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Infrastructure development is the key component in the economic growth of a country. But what is more important is having an integrated and holistic approach towards this development. While Prime Minister Gati Shakti Master Plan is a step in the right, smooth execution of the programme will be crucial. Prajakta Karnik takes a peek into the ambitious Rs 100 lakh crore master plan.

**EXPERTS’ VIEWS**

**Gati Shakti: A Paradigm Shift in Decision Making.**
Kanika Verma
Researcher & Investment Specialist, Invest India

**Gati Shakti: JNPT ups multimodal connectivity**
Sanjay Sethi IAS
Chairman
Jawaharlal Nehru Port Trust

**Initiatives that create conducive manufacturing environment will help sustain domestic steel sector.**
Alok Sahay
Secretary-General and Executive Head
Indian Steel Association

**Cement & steel sectors should be given more subsidy in the Gati Shakti projects.**
Vishal Kanodia
Managing Director, Kanodia Group

**Gati Shakti plan will positively impact manufacturing & exports of the country.**
Vivek Lohia
Director, Jupiter Group, Chairman
National Council of Railways
ASSOCHAM

**Gati Shakti: Shaping India.**
Safar Mohammad Khan
General Manager-HDD
Apollo Techno Industries
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Amol Sinha
General Manager, Product Support & Training, Terex India

Processing and producing aggregates at the matching pace of the infrastructure sector is the need of the hour.

Piero Guizzetti
CEO, MB Crusher India

All-round support needed to push renewable energy.

Nitin Bansal
Associate Director
India Ratings and Research

Large funding crucial for renewable energy growth.

Vipula Sharma
Director - Ratings and Head Infrastructure Ratings Brickwork Ratings

Indian power industry needs to develop significant energy management capabilities to achieve RE targets.

Karthik Krishnamurthi
Country Head, Marketing and Sales
Hitachi Energy India

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Ajay Aneja
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Dear Readers,

Year 2021 has been quite eventful from the point of view of the announcements made to bring India back on the growth track. India has been making great strides in improving its infrastructure, especially in the last few years. If statistics are to be believed, India is expected to become the world’s third largest construction market by 2022.

While the infrastructure development was progressing gradually, it was not matching the pace as envisioned, especially when India is hoping to becoming a USD 5 trillion economy by 2025. To provide a renewed impetus to India’s growth story, Prime Minister Narendra Modi launched the Rs 100 lakh crore Gati Shakti Master Plan.

Though an extension to the already existing infrastructure programmes, the main objective of the Master Plan is to ensure infrastructure upgrades that will cut logistics costs for industry and raise all round efficiency. And this cannot be achieved unless the respective ministries, which have been working in silos, are integrated and brought under one umbrella to ensure smooth project execution.

Ambitious and optimistic as it sounds, the Master Plan may face a few hiccups in the beginning considering the mammoth nature of the programme. The Master Plan has all the necessary ingredients that are essential to lead India to become a global super power. But it will be pertinent to see how it can address the challenges faced by various stakeholders, especially as it seeks to attract large private investments.

Our December edition has highlighted some of the bottlenecks that the sector players expect the government to address to ensure smooth execution of the projects. That said, it will be interesting to see how India takes forward its growth agenda in 2022.

We hope the new year 2022 brings in positivity and drive India on the desired growth path.

Wishing all a happy new year.

Best Regards
Ramamurthy Mayavan
Publisher and Editor-in-Chief

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MB POWER SIGNS MOU WITH SECL FOR RECLAMATION OF MINE VOID

MB Power (Madhya Pradesh) has signed an agreement with South Eastern Coalfield (SECL) to ensure 100% utilization of fly ash in its Anuppur Thermal Plant in a sustainable manner.

Under the MoU, MB Power has taken the responsibility for backfilling of the abandoned mine void in Sharda Open Cast Mine in Shahdol district in Madhya Pradesh. Backfilling or stowing and reclamation of the mine void will be carried out as per March 2019 guidelines of the Central Pollution Control Board and requirement stipulated by the MP Pollution Control Board.

As per the agreement, SECL has allocated 0.92 MCM volume to MB Power for backfilling out of total capacity of 1.08 MCM of the mine void.

Speaking at the occasion, Sanjeev Mehra, Regional Officer, Madhya Pradesh Pollution Control Board, said, 'It is a very important step in matters related to fly ash management; this is the first time in Madhya Pradesh that the mine out area/exhausted mine area is going to be utilized/used for fly ash filling. This will eliminate random dumping of fly ash here & there, and at the same time will ensure unused vast land is converted into useful, fully rehabilitated and valuable land.\(^\text{4}\)

In future other abandoned mine owners will also come forward to give their land to fly ash generators.

MG MOTOR, CLEANMAX PARTNER TO ADOPT WIND–SOLAR HYBRID ENERGY

MG Motor India has partnered with Clean Max Enviro Energy Solutions (CleanMax), for the supply of 4.85 MW of wind-solar hybrid power to MG's manufacturing facility in Halol.

With this partnership, MG will abate around 2 lakh MT of CO2 over 15 years which is equal to planting more than 13 lakh trees.

CleanMax's vision aligns with MG's commitment towards a sustainable future. The carmaker has been at the forefront of promoting EV adoption in India with the launch of India's first Pure Electric Internet SUV – MG ZS EV. The electric SUV was launched with the initiative ‘Change what you can’, which encouraged people to adopt zero-emission vehicles.

CleanMax is the first renewable energy company to set up a wind solar hybrid power park in Gujarat to sell clean energy to private consumers and corporates. It plans to expand to 150 MW by 2022. MG’s Halol facility is expected to begin drawing power in February 2022.

RELIANCE TO RESTRUCTURE & REPURPOSE GASIFICATION ASSETS

The Board of Reliance Industries has decided to implement a Scheme of Arrangement (Scheme) to transfer gasification undertaking into a wholly-owned subsidiary (WOS).

The gasification project at Jamnagar was set up with the objective to produce syngas to meet the energy requirements as refinery off-gases, which earlier served as fuel, were repurposed into feedstock for the refinery off gas cracker. This enables production of olefins at competitive capital and operating costs. Syngas as a fuel ensures reliability of supply and helps reduce volatility in the energy costs. Syngas is also used to produce hydrogen for consumption in the Jamnagar refinery.

RIL targets to have a portfolio which is fully re-cyclable, sustainable and net carbon zero. This will be achieved by transitioning to high value materials and chemicals with renewables as the source of meeting its energy requirements.

TATA STEEL EXECUTES BLOCKCHAIN ENABLED TRADE BETWEEN INDIA & B'DESH

Tata Steel has executed a blockchain enabled paperless export order with a metals major in Bangladesh. This makes it the first such deal executed between an India based company and a counter-party in Bangladesh assisted by different banks at respective ends.

This transaction was facilitated by Standard Chartered, India, and was conducted on Contour’s blockchain trade platform, which enables banks, corporates, and other trade partners across the world to transact with each other.

This integrated solution using blockchain technology allows all parties involved in the transaction to communicate on a single platform in real time. It aims to reduce processing time by digitising the entire LC process and eliminating the operational inefficiencies as compared to traditional paper-intensive process of LCs.

MARUTI SUZUKI, TOYOTA TSUSHO COMMENCES VEHICLE SCRAPPING AND RECYCLING UNIT

Maruti Suzuki and Toyota Tsusho Group have joined hands to set up MSTI as a step towards circular economy and with an aim to promote organized, transparent and environment friendly dismantling of End-of-Life Vehicles (ELVs).

The 10,993 sq m facility has a capacity to scrap and recycle over 24,000 ELVs annually. Built with an investment of over Rs 44 crore, the facility uses modern and technologically advanced machines to dismantle and scrap ELVs in a scientific manner. Aligning with the vision of Atmanirbhar Bharat, all the equipment being used at the facility is manufactured in India.

MSTI follows globally approved quality & environment standards. These include complete solid and liquid waste management ensuring zero discharge of liquid & gases from the ELVs.

Under the new policy, the Centre had said the states and Union Territories (UTs) will provide up to 25 per cent tax rebate on road tax for vehicles that are purchased after scrapping old vehicles.
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WAVIN LAUNCHES PLUMBING AND DRAINAGE SOLUTIONS

Wavin, an innovative pipes and fittings solution provider for the building and infrastructure industry, has launch two new product series in the form of Wavin Tigris K5/M5 plumbing solutions and Wavin AS+ low noise drainage system for the Indian market.

Building on the successful 30-year plastic low-noise legacy of the Wavin AS system, the new and improved Wavin AS+ provides advanced noise reduction in soil and waste systems. This will significantly reduce the problem of noisy drainage pipes in multi-storey buildings as well as as well as resolve time and budget constraints in the building process through ease-of-installation and great value.

With over 60 years of experience in the building and infrastructure industries, Wavin’s launch of the Wavin AS+ and Wavin Tigris K5/M5 reinforces its commitment to meet the water supply needs and urbanization of the world’s largest, and fastest-growing, region.

HCC–KEC JV WINS RS 1,309 CRORE CHENNAI METRO ORDER

Hindustan Construction Company, in consortium with KEC International, has been awarded Rs 1,309 crore contract by Chennai Metro Rail for the construction of 11.61 km elevated viaduct section and eleven elevated stations on corridor 5 of phase II of the Chennai Metro. This is the second order secured by the HCC-KEC Consortium for Chennai Metro. HCC share in the JV is 51% or Rs 668 crore.

The scope of work involves civil works, architectural works and signages, plumbing & drainage works and temporary services as per the employer’s drawings and the works economic & social benefits to the state while generating direct employment for more than 300 individuals, the company said.

Under the MoU, the Tamil Nadu government will facilitate and help Schaeffler India get the necessary infrastructural and regulatory support on best-effort basis including the single window facilitation as per Tamil Nadu Business Facilitation Act 2018.

This expansion is in line with our strategic growth plans for India as we continue to localize and sustainably expand our footprint.

SCHAEFFLER INDIA TO INVEST OVER RS 300 CR TO SET UP FACILITY IN TN

Auto component maker Schaeffler India plans to invest over Rs 300 cr. in the next four year years to set up a new manufacturing facility in Hosur, Tamil Nadu.

The proposed plant will manufacture transmission components and systems for automotive and tractor segments. For this purpose, Schaeffler India has signed a MoU with Tamil Nadu government’s nodal investment promotion and facilitation agency, Guidance, at the Tamil Nadu Investment Conclave in Coimbatore.

The proposal will engender tangible benefits in terms of job creation, infrastructural and regulatory support on best-effort basis including the single window facilitation as per Tamil Nadu Business Facilitation Act 2018.

This expansion is in line with our strategic growth plans for India as we continue to localize and sustainably expand our footprint.

WELSPUN ONE PLANS RS 2,500 CR INVESTMENT IN TAMIL NADU

Welspun One Logistics Parks (WOLP) plans to invest about Rs 2,500 crore in Tamil Nadu to set up six warehousing projects in the state.

The company has signed a MoU with Guidance, the Government of Tamil Nadu’s nodal agency, for investment promotion & single window facilitation to set up warehouse facilities across the state.

The projects will be executed by Welspun One Logistics Parks and will bring direct investments of approximately Rs 2,500 crore to Tamil Nadu, the company said.

Under this agreement, a total of six projects have been proposed in prime warehousing micro-markets like Hosur, Siripurumbudur and Thiruvallur; totalling to a development potential of nearly 8 million sqft to be built across a span of five years.

Welspun One Logistics Parks is an integrated fund, development, and asset management platform, part of the USD 3.5 billion Welspun Group.

As per our blueprint, we are looking at developing approximately 400 acres of land in Tamil Nadu to build top-class, warehousing facilities.
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State-owned power producer SJVN as signed an agreement with PTC India to develop products for supplying round-the-clock renewable energy.

The agreement was signed by SJVN Director (Finance) Akhileshwar Singh and PTC India Director (Marketing) Rajib Kumar Mishra in the presence of SJVN Chief General Manager Rajesh Kumar Gupta and other senior officials, according to a statement issued by SJVN.

"SJVN has entered into a memorandum of understanding (MoU) with PTC India to collaborate on the development of products to supply RTC (round-the-clock) power. SJVN and PTC will jointly develop products for supply of renewable power from projects of SJVN bundled with available market capacity for the supply of RTC power to beneficiaries," the company said.

PTC will provide portfolio management services to SJVN, as the primary objective of this MoU is to facilitate the development of energy mix from SJVN's renewable energy projects for RTC power. PTC will also provide necessary market information in terms of the availability of the merchant power capacity from various sources under the MoU.

In addition to this, PTC will study, explore, prepare and submit a detailed report regarding the supply of power from proposed renewable energy projects of SJVN to potential beneficiaries across India, the chairman and managing director said.

Greaves Cotton’s e-mobility arm Greaves Electric Mobility on Tuesday announced the opening of its largest EV production facility at Ranipet in Tamil Nadu.

Spread across 35 acre, the plant will serve as an e-mobility hub for both domestic and export markets, the company said. The facility is a part of the Rs 700-crore investment plan announced by the company earlier this year to enhance its market share further in the rapidly expanding domestic EV space. The manufacturing facility with additional assembly lines will produce 1-million vehicles a year.

This plant will also allow the company to nurture a highly skilled workforce and generate employment for the local community including women who form 70 per cent of the plant’s workforce.

The new manufacturing plant is also in accordance with the central government’s flagship initiatives such as “Make-in-India” and “Atmanirbhar Bharat” to promote indigenous capabilities in manufacturing.

Bentley Systems, Incorporated, the infrastructure engineering software company, today announced the winners of the 2021 Going Digital Awards in Infrastructure. The annual awards program recognizes the extraordinary work of Bentley software users advancing infrastructure design, construction, and operations throughout the world.

Sixteen independent jury panels selected the 57 finalists from nearly 300 nominations submitted by more than 230 organizations from 45 countries encompassing 19 categories.

Bentley Systems showcased 19 winners on December 2 during the 2021 Year in Infrastructure and Going Digital Awards virtual event. On the previous day at the virtual event, 22 Founders’ Honorees were recognized, representing organizations or individuals whose undertakings contribute notably to infrastructure advancement and/or environmental/social development goals.

Larsen & Toubro and ReNew Power have announced a partnership agreement to tap the emerging green hydrogen business in India. Under this agreement, L&T and ReNew will jointly develop, own, execute and operate green hydrogen projects in India.

Green hydrogen produced by splitting water into hydrogen and oxygen in an electrolyzer by using renewable-powered electricity can enable the world to meet its net zero emissions targets.

Many countries, including India (through its National Hydrogen Mission), have announced specific policy interventions to push for the widespread adoption of green hydrogen.

It is anticipated that green hydrogen demand in India for applications such as fertilizers, fertilizers and city gas grids will grow up to 2MMTPA by 2030 in line with the nation’s green hydrogen mission. This would call for investments upward of USD 60 billion.

L&T, with its deep expertise and experience in engineering and construction of projects, and ReNew, with its experience in the development of renewable energy projects, are market leaders in their respective sectors and this synergistic partnership is committed to tapping this emerging opportunity.

Commenting on this partnership, S N Subrahmanyan, CEO & MD of L&T said, “This partnership with ReNew is synergistic and brings together the impeccable track record of L&T in designing, executing, and delivering EPC projects and the expertise of ReNew in developing utility-scale renewable energy projects. We believe that green hydrogen is a promising alternate fuel and an important lever for achieving a cleaner future.”

L&T is extremely keen to add value in this space beyond the traditional EPC approach and is looking forward to working with ReNew.”
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EESL TIES UP WITH MSME MINISTRY, UNIDO, GEF

State-owned EESL has collaborated with the Global Environmental Facility (GEF), MSME ministry, and the United Nations Industrial Development Organization (UNIDO) to implement a project on promoting market transformation for energy efficiency in the micro, small and medium enterprises (MSME) sector.


The project aims to deploy 35 energy-efficient technologies that have the maximum possibility of replication and the potential to improve the energy productivity of fellow MSMEs units and to adopt various business models of ESCO (energy servicing company) where the MSME unit is expected to pay back to the investor from the monetised energy savings in a period of time.

