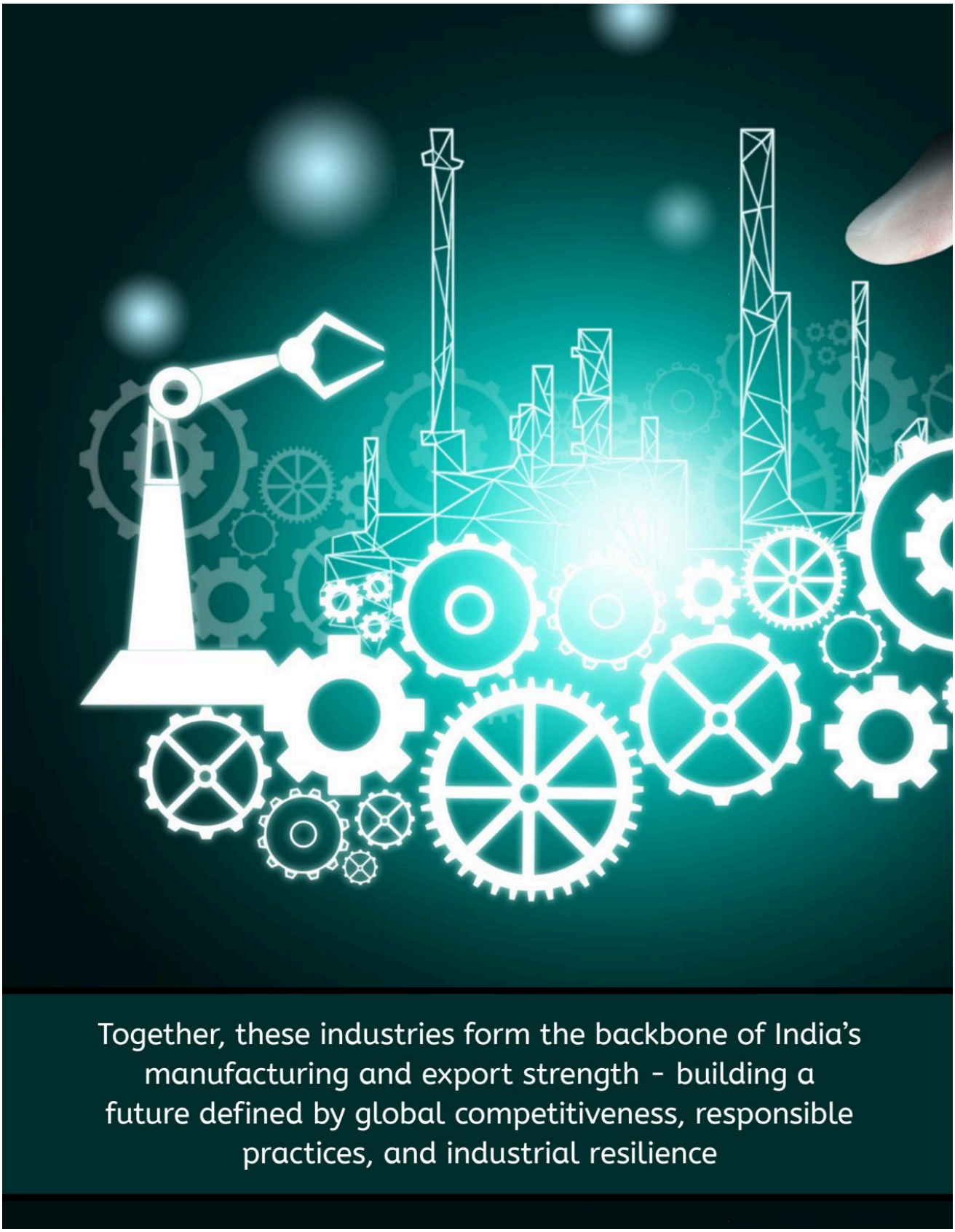
At the global level, demand is relatively stable with an annual growth rate of approximately one percent. For Indian manufacturers, the most important thing is that domestic sugar is stable. The industry has a primary objective of meeting domestic requirements, while the secondary objective is to divert sugar to produce ethanol. After these needs have been met, the third priority is to consider exports. Thus, exports are not a primary goal for the sugar industry, but become a focus area when surplus sugar is available in the system.

Do you want to share some insights for our readers regarding the sugar manufacturing?

The sugar manufacturing industry continues to be a vital and viable sector. From the standpoint of the industry, one of the foremost industry priorities is the price differential between ethanol produced from sugarcane and produced from maize. Presently, oil marketing companies pay around ₹72 per litre for maize-based ethanol, while sugarcane-based ethanol is priced at around ₹60–65 per litre. Bridging this gap has been a key demand of the sugar industry.

It is also vital to adjust the price of ethanol produced from the sugar industry. The sugar sector has a lot of regulation. Over the last two to three years, India have seen the price for cane go up significantly, estimated at around 18–20 percent, whereas the price for ethanol has stayed the same. The government also set the minimum selling price of sugar at approximately ₹31 per kg about five to seven years ago. The minimum selling price has never been reinstated, despite many increases in the fair remunerative price, or FRP for farmers.

The industry has consistently requested that the minimum selling price be aligned with the FRP increases to create a systematic and institutionalized pricing mechanism. Both initiatives - the review of ethanol pricing and the revision of the minimum selling price, continue to be top priorities for the industry and are being actively requested from the government. IMR


Together, these industries form the backbone of India's manufacturing and export strength - building a future defined by global competitiveness, responsible practices, and industrial resilience

India Manufacturing Review

NOVEMBER INDUSTRY SPECIAL - 2025

India's industrial ecosystem continues to evolve rapidly, powered by innovation, quality assurance, and global compliance standards. From manufacturing to infrastructure, every sector today demands reliability, precision, and trust - and that's where key industry players like FIBC bag manufacturers, testing labs, audit consultants, legal advisors, and EPC contractors play a transformative role.

FIBC (Flexible Intermediate Bulk Container) bag manufacturers are at the heart of industrial logistics, offering durable, eco-friendly, and cost-effective packaging solutions for sectors such as agriculture, chemicals, and construction. Complementing them are testing laboratories for the food and beverage industry, which ensure product safety, hygiene, and adherence to global standards - an essential component of India's growing export and consumer markets.

Meanwhile, factory audit consultants help businesses maintain operational excellence and compliance by assessing quality systems, ethical practices, and workplace safety. Alongside, industrial legal consultants provide critical guidance on regulatory frameworks, contracts, and dispute resolution, ensuring industries function smoothly within India's complex legal landscape.

At the infrastructure core, EPC (Engineering, Procurement, and Construction) contractors drive large-scale industrial and infrastructural projects, integrating technology, project management, and sustainability to deliver efficiency at scale.

Together, these industries form the backbone of India's manufacturing and export strength - building a future defined by global competitiveness, responsible practices, and industrial resilience.

India Manufacturing Review in this **'November Industry Special – 2025'** issue presents a list of companies who have leveraged their extensive industry expertise and experience in offering high quality products in the industry. The following list has been prepared after being closely scrutinized by a distinguished panel of judges including CXOs, analysts, and our editorial board. We recognize their valuable contribution to the ever expanding and competitive market and their ability to sustain themselves and emerge as top contestants through their reliable products.