To facilitate information dissemination on the project to the MSME industries, a technology exhibition-cum-workshop was held on Saturday at Hotel Niharika, Kolkata. EESL has signed pacts with industry associations for extending mutual support to meet the project targets. EESL has also signed an agreement with four MSME units for the implementation of technologies.

SANY INDIA LAUNCHES 3S BRANCH OFFICE OF RS INFRA EQUIPMENTS

Sany India, a leading manufacturer of CE & heavy machinery, further strengthened its presence in Gujarat by inaugurating a new branch office of its authorized dealership RS Infra Equipments at Gandhidham.

The dealership already has offices in Bhuj, Sayla & Rajkot and serves customers of the Kutch and Saurashtra belt (Rajkot, Amreli, Junagadh, Porbandar, Somnath, Bhavnagar, Morbi, Surendranagar) extending Sales, Service and Spare parts support.

It will be pertinent to mention here that Sany India holds a strong presence in the state with its other authorized dealer partner BVS Equipments in Ahmedabad, Surat, Bharuch, Vadgam & Palanpur.

This new office in the region will prove to be a crucial connection between the company and the customers and further strengthen the service delivery of Sany India. This new facility will enhance the future scalability options and will provide more opportunities for networking and collaboration.

Notably Sany India has a well established network of 39 dealers and 180 plus touch points in India and South Asia with over 500 certified service engineers deployed across to provide best in class service to the customers.

As the construction equipment market is gaining prominence rapidly - this expansion will make an inroad into untapped markets and gain potential customers.

FERTIGLOBE’S GREEN HYDROGEN CONSORTIUM SELECTS PLUG POWER

Fertiglobe, the strategic partnership between OCI N.V. and the Abu Dhabi National Oil Company (ADNOC), has said that its partners Scatec ASA, the Sovereign Fund of Egypt and Orascom Construction, that they have selected Plug Power Inc., a leading provider of turnkey hydrogen solutions for the global green hydrogen economy, as the technology provider for a 100 MW electrolyzer to produce green hydrogen as feedstock for up to 90,000 tons of green ammonia production at EBIC in Ain Sokhna, Egypt.

The 100 MW PEM (Polymer Electrolyte Membrane) electrolyzer will be the largest independently owned facility globally when it comes online and is the first phase in Fertiglobe’s green ammonia strategy.

Egypt is an ideal location to produce green hydrogen given its unique renewables profile with strong solar and wind loads, and close to markets with a hydrogen deficit.

HONEYWELL, DANFOSS SUPPORT DECARBONIZATION OF BUILDINGS

Honeywell has said its Solstice technology is supporting a new range of ultra-low global warming potential (GWP) scroll compressors designed and manufactured by Danfoss for heating and cooling applications. The new compressors deliver improved energy efficiency over models based on R-410A, while offering the same cooling capacity and similar footprint.

Danfoss, a leading manufacturer of heating, cooling and refrigeration solutions, will use Honeywell’s Solstice ze (R-1234ze) and Solstice refrigerant N15 (R-515B) refrigerants in its new DSG scroll compressor range for chiller and heat pumps used in commercial buildings, industrial processes, data centers and district heating/cooling applications. The compressor range will be available in Q2 2022, and will allow chiller and heat pump manufacturers to stay compliant with regulations requiring the phasedown of higher-GWP hydrofluorocarbons (HFCs).

With a GWP of less than 1, Solstice ze is 99.9 percent lower than R-410A and other HFCs. Solstice N15 (R-515B), a non-flammable, low-GWP solution, has a GWP lower than 300 and provides higher energy efficiency in the DSG compressor range than the R-410A models. Both refrigerants are based on Honeywell’s hydrofluoroolefin (HFO) technology.

The DSG compressors are specifically designed for medium pressure chillers to cool large buildings, infrastructure projects.
**SANDVIK PARTNERS BOLIDEN FOR BEV LOADER TRIAL**

Engineering group Sandvik has partnered with Boliden to trial Sandvik LH518B at the latter’s Garpenberg zinc operation in Sweden. Sandvik Mining and Rock Solutions and Boliden have agreed on a 12-month collaborative trial period for the new 18-tonne battery-electric loader.

Considered one of the most modern mining operations, Garpenberg is the world’s most productive underground zinc mine and Sweden’s oldest mining area still in operation. As a purely battery-powered loader, Sandvik LH518B will support Boliden’s efforts to improve sustainability by reducing greenhouse gas emissions underground.

Sandvik LH518B is easy to implement in most underground operations, as it does not require any major changes to mine infrastructure. The loader’s Sandvik AutoSwap & AutoConnect features facilitate seamless installation of a fresh battery in less than six minutes, enabling it to return to operation significantly sooner than ‘fast-charge’ mining BEVs. The battery swap is performed by the loader itself, controlled by the operator in the cabin, without need for overhead cranes or forklifts.

As a third-generation BEV, Sandvik LH518B has been designed from the ground up entirely around its battery system & electric driveline to fully leverage on the battery system possibilities.

The trial at Garpenberg is planned to start in late 2022.

**BP PLANS 500 MW GREEN HYDROGEN PLANT IN TEESIDE, UK**

Oil major BP has said it is planning to build a large-scale green hydrogen plant on a site in Teesside, UK, in the country’s industrial north.

The facility will be developed in phases, starting with 60 MW of capacity by 2025. Eventually, the capacity will go up to 500 MW of green H2 production. A final investment decision is scheduled for 2023.

The first customer for the plant could be fuel-cell powered heavy trucks, BP VP of Hydrogen Matt Williamson told Recharge. The oil company is partnering with truck maker Daimler to build a network of hydrogen fueling stations around the UK, and the 60 MW hydrogen plant will supply enough fuel to support about 1,300 trucks. When it comes online, it will be the largest electrolyzer plant in the UK.

Green hydrogen-based fuels are among the most promising and scalable options for decarbonizing shipping, and multiple companies - primarily in Australia - are looking at options to expand green H2 production to supply future bunker fuels.

BP also has a larger (and more controversial) “blue” natural gas to hydrogen plant planned for Teesside, with a planned 1 GW of capacity.

**TBM SERENA ACHIEVES BRENNER TUNNEL BREAKTHROUGH**

Italian construction giant Webuild’s tunnel boring machine Serena has achieved a breakthrough by completing its 14km dig, creating the exploratory tunnel on the Italian side of the Brenner Base Tunnel.

The task took Serena - a double shield TBM built by Herrenknecht - three and a half years and equates to a little over 80% of Webuild’s excavation work on Lot Mules 2-3.

The current project is one of four that Webuild has secured on the tunnel, set to be the world’s longest rail tunnel and a major high-speed connection between Italy and Austria.

The tunnel will run for 64km, between Fortezza in Italy and Innsbruck in Austria, and will reduce travel times by 69%, from 80 to 25 minutes. Webuild’s tunnel boring machine completes 1.4km dig in 3.5 years.

The Mules 2-3 represents the largest construction lot on the tunnel project, with up to 900 workers directly involved in the construction.

**GEKKO SYSTEMS BAGS CONTRACT FROM GROUP 6 METALS**

Gekko Systems, global leader in mineral processing solutions, has bagged a contract from Group 6 Metals for the design, procurement, construction, and commissioning of the processing plant and related facilities for the redevelopment of the G6M’s 100%-owned Dolphin Mine, located on King Island.

The contract, which has a value of around USD 49 million, anticipates the commissioning of the facilities in early 2023. Based on this timing the first shipment of ore from the Dolphin Mine to customers will also occur during the first quarter of calendar year 2023.

Gekko has been engaged with G6M over the last three years, and together they have formulated the flowsheet which was developed after extensive independent test work at the ALS laboratory undertaken on behalf of G6M in Burnie, Tasmania.

Group 6 Metals Executive Chairman, Johann Jacobs said, “We have successfully worked very closely with Gekko over a number of years, which has culminated in us being able to execute this substantial contract so soon after completion of the financing of the project. We look forward to continuing our working relationship with Gekko to ensure a quality facility that is completed on time and within budget.”

Commenting on the development, Gekko Systems Chair Elizabeth Lewis-Gray said, “This is a critical resource development and an important project for regional Tasmania and Victoria. The team at Gekko are proud to have the opportunity to collaborate on and deliver a quality, locally designed and built process plant solution for Group 6 Metals.”
ZÜBLIN BAGS CONTRACT TO EXPAND GERMAN SUBMARINE FACILITY

Strabag subsidiary Züblin has been awarded a two-year project to construct production and administration buildings for thyssenKrupp Marine Systems in Germany.

Within the scope of the contract – valued in the high double-digit million-euro range – Strabag subsidiary Züblin will construct a submarine production facility and a seven-storey administrative building for thyssenKrupp Marine Systems.

The 32m-tall facility with a floor area of 15,390 sqm will be built by Züblin Stuttgart (responsible for structural engineering) and Züblin North (responsible for civil engineering and port construction).

The project is expected to require 17,000 m³ of concrete, close to 4,000 tonnes of reinforcing steel and 2,500 tonnes of steel for supporting structures within the halls.

The seven halls for the submarine production facility will be equipped with steel platforms all around, supplemented with mobile scaffolding in the lower area. Large steel girders will be anchored for the two gantry cranes in each hall.

In addition to the measurement, control and regulation systems for the building automation, the shipbuilding halls are to be equipped with complex ventilation technology in the form of a high and medium vacuum system for the extraction and filtering of welding gases and dusts.

Work on the structure of the administrative building began in October, with the pouring of a 1m-thick floor slab. The project is scheduled to be completed by the end of 2023, with further construction expected to follow at the shipyard.

BAYWA R.E. SELLS 148 MW SOLAR FARM TO VERBUND

Austrian energy company Verbund is buying the 148MW Illora solar farm in southern Spain from the renewables arm of BayWa for an undisclosed price.

The PV park, with a planned total capacity of 147.6MW, is set to enter operation in the first quarter of 2022.

Construction of Illora, which is located in Pinos Puente near Granada, started in May.

It comprises three PV system sections that will produce approximately 260 gigawatt-hours of electricity a year.

BayWa r.e. global director solar projects Benedikt Ortmann said: “We are delighted about the successful collaboration with Verbund and are very proud of the implementation of the large Illora project, which ranks among our pioneering projects in southern Europe.

“Thanks to our many years of experience, our global network and fantastic team performance, we will be able to come in on schedule despite the restrictions caused by Covid-19 and delivery bottlenecks.

“Spain remains one of our core markets and we have been able to post strong growth here in recent years.”

Verbund chief executive Michael Strugl said: “The Verbund Strategy 2030 envisages significant growth in the area of renewable energies with the goal of achieving around 20-25% of total production from photovoltaics and onshore wind by 2030.

“In addition to entering the Spanish market, this transaction represents another important step on the way to the future of renewable energy.”

TOTALENERGIES COMMISSIONS 55MW SOLAR PROJECT IN FRANCE

TotalEnergies has commissioned its largest solar project in France, the 55MW Gien site in Lorient.

The hometown developer said the project comprises 126,000 photovoltaic panels spread over 75 hectares.

The plant will produce around 64 GWh per year, equivalent to the annual electricity consumption of 38,000 people.

It was financed partly using a participative financing scheme involving site neighbours.

TotalEnergies teams will operate and maintain the plant locally throughout its 30-year operating lifespan.

Commenting on the development, company’s Country boss Thierry Muller said, “TotalEnergies once again confirms its commitment to the development of renewable energies in partnership with the regions. I would like to thank all of the project stakeholders who helped develop our largest solar farm in France. This commissioning contributes to France’s energy transition and is a further step towards our goal of reaching 4 GW of renewable generation capacity by 2025. It reinforces our commitment to be a major player in renewable energy in France.”

CHINA BAGS PORT DEAL IN SRI LANKA

Making further inroads into Sri Lanka’s maritime sector, China Harbour Engineering Company (CHEC) has bagged a contract to construct the second phase of Colombo Port’s East Container Terminal (ECT).

Under the Sri Lankan government’s original plans, ECT was to be developed jointly with India and Japan under the terms of a 2019 tripartite agreement.

However, Colombo cancelled the agreement earlier this year, alleging that the Indian firm involved in the project refused to agree on terms of service.

Under the tripartite agreement, investors from Japan and India would have had a 49 percent stake in ECT while the state-owned Sri Lanka Ports Authority would have retained 51 percent. The Colombo port trade unions were opposed to this arrangement, claiming it would amount to a sell-out of the ECT.

Meanwhile, in the new deal with CHEC, the strategic port terminal will be “totally operated” by the Sri Lanka Port Authority, according to a statement by Department of Government Information.
Infrastructure development is the key component in the economic growth of a country. But what is more important is having an integrated and holistic approach towards this development. While Prime Minister Gati Shakti Master Plan is a step in the right, smooth execution of the programme will be crucial. Prajakta Karnik takes a peek into the ambitious Rs 100 lakh crore master plan.

Indian infrastructure sector, which largely includes power, roads, dams, bridges, ports and urban infrastructure development, has been making a significant progress in the last few years, thanks to the initiatives taken by the governments, both at the Central and state levels. These decisions have played a crucial role in time-bound creation of world-class infrastructure in the country, thus propelling India’s overall economic development.

While the efforts and intentions have been in the right direction, the focus lacked an integrated approach towards the development. In order to cement the development gaps and to streamline the project execution processes, Prime Minister Narendra Modi announced a massive and ambitious PM Gati Shakti National Master Plan for multi-modal connectivity. The Master Plan is a giant stride in India’s ambitious goal of achieving USD 5 trillion economy.

PM GatiShakti is designed to break departmental silos and institutionalize holistic planning for stakeholders across major infrastructure projects and to ensure that the country does not waste money or time due to lack of coordination in infrastructure projects. Under the plan, everything, from roads to railways, from aviation to agriculture, various ministries and departments would be linked. To streamline the processes, a technology platform has also been prepared for every mega project so that every department has accurate information on time.

The master plan takes a holistic approach to sector-specific developments by integrating 16 ministries in a joint committee to implement and monitor Rs 100 lakh crore of investment.

"India is now taking a bold step in the direction of raising its ‘competitive index’, setting apart a network of multi-modal transport systems for commuters as
well as logistics, largely boosting exports of goods and domestic manufacturing. The government is trying to simplify time-taking application, approval processes and the multiplicity of regulatory norms through this scheme,” Kanika Verma, Researcher & Investment Specialist, Invest India said.

She noted that the Gati-Shakti programme is structured to prioritise all-mega infrastructure and connectivity targets by 2024-2025. “In economics parlance, this would have multiplier effects in the economy by saving public revenue and taxes. The immediate effect would be seen through increased demand for construction materials, demand for labour and second order effects by better reach and connectivity,” Verma added.

HIGHLIGHTS OF THE MASTER PLAN

- Roadways capacity to be increased with the National Highway network to touch the 2 lakh km mark.
- Aviation will receive a massive boost with around 200 new airports, heliports and water aerodromes envisioned in the plan.
- Capacity of railways transport cargo to be increased to around 1600 tons by FY25.
- Ease in the electricity access with the transmission network to be increased to 4,54,200 circuit km.
- Renewable capacity to be increased to 225 GW by FY25. Also around 17,000 kms of gas pipelines will be completed in the same year.
- 4G connectivity for the villages by FY22.
- 20 New mega food parks.
- Substantial new employment opportunities will be created through the launch of the Gati Shakti Plan.

MULTI-MODAL CONNECTIVITY

In today’s era, one of the key components of integrated infrastructure development is to ensure that goods and people can efficiently and seamlessly be able to move and switch across various modes of transport. This necessitates a coordinated and interconnected approach, wherein roads would ideally feed into railway tracks, which could then connect to ports and so on.

Under the PM Gati Shakti Master Plan, the government aims to achieve this target by integrating the various schemes announced by the government under different ministries like roads and highways, ports, airports, railways, etc.

Under Sagarmala, shipping sector to see an increase in cargo capacity at the ports to 1759 Million Metric Tonnes per Annum (MMTPA) by 2024-25 from 1282 MMTPA in 2020. Cargo movement on all national waterways will be 95 Million Metric Tons(MMT) by 2024-25 from 74 MMT in 2020. Cargo movement on Ganga to be increased from 9 MMT to 29 MMT by 2024-25.

Powered by Regional Connectivity Scheme – UDAN, civil aviation sector to see an increase in the aviation footprint globally. 220 airports, heliports and water aerodromes to be operational by 2024-25. 109 airports including existing 51 airstrips, 18 greenfield airports, 12 water aerodromes and 28 heliports to be developed by 2024-25.

In the road transport and highways sector, under the Bharatmala programme, two lakh km route of national highway network is proposed to be achieved by 2024-25. Along the coastal areas, 5590 km of four & six-lane national highways to be completed by 2024-25. All state capitals in North Eastern Region to be connected with either four-lane National Highway or two alternate alignments of two-lane configurations each by 2024-25.

By 2024-25, Indian Railways to see a decongestion by 51 per cent due to completion of critical projects. Cargo to be handled by Indian Railways will be 1600 million tonnes up from 1210 million tons in 2020. Western and eastern dedicated freight corridors for faster movement of freight trains to be completed.

With Gati Shakti, the country will get an integrated, harmonised transportation and logistics grid as logistics and supply chain costs account for 12% to 13% of the Gross Domestic Product (GDP), compared to the global average of 8%. Equally true with the road network at JNPT, linking the port with the hinterland road network are NH4B, NH4, NH17, NH 3 & 8 and state highway 54.

“Multimodal connectivity integrates the supply chains of the region further enhancing trade connectivity and benefits not only the business
community but also the people of the sub-region. It has positive impacts on employment, domestic demand mobilisation, and improvises the macroeconomic situation of the country. Efficient and adequate systems of transportation, logistics, and trade-related infrastructure can assist a country’s ability to compete on a global scale. Gati Shakti will lend more power and speed to the infrastructure pipeline by sharing resources and developing synergies towards building a more harmonised ecosystem. It will ensure last-mile connectivity to economic zones in a definite timeframe by ultimately improving India’s productive capacity and global competitiveness in manufacturing in India,” Sanjay Sethi IAS, Chairman Jawaharlal Nehru Port Trust said.

According to Navneet Kumar, Manager, Crisil Research, the programme promotes multimodality, which is an efficient way of cargo movement, vis-à-vis bulk/disjointed movement. “The ease of cargo movement provided by multimodal logistics improves the utilisation of industrial assets and limits wastages. Despite such advantages, multimodal or containerised freight accounts for less than 10% of overall freight (in billion tonne kilometre terms),” he added.

Echoing similar views, Vivek Lohia, Director, Jupiter Group, Chairman, National Council of Railways, ASSOCHAM, noted that the master plan will positively impact the manufacturing and exports of the country and play a key factor in making “Aatmanirbhar Bharat” a success.

DIGITAL COMMUNICATION

In the telecommunication sector, a total length of 35,00,000 km of optical fiber cable network is to be laid down by 2024-25. Connecting all 2,50,000 Gram Panchayats with high-speed internet and 4G mobile connectivity by 2022.

Under the Digital Communications Policy of the government, various projects like National Broadband Mission, Digital India, BharatNet and now Gati Shakti has proved the importance of optical fibre cables as one of the most important elements & backbone of a modern communication network.

“The pandemic has proved the importance of a robust telecommunication network for people, businesses and governments. It also emphasizes that broadband connectivity has become a virtual necessity and may soon get classification of a fundamental human right.

Since optical fibre cables are being used for voice, video, data and even in monitoring and sensing various parameters. At present railways, NHAI and other ministries uses Optical Fibre cables for communication. However, in the Gati Shakti project all these and various ministries will join hands for integrated planning & implementation of infra projects and to provide seamless connectivity,” opined Amit Mathur, Sr. Vice President- Sales & Marketing, Finolex Cables.

Due to GatiShakti, the demand for optical fibre cables is poised for a robust growth. Since the project will bring synergy among various ministries and most importantly it will solve the problem of ROW for the connectivity of infrastructure.

“The present broadband penetration along with associated benefits is yet to reach interiors of India. We think its full potential & benefits will be realized with Gati Shakti project. Finolex has been awarded by GOI for its significant contribution to the BharatNet project and will continue to contribute in projects of national importance like Gati Shakti,” Mathur added.

MEETING “GREEN” TARGETS

Under the Gati Shakti Master Plan, new and renewable energy sector capacity is to be increased from 87.7 GW to 225 GW by 2024-25 as 50 per cent of India’s power generation capacity is to be met by renewable energy sources by 2024-25.

The plan also proposes power transmission network to be upgraded from 4,25,500 circuit km to 4,54,200 circuit km by 2024-25 and improving the transmission network performance parameters.
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In Petroleum and Natural Gas sector, 17000 km long trunk pipeline, connecting major demand and supply centers for industries, is to be added by 2024-25 making a total length of 34500 km of pipeline across the country. All states are proposed to be connected with the trunk natural gas pipeline network by 2027.

“GatiShakti program is envisioned to integrate various department to leverage technology for faster project clearance and reduce reworks. This program can unleash the potential of single window clearance of renewable energy applications across states, departments, and sectors. If implemented with progressive policies, it has a huge potential to unlock and integrate renewable energy projects across highways, food & agriculture storage facilities, industrial clusters, transportation, and many others,” said Tejus A.V. Chief, Wind and Solar Farms, CleanMax.

**BOTTLENECKS & SOLUTIONS**

PM Gati Shakti is a landmark initiative that will enable coordination among different ministries, states and departments, facilitate ease of planning and bring down the overall costs of implementation as well. There could be initial bottlenecks with the platform however, once these are taken care of, this system can turn out to be a game-changer in the space of infrastructure development.

“With the information available to all the stakeholders at different levels - central, state, cities and even panchayats, taking up projects would get simplified, bundling of projects within ministries or departments, single approvals for multi-faceted projects and avoiding duplication of efforts and costs would become possible. A holistic approach to the infrastructure and logistics projects would ensure the faster pace of development and is indeed expected to bring out efficiencies as well as governance in the system.” Vipula Sharma, Senior Director – Ratings, Brickwork Ratings (BWR) said.

Expressing similar views, Karthik Krishnamurthi, Country Head, Marketing and Sales, Hitachi Energy India stated that while the Gati Shakti plan is a welcome initiative as it intends to augment infrastructure development in India. “Efforts and conversations are still ongoing to understand how best the plan can be implemented as well as to come up with a right mechanism to identify and resolve challenges in the process of building quality infrastructure,” he said.

According to Lohia, the initial challenges that one could face is the easy available of funds and navigating through the new modus operandi. “However, we strongly believe that this plan is only going to benefit the country and take it to newer heights,” he added.

Alok Sahay, Secretary-General & Executive Head, Indian Steel Association noted that the important bottlenecks include stable and consistent policies, major raw material security, availability of raw materials not available domestically - at reasonable prices, for which imports need to be allowed at nil customs duty.

“Easy access to finance at a reasonable interest rate and conducive compliance requirements will also benefit the industry. Steel has been at the forefront of infrastructure and socio-economic development, it’s not just only an enabler in India’s growth story but has laid the foundation for that growth story. The green economy has become very important post-COP26 UNCC summit at Glasgow. The important aspects which will put pressure on the bottom lines will be based on the Trade Défense Instruments; increasing regulatory push at home markets; carbon regulation and border measures on exports markets to a green economy; specific entry requirements for import; development of new green technologies (hydrogen); and implementation of the climate projects to offset companies’ emission levels. These aspects need the focus of the government,” he added.
Expressing similar views, Vishal Kanodia, Managing Director, Kanodia Group noted that India’s excessive dependence on roadways and under utilization of rail, air & water ways has increased the supply chain costs. This supply chain shortage increase the transportation cost & made Indian product less competitive in national & international markets.

“Although the government has taken all care to various counterparts of GatiShakti, but cement & steel sector should be given more subsidy in supply of their products in the Gati Shakti projects,” he added.

Jagannarayan Padmanabhan, Director, Transport & Logistics, Crisil Infrastructure Advisory noted that private sector participation will be critical for the effective rollout of this much-needed initiative, whether for augmenting existing infrastructure or greenfield development. “In recent past, we have seen significant appetite for built infrastructure and the authorities have also been able to get good value due to larger participation. Moreover, the private sector can recoup an exponential increase in value (bankability) if it is able to show progress. Hence, a time-bound rollout with the participation of the state governments and other stake holders can help ensure better market access for our manufacturing sector,” he said.

As Safar Mohammad Khan, General Manager -HDD, Apollo Techno Industries sums up, “Although Gati Shakti is a step in the right direction, it needs to be coupled with a stable and easy regulatory and institutional framework. Lowering logistic costs is critical for India. Government should take essential steps to strengthen the logistic ecosystem across the country. Government should also take some good steps on the current bureaucratic systems which take long time to execute any infrastructure project.”
On the eve of the 75th Independence Day, Prime Minister Narendra Modi announced, from the Red Fort, that the government will launch ‘PM Gati Shakti Master Plan’, an Rs 100 lakh-crore project for building ‘holistic infrastructure’ in India.

The idea behind ‘Gati Shakti’ scheme is that the government is aiming to create a digital platform promising “integrated planning and coordinated execution” by sixteen ministries. Each ministry and government department will be able to access information about the ongoing and upcoming projects for a balanced and synchronised approach. It will bring together, under one ambit, government departments like railways, roads, highways and many more. In this era of geo-satellite imagery and big data, land and logistics plans would be realised in an efficient manner on the ground.

For instance - it has been seen on multiple occasions that when a road is constructed, other agencies dig up the constructed road again for miscellaneous activities like laying down underground telephone lines, gas pipelines, etc. Thus, this master plan aims to resolve the infrastructural issues that India has been suffering from many decades. The idea is to reduce the lack of coordination between various departments and to reduce the inconvenience caused to the common man in the country.

The growing population, urbanisation and pace of development determines the needs of a country, as the preferences for residents, modes of transport and industries. Post World War II, Europe had to undergo infrastructural recreation, just the way USA had to sign the ‘New Deal’ to come back into shape post Great Depression. The world has witnessed that, between 1960-1990, South Korea started growing at an average rate of 10 per cent per annum, once they invested into infrastructural development. China, too is a great example that set a similar pace in 1980-2010, ushering socio-economic transformation and became the manufacturing hub of the world.

India is now taking a bold step in the direction of raising its ‘competitive index’, setting apart a network of multi-modal transport systems for commuters as well as logistics, largely boosting exports of goods and domestic manufacturing. The government is trying to simplify time-taking application, approval processes and the multiplicity of regulatory norms through this scheme. The Gati-Shakti programme is structured to prioritise all–mega infrastructure and connectivity targets by 2024-2025. In economics parlance, this would have multiplier effects in the economy by saving public revenue and taxes. The immediate effect would be seen through increased demand for construction materials, demand for labour and second order effects by better reach and connectivity.

Studies by the Reserve Bank of India and the National Institute of Public Finance and Policy have estimated at least 2.5-3.5 times of a multiplier effect. This implies that public investment if timed and targeted right, can actually ‘crowd-in’ private investment, rather than ‘crowd-out’. To realise these benefits, raising our capital expenditure as a percentage of the Gross Domestic Product (GDP) will be crucial, at both the central and state level.

In the last seven years, under PM Modi, the
PM Gati Shakti Master Plan is based on six pillars:

Comprehensiveness: Gati Shakti programme marks a paradigm shift in decision making to break the silos of departmentalism. In the proposed plan, all the existing and proposed economic zones have been mapped along with the multimodal connectivity infrastructure in a single digital platform. The National Master Plan will employ modern technology and the latest IT tools for coordinated planning of infrastructure. A GIS-based Enterprise Resource Planning system with 200+ layers for evidence-based decision-making is one such example.

Prioritization: There would be no more fragmented nature of decision making, each department would work with joint efforts for creating the desired industrial network. If a rail network has been laid to connect a district to a city, it is also the responsibility of the allied departments to ensure last mile connectivity. The departments that have to lead the project first will be given prioritization, for example- laying the underground gas pipeline is necessary before finalising the road.

Optimisation: The required facilities should be ensured before beginning the development of a project. For example- a fertilizer plant has been constructed but a gas pipeline is inaccessible leading to the plant being unable to reach its production potential. Thus, the funds raised for the project would not yield any results for the common man. Having an efficient logistics network and economies of scale in manufacturing are key conditions. Industrial parks and logistics parks need to grow in size to be globally competitive. The National Industrial Corridor Development Corporation (NICDC), formerly DMIDC will work in close coordination with state governments to develop these industrial corridors. State governments must take the lead in identifying parcels of land for industrialisation in consonance with the national plan to reap maximum benefits of jobs and growth.

Synchronisation: Achieving an efficient, seamless multi-modal transport network is no easy task. It requires independent government departments to work in close coordination and collaboration, guided by an overarching master plan. Ministry of Road, Transport and Highways, Ministry of Commerce and Industry, Ministry of Ports, Shipping, Waterways and Ayush, Ministry of Civil Aviation, Ministry of Power, New and Renewable Energy, Ministry of Railways, Communications, Electronics and Information Technology, Ministry of Petroleum and Natural Gas and Housing & Urban Affairs are going to work in synchronicity.

Analytical: India has witnessed completion of many infrastructural projects from 2014 that have been fast-tracked by many government departments. This has happened only because of digital platforms for accessing all documents on an online basis. For example- The Railways has started a ‘Common Drawing Approval System’ on an online platform, so all the approvals can be accessed on one portal. This initiative taken by the Indian Railways has given great results by ensuring the approvals take not more than 90 days, where it was taking more than 180 days. Even for environmental clearances, online portals have been created, which usually would have taken more than 2 years, but can now be completed in a matter of few weeks or months.

Dynamic: The Gati Shakti scheme will ensure that a basic commonality is maintained for similar projects even if the end goal is to be achieved by inter-departmental coordination. For instance - Ministry of Road and Transport has already started acquiring the ‘Utility Corridors’ alongside the new national highways and expressways, so as to ensure that optic fibre cables, telephone and power cables can be installed while the expressways are being constructed. Additionally, digitisation will play a big role in ensuring timely clearances and flagging potential issues, as well as in project monitoring.

According to Prime Minister Narendra Modi, the Gati Shakti plan will help raise India’s global profile, strengthen our local manufacturers, let passengers swiftly move from one place to another, and become a push factor for our exports as well. It also raises possibilities of new future economic zones.
The PM Gati Shakti National Master Plan for multimodal infrastructure connectivity to economic zone aims to enable efficient connectivity for the flow of products and people while also improving the comfort of living and doing business. The plan aims to boost Indian infrastructure and multi-modal connectivity over the next 25 years and reduce logistics costs for improved global competitiveness. The project will kick off a virtuous cycle of investments, large employment opportunities, aggregate demand, and thus economic growth.

Multimodal connectivity results in high environmental sustainability, with the development of new modal and intermodal infrastructure and hinterlands which have gained access to the global market.

Compelling multimodal transportation at JNPT not only provides manufacturers faster access to domestic and international markets but also has a multiplier effect on the economy too. It will ensure that infrastructure investments flowing into the country are better utilised by the economic hubs, and open the doors for new future economic zones.

Multimodal transport system at the port has integrated different geographical scales from global to local by creating a transportation system composed of gateways and hubs where regional and local transportation networks converge. JNPT has created a vibrant and efficient multimodal system integrating roads, rail, sea, inland waterways, air and warehousing facilities.

The port has formulated a strategic model to conceptualize multimodal maritime connectivity at the regional and global levels. With an extensive network of road, rail, inland shipping and container services JNPT are well connected with the rest of the country. The port’s maritime and intermodal solutions create better transportation, ensure manufacturing hubs gets the easy and shortest route to take their goods for exports.

By providing a coastal berth at JNPT, the port handles about 2.5 million tonnes of coastal cargo,
including coastal liquid cargo. The construction of the dedicated berth is in tune with the government’s policy to promote coastal shipping to shift freight from road to an environment-friendly and cost-effective mode of transport. It also meets a constant demand from the shipping and trade fraternity.

Coastal berths provide an impetus for coastal cargo movement and enhance coastal shipping of goods and passengers. Better infrastructure for coastal shipping decongests rail and road networks besides ensuring cost-competitive and effective multi-modal transportation solutions.