TESTING LABS FOR FOOD AND BEVERAGE INDUSTRY

ALS Testing Services
Bangalore
alsglobal.com

Pooja Ahuja
Director - Quality

Offers chemical and microbiological testing to ensure products meet quality and safety standards and provides testing to ensure products meet Indian and international food safety standards

INDUSTRIAL LEGAL CONSULTANTS

Cyril Amarchand Mangaldas
Mumbai
cyrilshroff.com

Tapan Deshpande
Director

The firm advises a large and diverse set of clients, including domestic and foreign commercial enterprises, financial institutions, private equity and venture capital funds, start-ups, government and regulatory bodies

FACTORY AUDIT CONSULTANTS

Eco Safetech
Delhi
ecosafetech.in

Arun Srivastava
Founder

The company offers a diverse range of services, which encompass management services, auditing services, fire safety services, installation of fire systems, fire safety audit services, and many more

FIBC BAGS MANUFACTURERS

Gujarat Dyestuff Industries
Ahmedabad
gdipl.com

Rajesh Tibrewal
Director

A manufacturer of customized FIBCs, delivering regulatory-compliant, application- specific designs liners, spouts, and laminated/unlaminated options with UV stability as required

EPC CONTRACTORS

HEFT Energy
Chennai
heft-energy.com

Rajakumar Krishnan
CEO & Director

The company provides end-to-end turnkey EPC services across the solar, wind, hydro, BESS, and hybrid segments, delivering seamless integration and operational excellence

FACTORY AUDIT CONSULTANTS

IQRA Quality Services
Hyderabad
iqraquality.com

Raghunath Ravula
Founder & Director

Provides mentor-based, concept-building programs that not only prepare engineers for certification but also empower them to make confident decisions on-site

TESTING LABS FOR FOOD AND BEVERAGE INDUSTRY

Shoolini Life Sciences
Panchkula
shoolinilifesciences.com

Suman Kumari
COO

Offers high quality, NABL-accredited food testing services which are designed to meet the needs of Indian food businesses, SMEs, and exporters

INDUSTRIAL LEGAL CONSULTANTS

Spark Placement
Bangalore
sparkplacement.com

Gaurav Maniyar
CEO

Provides a full-scale provision of services including audits, local investigation, grievance repairs, and disciplinary procedures

EPC CONTRACTORS

Tata Power Solar
Bangalore
tatapowersolar.com

Balaji Parthasarathy
CEO

Specializes in offers end-to-end solar solutions, including engineering, procurement, and construction for utility-scale and rooftop solar projects

FIBC BAGS MANUFACTURERS

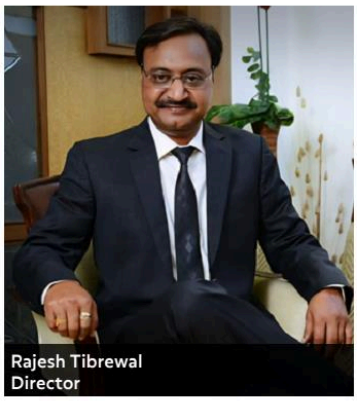
Teekshana Polymers
Bangalore
teekshanapolymers.in

Chaithra Nanjappa
Director

Offers a variety of bag designs, including baffle bags, four-panel bags, one and two-loop bags, and thermal container liners, serving industries that require packaging for petrochemicals, chemicals, and food-grade products

GUJARAT DYESTUFF INDUSTRIES

DELIVERING RELIABLE & COMPLIANT FIBC SOLUTIONS GLOBALLY



Rajesh Tibrewal
Director

The Flexible Intermediate Bulk Container (FIBC) bags industry is experiencing significant growth, driven by increasing demand for sustainable, cost-effective, and reliable packaging solutions. Industries worldwide are shifting toward reusable and recyclable materials to meet environmental regulations and reduce operational costs. FIBC bags, traditionally associated with exports, are already beginning to find a second life within India, where they are utilized in industries such as agriculture, chemicals, and construction. The global FIBC market is growing, due to production and exports, despite challenges such as unstable raw material prices, strict regulations, and diverse regional demands.

GDIPL is a trusted Indian manufacturer of customized FIBCs, delivering regulatory-compliant, application-specific designs liners, spouts, and laminated/unlaminated options with UV stability as required. Over the years, GDIPL has built a strong reputation as a reliable producer of high-quality FIBC bags tailored to meet both domestic and international standards.

Ensuring Strength & Reliability

GDIPL ensures the strength and reliability of its FIBC bags through rigorous quality control processes. "The company's plants operate under ISO 9001:2015 and ISO 22000:2018. They are GeM-registered and a GPCA member, reinforcing compliance and industry collaboration", says Rajesh Tibrewal, Director, Gujarat Dyestuff Industries. The company provides its consumers with customizable solutions consisting of standard, conductive, and baffles bags that can be adapted to the particular demands of industries such as agriculture, chemicals, and construction. GDIPL uses virgin resin and food-safe additives to produce bags to meet the most stringent safety standards making them ideal for sensitive applications such as pharmaceutical and toxic chemicals.

Regular audits and certifications include BIS licenses and ISO 9001/22000; UN certification is available for select designs per application. These guarantee that GDIPL's manufacturing processes meet global hygiene and safety requirements. The company's commitment to using 100 percent recyclable materials and food-safe additives further enhances its compliance with international norms, providing clients with peace of mind for applications requiring high safety standards.

Client-Centric Approach

GDIPL fosters long-term partnerships through custom design consultations and 24/7 customer support. As client partners, GDIPL works closely with them to understand their requirements, and delivering tailored and cost-effective packaging solutions depending on industry knowledge. Using in-house printing, stitching and liner services, the company can guarantee fast delivery and quality customization.

"Our motto, 'Excellence Engineered, Trust Delivered,' drives everything we do. We are determined to produce high-end FIBC bags that would surpass the expectations of our clients and establish trust and long-lasting relationships via an endless commitment to their satisfaction", says Rajesh Tibrewal.

The company offers a Buy-Back Scheme at ₹5/kg for used bags and has in-house recycling plants for sustainable production. Their Smart FIBCs support traceability and closed-loop supply chains aligned with India's EPR efforts.

Future Vision

Looking ahead, Gujarat Dyestuff Industries is in the research and development phase to consider biodegradable FIBC options. GDIPL is actively diversifying into Africa, Latin America, and CIS countries as well as developing fully automated sensor-based production lines. By expanding into geotextiles, technical textiles, and thermal liners, GDIPL will enhance its presence in the global FIBC market by providing new, green, and credible packaging solutions. IMR

INDUSTRY OPINION

HOW ELECTRONIC MANUFACTURING IN INDIA DRIVES GLOBAL GROWTH

● J.S. Gujral, Managing Director, Syrma SGS

J.S. Gujral, Managing Director, Syrma SGS, in an interaction with India Manufacturing Review, shared his views on the fast changing Electronic Manufacturing Services (EMS) industry in India, particularly factors relating to its growth, effective and impactful Government programs such as Make in India and PLI to strengthen domestic manufacturing. Gujral also talked about future business opportunities related to global partnerships, how Indian EMS companies are successfully competing on cost, scale, and quality, and the sub-sectors driving the demand, including consumer electronics, automotive, telecom, and IoT.

With over three decades of leading entrepreneurship, J.S. Gujral has forged a distinguished career in the electronics manufacturing industry. Starting over 34 years ago as Founder Director of SGS Tekniks, and he continues to lead Syrma SGS today with the same vision of innovation, excellence, and growth.

J.S. Gujral,
Managing Director, Syrma SGS

What factors are driving the rapid growth of Electronic Manufacturing Services (EMS) in India?

India has electronic manufacturing services for several decades, with a presence spanning over 35 years. However, growth has occurred in the last five to seven years as the Government of India recognized the need to foster domestic manufacturing. So in response, the government launched a range of measures aimed at fostering growth in this sector. In developing nations, where a significant part of the population is seeking employment, it is critical to create blue-collar jobs. No economy can be sustained on a white-collar workforce alone. Hence, manufacturing must be positioned strategically in government policy.

In the manufacturing industry, electronics is notably important. Considering the consequences of foreign exchange management, job creation, and ecosystem growth, the government has identified electronics manufacturing as a focus area. By looking at Japan, Korea, Singapore, Taiwan, China, Vietnam, and Thailand, we can see that these countries' economic growth was generated mainly by electronics manufacturing. Generally, large industrial growth derives from the automotive industry and electronics.