With Gati Shakti, the country will get an integrated, harmonised transportation and logistics grid as logistics and supply chain costs account for 12% to 13% of the Gross Domestic Product (GDP), compared to the global average of 8%. Equally true with the road network at JNPT, linking the port with the hinterland road network are NH4B, NH4, NH17, NH 3 & 8 and state highway 54. These roads are an important link between the northern and southern parts of India and JNPT.

To enhance the rail connectivity and enable faster movement of cargo to benefits the EXIM community, JNPT is linked with the Indian Railways through a lead line connecting the port with its serving station at Jasai. The rail system at the port is operated and maintained by the Indian Railways, has 8 full-length railway lines serving the three existing container terminals.

The functioning of Dwarf Containers train services at JNPT is a pivotal step towards streamlining the rail movement of EXIM cargo via double-stacked dwarf containers giving the EXIM community a competitive cost advantage by lowering hinterland logistical costs, while simultaneously enhancing rail-cargo traffic at the port.

Multimodal connectivity integrates the supply chains of the region further enhancing trade connectivity and benefits not only the business community but also the people of the sub-region. It has positive impacts on employment, domestic demand mobilisation, and improves the macroeconomic situation of the country. Efficient and adequate systems of transportation, logistics, and trade-related infrastructure can assist a country’s ability to compete on a global scale.

Gati Shakti will lend more power and speed to the Infrastructure Pipeline by sharing resources and developing synergies towards building a more harmonised ecosystem. It will ensure last-mile connectivity to economic zones in a definite timeframe by ultimately improving India’s productive capacity and global competitiveness in manufacturing in India.

JNPT’s multimodal connectivity contributes immensely along the lines of PM Gati Shakti National Master Plan for Multimodal Infrastructure Connectivity to Economic Zone. The extended gateways globally and locally are seamlessly connected to the port by rail, road, air, etc. enhancing, maximum and flexible access to the hinterland, creating flexibility and efficiencies among businesses, connecting the movement of people, goods and services.
How do you perceive the opportunities getting better for steel manufacturers as the Gati Shakti programme aims to ensure speeding up approval processes to enable quicker execution of projects?

We welcome the Gati Shakti National Master Plan by the Hon’ble Prime Minister of India. The idea behind the ‘Gati Shakti’ scheme is that the Government is aiming to create a digital platform promising the “integrated planning and coordinated execution” by sixteen ministries. Each ministry and Government department will be able to access information about the ongoing and upcoming projects for a balanced and synchronised approach. It will bring together under one ambit the Government Ministries like Railways, Roads Transport and Highways, Shipping and many more. Geo-Satellite imagery and associated data, land, and logistics plans would be realised efficiently on the ground.

For instance, it has been seen on multiple occasions that when a road is constructed, other agencies dig up the constructed road again for other activities like laying down the underground telephone lines, gas pipeline, etc. Thus, this master plan aims to resolve the infrastructural issues, India has been suffering from for many decades. The idea is to reduce the lack of coordination between various departments to reduce the inconvenience caused to the common man in the country. This plan will help a coordinated infrastructure growth, avoiding wasteful expenditure and efficient utilization of public money.

It will also be the continuous driver for increased consumption of steel within the country as construction and infrastructure sectors are major consumers of steel.

The PM Gati Shakti National Master Plan also aims for bolstering multi-modal connectivity. The opportunities for steel, therefore, arise from the consumption of steel in these multi-modal projects. The Ministry of Ports, Shipping, and Waterways have identified 101 projects for implementation by 2024-25. The identified projects are in addition to the 80-odd Sagarmala projects that are underway and include many waterways. New ports could relieve the pressure on existing major ports and make logistical costs more competitive. Streamlined approval processes will also help in the quicker execution of National Highway projects. National Highways constitute only 2% of the total road length in the country but carry 40% of the total traffic. The National Highways Development Programme (NHDP) aimed at the fast-track building of national highways approximately 70,000 km pan-India, has already completed 48,000 km and the balance is under implementation and order placement.

What according to you would be the bottlenecks for manufacturers; in terms of market dynamics, international developments putting pressure on prices, capacity utilisation, technology adoption etc?

At this critical juncture post the Covid-19 pandemic, Government initiatives that create a conducive manufacturing environment will help sustain domestic manufacturing including steel. The important bottlenecks include stable and consistent policies, major raw material security, availability of raw materials not available domestically - at reasonable prices, for which imports need to be allowed at nil customs duty. Easy access to finance at a reasonable interest rate and conducive compliance requirements will also benefit the industry. Steel has been at the forefront of infrastructure and socio-economic development, it’s not just only an enabler in India’s growth story but has laid the foundation...
for that growth story. The green economy has become very important post-COP26 UNCC summit at Glasgow. The important aspects which will put pressure on the bottom lines will be based on the Trade Defense Instruments; Increasing regulatory push at home markets; Carbon regulation and border measures on exports markets to a green economy; Specific entry requirements for import; Development of new green technologies (hydrogen); Implementation of the climate projects to offset companies’ emission levels. These aspects need the focus of the Government.

However, the manufacturing in the steel sector is attracting investments in both-brownfield greenfield projects. The sector has been consistently investing in the economy even when no one else would. According to CMIE (Centre for Monitoring Indian Economy) data, between 2014 and 2021, Indian steel companies invested US$ 24.8 billion (1.85 lakh crore rupees). The Steel Industry plans to invest nearly US$62.4 billion on capacity expansion in the coming decade, of which US$ 8.09 billion will be invested over the next three years alone. Experts too predict a super cycle for commodities worldwide. The segment is slated to grow at 7 percent per annum in the medium term. This requires proportionate growth in domestic capacity. Steel companies are employing more workforce to meet the increased demand.

How do you see initiatives like Make in India, PLI scheme etc, further accelerating the growth of the steel industry?

Steel manufacturers have always been the champions of Make in India and self-reliance. PLI scheme is a way forward making India Atmanirbhar in speciality steel. The capital outlay of Rs 6322 for incentivisation of investment in the manufacture of specialty steel by creating an additional capacity of 24.6 million tonnes with the next 7-8 years will definitely accelerate growth. The Ministry of Steel supported by the Empowered Group of Secretaries (EGOS) is also trying to make the scheme more investor-friendly and attractive by notifying liberal guidelines keeping the main objective of domestic capacity building in speciality steel in perspective.

Can you elaborate or provide suggestions that need to be incorporated by the government to ensure not just the success of the programme but also growth for material manufacturers? Also, share your forecast on the growth.

As regards material manufacturing, the steel industry always supports downstream Industry to meet the increasing and growing steel demand in the Country. Steel Industry plans to invest nearly USD62.4 billion on capacity expansion in the coming decade, of which USD 8.09 billion will be invested over the next three years alone as already stated. Experts too predict a super cycle for commodities worldwide. The segment is slated to grow at 7 percent per annum in the medium term. This requires proportionate growth in domestic capacity. This capacity building will also result in new avenues for employment generation.

However, for the confidence-building of investors, a level playing field is a must in order to sustain the growth of the steel industry and ensure continued investments into the sector.

While on the one hand, the domestic players are required to invest to fulfill the vision of the Government of setting up of additional steel capacity of 158 million tonnes by 2030-31 from the current level of 142 million tonnes to take the total capacity to 300 million tonnes, on the other hand, the domestic market gets dumped steel imports. These dumped products are exported to India at subsidised rates without being charged any countervailing duty. Around 8-10 percent of the cost of steel are levies, duties, and taxes.

Since these are not subsumed in GST, steel producers absorb them as an additional cost while exporting. Introducing RoDTEP for Steel exports from India will create a level playing field against global players like Japan, Korea, and China having huge excess steel capacities in comparison to their domestic demands. Exports from these three countries into India constitute about 70-75 percent of India’s imports till April 2021.

Similarly, costs for logistics, fuel, electricity, and financing are higher in India as compared to other steel economies. A NITI Aayog study estimates almost USD 80 to USD 100 per tonne as an adverse cost for Indian producers. Hence, to create a level-playing field, a corresponding Border Adjustment Tax (BAT) is of utmost necessity.

India also follows the lesser-duty rule while pursuing anti-dumping measures. Under a lesser-duty rule, authorities impose duties at a level lower than the margin of dumping if this level is adequate to remove injury. While the lesser duty rule was meant to protect the interest of users when domestic steel availability way back in the year 1999 was very low, the method in which the rule is implemented now hurts domestic producers defeating its very purpose.

The removal of lesser-duty rule will bring ease in checking undisciplined exporters from the global community for dumped imports into India.

Thus, Government initiatives that create a conducive manufacturing environment will help sustain domestic manufacturing including the steel sector.
Cement & steel sectors should be given more subsidy in the Gati Shakti projects.

VISHAL KANODIA
Managing Director, Kanodia Group

Gati Shakti is basically a comprehensive scheme to bring all the authorities, agencies and private sector engaged in multimodal transportation under one roof. How do you perceive the opportunities getting better for material manufacturers as the programme aims to ensure speeding up approval processes to enable quicker execution of projects?

Gati Shakti is multimodal transportation network will provide manufacturers faster access to domestic and international markets, but will have to multiplier effect on economy too. It will ensure that the infrastructure investments flowing into the country are better utilized by our economic hubs, and open the doors for new future economic zones. It will also incorporate the infrastructure schemes of various ministries and state governments like Bharatmala, Sagarmala, Inland Waterways, Dry/Land Ports, DAN etc. The economic zones like textile clusters, pharmaceutical clusters defence corridors, electronic parks, industrial corridors, fishing clusters, agr clusters will be covered to improve connectivity and make Indian business more competitive in country and aboard. The entire activities will create opportunity for especially construction segments specially cement & steel directly.

What according to you would be the bottlenecks for manufacturers; in terms of market dynamics, international developments putting pressure on prices, capacity utilization, etc?

At present, logistic cost is approx 12-14% of the gross domestic product (GDP) compared to the 8% of global average. In india excessive dependence on roadways and under utilization of rail, air & water ways has increased the supply chain costs. This supply chain shortage increase the transportation cost and made Indian product less competitive in national & international markets.

Can you elaborate or provide suggestions that need to be incorporated by the government to ensure not just the success of the programme but also growth for material manufacturers? Also, share your forecast on the growth.

Although governments has taken all care to various counterparts of GatiShakti, but as cement & steel sector should be given more subsidy in supply of their products in the Gati Shakti projects.

Kanodia Group has present capacity of 5.0 million tonnes per annum, presence in UP, Uttrakhand, Delhi, Haryana & Bihar and targeting to strong presence in central region by installing more grinding units to meet the requirement of GatiShakti projects.
JANUARY 2022 HIGHLIGHTS

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Silos have long plagued the governance of public sector projects in India. Projects with cross-departmental/ministry stakeholders have been hobbled by inertia in execution compared with more unitary initiatives.

In a bid to tackle this, the Cabinet Committee on Economic Affairs on October 21 cleared the PM GatiShakti - National Master Plan (GSNMP) for Multi-modal Connectivity to economic zones.

The master plan aims to break down silos, institutionalise holistic planning & ensure seamless functioning across major infrastructure projects. It seeks to streamline such collaboration by means of a three-tiered institutional framework.

**INSTITUTIONAL FRAMEWORK**

The scaffolding framework to implement, monitor and support the GSNMP has the following constituents:

**Tier I: Empowered Group of Secretaries**

The Empowered Group of Secretaries, which comprise secretaries from 18 ministries and a member convener from the logistics division, will be led by the Cabinet Secretary. The group will review and monitor implementation to ensure logistics efficiency. It will also have the authority to establish a framework and standards for any further revisions in the GSNMP.

**Tier II: Network Planning Group**

The Network Planning Group, which is made up of the chiefs of the network planning wings of infrastructure ministries, will help the Empowered Group of Secretaries.

**Tier III: Technical Support Unit**

The Technical Support Unit will provide the required competencies given the complexities involved in network integration. It will enhance optimisation to avoid duplication of work for the holistic development of any region and help lower logistics costs through micro-plan detailing.

Developing these economic zones in...
alignment with the sectoral development strategy would be pivotal in the execution of this master plan. For example, road and rail connectivity, as well as availability of rakes, is an important success factor for most sectors the GatiShakti plan proposes to revive.

Hence, a well-planned execution of these economic zones can provide optimum logistics efficiencies in terms of lower integrated logistics costs, providing greater value to stakeholders.

**THE TRADE-OFF**

Infrastructure projects often face the brunt of unsynchronised development of enabling logistics activities, leading to hampered prospects despite sound fundamentals — for example, poor utilisation of a port gas terminal due to delays in pipeline connectivity or limited evacuation capacity due to a non-widened connecting road or stalled construction activity due to land acquisition issues of a small stretch.

The GSNMP aims to minimise such issues through a technology-driven platform. Few of the benefits are:

- **Improved project execution visibility**
  - Viability of large infrastructure depends on a plethora of ancillary actions, such as last-mile road connectivity, access to rail sidings, evacuation

<table>
<thead>
<tr>
<th>Sector</th>
<th>GSNMP sector target for fiscal 2024-25</th>
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<tbody>
<tr>
<td>Telecom</td>
<td>A 35,00,000 km-long optical fibre cables network to be laid</td>
</tr>
<tr>
<td>Energy</td>
<td>New and renewable energy sector capacity to be increased from 87.7 Gigawatt (GW) to 225 GW. 50% of India’s power generation capacity to be met through renewable energy sources</td>
</tr>
<tr>
<td>Power transmission</td>
<td>The power transmission network to be upgraded from 4,25,500 circuit km to 4,54,200 circuit km</td>
</tr>
<tr>
<td>Petroleum and natural gas</td>
<td>17,000 km-long trunk pipeline, connecting major demand and supply centres for industries, to be added, increasing the total length to 34,500 km of pipeline</td>
</tr>
<tr>
<td>Ports and shipping</td>
<td>Shipping sector to see an increase in cargo capacity at the ports to 1,759 million metric tonne per annum (MMTPA) from 1,282 MMTPA in fiscal 2020</td>
</tr>
<tr>
<td>Inland waterways</td>
<td>Cargo movement of 95 MMT across national waterways, up from 74 MMT in fiscal 2020. Cargo movement on Ganga to be increased to 29 MMT from 9 MMT</td>
</tr>
<tr>
<td>Aviation</td>
<td>220 airports, heliports and water aerodromes to be operational</td>
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<tr>
<td>Roads</td>
<td>2 lakh km of national highway network to be achieved</td>
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<tr>
<td>Railways</td>
<td>Indian Railways to see 51% decongestion due to completion of critical projects</td>
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</table>
pipelines, supporting urban infrastructure, etc. These activities typically fall under the purview of different government entities – central, state or local. Lack of synchronisation in completion of these enabling activities often impacts the viability of infrastructure projects.

Well-coordinated government stakeholders across levels can help in timely completion of all ancillary work, improving the visibility of project execution. This, in turn, will help the lenders in assessing the project meaningfully and the developers in predicting the utilisation of the developed assets commensurate to their planned capacities.

b) Control on cost overruns

Infrastructure projects are often marred by cost overruns due to lack of coordinated development in associated works. These costs overruns are typically attributed to halting of construction activities due delays in critical legs of development, underutilisation of deployed resources, idling of machinery, need for additional studies due to time overruns, etc. The cost and time overruns add to capital requirements and impact the viability of the project itself.

Well-monitored ancillary infrastructure with frequently available status updates from government departments, including the state and local bodies, can limit the overruns.

c) Better project appraisal and monitoring

Increased costs due to delays impact the viability of carefully conceptualised projects, burdening the developers and lenders. It is envisaged that with a technology-driven portal, having real-time updates on developments around the projects will help lenders appraise the projects thoroughly. Frameworks can also be developed on the basis of real-time status of the enabling infrastructure, in addition to the construction activity of the project itself.

Lenders can identify and allocate project risks through such frameworks, aiding in disbursement negotiations as well as due diligence.

d) Boost to connectivity and multimodality to curtail logistics cost

The GSNMP promotes multimodality, which is an efficient way of cargo movement, vis-à-vis bulk/disjointed movement. The ease of cargo movement provided by multimodal logistics improves the utilisation of industrial assets and limits wastages. Despite such advantages, multimodal or containerised freight accounts for less than 10% of overall freight (in billion tonne kilometre terms).