In response to this trend, the Government of India thoughtfully chose to prioritize electronics manufacturing. Geopolitical considerations reinforced this emphasis as global corporations sought to diversify supply chains, lessening their reliance on one country. In summary, these factors have led to strong and extraordinary growth of India's electronics sector in the last four to seven years.

How is India positioning itself as a global hub for EMS compared to China, Vietnam, and other Asian economies?

India has both advantages and challenges in the electronics manufacturing sector. The advantages include a large domestic market, an expanding pool of skilled workers who can be reskilled in high-end manufacturing, and rising

income levels, which are driving consumer demand for electronics as they become part of daily life. Other positive things include India's democratic system and the rule of law.

On the other hand, India does not fully have an electronics ecosystem, which creating a structural barrier for domestic companies. This gap is being filled by government incentives such as the Production-Linked Incentive scheme, or previous policies such as the Modified Special Incentive Package Scheme (MSIPS). These policies ultimately seek to stimulate the development of the solid electronics ecosystem, including component manufacturing that is expected to develop as the industry develops.

In the past years, electronics manufacturing has become a core focus within India. However, as of 2025, various companies are still hesitant to invest in component-level manufacturing, such as printed circuit boards (PCBs) or semi-processed components, despite the market now being stable. India may have some disadvantages with raw materials, but it is still extremely competitive with labor costs, availability of power, government support and domestic demand. It is a major and viable option for foreign companies to enter the electronics manufacturing sector. It is a significant and viable destination for international firms to manufacture electronics.

What role do government initiatives like Make in India and PLI schemes play in boosting EMS growth?

The PLI scheme is a tactical method of dealing with the structural issues for Indian companies created by the fact that there is no fully established electronics ecosystem. During the time of the PLI, Indian companies should utilize this window to develop the necessary skill sets, domain expertise, and an operational scale. The aim is to ensure that after the completion of the PLI scheme, these companies can be competitive and sustainable on a global scale. At that point, the domestic electronics ecosystem is also expected to have developed further, which will provide greater sustainability for continued growth and competitiveness.

What new business opportunities can enterprises unlock by partnering with EMS providers in India?

Partnering with Indian firms can provide global companies with significant benefits, such as access to a vast domestic market and cost-competitive environment. Moreover, India offers companies a valuable risk mitigation strategy, specifically for companies seeking to reduce their reliance on a single country. While other countries, such as Vietnam, the Philippines, Cambodia, and Thailand, have competitive labor markets, these countries lack significant local demand. In contrast, India's strong domestic demand is a valuable strategic advantage, making the country a highly attractive country for global investment in electronics manufacturing.

How are Indian EMS companies competing with global players in terms of cost, scale, and quality?

Indian businesses have been exporting products since about 1996, and the companies are competing favorably

with global organizations based on cost, quality, and delivery terms. The key challenge is mass producing products at a global standard. India's success in mobile phone production shows that domestic firms can fulfill larger needs. Indian firms have been exporting for over thirty years, meeting customer expectations of quality, delivery, and every other requirement that comes with product. The key step is to scale production rapidly to compete on a global basis.

Which electronics sub-sectors (consumer electronics, automotive, medical devices, telecom, IoT) are driving EMS demand in India?

In India, the demand for electronics is mainly from the consumer and automotive sectors. The automotive industry is growing, with even more growth from the electric vehicle (EV) revolution, which is increasing the value of electronics sold per unit. Moreover, as the country continues to develop, demand for electrification is operating with a natural increase in demand for energy metering solutions. Domestically, the largest proportion of demand is growth from consumer electronics, including telecom and automotive, followed by industrial electronics. Other segments, including medical devices and Internet of Things (IoT) applications, are present but currently represent a smaller share of overall demand.

How can enterprises leverage India's EMS ecosystem to reduce supply chain risks?

At present, global supply chains are extremely interconnected, yet a large percentage of that supply is from China. China is roughly 25–30% of global industrial manufacturing and perhaps even more in electronics. Indian companies can also strategically partner with existing global firms, including Chinese firms, to access advanced technology. Instead of creating new expertise from scratch, domestic firms can scale their operations and provide global partners with holistic solutions. In recent years, more global companies are looking for solutions, and not just manufacturing. If India is able to adopt this approach, it can help to alleviate global supply chain risks. However, this transition will be gradual as it is a long-term journey.

Would you like to share more insights about this electronics manufacturing?

Electronics manufacturing has been present in India for nearly 35-40 years, with exports to the United States and other international markets from the beginning. Indian companies are competitive and have strong capabilities to adopt the latest technologies. Indian firms, with adequate capital and a solid growth mindset, are well-equipped to take advantage of current opportunities. This period can be considered a golden era for manufacturing in India, particularly in the electronics sector. IMR

EPC CONTRACTORS

Manufacturing INDIA REVIEW
NOVEMBER INDUSTRY SPECIAL - 2025

HEFT ENERGY

ENGINEERING TOMORROW'S CLEAN ENERGY LANDSCAPE TODAY

Rajakumar Krishnan
CEO & Director

By 2032, the global EPC market is forecasted to surpass $1,380 billion, a signal of the immense transformation sweeping across the energy sector. As countries push toward decarbonization and grid modernization, demand is rising for EPC partners who can turn renewable ambition into high-performance infrastructure. In India, where energy needs are surging, parallel to net-zero goals, this demand is amplified. With ambitious clean energy targets, favorable policies, and record-breaking investment flows, the country has become a hotbed for infrastructure acceleration.

In the thick of this momentum is HEFT Energy Pvt. Ltd., a young, dynamic, and performance-driven turnkey EPC company that is setting new benchmarks in renewable project execution. As the world pivots towards a carbon-neutral future, HEFT Energy is redefining renewable infrastructure delivery through turnkey excellence, hybrid innovation, and unmatched execution speed.

A Turnkey Partner That Delivers

A standout name in India's growing renewable EPC space, HEFT Energy has built its reputation on the pillars of agility, quality, and safety. The company provides end-to-end turnkey EPC services across the solar, wind, hydro, BESS, and hybrid segments, delivering seamless integration and operational excellence.

In a remarkable display of execution strength, HEFT Energy recently completed the installation of 25 Wind Turbine Generators in just 4 months, followed by 100 MW of WTG installation within 5 months, an achievement few in the industry can match.

With in-house capabilities across project planning, engineering, procurement, construction, logistics, and commissioning, HEFT Energy operates with an integrated, centralized project management approach, ensuring tight control on timelines, budgets, and safety.

In an era where grid reliability and decentralized energy demand are rising, hybrid systems are the future, and HEFT Energy is leading the way. The company is renowned for its custom-engineered solutions that integrate wind, solar, and battery storage into smart, scalable, and interoperable hybrid architectures. These systems, supported by digital SCADA integration and advanced analytics, enable superior land utilization, real-time energy balancing, and higher plant reliability, all while keeping lifecycle costs low.

"Our holistic, interoperable model ensures maximum generation efficiency and better ROI for clients. Our dedicated team of trained manpower, supported by advanced machinery, an agility-focused strategy, reliable vendor networks, and strong risk mitigation practices empowers us to consistently exceed project goals and quality benchmarks", shares Satish Kumar G, COO, HEFT Energy.

Displaying strength on the ground, HEFT Energy is fortified by an in-house fleet of heavy lifting equipment, specialized tools, and SOP-led construction practices, all of which enable standardization, speed, and safety across locations.

But beyond engineering and efficiency lies a deeper value, which is sustainability in its DNA. HEFT Energy integrates a sustainability-first approach across its operations, from low-impact site selection and optimized logistics to resource-conscious construction methods and environmentally responsible O&M protocols. The company also places a strong emphasis on community engagement and minimizing ecological disruption in all its projects.

> As India and the world march toward greener, more resilient energy futures, HEFT Energy is poised to be the partner of choice

Towards Global Expansion & Innovation

"We are more than an EPC service provider, we are building the future of energy infrastructure with a commitment to operational excellence, client partnership, and environmental stewardship. Our team is young, dynamic, and driven by a shared vision of sustainable progress", adds Rajakumar Krishnan, CEO & Director, HEFT Energy.