MAKING THE PLAN WORK

Private sector participation will be critical for the effective rollout of this much-needed initiative, whether for augmenting existing infrastructure or greenfield development. In recent past, we have seen significant appetite for built infrastructure and the authorities have also been able to get good value due to larger participation.

Moreover, the private sector can recoup an exponential increase in value (bankability) if it is able to show progress.

Hence, a time-bound rollout with the participation of the state governments and other stake holders can help ensure better market access for our manufacturing sector.
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How do you perceive the opportunities and demand for industry players under GSNMP?

The government has pushed for significant reforms to boost India's growth story. One of them being Gati Shakti. By doing away with silos of departmentalism, the infrastructure roadmap will see faster and efficient completion. It is expected to increase the cargo handling capacity of railways to 1600 MT by the year 2024-25 thus accelerating the construction of two dedicated freight corridors. Even metro works have picked up and we can see India having a top-notch multi-modal transport hub in the coming years. These efforts will see greater last mile connectivity and increase the pace of economic prosperity.

The following figures may be considered while building up the response.

- Projections: 12 billion passengers per year by 2031. 2024 million tons freight by 2024. Capital expenditure of 29.5 billion dollars in 2021-2022. 83% increase in average freight train speed. 6015 kms of electrification by 2021 and 33000 kms by 2023 with an estimated expenditure of 2 billion per year. Solar panels on roof top as source of energy supply through renewable energy sources. Redevelopment of 400 stations by 2022. 6 Dedicated Freight Corridor: 35 bullet trains by 2022 at an outlay of 17 billion US dollars.
- Achieve green mission for 1000 railway station by electrification of entire railway network annual energy saving will be 1.55 billion US dollar.
-

Could you throw some light on the challenges or hurdles that the private sector is likely to face initially?

The initial challenges that one could face is the easy available of funds and navigating through the new modus operandi. However, we strongly believe that this plan is only going to benefit the country and take it to newer heights.

- Consistent and continued flow of orders, assurance of return on investment by the private sectors.
- Fast tracking vendor registration procedure in the railway system rationalisation of pre-qualification criteria to promote start up enterprises.
- Integrating global standards into a national standardisation module to provide relief from high value technology transfer costs.

Gati Shakti plan will positively impact manufacturing & exports of the country.
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In October 2021, Prime Minister Narendra Modi launched the ambitious Gati Shakti plan – National Master Plan for Multi-modal Connectivity, a key step to boost the country’s infrastructure as well as the Indian economy.

Gati Shakti is a master plan encompassing a Rs. 100 Lakh crore project for developing ‘holistic infrastructure’ or establishing the multi-modal connectivity through a digital platform.

Gati Shakti which means the power of speed, is a digital platform that ensures “integrated planning, and well coordinated execution”. This platform will also provide high-resolution satellite images, utilities, infrastructure, administrative boundaries, land and especially logistics.

**Gati Shakti Scheme**

Gati Shakti is a national master plan aimed at coordinated planning and execution of infrastructure projects in India to minimize logistics costs.

Gati Shakti is a digital platform that will bring 16 ministries (monitored by super ministers) and departments of the Government of India together and that includes the Railways and the roadways, ports, national highways, mega gas pipeline project for PNG, CNG, LNG etc (city gas distribution), OFC network, power cable, water and sewerage pipeline, transport etc.

The idea is to have a coordinated execution of infrastructure connectivity projects across the country.

The master plan will also cover economic zones such as pharmaceutical clusters, textile clusters, defence corridors, industrial corridors, electronic parks, and agro zones.

Gati Shakti will keep full monitoring on the infrastructure development without harming the nature also by adopting the sustainability. All the technological advancement will be taken place to execute.

The existing infrastructure schemes under various ministries will be incorporated into this plan, including Bharatmala, Sagarmala, UDAN scheme, inland waterways, etc.

It will also grasp the technology extensively including spatial planning tools with ISRO imagery developed by Bhaskaracharya National Institute for Space applications and Geo Information (BISAG-N)

The master plan will usher in the seamless movement of goods and people all across India.

PM Gati Shakti will provide the public & business community information regarding the upcoming connectivity projects, other business hubs, industrial areas and surrounding environment.

Gati Shakti raises the possibility of future economic zones as well.

The program has been launched as an umbrella integrator of Rs 111-lakh crore worth of projects under the National Infrastructure Pipeline (NIP) for 2020-25.

**Gati Shakti Significance**

The main aim of the program is to enhance coordination among the various ministries and departments. India has been suffering from poor infrastructure for decades. The infrastructure creation domain had several inherent weaknesses.

There was a lack of proper coordination between different departments, for example,
once a road was constructed, other agencies dig the well constructed road again for activities like laying of underground OFC cables, PNG gas pipelines, etc.

This will ensure last-mile connectivity by working with all stakeholders.

Individual departments & ministries often worked in silos leading to poor planning and execution, which ultimately led to delays in the projects. This is where the Gati Shakti program hopes to bring a positive change.

The digital plan will provide the entire data at one place with GIS-based spatial planning and analytical tools enabling better visibility to the executing agency.

Gati Shakti will help departments or ministries plan cross-sectoral projects better, monitor the implementation, review the progress and make course corrections if necessary since all the information will now be available on the portal through satellite imagery.

It is important to reduce logistics costs in India which is currently about 13.8% of GDP causing decreased competitiveness of Indian exports in the global markets. By planning to close the gap between macro planning and micro implementation, Gati Shakti seeks to reduce the huge logistics costs.

WHY IS INFRASTRUCTURE IMPORTANT?

Infrastructure spending has a tremendous effect on the Indian economy.

Apart from the direct benefits such as employment generation, demand for raw materials for construction, etc.

The second-order effects are those that are brought on by improved connectivity.

People and goods would move faster between destinations reducing logistics costs.

For balanced regional development, it is important that multiple urban clusters sprout up across the country and are not concentrated in certain areas only. This is possible by a coordinated approach in infrastructure development, for instance, roads would feed into railway lines which in turn would feed into ports, efficiently moving goods from the hinterlands to the ports.

EXPECTED OUTCOMES OF GATI-SHAKTI

Gati Shakti envisages shaping India into the business capital of the world.

It will help map the existing and proposed connectivity projects.

A comprehensive and integrated transport connectivity strategy will considerably support ‘Make in India’.

It should help achieve the various objectives of the government of India such as expanding the length of the national highway network to 2 lakh km, the creation of heliports and water aerodromes, and the development of over 200 new airports.

Boosting trade by enhancing the cargo handling capacity and decreasing the turnaround time at Indian ports.

Establishing 11 industrial corridors and two defence corridors.

It seeks to extend 4G connectivity to all the villages of the country.

Another aim is the expansion of the gas pipeline network(CNG/PNG/LNG) across India under the smart city development program, GOI controlled and monitored by PNGRB.

Apollo has already initiated some GOI agencies to build the gas pipeline infrastructure in a sustainable manner without disrupting constructed infrastructure through HDD method.

We have developed 5 ton to 160 tons HDD machines at Mehsana plant which would be very helpful to develop the gas pipeline infrastructure (CGD projects) in a speedy manner.

There are some structural problems in land acquisition and litigation issues and getting environmental clearances because of which the rate of project implementation is very low by global standards.

Although Gati Shakti is a step in the right direction, it needs to be coupled with a stable and easy regulatory and institutional framework.
Crushing & screening equipment are used in mining industry to turn big pieces of stones into smaller size which can be used in the construction sector. There are different types of crushers and screening systems. Construction Times finds out the present market dynamics, technological upgrades, opportunities, future market, target avenues, challenges in the crushing and screening segment.

The crushing and screening equipment market is segmented by product into crushing and screening equipment. The crushing equipment is further segmented into jaw-, cone-, and impact crushers, and others, whereas, the screening equipment is segmented into free fall-, and roller screens, scalpers, and others. The revenue generated by new demand for these equipment is estimated to be higher as compared to replacement demand for the same.

The mobile crushing and screening solutions segment has grown enormously in recent years. With the first track-mounted mobile units having appeared in the 1980s and pioneered by a small number of manufacturers, the range and variety of units on the market has grown enormously since.

Mobility and versatility have been drivers of this huge growth in demand for the mobile units. These machines can be moved to sites for short periods and then elsewhere, for projects of short duration. Even for quarries with long-term permission, using mobile units can offer benefits as the equipment can be relocated during operations as extraction progresses and new working areas are developed, ensuring higher working efficiency. Competition is now tough between manufacturers as a very wide range of firms now offer machines into this market, providing customers with many choices. The technology too is wide and varied, with different crusher types suiting different feed materials, product types and applications. Sophisticated technologies also offer remote control of equipment and computerised batching options for some units.

RISING COMMERCIAL AND INDUSTRIAL APPLICATIONS

According to Research nester, growth in infrastructure and construction projects comprising building construction and other industrial applications is driving the demand for crushing and screening equipment. This growth is backed by the rise in urban population with advanced living standards around the globe. Numerous regulating organizations are significantly investing in the infrastructure and technological innovations around the world. These are some of the significant factors that are estimated to boost the growth of crushing and screening equipment.
**CHALLENGES**

**Concerns Related to CO2 Emissions**

The usage of diesel as operation fuel in crushing and screening equipment results in CO2 emission, further raising the concerns on environment safety. Moreover, stringent safety regulations due to hazardous nature of work might act as barriers to the growth of the market.

**Impact of Covid-19 on Construction Industry**

The corona virus pandemic has impacted numerous industries on a large scale. Construction industry is one such industry that witnessed challenges related to health and safety standards, unemployment, contractual agreements, remote training, delay or cancellations of projects among others.

**TECHNOLOGY TRENDS**

It is pertinent to note that when it comes to faster construction of roads and highways in the country, the role played by crushing and screening plants is immense. Technology has come a long way as we have also witnessed a rise in new age technologies in the recent past. The projects of roads and highways are becoming bigger and it is slowly getting replaced by expressways which is also propelling the demand for crushing and screening equipment.

**GREEN INITIATIVES**

Currently, the crushing and screening equipment market is dominated by diesel powered plants and machines. However, leading players are offering hybrid and electrical powered models for various applications. This can reduce emission in crushing and screening. However, there are issues related to dust and suspended particles in crushing operations.

**LEADERS SPEAK**

Ramesh Palagiri, Managing Director & CEO – Wirtgen India, said, “Government policies like smart city initiative will give more focus to waste screen opportunity of classifiers and scalpers. Faster clearance and allotment of Iron ore mines will entrust the demand for C&S plants requirement in the mining sector.”

Amol Sinha, General Manager, Product Support & Training – Terex India, said, “India is witnessing rapid urbanization and so is the crushing & screening industry, fueling demand for faster construction which is a major driver for customers to move towards mobility. Terex is one of the first organisations to manufacture mobile plants in India that are best suited to meet the requirements of larger projects for completion in a relatively shorter period. We are seeing a surge in demand for the manufactured sand (M-sand) with many states in India banning illegal river sand mining.”

Sharad Thussu, Head- Mining & Construction Equipment Division at Voltas. As India continues on the exponential development path, the demand for aggregates is expected to increase exponentially over the next few years as they serve as reinforcement to add strength to the overall composite material. The availability of good quality aggregate is still a concern mainly due to the strict environmental laws that restrict mining.

The demand for aggregates in India will increase owing to residential and commercial construction as well as large-scale smart city projects funded by the Government. The production of aggregates, M-Sand is also in upward trend with investments in Roadways, Railways, Metros and Smart Cities and mega infrastructure projects like Bharat Mala and Setu Bharatam Project. The rebuilding of Roadways, Railways, Waterways, Smart Cities, Metros, Mining from Coal & Iron Ore are great opportunities across the country as they contribute to growth in demand for equipment used in Mining, Construction, Crushing & Screening. Additionally we witnessing a surge in demand for crushers in the iron ore segment, primarily due to the increased local steel demand and the auctions of iron ore in 2020. Going forward, we are optimistic of staying on the path of upward growth trajectory as India has large reserves of iron ore and our expertise is highly sought-after in the industry.

He further added, “The coal sector is set to grow rapidly for the next few years, so while we already have a range of equipment which customers are currently using in their coal mines, we are simultaneously preparing to launch new products that further meets the demands of this sector. We have seen both ups and downs as far as India’s Crushing & Screening Industry is concerned.”
Aggregates are essential in every construction project. What do you think is the present market dynamics/demand drivers for the crushing and screening units?

C&S market for track equipment’s has shown a growth compared to previous year due to the demand in the mining market and new application such as biomining, has been a driver for this market.

There is a surge in the requirement of biomining screening plants both classifiers and scalpers which gives higher production to the customer.

Have you introduced any new features/designs or latest technological upgrades that can enhance the utility of the crushing and screening systems?

On the classification plants we have four models of double deck and triple deck versions having capacities of 350 TPH and 500 TPH which can give 3 and 4 product output (Models MS 702/MS 703/MS 952/MS 953). All Kleemann machines are equipped with telematics, we have named it WITOS (Wirtgen Telematics) as standard feature inbuilt with the machine, this helps the customer to know the major machine breakdowns, engine parameters & service intervals sitting at his office.

All Kleemann classifiers are equipped with optional EPS system, which will enable the machine to work with grid power apart from diesel.

How do you look at the opportunities/future market/your target avenues for crushing and screening units?

Government policies like smart city initiative will give more focus to waste screen opportunity of classifiers and scalpers. Faster clearance and allotment of Iron ore mines will entrust the demand for C&S plants requirement in the mining sector. Government should focus more on the production output and should link it with bonus and performance clause which will give a good boost to C&S industry in these segments.

What are the major challenges in today’s context in the crushing and screening market?

There is an increase in demand for classifiers in the market. Our major challenge is on steel price increase & the delay in getting parts from our suppliers due to the lockdown impact. We are trying our best to optimise our product offering without compromising on the product quality and thereby meeting the demands of the industry.
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Aggregates are essential in every construction project. What do you think is the present market dynamics/demand drivers for the crushing and screening units?

The production of aggregates & M-sand is in upward direction due to investments in infrastructure projects & we expect this to continue in the coming years and this in turn is driving demand for capital equipment like Crushers & Screeners. There is shift in demand towards modular crushing solutions to augment capacity, customisation to improve plant efficiency. We are also serving the rising demand for mobile crushing and screening equipment, including electric hybrid track crushers for highway segment. Opening up of Iron Ore mining is another driver for mobile screening plants Terex is proud to be offering a wide range of equipment from Modular Autosand® cone crushers for sand manufacturing to Terex washing equipment for sand classification to Mobile crushers & more, thus fulfilling customer needs.

Additionally, there is a need for more rugged and smaller plants for use in the hilly regions, and in view of this, we will be soon launching our smaller range of crushing machines such as jaw crushers and impact crushers this year. These machines will be of 60, 70 and 80 ton/hour capacity, and can be transported on a small truck or trailer. They are being developed to cater to projects in the North-East and Himalayan regions as well for C&D crushing close to cities.

India is emerging as a top manufacturing hub in the world and our equipment manufactured at Hosur facility have the same quality standard as any other Terex factory.

Have you introduced any new features/designs or latest technological upgrades that can enhance the utility of the crushing and screening systems?

We recently launched Powerscreen Pulse™, an award-winning telematics solution across our Powerscreen range of crushing and screening equipment produced at our manufacturing facility in Hosur, India. Using Powerscreen Pulse, our customers gain deeper insights into how their machines and entire fleets are performing through dynamic, intuitive dashboards, filters and custom reports on the health and productivity of their equipment. No matter where Powerscreen customers are in the world, they can stay on top of production by accessing this accurate up-to-date information from their PC, tablet or smartphone. Key pieces of data that Powerscreen Pulse provides include cost analyses of fuel/throughput (i.e. cost per tonne), tonnages, maintenance status, monitoring of the machine operation (i.e. identify any misuse or abuse), utilisation trends and comparison, and machine location, which is particularly for rental fleets.