Looking ahead, HEFT Energy is charting an ambitious course. The company is actively expanding into international EPC markets across Asia and Africa, while diversifying into emerging verticals such as battery energy storage systems (BESS), offshore wind, and hybrid microgrids.

Its long-term vision involves transitioning into a self-IPP model, building and operating its own renewable energy assets. Strategic collaborations with key component suppliers are also underway to reinforce supply chain resilience, improve efficiency, and reduce project costs.

As India and the world march toward greener, more resilient energy futures, HEFT Energy is poised to be the partner of choice. With a growing portfolio, cutting-edge capabilities, and an unwavering commitment to sustainability and client success, HEFT Energy is not just keeping pace with the global clean energy transition, it is leading it. IMR

MEETING GLOBAL PAINT STANDARDS: VOC RULES & ENVIRONMENTAL NORMS

● Kuldip Raina, Managing Director & CEO, Shalimar Paints

Kuldip Raina, Managing Director and CEO of Shalimar Paints, in a conversation with India Manufacturing Review, shared his views on developing regulatory governance and enhance profitability by addressing evolving customer needs and preferences in sustainable and premium paints. To enhance capital and improve productivity, he mentioned the utilization of new technologies, including nanotechnology, which will enhance quality and the production process. He also noted growth opportunities in the urban and rural markets of India.

Kuldip Raina, Managing Director & CEO

Kuldip Raina is leading the growth and transformation of Shalimar Paints through innovation, operational excellence, and strategic vision. With more than three decades of leadership experience with leading organizations, he is establishing the brand as a sustainable, tech-forward, and consumer-centric leader.

How do you prioritize investments in compliance without impacting margins in general paint manufacturing?

When advanced technologies are offered to consumers, it achieves a certain level of premium. However, the recent transition from solvent-based to water-based products and from low-end to high-end segments, the changing product mix effectively alleviates other profitability concerns that could arise from regulatory changes.

Are there regulatory gaps in certain regions that you leverage strategically for competitive advantage?

In India, consumers located in southern and western regions usually prefer advanced and premium products more than consumers in other regions. However, as a pan-India company, it is impractical to create separate product lines for various regions; product launches are uniform across the country. Nevertheless, a noticeable trend indicates that consumers in the West and South demonstrate a greater inclination towards high-end products compared to those in the East and North.

How do you balance production scale with environmental compliance while maintaining profitability?

In general, all emulsions and water-based product categories provide comparatively better margins. Therefore, by increasing the share of emulsions and water-based products, it becomes possible to offset the additional costs associated with meeting regulatory or waste-compliance requirements. In short, although the margin is lower, the higher margins associated with these products will help to maintain a balanced and profitable portfolio in the presence of these additional compliance costs.

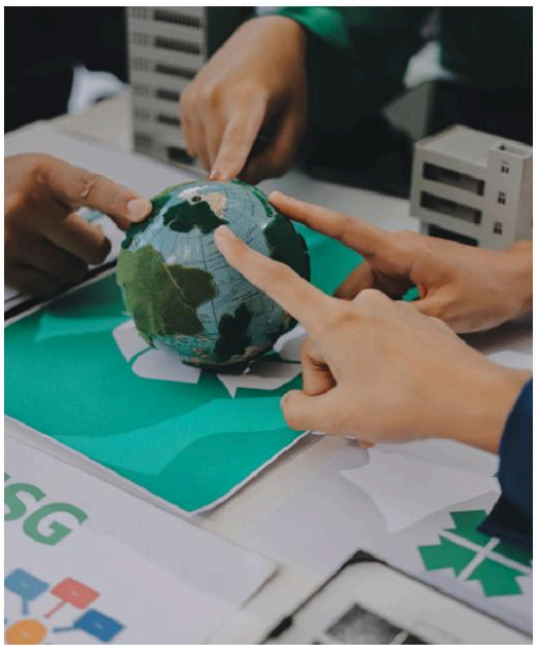
How does consumer demand for low-VOC or sustainable paints influence your revenue strategy?

Within the Indian context, this trend exists more strongly in the metro cities and tier-1 regions. Affordability is

the major consideration in tier-2 and tier-3 markets, as consumers in those markets see paint as mostly as a basic product. However, in metropolitan areas, customers are aware and selective on what they choose. Unlike earlier times when living spaces were more open, modern homes now tend to have enclosed environments, thus consumers are becoming increasingly focused on interior wall protection. As a result of this changing consumer focus, paints are being demanded to have new features such as low VOC content, minimal fumes, washability, and self-cleaning properties. These changes in demand for paint can simply be seen as evidence of evolving currency of awareness and expectations by urban consumers.

Which markets offer the highest growth potential for compliant and eco-friendly paints, and why?

The advancement and eco-friendly paint products are presently emerging in metro and tier-1 and tier-2 cities, while it has not yet become a widespread trend in the interior regions of the country. However, in urban centers, many builders and new projects are strictly following sustainability and compliance regulations. To address these new expectations the company has a product portfolio that addresses similar needs and is developing new product lines to address this growing segment.



How can companies ensure compliance initiatives that align with overall business strategy and profit goals?

India is an incredibly straightforward market, and consumption of paint is only one-tenth the world average. This indicates enormous potential, especially in rural markets that remain underdeveloped and under-represented. Since about two-thirds of the Indian population live in villages, these regions represent emerging growth opportunities. Although the demand for technology-rich products continues to be concentrated mainly in tier-1, tier-2 cities, and metros, rural areas have emerging demand from consumers upgrading from traditional lime-based coatings to distempers and emulsions.

The Indian market has significant potential. However, it varies from consumer segment to consumer segment. The tier-1 consumer segments tend to have higher expectations in terms of low-VOC and premium emulsions. The rural market only dips into lower-end product categories. This illustrates the varied nature of Indian consumers. But given the ongoing trends in the paint sector, India has feasible growth prospects and is well-positioned for strong growth over the next decade.

In terms of industry benchmarking, which competitors are leading in VOC compliance, and what lessons can industry players draw from them?

In today's market, nearly all major brands offer low VOC products. The only potential non-compliant products are likely from the unorganized sector. The shift towards low VOC formulations began nearly a decade ago, and although India does not yet have comprehensive regulations, these practices have largely been self-imposed by the paint industry. Today, most organized players have incorporated low VOC modifications across their product lines.

How do you see environmental compliance shaping the paint industry's profitability and growth over the next 5–10 years?

A distinct shift is taking place from unorganized to organized segments, from distempers to emulsions and from standard emulsions to premium emulsions to retain margins. This transition is expected to support profitability in the future. While environmental challenges and regulatory restrictions may have a marginal impact on company, the gradual improvement in the product mix over time is likely to offset the additional costs arising from these regulations.

Do you want to share some insights regarding paint manufacturing to our readers?

In the paint industry, emerging technologies such as nanotechnology and smart coatings are expected to play a vital role in the near future. These technologies are becoming increasingly integrated, which fall in line with current consumer preferences and provide real benefits including durability, improved sheen, surface protection, and longer product life.

Nanotechnology is well-recognized for providing functional benefits, and future product launches should heavily emphasize improved product attributes and function. Over the next four to five years, the industry is expected to witness advance manufacturing significantly due to the increased use of both artificial intelligence and advanced technologies. These improvements contributes to improved sheen, better finishes, more vivid colors, optimized production cycle times, and more robust, error-free formulations often called "first-right formulations". These practices will benefit consumers by delivering higher-quality, more reliable paint products. IMR

FACTORY AUDIT CONSULTANTS

Manufacturing
NOVEMBER INDUSTRY
SPECIAL - 2025

IQRA QUALITY SERVICES

REDEFINING QUALITY ASSURANCE THROUGH AUDITS & WORKFORCE DEVELOPMENT

Raghunath Ravula
Founder & Director

The global market for quality assurance and training services is expanding rapidly, driven by increasing demands for compliance with international standards and a need for skilled, confident engineers. In sectors such as oil and gas, petrochemicals, and manufacturing, companies often face challenges including delayed deliveries, rework, and quality-related losses. These hidden costs drain revenues and undermine trust in supply chains. Furthermore, a lack of hands-on experience exacerbates the problem, leaving engineers inadequately prepared to make confident decisions in the field.