As crushing equipment operates in challenging and often remote work environments, telematics enables equipment owners to stay connected and keep track of their equipment. This pro-active use of Powerscreen Pulse provides the ability for the

India is witnessing rapid urbanization and so is the crushing & screening industry.

**AMOL SINHA**
General Manager, Product Support & Training, Terex India
Terex India team to communicate and collaborate with our distributors and customers, using the transparency of the machine data to; see how and where their machines are being operated, carry out fault-finding activities to ensure optimised performance/mitigate downtime, drive operational improvement, reduce idle time, and understand fuel consumption to drive a more fuel-efficient operation.

**How do you look at the opportunities / future market / your target avenues for crushing and screening units?**

India is witnessing rapid urbanization and so is the crushing & screening industry, fueling demand for faster construction which is a major driver for customers to move towards mobility. Terex is one of the first organisations to manufacture mobile plants in India that are best suited to meet the requirements of larger projects for completion in a relatively shorter period.

We are seeing a surge in demand for the manufactured sand (M-sand) with many states in India banning illegal river sand mining. The M-sand derived from crushed rock fines is a sustainable and viable alternative for construction needs and can also be manufactured in the vicinity of quarry sites, thus reducing transport cost and ensuring timely project completions.

The coal sector is set to grow rapidly for the next few years, so while we already have a range of equipment which customers are currently using in their coal mines, we are simultaneously preparing to launch new products that further meets the demands of this sector.

Customers are cost-sensitive but they are willing to pay for features which bring efficiency in costs and quality. Our Hybrid technology and Telematics are the perfect examples for this. In our kind of machinery, we don’t see rental or leasing but we are seeing purchase by sub-contractors but we are not seeing rental or leasing.

Terex India has been self-reliant ever since it began its operations in India. Localisation has been a major initiative for us. Majority of the machines are manufactured in our world class manufacturing facility at Hosur in Tamil Nadu.

We are working on various new product development projects for the Indian and regional markets, with multiple new models in the pipeline across crushing, screening, washing, lifting, conveying, and recycling applications. We are bullish on the long-term market opportunities for crushers and screens considering the Government’s National Infrastructure Pipeline plan, policy reforms in mining, Recycling of C&D Waste, Biomining under Swachh Bharat Mission.

We have invested in a service field force through our dealers, as well as at our end. The idea again is to ensure that all machines operate safely and with minimum downtime. These are some key points, apart from a well-designed, rugged, reliable product that differentiates us in the market.

**What are the major challenges in today’s context in the crushing and screening market?**

We have seen both ups and downs as far as India’s Crushing & Screening Industry is concerned. The Covid-19 pandemic created significant challenges, but we are starting to see strong revival this year. The long-term growth opportunities for the CE industry remain positive. While most of the demand for construction equipment is expected to come from the Infra sector, the mining sector would also raise a lot of demand for machines.

A slew of Government announcements is also helping the CE industry get back its growth momentum, such as the numerous new road projects announced. According to a recent report published by Allied Market Research, the mobile crushing and screening market is anticipated to reach $2,550 million by 2022, due to increased construction and mining activities in the emerging countries, such as India.
Aggregates are essential in every construction project. What do you think is the present market dynamics/demand drivers for the crushing and screening units?

India is the 2nd largest aggregate consumer in the world. With the heavy investment in the Infrastructure sector by the government of India, the overall demand for aggregates is bound to go up. Aggregate industry is very fragmented in India, mostly dominated by local players & small captive players who own small quarries & low capacity plants.

As the government is heavily focusing on infrastructure development, the demand for crushed & screened aggregates are required in huge quantity. Processing & producing aggregates at the matching pace of the infrastructure sector is the need of the hour and the demand for M-sand is on the rise due to the ban imposed on natural sand mining in several states of India. It is estimated that more than 50% of the M-sand demand comes from the road construction sector followed by construction and real-estate sector.

Have you introduced any new features / designs or latest technological upgrades that can enhance the utility of the crushing and screening systems?

We have recently further enhanced the weight distribution of our machines, thereby ensuring an even better experience for the operator and zero impact on the base machine and its boom. We already had the best in class parameters; we have now gone even beyond that level. We have also given India specific reinforcements in key parts of our machines. We have been able to do this thanks to our leadership in the market, internationally and in India.

How do you look at the opportunities / future market / your target avenues for crushing and screening units?

We see a relatively more positive growth prospect for our niche segment. This is owing to the fact that mobilisation and installation of other alternatives have much longer timelines as compared to our solutions. As the country kicks back into gear, contractors will be keen to promptly resume operations. With MB, you can start trenching, crushing and screening in a matter of a few days.

What are the major challenges in today’s context in the crushing and screening market?

Financing is one. Owing to the still not yet stabilised curve of cases stemming from this pandemic, there is still a bit of uncertainty. With uncertainty it is difficult to plan. Hence, for NBFCs it is difficult to frame the new criteria for creditworthiness of its clients which is in turn affecting machine sales. I do believe that the Government will ensure that liquidity is injected and that financing is re-opened; it is the only way to kick start the economy in an expedited manner. We work very closely with our clients and our finance partner in trying to find solutions whereby we all give a bit of extra effort in these extraordinary circumstances, for the mutual benefit of all.
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What is your macro-level outlook on the present demand trends of concrete equipment spanning across mixing line, transportation, and placements? What about the demand of higher capacity equipment with rising requirements of productivity?

The last 2 years have been challenging for the industry and in the quarter ending September 2021, CE industry posted a robust sales growth of 47%. So, we can see some green shoots and with the Government’s continued focus through different missions has increased the impetus and catapulted various infrastructure developments projects across India. The National Infrastructure Pipeline, an Rs 111 crore project by the Government which has been actioned upon, augurs well for the Indian construction equipment industry.

The infra projects awards tendering activity has started to pick up and majority of this is account by road projects. The road construction activity will gather pace from now on with the withdrawal of monsoon. Road construction has been a major volume driver for the CE industry with pace of execution pace in FY22, targeted at 40 km per day.

CRISIL estimates that the investment in Industry could rise by 30% in FY22-24 led by mega projects in High-Speed Rail, corridors, expressways, solar energy, affordable housing, airports apart from roads and railways. This projects pipeline and shortage of labour has led to increase in demand for higher capacity and productivity equipment like batching plants, boom pumps and transit mixers.

Catering to the demand trend, what are the newer and upgraded solutions you are offering across the concreting value chain? What has been the newer technological inclusion you have made in your machines (like new range of mixers for better mixing, higher engine horsepower, advancements in drum designs for the transit mixers, higher heights of boom placers with better flexibility for the truck mounted, newer pumping technologies for the stationery pumps and so on) and key deliverables therefrom?

Innovation & indigenization has been a way of life at AJAX, and we are proud self-reliant Indian company.

AJAY ANEJA
Chief Marketing Officer, AJAX Engineering
first locally made concrete slip-form paver. Today, we have a customer base pan India & across the globe. We support our customers with a network of dealerships and after-sales support touchpoints. AJAX offers world-class technology solutions to meet the growing customer demands for precision and efficiency to deliver profitability.

AJAX was the pioneer in bringing the concept of SLCM in India way back in 1992 and revolutionised the way of concreting in project sites. Over the years we have added new features like load cell weighing system for higher accuracy that has been patented. Further, we have introduced smart fleet telematics, rear view camera, admixture dosing units, bidirectional tyres, AC cabins, EH drum control, high pressure water jet, smart CBC etc., to name a few and many of these have been industry first keeping in mind our customers evolving needs. In August 2021, we introduced India’s first all new CEV Stage IV compliant ARGOs that offer the best-in-class benefits with excellent fuel efficiency as well as less down time due to longer service intervals ensuring very high reliability due to our high-quality standards.

The shortage of manpower and need for a quicker placement of concrete in inaccessible areas has necessitated the use of boom pumps in the current construction processes. Smaller 4X2 truck chassis mounted concrete boom pumps have been revolutionizing the construction of commercial & residential buildings and structures. With its short turning radius and lower cost, it offers higher productivity and efficiency to the customers. We have also built a patented product self-propelled boom pump which is again an Industry first which eliminated the need for a truck chassis and offer even shorter turning radius. With its 4X4 capability, it can reach anywhere in any terrain making it easing for customer to do difficult, narrow access concreting jobs.

AJAX has also designed and manufactured India’s first and only slip-form paver to build concrete roads up to 12 meters thereby eliminating the need for customers to import pavers from outside the country. We are proud to say that it has worked rigorously for over 2500 hrs and has built over 100 kms of concrete road in India, and we are confident of offering it for sales in India and abroad in coming quarters.

AJAX has charted an investment of Rs 140 crore to build a new manufacturing facility and design centre in Bangalore. These investments will further help AJAX in innovation and indigenization to follow the Atmanirbhar Bharat mission and meeting the growing demands in North Africa, Middle East, and Asia (MENA).

The roadmap ahead for AJAX Engineering is to be a next gen 360° concreting solutions company. We have aligned ourselves in line with the GoI’s investment plans in the Indian infrastructure segment in order to cater to the requirements of customers from residential & industrial building projects to metro rail corridors, railways, irrigation canals, aqueducts, solar power plants, road tunnels & bridges, airports, and smart city projects. Our concreting solutions have been the preferred choice of contractors across the country.

Way forward in another five years, we see ourselves emerging as an Indian MNC and to be among the top 3 international players in the concrete equipment space. A company that truly believes in the “Made in India; Made for the World” mission.

What are the newer challenges on way towards after sales services with the rising population of equipment, disruptions in skilled manpower, training, and also in parts supply owing to rising transportation costs? How do you propose to address these issues?

AJAX has a widest network of dealers for product sales & after sales support among all concrete equipment players in the country. Currently, AJAX has 35+ dealers and 100+ touch points PAN India. AJAX serves the international market through 16+ international distributors and has its presence in Asia-pacific, Middle East, and North African (MENA) regions.

The network is equipped with a full-fledged team of skilled engineers trained to handle both preventive and general maintenance. They offer (MRO) for the equipment that ensures the best value for money to customers. AJAX Customer Care can be reached 24X7 for any queries and requests, thereby enabling round-the-clock support. AJAX offers excellent serviceability options to ensure maximum uptime of the machines thereby enhancing customer satisfaction to a greater level.
CONCRETE PAVING: Wirtgen Sets World Record

During the construction of a motorway between the major Indian city of Vadodara and the global metropolis of Mumbai, the Wirtgen SP 1600 was able to demonstrate its impressive performance potential and set four world records. The major Vadodara-Mumbai Expressway project is part of the 1,350 km Delhi-Mumbai Expressway linking India’s capital New Delhi and Mumbai. The construction project is part of the country’s National Highways Development Project, passes through six states and, due to its size, has been divided into more than 50 individual sub-projects awarded by the National Highways Authority of India (NHAI). Initially, the roadway will be widened to eight lanes, with four lanes in each direction. Looking ahead to the future, however, sufficient space has been set aside in the middle of the road to allow four additional lanes to be added. The motorway, often referred to as the backbone of the Delhi-Mumbai Industrial Corridor, cuts travel time between Delhi and Mumbai from 24 to 12 hours. In addition, it significantly shortens the travel distance between the two cities due to the direct connection. This has a positive effect on fuel consumption and thus also on exhaust emissions and, in no small measure, on the costs incurred on the route. The NHAI (National Highways Authority of India) expects an average daily traffic volume of 100,000 PCE (passenger car equivalent units). A project of this size calls for maximum concrete paving performance, both in terms of output and quality.

CONSTRUCTION PROJECT
• Expansion of the Delhi-Vadodara-Mumbai Expressway
• Length of the entire construction project: 1,350 km
• Planned completion of the entire project: January 2023
• Length of the construction section (km 292 – km 323): 31 km
• Measured distance for the world record: 2.56 km (1.28 km in both directions)

PARAMETERS
• Window of time for the world record: 24 hours
• Paving width: 18.75 m
• Paving thickness: 300 mm
• Paving of pavement quality concrete (PQC)
• Machine-integrated, fully automatic insertion of dowel bars and tie bars

MACHINES USED
• SP 1600 (modified for paving width of 18.75 m)
• TCM 180 (modified for paving width of 18.75 m)

CONSTRUCTION COMPANY
• Patel Infrastructure

CONCRETE PAVING RECORDS
At temperatures around 28 degrees Celsius, winter in this region, the record attempt started.
on 1 February 2021 at 8:00 a.m. and ended 24 hours later. Using the modified Wirtgen SP 1600, Patel Infrastructure Pvt. Ltd. succeeded in completing a four-lane motorway, including hard shoulder, with a working width of 18.75 m over a distance of 2.56 km within 24 hours – a new world record. In fact, a total of four world records were entered into the India Book of Records and the Golden Book of World Records in

**CONNECTION WITH THE CONSTRUCTION PROJECT**

- Largest quantity of PQC paved in 24 hours – 14,613.30 m³
- Largest volume of PQC produced in 24 hours – 14,370 m³
- Longest continuous section with a width of 18.75 m paved with PQC in 24 hours – 1,280 m
- Largest area of a motorway paved with PQC in 24 hours – 48,711 m²

**USING FLEXIBILITY & INNOVATION**

The SP 1600 slipform paver cost-effectively paves concrete surfaces for traffic areas, roadways, industrial areas or surfaces at airports, such as runways or taxiways, with a working width of up to 16 metres and with unparalleled precision. It can be used, for example, to pave full-width motorways in a single pass. But sometimes even that isn’t enough. Thus, the team from Wirtgen R&D department worked closely with Patel Infrastructure Pvt. Ltd. to develop a customised special solution for the company. The machine and, in particular, its concrete unit, was extended to a working width of 18.75 metres. This involved, on the one hand, additional extension elements for each component, including the extremely complex dowel bar inserter. On the other hand, the machine has to be able to compensate for the enormous amount of additional weight and still be capable of high-precision levelling. The TCM 180 texture curing machine was also adapted to the working width of 18.75 metres in order to apply a dispersion to the concrete surface behind the slipform paver as protection against evaporation.

**ONE-OF-A-KIND SUPPORT FROM SERVICE TEAM**

To ensure that the customised machine always ran smoothly, the construction project was supported by four Wirtgen technicians. Every hour, a total of 45 transport vehicles delivered concrete to the construction site to provide the slipform paver with sufficient material. In order to be able to process this enormous quantity of concrete in such a short time, the paving process had to be carried out at an average speed of 1.8 m/min. Approximately 30,000 dowel bars and tie bars were inserted using the built-in automatic dowel bar inserter (DBI) and the central tie bar inserters (CTBI), providing the structure with the necessary stability and ensuring that the slabs are bonded together properly to withstand traffic loads for many years to come.

**SP 1600 INSET PAVING TRAIN ON THE ROAD TO SUCCESS**

The world records speak for themselves. With its specifications, the SP 1600 is synonymous with unparalleled concrete paving performance. But long-term reliability also plays a critical role on the road to a successfully completed project. As such, the slipform paver was not only able to complete its work on the section measured for the world record, but now, in the meantime, this entire stage of construction. The slipform paver team from Patel Infrastructure has many more miles to go in this major project, however, and continues to rely on the Wirtgen SP 1600 paving train.
India has been investing at a prolific rate into infrastructure, urban development, highways, expressways and some ambitious high speed railway lines which are under construction or being planned for next decade.

While the consultancy firms, designers and engineers are involved in developing the most optimistic specifications, DPRs for these developmental projects, our home grown Indian MSMEs and niche market players also play a significant role in addressing few specific challenges where they have expertise in. One such challenge being faced in India or across the globe is erosion of soils and we here are discussing about how to address it in a bio-engineering approach which will be Environmentally Sustainable and compliments UNs Sustainable Development Goals (SDGs) Goal 9, 11, 12 & 13.

Let’s understand erosion, its causes and solutions to mitigate associated risks. The erosion of topsoil is one of the major challenges faced in India and across the world. It may be due to natural factors like rainfall, winds, temperature changes, natural weathering or human induced factors like infrastructure developmental activities, construction involving large scale cutting or building high embankments. Factors such as topography, climate, soil type and vegetation cover mainly influence the erosion process. High intensity rainfall, flash floods can trigger erosion process even on some the stable embankment and cutting slopes.