In this context, Raghunath Ravula, the Founder and Director of IQRA Quality Services, brings over three decades of field expertise to create a comprehensive ecosystem - not just a company. With more than 5,000 inspections and over 3,000 engineers trained in India, China, Oman, and the Middle East, he identified a recurring issue: Inspections, Consultancy, and Training were typically conducted in isolation, leading to persistent problems. In response to this, IQRA Quality Services was established as an integrated model designed to break this cycle and help clients recover profits through enhanced quality.

Excellence in Inspection, Consultancy, & Training

At the core of IQRA Quality Services' success is a thoughtfully designed model where inspections identify problems, consultancy addresses them at the systemic level, and training prevents their recurrence. This closed-loop approach, conceptualized and refined by Raghunath Ravula, ensures that clients receive results, not just reports.

For MSME manufacturers, IQRA Quality Services implements realistic SOPs and system redesign interventions that enhance internal traceability, reduce rejection rates, and improve vendor performance-helping these manufacturers compete effectively without compromising quality.

For large EPC firms, IQRA offers rigorous Third Party Inspections accompanied by detailed reporting, photographic documentation, and traceable records, facilitating smoother project deliveries with fewer reworks and faster approvals.

IQRA Quality Services' training division provides mentor-based, concept-building programs that not only prepare engineers for certification but also empower them to make confident decisions on-site. The inspectors trained at IQRA Quality Services become true extensions of the client's QA/QC teams, offering real-time insights, root cause analysis, and actionable recommendations for corrective actions.

Audit and Training Excellence

IQRA conducts inspections and audits in accordance with ASME, ASTM, ISO 9001, and customer-specific QAPs. Whether the client is a global EPC or an MSME fabricator, IQRA Quality Services delivers checklist-backed verification and context-specific recommendations. The company goes beyond merely identifying non-conformities; it closes the loop to ensure sustainable solutions.

To strengthen their systems, MSMEs receive customized SOPs and competency-based training. Engineers are taught how to justify their decisions during audits - an often-overlooked skill in technical training. The training platform employs case-based modules, real defect samples, and weekly live sessions in a hybrid model designed to enhance clarity and performance, rather than just focusing on passing rates.

All these services are supported by IQRA Quality Services' Hyderabad-based back-office team, which ensures that every report, checklist, and training plan is standardized, tailored, and delivered with precision. This operational backbone allows IQRA Quality Services to maintain quality across multiple client locations simultaneously.

Looking Ahead: Vision 2030

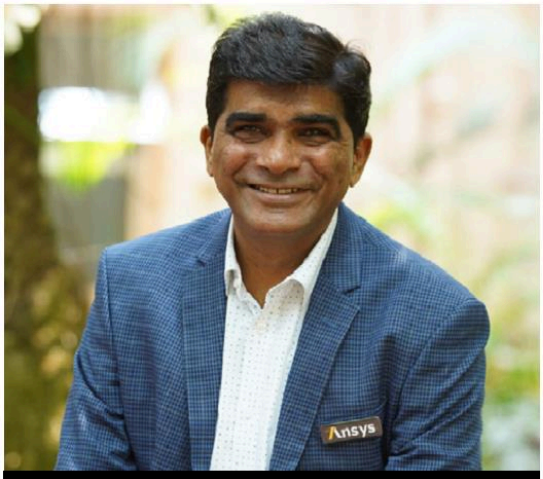
Looking ahead, IQRA Quality Services' roadmap features AI-driven inspection reporting, vendor performance analytics, a 90-day MSME profit recovery program, and AI-powered multilingual training. By 2030, the company aims to lead quality, profitability, and workforce transformation across India and the Middle East, empowering clients to shift from reactive fixes to proactive foresight. IMR

INDUSTRY OPINION

SIMULATION: THE SHORTEST ROUTE BETWEEN DESIGN & REALITY

● Rafiq Somani, Area VP & Country Manager - Canada, Ansys

With over 34 years of experience in the software industry, Rafiq is a passionate and committed leader with a focus on go-to-market strategy (GTM), sales excellence, and mentoring. He deeply believe in the power of teamwork, in empowering engineers, and in promoting diversity.



Rafiq Somani,
Area VP & Country Manager - Canada

In the present-day scenario where the race for innovation is constantly on and competition is like never before, the traditional ways of product development is no longer sufficient. Simulation that used to be an occasional resource applied in the design of only the most complex engineering products is today becoming pervasive i.e. it's a continuous simulation with all physics across the entire lifecycle, for all kind of products. Simulation has become a standard component in product development today that is bridging the gap between design and reality.

The Design Journey

Engineers are under pressure to design innovative products that work perfectly the very first time itself in order to be able to get them out into the market before the competition does so. Additionally, they need to be sure that the product will endure and be reliable once it enters the market. Simulation solutions involving any area of physics, be it structures, fluids, electronics or combinations of these, will provide engineers with the speed that is needed to stick to these goals that seem to be almost impossible to reach. The toughest design challenges can be overturned and made into a success story with engineering simulation software. Simulation of the design helps in the validation and the verification of the function of the product and engineers can check product feasibility too.

Faster, Simpler & Cost Effective

Simulation accelerates design to an extend that is almost unbelievable. Engineers are now even able to see the real-time results of simulation throughout the modeling process and this enables them to understand all the design changes in their prototypes. Simulation is providing engineers with unparalleled understanding into their design implementations. Engineering simulation is becoming more pervasive in its ability to positively impact product innovation and performance, time to market, drive top-line growth, reduce cost and deliver end-user benefits. The integrated Multiphysics platform of simulation provides customers the capability to innovate and analyze designs across all the different physics and this goes for all products, not only complex ones. Using simulation more ubiquitously and pervasively will simplify tasks and allow engineers to take decisions earlier on thereby reducing the cost of production.

We have been helping drive this innovation with engineering simulation, while also reducing costs and

product development time. Simulation-driven design solutions like Discovery Live offer a unified modeling and simulation environment and remove the limitations between CAD and simulation Instantaneous simulation is tightly coupled with direct geometry modeling, to enable interactive design exploration that permits design engineers to better understand each of the many design decisions they make during product development course. Supporting common fluids, structural, and thermal simulation applications, it allows engineers to experiment with design ideas and see instant feedback from their changes. It therefore radically lessens the need for persistent, laborious testing on expensive physical prototypes and consequently cuts the total development time and cost.

Additive Manufacturing

The design engineer today needs to build optimized, lighter and smarter products to stay relevant. With additive manufacturing, the process of manufacturing itself can introduce changes in the final shape, and simulation can help to factor in those changes. Therefore, there is a need to use appropriate tools like 3D Design products that enable CAD modeling and simulation for all design engineers. Simulation tools are today built on direct modeling technology that makes creating, repairing or editing geometry easy, whether you are involved in concept modeling, reverse engineering scanned data or preparing a model for manufacturing or simulation.

Digital Twin and Simulation

During operation, to fully comprehend a machine, the comprehensive virtual model must be connected to actual operational data from the machine. The virtual model is the digital twin. Digital twins eliminate the silos, errors inadequacies, doubts and enormous resources while working with models. Engineering simulation forms a key component of the digital twin. When simulation is added to the digital twin system, environments that are otherwise difficult to view and evaluate becomes evident. The product performance can be maximized by scheduling predictive maintenance, determining root of performance is sues, and evaluating various other aspects. Simulation allows accurate prediction of how the changes in machines will affect it during its life cycle. Simulation is thus the lone method to completely appreciate the digital twin technology.

On-Product Simulation

From cars, airplanes and trains to consumer electronics, machinery and healthcare solutions, products have been transformed through simulation. Product simulation observed single characteristics: one physics, one component, one design. Now we explore multiple designs at the system level with interactions across several physical and digital realms. Simulation is being utilized not only for design validation, but also from early ideation through manufacturing, operations and maintenance. We are thus viewing an ultimate revolution in engineering and product development. The advantages of simulation when in vehicles are well-known. As on-track testing is expensive and not always feasible, simulation is what makes design changes easier and makes it a reality.

Autonomous cars, for example, have to be out on the open road and be able to adapt to all the uncertainties that come along with it. It has to have the ability to do this on par with or even better than humans in order to be considered safe. What is required is over eight billion miles of test driving. How does a company do so much testing? The only solution is simulation if one is hopeful of releasing them anytime soon. The validation of the software that is needed by the manufacturers can be done only in this manner. If one depends exclusively on AI for autonomous cars then one won't be able to assign or trace the neural networks of AI to safety requirements.

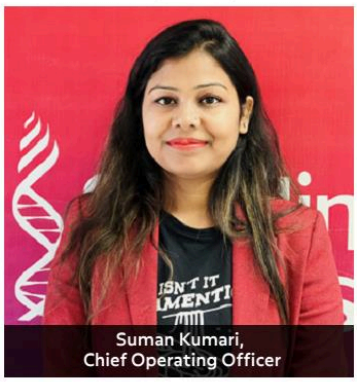
Simulation actually trains and tests artificial intelligence. The safety gates of autonomous car developers are what decide if the outputs of the AI system disrupt any safety standards. If positive, then it initiates a course of action based on a safety plan. This system needs to be validated and the only way to do that in less time is through simulation. There is a seamless integration of design and simulation for all engineers now that help them to explore ideas and concepts in greater depth. It provides a single platform for simulation-driven product development. The technology is easy to learn and use and offers unparalleled adaptability, speed and accuracy to enhance the final design. Simulation is thus the shortest route between design and reality and it helps companies in bringing innovative and safer products into the market faster. IMR

TESTING LABS FOR FOOD & BEVERAGE INDUSTRY

Manufacturing India Review
NOVEMBER INDUSTRY SPECIAL - 2025

SHOOLINI LIFE SCIENCES

PROVIDING HIGH QUALITY, NABL ACCREDITED FOOD TESTING SERVICES FOR INDIAN FOOD BUSINESSES, SMES, & EXPORTERS



Suman Kumari,
Chief Operating Officer

With increased consumer awareness and strict regulations India's food testing service sector is transforming rapidly. The current market is valued at $25.4 billion in 2025, and it is projected to reach $56.8 billion by 2035 with a CAGR rate of 8.5 percent. These factors are contributing to its growth and they include the strict conformance of FSSAI, growth in demand for quality-marked products, and the performance of India as an exporter. The innovations of rapid testing kits, NABL-accredited laboratories, and the introduction of the governmental project PMFME, are the factors that increase the chance of access to food safety assurance in India, turning it into the leader of this sphere.

Shoolini Life Sciences offers high quality, NABL accredited food testing services which are designed to meet the needs of Indian food businesses, SMEs, and exporters. Located in the District of Solan, Himachal Pradesh, and another in Haryana, the company closes the accessibility gap in terms of provision of time bound, accredited and cost effective testing services specifically in under-served Tier-II and Tier-III cities. With complete testing coverage of microbiology, chemical, nutritional, heavy metals, pesticide residues and shelf-life analysis, SLS helps the clients to meet the requirements at both domestic and export levels by ensuring FSSAI, ISO and international standards.

Customer-Focused Compliance

SLS's customer centric approach which includes digital reporting, rapid turnaround times and customized test packages, empowers local manufacturers and exporters to compete globally. SLS's infrastructure is equipped with advanced instrumentation such as GC-MS, HPLC and ICP-OES ensuring precise and reproducible results.

The company uses standardized procedures and approaches, accepted protocols, and legal standards and measures in terms of consistency within FSSAI, ISO and Codex regulations to keep tabs on food items all through the production, distribution, and retail processes. "To make sampling traceable, we follow stringent conditions such as ISO 707 on dairy-based food and ISO 24333 on cereals and the trained civil servants execute the sampling", says Suman Kumari, Chief Operating Officer, Shoolini Life Sciences.

Precision Food Analysis

The equipment provided in the lab are updated with the high-end instruments such as GC-MS/MS to screen pesticides, ICP-MS to identify heavy metals and PCR to determine pathogens, and GMOs, and are able to test a wide range of food matrices including edible oil, beverages, dairy, spices, and condiments.

The data integrity and regulatory compliance can be obtained through a powerful quality assurance system, which should include internal quality controls, proficiency testing, and LIMS integration, providing reports ready to pass an audit, allowing consumers to develop confidence and brand credibility. An integrated solution would minimize the risk and regulatory compliance and also boost consumer confidence so that its clients such as QSRs, exporters and the food processing industries can manage the safety and authenticity of their products.

The R&D division at SLS drives innovation in food safety and environmental sustainability by developing protocols for detecting emerging contaminants such as micro plastics, PFAS, and pesticide residues in soil and water. "By adopting low waste analytical methods, bio degradable reagents and energy efficient transformation, we are advancing green chemistry initiatives and moving towards a green lab model reducing environmental impact without compromising precision", says Suman Kumari.

Vision for Tomorrow

Looking ahead, SLS's roadmap includes expanding into nutraceutical and cosmetic testing, integrating AI-driven analytics, and launching mobile testing units to serve agricultural belts. By 2026, the company aims to establish regional labs, achieve new accreditations such as GLP and ISO 17034, and implement blockchain-based traceability for high-value exports. With such efforts and a client-centered approach, Shoolini Life Sciences is an ideal organization to guide in a new era of analytical sciences in India to make sure that there are safer food systems as well as environmental sustainability in the country. IMR

INDUSTRY OPINION

AI, PREDICTIVE ANALYTICS & DIGITAL TWINS POWERING FPSO LIFECYCLE MANAGEMENT

● *Philippe Moulin,* **Operations Manager & Site Representative, SBM Offshore**

In an interaction with India Manufacturing Review, Philippe Moulin, Operations Manager and Site Representative, SBM Offshore, has shared his views and thoughts on the key technology enablers making digital twin adoption economically viable across new builds and conversions, as well as what training and upskilling initiatives are most effective in aligning local workforce capabilities with next-generation FPSO technologies.

Philippe Moulin is the Operations Manager and Site Representative at SBM Offshore India. With over 31 years at SBM Offshore, he brings extensive expertise in offshore operations, sustainability, and leadership. Over his career, Philippe has held senior global roles including Operations HSSE & Sustainability Director, Operations HR Director, O&M Product Line Director, and General Manager for FPSO (Floating Production Storage and Offloading)/FSO operations across Asia and Africa.

Operations Manager & Site Representative

How can predictive analytics fundamentally transform lifecycle asset management to extend the operational lifespan of aging FPSOs (Floating Production Storage and Offloading)? What are the biggest data integration challenges when implementing real-time predictive maintenance systems on legacy FPSOs?

Predictive analytics is reshaping lifecycle asset management by enabling a shift from time-based to risk-based maintenance strategies. This is particularly valuable for aging FPSOs, where optimizing limited resources is essential. By evaluating asset conditions and forecasting potential failures, predictive tools help prioritize maintenance activities where they are most impactful, improving both efficiency and safety.

Predictive maintenance can reduce unplanned downtime and lower maintenance costs. For older FPSOs, the key consideration is data availability. Many were built before the advent of digital infrastructure, and much of their historical data exists in formats like PDFs or static reports.