Whatever be the reasons for this erosion it has been having a cascading effect and needs some engineering intervention to control it at the root of the problem. The run-off from rainfall leads to rain cuts on the soil slopes or embankments which in turn lead to failure of highway or railway embankment slopes or the hill cutting zones created for infrastructure or utilities. It’s evident that healthy top soil, vegetative cover on ground and erosion are all interrelated.

To deal with this problem, Garware Technical Fibres has been using its unique bio-engineering solution “Garmat Supreme” erosion control mat (ECM) which is specifically designed to solve difficult erosion problems. The ECM is a photodegradable erosion control mat manufactured from long-term double net and 100 percent coconut fibre blanket with a 36-month functional lifespan.

The coconut fibre is equally dispersed over the entire area of the mat, giving the blanket a consistent thickness. Heavyweight photodegradable polypropylene netting with ultraviolet compounds to prevent deterioration and a sufficient mesh opening is used to cover the top and bottom sides of the coir blanket.

During the initial period of vegetation growth, the biodegradable mulch material provides a high level of protection. It also encourages vegetation development by conserving moisture and conditioning the soil. Synthetic nets improve the effectiveness of vegetation in both the short
and long term. While the degrading coconut fibres provide the top soils with much needed nutrients, nitrogen content and initial support for vegetation growth.

The application of ECM can be slope as well as channel stabilization. The goal of slope stabilisation is to create an over layer that stabilises the soil, dissipates the effect of raindrops, and supports new plant. Through channel stabilization, it makes the open channels non-erosive. Apart from that it prevents deposition of sedimentation and provides adequate capacity for water management.

**NEED FOR VEGETATIVE COVER**

Now that we have learnt about Erosion Control Mat by Garware and its uses, let us try to understand the need for vegetative cover. One of the central uses of having a vegetative cover is that it protects the surface from erosion cause by water as well as wind. The vegetative cover helps to absorb the impact of rain & binds the soil particles. Additionally, it improves the ability of the soil to absorb water, controls velocity of runoff water & helps in removing subsurface water between rainfalls through the process of evapo-transpiration.

The mechanism to manage erosion is to maintain a balance of shear stress and shear strength. A slide happens when the shear stress on any surface of a soil mass exceeds the available shear strength. The total of the components attributable to cohesion and frictional resistance is the shear strength available. Shear strength is essentially a function of the effective normal stress and the effective angle of shearing resistance in materials with little or no cohesiveness. Due to a loss in shear strength and/or a rise in shear stress, a slope that was initially in a state of equilibrium could become unstable. A shallow or deep-seated failure could occur depending on the site conditions.

**GARWARE’S ROLLED EROSION CONTROL PRODUCTS**

Apart from the temporary (photodegradable) erosion control mats, Garware also offers permanent turf reinforcement mats under its range of rolled erosion control products (RECP). Garware’s rolled erosion products have several benefits, including reducing soil erosion, conserving soil moisture, boosting seed germination, protecting seeds and seedlings from heavy rainfall, and allowing for better vegetation settling.

So, what’s the difference between temporary and permanent RECPs? Temporary RECPs are employed in areas when natural vegetation is insufficient to provide permanent erosion protection. On the other hand, the permanent RECPs provide a long-term protection against soil erosion where natural vegetation cannot solely sustain expected flow conditions.

**GTFL EXPERIENCE**

Garmat has been conceptualized and created in line with the vision of GTFL to provide new age solutions for preserving the critical infrastructure while also saving the environment. It has been our aim since the beginning and our endeavours are always focused on that direction. GTFL is a forward-thinking company that is heavily influenced by Japanese Kaizen ideals. This means that the emphasis is on both ongoing enhancement of existing products and the conceptualization of new ones.

Garware’s ECM has a number of significant advantages over traditional biodegradable meshes composed of coir or jute, which are commonly used for erosion prevention. It gives significantly better covering of the surface, resulting in a high level of protection, because it is made up of a continuous mat of fibrous material. This is especially important in instances where the vegetation may take a long time to properly grow. During the early phases of growth, the mat provides protection, which helps to keep the vegetation alive. Ordinary meshes with open openings can only provide a much lower level of security.

GTFL’s Geo-synthetics Division currently has a portfolio of offerings for the infrastructure and environmental sectors, including product supply, design and installation services, design and supervision services, and solely specialist design services, as needed. With GARMATSupreme erosion control mat, GTFL is continuing the important work of providing the best solutions through a product that is biodegradable and unique in its own capacity.
Energy is inarguably the indispensable force that drives all the economic activities. Consumption of energy has been one of the key indicators of economic growth of any country, since the beginning of the industrial age.

Using different forms of energy has transformed standard of living for billions of people, enabling them to enjoy a level of comfort and mobility. India, which has the second largest population after China, took too long to understand the need to harness the latent potential of the natural resources of energy.

For long, India had not exploited the potential of non-conventional resources, due to various reasons, including higher cost of power and inadequate technical know-how, among others. However, with the advancements in technologies and the urgent need to address challenges of climate change, India took a major decision to increase its renewable energy generation capacity to as much as 450 GW by 2030, out of which, about 280 GW (over 60%) is expected from solar.

OVERVIEW

In the year 2014-15, the total installed renewable energy capacity was only 39.55 GW, according to the annual report of the Union Ministry for New and Renewable Energy. However, due to the concerted initiatives taken by the government both at the state and Central levels, India managed to increase its installed capacity of renewable energy to 92.54 GW, excluding large hydro projects.

During the period from April 2014 to January 2021, the installed RE capacity of India has increased by two-and-half times, and in the same period, the installed solar energy capacity has increased 15 times. Globally, today India stands at the fourth position in the renewable energy, fourth in wind power, and fifth in solar power capacity.

As per Global Trends in Renewable Energy Investment 2020 report, during the period 2014-2019, renewable energy programmes and projects in India attracted an investment of USD 64.2 billion or Rs 4.7 lakh crore. During the period from April 2014 to January 2021, the installed RE capacity of India has increased by two-and-half times, and in the same period, the installed solar energy capacity has increased 15 times.

As of September 2021, India had 101.53 GW of renewable energy capacity and represents 38% of the overall installed power capacity. In September 2021, installed capacity of hydro projects in India reached to 46.5 GW, while capacity of small hydro plants reached to 4.8 GW.

As India looks to meet its energy demand on its own, which is expected to reach 15,820 TWH by 2040, renewable energy is set to play an important role. By 2030, renewable sources are expected to help meet 40% of India’s power needs.

"India is on the cusp of large changes in the renewable energy sector with an aspiration of 50%
penetration by the end of the decade from the current 20%. India can achieve the ultimate milestone of cost-effective round-the-clock renewable power with right interventions related to technology, regulatory & policy ecosystem, business models and trained workforce across the entire RE value chain,” said Dr. Ajay Mathur, Director General, International Solar Alliance said at a CII event.

GOVERNMENT INITIATIVES
Realising the urgency to address the challenges posed by climate change, India, under the leadership of Prime Minister Narendra Modi, became a part of the Paris Agreement that aims at reducing carbon emissions. Under the Paris agreement, India has committed to cut the intensity of greenhouse gas emissions of its gross domestic product 33% to 35% by 2030, increase non-fossil fuel power capacity to 40% from 28% in 2015 and substantially boost forest cover to reduce carbon.

Under the Paris Agreement, the government initiated the Nationally Determined Contributions (NDC) for the period 2021-2030, which aims at reducing the emissions intensity of its GDP by 33-35 percent by 2030 from 2005 level and achieving about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030 with the help of transfer of technology and low cost international finance.

At the COP 26 summit in Glasgow, India has announced that it will meet 50% of its energy requirements from renewable energy; installed capacity of non-fossil-fuel energy in India will stand at 500 GW; emissions intensity of the country’s GDP will drop by 46-48% from 2005 levels; and that its carbon emissions will be lower by one billion tons by 2030.

Some of the initiatives announced to boost renewable energy sector are:
- New rules for the purchase and consumption of green energy to encourage large-scale energy consumers to leverage renewable energy sources for regular operations.
- To encourage rooftop solar (RTS) throughout the country, the government has undertaken Rooftop Solar Programme Phase II, which aims to install RTS capacity of 4,000 MW.
- Union Cabinet has approved a Memorandum of Understanding (MoU) between India and France in the field of renewable energy cooperation.
- Gram Ujala, an ambitious programme to include the world’s cheapest LED bulbs in rural areas for Rs 10.
- In the Union Budget 2021-22, MNRE was allocated Rs 5,753 crore and Rs 300 crore for the ‘Green Energy Corridor’ scheme.
- The Budget 2021-22 has provided an additional capital infusion of Rs 1,000 crore to SECI and Rs 1,500 crore to Indian Renewable Energy Development Agency.
- To encourage domestic production, customs duty on solar inverters has been increased from 5% to 20%, and on solar lanterns from 5% to 15%.
- A USD 238 million National Mission has been announced for advanced ultra-supercritical technologies for cleaner coal utilisation.

CHALLENGES
According to Tejus AV, Chief, Wind and Solar Farms, CleanMax, the biggest challenges the industry is currently facing is on policy uncertainty and the constant changes in the policies. “Since various states such as Karnataka, Gujarat, Maharashtra, Tamil Nadu, and Chhattisgarh are all forming new open access policies, but these open access policies will need to be designed for at least five years, that will give developers certainty to plan ahead. The policy uncertainty around energy banking & ISTS across India needs to end and the policy around it needs to be eased keeping the changing dynamics in mind to encourage private sector to significantly increase renewables in their overall energy mix,” he said.

Vipula Sharma, Director -Ratings and Head - Infrastructure Ratings Brickwork Ratings noted that the primary roadblocks seem to be the deteriorating financials of the discoms and the grid infrastructure enabling the evacuation of power from the remote areas where the utility scale power plants need to be set up.

Another challenge is that India is currently importing around 80%-85% of its solar modules which is the major cost in a solar project. “The issues in China over the last one year has led to increase in the module prices and hence increasing the tariffs in recent bids. India has around 7-8GW of module and around 2GW of cell manufacturing operational capacities respectively, though the domestic module prices are still not competitive internationally due to highly subsidized Chinese capacity. Also, the solar modules are ultimately manufactured from polysilicon where India has no refining capacity at
all,” opined Nitin Bansal, Associate Director, India Ratings and Research.

With the announcement of PLI scheme of Rs 45 billion, the dependency on imports is likely to reduce, as the private sector is investing in module and cell manufacturing capacities to the tune of 13-14GW and 7GW respectively.

“India however would still remain dependent on import of basic raw materials including polysilicon and wafers until there are large investments to be done in poly silicon manufacturing to indigenize the entire value chain. One such 4GW Giga factory is planned by Reliance Industries, however it is still much less than the required capacity,” Bansal added.

A recent report by technology group Wartsila & KPMG stated that managing India’s power system is becoming increasingly complex as its resource mix includes more weather-dependent and decentralized energy sources. To deal with such complexity, the system operator needs greater operational flexibility in order to reliably serve the load, which means an increased need for ancillary services to keep the grid stable.

FUNDING CONCERNS
While India has made great strides in increasing its solar and wind generation capacity, increasing its generation to planned levels needs serious investments in the grid infrastructure to remote areas as also increased regional coordination to enable easy energy flow from surplus to deficit areas, Sharma noted.

“Reaching a capacity of 500 GW would however require an addition of around 350GW in the next 8 years meaning an average addition of 40 GW each year which is a substantial jump over the average of 8-10 GW added each year over the last decade. This addition of renewable energy generation has been largely driven by private sector investment. The increased pace of addition of capacity will need very large funding. While the government has recently taken proactive measures both by way of changes in procedures as well as funding support to the discoms to smoothen the roadblocks faced by the sector, attracting this level of funding for the sector would require several systemic changes for the sector,” she added.

Though it makes sense economically for increasing the renewable addition, however the capital required for such large capacities can become a road block both from the debt and equity side, noted Bansal.

HYBRID MODEL
The other major addition of around 130GW would need to come from wind sector where the capacity addition CAGR growth in the last 5 years is just 7%. The wind additions were high before FY18, when the projects were on feed-in-tariff basis. Though the economic viability remained with the reduction in tariffs with introduction of competitive bidding in wind sector, the issues faced including land acquisitions has derailed the growth.

“The focus on the hybrid renewable will add up to the wind capacities in coming years. Though both solar and wind power are infirm in nature however given the complimentary nature of generation, a hybrid plant has more firm supply than individual power to the off taker and hence the wind addition shall continue, though the issues need to be addressed to enable such large growth,” Bansal noted.

According to Tejus, hybrid power was a niche concept in 2012-14 in India. But today, India is amongst the very few countries that have demonstrate to the world it is possible to integrate wind and solar hybrid projects seamlessly into its grid. In future with battery storage combining with hybrid energy projects, it will make this more interesting proposition.
STEPS NEEDED & WAY AHEAD

COP 26 commitments can be met if India consistently adds at least 35 GW of RE capacity annually, duly supported by at least 2500 MW of battery storage systems.

Sandeep Sarin, Head - Market Development and Policy, Wartsila India, said, “Given how our power market is structured today, we need to ensure that our grid is equipped to integrate 450 GW of renewables by 2030. We need more resources such as thermal balancing power plants, as well as battery storage to manage system imbalances caused by the intermittency of renewables, and to support the grid during periods of renewables drought. Apart from Solar and Wind, the Government should focus on changing the way our power market is structured to offer enough incentives for investments in flexible technologies. The joint study Electricity market design for efficient procurement of ancillary services in India to address changing system needs by Wartsila and KPMG makes a case for power market reforms in India using power system simulation models.”

Currently the contribution of renewable energy is less than 15% in the overall generation and it needs storage systems like batteries for grid balancing in case it goes above a certain threshold of 15-17% due to its infirm nature.

“Hence these high annual installation targets if installed would come with an associated cost of storage in future. Hence the policy level initiatives from government would continue to be required so that discoms continue to tie up the renewables in case of increase in cost than other sources,” Bansal added.

According to Mathur, solar PV modules, batteries and electrolyzers as the key technologies that would bring about the transformation in RE sector in India. “There is a need for collaboration among various stakeholders,” he added.

Saurabh Gupta, Deputy Managing Director, Microtek International has opined that the local electrical equipment industry has a critical role to play in meeting India’s renewable energy targets as well as the overall carbon reduction targets under the Paris agreement.

“India has set an ambitious target of having 175 GW renewable energy capacity by 2022, 450 GW by 2030. In order to meet RE capacity India will require new age equipment and local players will play a pivotal role in achieving the target. The industry needs encouragement in the form of incentives so that production is boosted and research and development work is carried out in the sector. If industry and the government are in sync, India can even surpass its energy efficiency and climate change targets,” he added.

According to MNRE, with installed renewable energy capacity including hydro has crossed 150 GW and about 63GW is under construction then it could mean installing another 290 GW of capacity addition split across wind, solar PV and hydro in 9 years.

“So to achieve this we will have to double our current installation rate to around 26 GW per year to meet this deadline, which is a very ambitious target. As effects of climate change have started impacting lives and livelihoods across the world including India, having this ambitious target is the need of the hour. As storage technologies start becoming commercially viable this target will be more attractive,” Tejus added.

To achieve the targets, the Indian power industry needs to develop significant energy management capabilities. We will require to consider investments in grid modernization to ensure a sustainable energy transition. This will entail the adoption of smart digital grid solutions to manage the risk of grid instability, AI-enabled technologies, and systems to improve overall operational performance and enable integrated planning, and a higher degree of customer engagement.

“We will also require significant amount of energy storage technology to manage the increased influx of renewables, especially wind and solar which bring tremendous challenges to operate the grid, primarily due to the intermittency associated with them. Unfortunately, the pandemic has set us some steps back. We need to build capacity, flexibility, and resilience to integrate increasing amounts of intermittent renewables and distributed energy,” Karthik Krishnamurthi, Country Head, Marketing and Sales, Hitachi Energy India concluded.
The targets set by the government are quite ambitious. Do you feel these are realistic? Can you throw some light on the current scenario in terms of installed and operational capacities?