While retrofitting sensors and condition monitoring tools is increasingly viable, achieving seamless real-time data transmission and integration remains a challenge. Aligning legacy systems with modern analytics platforms requires thoughtful adaptation, but doing so opens the door to smarter, more resilient asset management across the vessel's lifecycle.

In what ways can AI-driven anomaly detection help balance safety, cost, and operational uptime for mature offshore assets? How do operators quantify ROI when investing in predictive analytics for FPSO life extension projects?

Safety is non-negotiable; we do not balance it against cost or uptime. AI-powered anomaly detection enhances safety by continuously monitoring the health of critical barriers using risk models like bow ties. These tools help identify early warnings of failure, enabling proactive mitigation.

Cost and uptime are addressed early, during the design phase, where system redundancy is tailored to client requirements. During operations, Computerized Maintenance Management Systems (CMMS) manage

programmed tasks. Over time, AI helps refine these routines using operational insights, leading to smarter, more risk-adjusted maintenance.

For life extension, we conduct detailed structural and fatigue assessments to ensure safe, continued operations. ROI is measured not just in cost savings, but in extending asset life, minimizing environmental impact, and reducing downtime. Newer units have better emissions profiles, so integrating sustainability is also a core part of long-term value creation.

What role does modular design play in accelerating FPSO deployment timelines, especially in high-CapEx deepwater projects? How do digital twins enhance operational readiness, risk management, and remote monitoring of next-generation FPSOs?

Modular design allows for faster FPSO construction by standardizing components and interfaces. This reduces engineering time, simplifies module integration, and shortens assembly durations, resulting in both time and cost savings.

Digital twins built from engineering 3D models enable operators to simulate processes, validate design assumptions, and train personnel in realistic environments. They are instrumental in commissioning, diagnosing process anomalies, and conducting root-cause analysis. These virtual environments ensure teams are well-prepared before stepping on board, enhancing safety and readiness.

During the operations phase they can be key to streamline the maintenance process from fault diagnostics, identification of faulty component re-ordering, installing and recommissioning.

What are the key technology enablers making digital twin adoption economically viable across new builds and conversions? In terms of project execution, how do modular FPSO designs impact supply chain complexity and fabrication strategies?

We aim to leverage advanced 3D modelling tools combined with laser scanning post-construction to build accurate digital twins. These models enable engineers to remotely plan upgrades and maintenance campaigns, reducing the need for costly onboard surveys. Keeping the digital twin updated after each modification is essential to ensure accurate future planning and safe operations.

On the project execution side, modular design simplifies supply chains by enabling standardization. This allows us to work through framework agreements and reuse proven equipment designs. It streamlines procurement, reduces lead times, and improves the overall execution efficiency.

How can simulation-based commissioning shorten first oil timelines and improve system reliability?

Simulation-based commissioning allows virtually testing and optimizing commissioning steps before execution, helping with the identification of prerequisites. It enables comparison between theoretical process data and real-time system performance, which is particularly useful during initial start-up.

While achieving first oil involves fewer dynamic elements, the challenge lies in stabilizing systems like gas compression and water injection. These involve complex rotating equipment and are critical for reducing flaring and meeting environmental goals. Thus, simulation tools help shorten the time between first oil and flare-out, improving system reliability and reducing emissions.

In what ways can digital platforms help track, measure, and improve local content compliance? What training and upskilling initiatives are most effective in aligning local workforce capabilities with next-generation FPSO technologies?

In markets with developing digital infrastructure, full integration remains a challenge with local service providers, but incremental progress is enabling greater transparency and alignment.

Upskilling is critical. The ideal local workforce combines domain expertise in FPSO operations with digital proficiency. Bridging these two capabilities is key. Initiatives focused on digital tools for maintenance, analytics, and system diagnostics, alongside core technical training, will prepare local talent to support and grow with next-generation offshore assets. IMR

Manufacturing NOVEMBER INDUSTRY SPECIAL - 2025

INDUSTRIAL LEGAL CONSULTANTS

SPARK PLACEMENT

DELIVERING INTEGRATED LEGAL & WORKFORCE COMPLIANCE SOLUTIONS

Gaurav Maniyar
CEO

In India, the legal service market which is currently at $45.2 billion is expected to reach at $67.4 billion by 2030, growing at a CAGR of 6.5 percent. Since this sector is fueled by foreign investments, technological advancements such as AI and evolving labor laws, these factors demand robust compliance frameworks, proactive dispute resolution and employee centric strategies to mitigate risks and ensure sustainable industrial harmony. The organizations face increasing pressures from frequent law amendments, shifting power dynamics toward employee rights, and the need to handle cybersecurity threats, union activities and state specific regulations, all while maintaining operational efficiency and ethical standards.

Founded in 1994, Spark Placement has over 30 years of expertise in industrial legal consulting. The company fills important market gaps in terms of labor law, as well as industrial relations since it provides a full-scale provision of services including audits, local investigation, grievance repairs, and disciplinary procedures. Utilizing automated tools for data capture and analysis, Spark Placement ensures accuracy and consistency in audits across diverse industries and states, adapting seamlessly to varying statutory requirements.

Integrated Legal Solutions

The company has its own procedures according to which the scope, frequency, criteria of audit are intended, and it places a stronger emphasis on data integrity, monitoring, and documentation. Positioned within the competitive landscape of domestic and foreign players, Spark Placement stands out through its deep-rooted experience and a dedicated HR team of qualified professionals. Being part of the Spark group which includes several companies such as Sankalp Manpower and SM Associates, the company has over 1000 professional workforce in over 50 units across India.

This structure enables end-to-end legal advisory from contract labor management and statutory inspections to manpower recruitment across categories A to C. "We help organizations in establishing integrated compliance frameworks, leveraging AI for automation and prioritizing risk assessments to navigate regulatory complexities",says Gaurav Maniyar, CEO, Spark Placement. Centralizing compliance management and standardizing processes are the key recommendations to ensure clients meet stringent MNC standards without operational hurdles.

Empowering Workforce Compliance

The best place to start is at the top. Leaders demonstrate their commitment to compliant workplace practices. When company leaders set an example, employees will follow. It is highly important for the leadership to communicate the value of compliance to the Employees and the Team.

When dealing with grievances and employees discipline, Spark Placement applies well-organized systems and formal processes that aim at ensuring problem-solving efficiency. "We consider our employee as highly valuable assets and thus, cultivate ethical compliance as the joint responsibility of organizations and employees", says Gaurav. The training programs are also crucial for educating employees on government schemes, changes in law and safety benefits transforming compliance from a perceived burden into a tool for well-being and productivity.

The expertise of the company in individual management, administrative acts and back-up of HR laws enables the company to prepare and employ training programs that are effective in increasing efficiency and motivation. Between management and workforce expectations, the company ensures adherence to evolving labor laws while cultivating industrial peace.

Future-Ready Compliance

Looking ahead, Spark Placements highlights geographic expansion beyond Gujarat, deeper integration of regulatory technology such as AI for data-driven decision making and capacity building in talent development. A specialized team is dedicated to embedding AI into consulting frameworks, enabling quicker, more precise support for clients. Through workforce optimization and the importance of constant improvement the company secured itself as a potential solution to a wide variety of needs as broad as compliance with cybersecurity or workforce motivation. Spark Placement remains a trusted partner in India's dynamic legal services sector delivering solutions that foster harmony, mitigate risks and drive sustainable success in an evolving industrial landscape. IMR

INDUSTRY OPINION

NAVIGATING QUALITY, SUSTAINABILITY, & INNOVATION IN INDIAN AGRICULTURAL COMMODITY PROCESSING

Rahul Kamath, *Director, Bolas*

Rahul Kamath, Director

In a recent interaction with Industry Outlook, Rahul delved into industry-specific quality control measures and certifications. Additionally, he highlighted essential sustainability practices, technological innovations within the cashew manufacturing sector, initiatives supporting local farmers, and endeavours promoting sustainable agricultural practices in India and many other African countries.

Rahul Kamath, an experienced professional with expertise in the processing of agricultural commodities in India, is well-versed in the dynamic nature of the industry. His proficiency lies in effectively addressing the intricate trends and challenges faced by food manufacturers in the country.

What industry-specific quality control measures and certifications are crucial for ensuring the safety of agricultural commodities like cashews, coffee beans, edible oil, almonds, and dry fruits?

Ensuring the safety and quality of agricultural commodities like cashews, coffee beans, edible oil, almonds, and dry fruits involves industry-specific quality control measures and certifications. In cashew processing, adherence to ISO 22000 and HACCP standards is crucial for maintaining hygiene and ensuring the final product meets accepted safety standards, especially in larger facilities. The coffee bean industry, while requiring hygiene standards, may focus on certifications such as UTZ or Rainforest Alliance to address sustainability and social responsibility concerns. Edible oil production, being directly consumed, demands stringent measures, with certifications like ISO 22000, and HACCP playing a vital role in ensuring safety throughout processing and packaging. For almonds, certifications like Global G.A.P. and HACCP are important for safe agricultural practices, while ISO 22000 and HACCP are relevant for maintaining food safety standards in dry fruit processing.

Could you outline key sustainability practices that are becoming prevalent within the agricultural commodity processing and export sector in India?

In the agricultural commodity processing and export sector in India, key sustainability practices are emerging to address challenges such as post-harvest damage and underutilization of by-products. To tackle post-harvest losses, there is a growing emphasis on adopting efficient

treatment plans, particularly in crops like cashews, where exploration of mechanical or artificial drying processes is underway to salvage yields during challenging weather conditions. Additionally, initiatives focusing on the underutilization of by-products, such as cashew apples, are gaining traction. Efforts to maximize the use of cashew apples, rich in vitamin C and fibre, not only contribute to reducing waste but also aim to boost farmer income sustainably. Furthermore, in the broader context of Indian agriculture, there is a push for improved infrastructure, including cold storage facilities, to mitigate market rate uncertainty and ensure the preservation of agricultural products.

What technological innovations are currently influencing the efficiency and sustainability of food manufacturing processes in this industry?

Over the past 15 years, the cashew processing industry has shifted from manual to highly mechanized methods, with specialized machines for tasks like shelling and blanching. This technological transformation has significantly enhanced efficiency, scalability, and overall product quality, minimizing breakage and contamination. Technological evolution in cashew processing has boosted labor efficiency, reduced man-days, and shifted the process to be predominantly mechanical, minimizing human involvement. These advancements not only enhance efficiency but also contribute to sustainability by allowing flexible production adjustments based on demand. Unlike the past, where manpower constraints limited production adjustments, the current mechanized approach allows for more responsive and adaptable changes, fostering a more sustainable and efficient cashew processing industry.

In the context of the cashew manufacturing industry, what initiatives are supporting local farmers and promoting sustainable agricultural practices in India?

The key approach to supporting local farmers and promoting sustainable agriculture in India's cashew manufacturing industry entails adopting artificial and mechanical drying methods, as specified in the proposal. The strategy aims to improve cashew quality and ensure a stable market for growers, especially crucial during the concentrated harvest season in April, May, and June. Recognizing the unique annual crop cycle, efficient post-harvest processing is emphasized. To counter post-harvest price drops due to bulk cashew availability, the proposal suggests an on-farm drying concept. This supports farmers by enabling prompt processing and storage until September and October, aligning with higher demand and prices during festivals.

From an industry perspective, what are the prominent trends and challenges impacting food manufacturers of agricultural commodities in India today?

Food manufacturers in India face challenges in maintaining consistent high-quality products, particularly in the agricultural sector, where seasonal variations affect raw material quality. Adhering to global standards and addressing the inherent variability in agricultural commodities is essential for establishing and sustaining a brand that meets consumer expectations for consistent quality and satisfaction. Food manufacturers in India also confront supply chain challenges, requiring efficient storage and transportation infrastructure to manage the impact of seasonal fluctuations. Staying informed about trends in sustainable and ethical sourcing, as well as meeting the demands of a growing health-conscious consumer base, adds complexity to the industry.

How can dry fruit and cashew manufacturers boost their market presence and attract health-conscious consumers?

In response to the heightened health consciousness observed during the COVID-19 pandemic, dry fruit, and cashew manufacturers enhance their market presence by strategically promoting the nutritional benefits of their products. They prioritize clear communication of immune-boosting properties and overall health advantages, particularly in areas such as heart health, diabetes, and reproductive health, through informative packaging and online platforms. Targeted advertising and promotions focused on the health benefits, leveraging social media and health-related publications, effectively reach and resonate with the health-conscious consumer base. Diversifying product offerings, introducing innovative variants, and incorporating health-friendly features such as low-sugar or organic options attract a broader audience. To enhance credibility and visibility, dry fruit and cashew manufacturers should prioritize transparent sourcing and collaborate with health influencers. Aligning marketing strategies with health-conscious trends and ongoing innovation establishes them as prominent players in the health-focused consumer market. IMR

AFTERWORD

PRACTICAL PATHWAYS TO CLEAN & GREEN ENERGY

● *Pravin Karve, President,* **Thermax Babcock & Wilcox Energy Solutions**

Pravin Karve, President

A lot of work is going on at feverish pace to change the source of energy from Carbon to Non-Carbon. This transition in energy source to non-carbon has become necessary because of the dramatic changes in the climate patterns and rainfalls that have manifested in the recent years. Every day, we see pledges of becoming carbon neutral or Net Zero by Heads of Countries or Heads of Large Corporations. All this is necessary & vital for the survival of Human Race on our planet. We also come across news of path breaking new technologies being developed for production, management, usage & storage of Green Energy. The range of technologies include Green Hydrogen, Ammonia, Fuel Cells, Electrolysers, cultivated biomasses, Gasification, Wave power, battery & other storage technologies, & the like. The focus of most of these developments is to make the Green Energy affordable by using new & innovative techniques. Despite the urgency demonstrated by all of us, we seem to be a little away from getting commercially affordable Green Energy, especially for poor & developing countries. It will be some time before these new technologies become commercially affordable for the poor & developing countries. While the whole world is looking forward to availability of affordable Green Technologies, majority of the existing energy producers & users are staring at the devastating prospect of their investments in the Energy infrastructure becoming obsolete & worthless!

The world is caught in a peculiar situation. While waiting for emergence of the cost effective Green technologies, we will continue to harm the planet & once they emerge, we have to write off a lot of our long term investments!

Practical Pathways to MWanage the Energy Transition

In the given situation, it is necessary for the world to find energy transition pathways that satisfy the following conditions Pathways that start minimising the environmental impact while we wait for the economically viable Green Technologies to become available Pathways that make the existing Energy infrastructure suitable for Green Technologies & minimise the cost of write-offs We have a great example of a Practical Pathway created by the automobile Industry. The approach of Hybrid Vehicle has provided this Practical Pathway. The Hybrid vehicle allows users to cut emissions by up to 50% while waiting for the EVs to become viable with progressive deployment of charging infrastructure& extension of driving range. Based on my experience of more than 38 years in the Energy Industry, I believe that a similar "Hybrid"Practical Pathway is also available for Energy users to meet the twin objectives of immediate start of emission reduction & prevention of future loss of investments.

Conclusion

I believe that, while it is immensely important to continue to focus on development of commercially viable Green Technologies, it is equally important to find Practical Pathways for quicker & easier Energy transition that focus on immediate reduction in CO_2 emissions & that minimise losses in the value of existing Energy infrastructure. I have given a few examples of such Practical Pathways that will permit the Energy Transition to start right away without waiting for availability of commercially viable technologies. I am sure, if all the energy producers & users look harder, they will find a lot many Practical Pathways to Clean & Green Energy. I would call this as the Energy Industry's "Hybrid" solution! IMR

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