I think, recently the government did announce that it plans to increase non-fossil capacity to 450 GW and 50% of energy requirements to be met from renewable energy resources by 2030. So according to MNRE with installed renewable energy capacity including hydro has crossed 150 GW and about 63GW is under construction then it could mean installing another 290 GW of capacity addition split across wind, solar PV and hydro in 9 years. So to achieve this we will have to double our current installation rate to around 26 GW per year to meet this deadline, which is a very ambitious target.

As effects of climate change have started impacting lives and livelihoods across the world including India, having this ambitious target is the need of the hour. As storage technologies start becoming commercially viable this target will be more attractive.

The GatiShakti programme seeks to enhance the renewable energy capacities. Besides, the focus on e-mobility is expected to drive the demand for renewable energy. How do you assess the opportunities in the wake of the GatiShakti programme? Can you share your views on how far we have managed to achieve success in the hybrid model?

GatiShakti program is envisioned to integrate various department to leverage technology for faster project clearance and reduce reworks. This program can unleash the potential of single window clearance of renewable energy applications across states, departments, and sectors. If implemented with progressive policies, it has a huge potential to unlock and integrate renewable energy projects across highways, food & agriculture storage facilities, industrial clusters, transportation, and many others.

Hybrid power was a niche concept in 2012-14 but today India is amongst the very few countries that have demonstrate to the world it is possible to integrate wind and solar hybrid projects seamlessly into its grid. In future with battery storage combining with Hybrid energy projects, it will make this more interesting proposition.

What are the challenges faced by sector players like you and what measures need to be taken to ease out these issues? Tell us about the fund raising/financial closure challenges faced by the sector players?

Biggest challenges the industry is facing is on policy uncertainty & the constant changes in the polices. Since various states such as Karnataka, Gujarat, Maharashtra, Tamil Nadu, and Chhattisgarh are all forming new open access policies, but these open access policies will need
to be designed for at least five years, that will give developers certainty to plan ahead.

The policy uncertainty around energy banking & ISTS across India needs to end and the policy around it needs to be eased keeping the changing dynamics in mind to encourage private sector to significantly increase renewables in their overall energy mix.

Also, for developer’s the recent change in GST is difficult to absorb within their under-construction project cost and it will eventually be passed through as increase in tariffs. Additionally, the commodity prices are hitting the roof which has increase project costs by 35-40 per cent within six months.

All these issues are creating a lot of pushbacks from customers, investors, lenders which will eventually result in delayed financial closures and project over run.

Also, what is your take on technological advances, and the need to reduce costs? Tell us about your growth plans by 2025.

We believe that technology advances across renewables (wind/ solar) is happening and cost per unit has been reducing since many years. Today India has become one of the lowest-cost producer of solar power.

Now, we need to focus on making renewable energy more reliable by giving a boost to storage which will help us to use renewable energy 24/7. This is where technology and policies should support in making renewables more accessible across the country for everyone. Since I believe that going forward renewable energy sector will grow faster as storage solutions start becoming economically viable.

CleanMax will continue to focus on the commercial & industrial segment in India as well as expanding in Middle East & South East Asia and we are planning to enhance our operating capacity from current level of around 750+ GW to around 2 GW in the next three years.

CleanMax has really taken a lot of efforts to bring in Hybrid wind solar offerings to its C&I customers and has demonstrated higher renewable energy generation, some of our clients have even achieved their RE100 goals.
India currently ranks 4th worldwide in installed renewable energy capacity. The renewable capacity excluding large hydro capacity has grown with a CAGR of 16% in the last 5 years with total renewable capacity growth to 103GW by October 2021 as against the thermal capacity growing at a CAGR of 2% in the same period clearly indicating the thrust on renewables. The government clearly remain focused on renewables announcing a further increase in reliance on renewables and reduce the carbon intensity and to adopt a net zero target by 2070 at COP26 summit in 2021. The government has already increased the December 2022 target of 175GW to 450GW by December 2030.

Out of 450GW, a total of 280GW would come from solar against a 48GW capacity at October 2021 requiring around 25GW annual capacity addition in the next 9 years. The existing solar tariffs at around Rs 2.5-2.7/unit factoring in higher commodity prices and increase in duties on imported panels are still cheaper than thermal and hence makes economic case to install such large capacities. The reduction in the solar module prices over the last decade has made solar tariffs cheaper as compared to NTPC’s average realization of around Rs. 3.8/unit. Though the raw material price reduction over the last decade played a large part however initiatives by government such as bringing in SECI as off-taker reducing the counterparty risk, must run status to renewable power, no transmission charges associated with renewable projects along with development of large solar parks has brought in confidence among the developers to develop large capacities annually. However currently the contribution of renewable energy is less than 15% in the overall generation and it needs storage systems like batteries for grid balancing in case it goes above a certain threshold of 15-17% due to its infirm nature. Hence these high annual installation targets if installed would
come with an associated cost of storage in future. Hence the policy level initiatives from government would continue to be required so that discoms continue to tie up the renewables in case of increase in cost than other sources.

India is importing around 80%-85% of its solar modules which is the major cost in a solar project. The issues in China over the last one year has led to increase in the module prices and hence increasing the tariffs in recent bids. India has around 7-8GW of module and around 2GW of cell manufacturing operational capacities respectively, though the domestic module prices are still not competitive internationally due to highly subsidized Chinese capacity. Also, the solar modules are ultimately manufactured from polysilicon where India has no refining capacity at all. With the announcement of PLI scheme of Rs. 45 billion, the dependency on imports is likely to reduce, as the private sector is investing in module and cell manufacturing capacities to the tune of 13-14GW and 7GW respectively. India however would still remain dependent on import of basic raw materials including polysilicon and wafers until there are large investments to be done in poly silicon manufacturing to indigenize the entire value chain. One such 4GW Giga factory is planned by Reliance Industries Limited, however it is still much less than the required capacity.

The other major addition of around 130GW would need to come from wind sector where the capacity addition CAGR growth in the last 5 years is just 7%. The wind additions were high before FY18, when the projects were on feed-in-tariff basis. Though the economic viability remained with the reduction in tariffs with introduction of competitive bidding in wind sector, the issues faced including land acquisitions has derailed the growth. The wind tariffs also remained higher as compared to solar as wind sector had no advantage like solar where polysilicon prices declined sharply shifting the off-takers focus to the solar. However, the focus on the hybrid renewable will add up to the wind capacities in coming years. Though both solar and wind power are in firm in nature however given the complimentary nature of generation, a hybrid plant has more firm supply than individual power to the offtaker and hence the wind addition shall continue, though the issues need to be addressed to enable such large growth.

Though it makes sense economically for increasing the renewable addition, however the capital required for such large capacities can become a road block both from the debt and equity side. A back of the envelop calculation suggest that to reach 450GW target, it would require additional capital of USD270 billion over the next 9-10 years requiring large equity and debt commitments. The domestic banking system has already seen large NPAs in private sector thermal projects in the last decade. Though, in renewables, the nuances of credit risk are different as due to low gestation period, the capex cost overrun are usually restricted or small as against a thermal project. With maturity of the solar and wind sector in India, investors including banks do have better understanding on the renewable financing models.

Also, other than domestic markets, the global markets are now more accessible given the focus shifting from coal projects to clean energy. Further, the annual equity requirement at around USD8 billion is also huge compared to the cash flows available post debt servicing for large power entities and hence the sector is seeing increased participation of foreign players on standalone basis or in collaboration with existing players to provide impetus to the required growth. The increasing focus on ESG is leading to increasing investments by global energy giants like Total Energies, Shell in India.

Given the tariffs in the industry are very competitive and is fixed for the next 25 years with no pass- through unlike coal-based projects with long term PPAs, the majority of the risk remains with the technology and the timely cash flows to service the debt. The weak financial health of state discoms along with states not adhering to PPAs have cautioned the investors for a calibrated growth. The turnaround of discoms in future bringing the required discipline for timely cashflows can help in bringing more confidence to both debt and equity investors and help in achieving the required growth.

Government has already increased the December 2022 target of 175GW to 450GW by December 2030.
As part of the Nationally Determined Contributions, India had committed to achieving 40% of the installed capacity of power generation from non-fossil sources by 2030 at COP21 and MNRE has announced that India has already achieved the target by November 2021 itself with 150.05 GW of renewable energy and 6.78 GW of nuclear energy out of the total installed generation capacity of 390.80 GW and will install 500 GW of renewable energy capacity by 2030. This achievement underlines India’s strong commitment to the transition from coal to renewable sources.

The rapidly falling tariffs for solar and wind power units have made the renewable generation cheaper than fossil fuels enabling the country to fulfill its developmental agenda of increasing the electricity access by rural electrification and reducing the power costs for the ailing discoms while reducing the carbon footprint with an increasing proportion of clean energy in its power mix. The recent announcement allowing discoms to discontinue procuring power from CGS where the PPAs have been in place for more than 25 years will also allow the discoms to procure more power from clean sources. This year the Government has also announced a Rs.4500 crore PLI for solar PV module manufacturing and proposes to increase this to Rs 24000 crore. This is expected to increase the solar equipment manufacturing capability by around 10000MW.

While India has made great strides in increasing its solar and wind generation capacity, increasing its generation to planned levels needs serious investments in the grid infrastructure to remote areas as also increased regional coordination to enable easy energy flow from surplus to deficit areas.

At the COP 26 summit in Glasgow, India has announced that it will meet 50% of its energy requirements from renewable energy; installed capacity of non-fossil-fuel energy in India will stand at 500 GW; emissions intensity of the country’s GDP will drop by 46-48% from 2005 levels; and that its carbon emissions will be lower...
Reaching a capacity of 500 GW would however require an addition of around 350GW in the next 8 years by one billion tons by 2030.

Reaching a capacity of 500 GW would however require an addition of around 350GW in the next 8 years meaning an average addition of 40 GW each year which is a substantial jump over the average of 8-10 GW added each year over the last decade. This addition of renewable energy generation has been largely driven by private sector investment. The increased pace of addition of capacity will need very large funding, While the government has recently taken proactive measures both by way of changes in procedures as well as funding support to the discoms to smoothen the roadblocks faced by the sector, attracting this level of funding for the sector would require several systemic changes for the sector.

The primary roadblocks seem to be the deteriorating financials of the discoms and the grid infrastructure enabling the evacuation of power from the remote areas where the utility scale power plants will need to be set up. While the Covid funding support to the discoms has provided a temporary lease of life both to the discoms which have seen reduced interest costs and the generators whose receivables have reached manageable levels, the ACS-ARR gap for the discoms needs to be addressed along with the T&D losses and the overall operational efficiency of the system. The transmission and the SDLC infrastructure need to be strengthened to source power from these locations. The intermittency of the green sources needs to be managed better. Systems for Planning and Forecasting of demand to manage the sourcing schedules better is required. Coordination of the disparate state regional transmission systems would be required.

Several states including Gujarat, Uttar Pradesh, Karnataka, and Rajasthan have attempted to renegotiate the older PPAs with the renewable power companies. Andhra Pradesh went ahead and cancelled several PPAs since 2019. The Courts directed the State discoms to pay the generators the dues at a lower tariff of Rs 2.44 per unit which was not sufficient to meet the debt liabilities which were taken by these companies to meet the large capital costs at the time. The final verdict is yet to be announced. Punjab has now passed a legislation enabling the State to cancel PPAs which had higher tariffs of around 7 per unit vs the current tariffs of Rs 2 - 2.44 per unit. These measures by the States will affect the future funding into the sector. These are the states that are the focus states for furthering the solar agenda of the country. The uncertainty introduced by the measures will slow down the private equity funding while the banks will be saddled with non-performing assets from the loans to the older units.

Managing the expectations of the various stakeholders and consumers while pursuing the committed agenda for reduction of its carbon footprint is a tough road ahead for the Central Government. We need to keep moving ahead in reducing reliance on fossil fuels while improving electricity access.
Indian power industry needs to develop significant energy management capabilities to achieve RE targets.

Karthik Krishnamurthi
Country Head, Marketing and Sales, Hitachi Energy India

The targets set by the government are quite ambitious. Do you feel these are realistic? Can you throw some light on the current scenario in terms of installed and operational capacities in the renewable segment?

Yes, India is well on track to achieve its renewable energy targets. At the COP26 climate summit, India has upgraded its 2030 target to 500 GW of renewable energy capacity from 450 GW and committed to reaching net-zero by 2070. According to MNRE, the installed renewable energy capacity at present is approximately 150 GW including large hydro projects, 31GW is under installation and 35GW is underbidding process. With consistent efforts and implementation of the right policies, India will achieve the renewable energy milestone of 200GW by 2022. Today, India stands at 4th position in the world in terms of installed renewable energy capacity, 5th in solar, and 4th in wind in terms of installed capacity. Through government support and the right investment climate, the road ahead needs further acceleration of these targets to help India ultimately achieve its renewable energy targets.

The GatiShakti programme seeks to enhance the renewable energy capacities. How do you assess the opportunities for growth of the sector? Can you share your views on how far we have managed to achieve success in the hybrid model?

Gati Shakti is a welcome initiative for the industry as it intends to augment infrastructure development in India. While the initiative is good, efforts and conversations are still ongoing to understand how best we can implement the Gati Shakti tool and the right mechanism to identify and resolve challenges in the process of building quality infrastructure. India needs enhanced connectivity where roads, rails, and ports are symbiotically interlinked and with the implementation of such schemes, it could surely provide a prominent boost to the economy.

How do you assess the steps taken by the government (encouraging MSMEs, Make in India, PLI, SGD, BCD, etc) to encourage domestic manufacturing in India?

The government of India is making continuous efforts for promoting local manufacturing and steps such as ‘Make in India’ and Atmanirbhar Bharat can provide a fillip to this vision. This is also important from the perspective of reducing the dependency to achieve the ambitious clean energy targets set by the government of India. We need policies that incentivize partnerships, ensure a level-playing for all industry participants-big or small, ensuring better participation. With the right support from the government, we can soon be on the path to become a manufacturing hub for the world.

Can you share your insights on the challenges related to clean energy transition, integration through use of technology, grid connectivity, etc?

India is in a midst of an energy transition towards carbon neutrality and the country is striving for achieving the renewable energy target of 500 GW by 2030. This is required to meet India’s Nationally Determined Contribution (NDC) of achieving about 40 per cent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030. To achieve this, the Indian power industry needs to develop significant energy management capabilities. We will require to consider investments in grid modernization to ensure a sustainable energy transition. This will entail the adoption of smart digital grid solutions to manage the risk of grid
instability, AI-enabled technologies, and systems to improve overall operational performance and enable integrated planning, and a higher degree of customer engagement. We will also require significant amount of energy storage technology to manage the increased influx of renewables, especially wind and solar which bring tremendous challenges to operate the grid, primarily due to the intermittency associated with them. Unfortunately, the pandemic has set us some steps back. We need to build capacity, flexibility, and resilience to integrate increasing amounts of intermittent renewables and distributed energy.

**Can you share Hitachi Energy’s plans in India?**

In November, we evolved to Hitachi Energy from Hitachi ABB Power Grids’ in India. In our refreshed identity, we continue to stay committed towards accelerating the clean energy transition in India. The stage is set for India’s green energy revolution and we are optimistic of the opportunities the new identity will create. For Hitachi Energy, India is a key market for long-term business growth. In the next five years, Hitachi Energy aims to augment its grid integration portfolio through power quality solutions and system studies, supporting the modernization of grids. We aim to achieve 100 percent fossil-free electricity consumption by March 2022. We see tremendous potential in data centers, e-mobility, high-speed rail, renewable energy, and power quality. Additionally, we intend to introduce new products to capture a bigger share of the market. Our goal is to localize our portfolio to build indigenous capabilities. We will continue to make in India for India and for the rest of the world. We are geared up to advance a sustainable energy future, making energy systems more sustainable, flexible, and secure.
What is the value of green? Green bricks are the basic component of construction and provide strength to the foundation. A green option like aerated autoclaved concrete blocks offers a great combination of quality, strength, low weight, thermal insulation, acoustics, fire resistance and excellent buildability.

AAC blocks are made of a steam-cured mixture of sand or pulverized fuel ash, cement, lime and aeration agent. This is produced using high-pressure steam curing in autoclaves, which helps to create a physically and chemically stable product with average density being one-fifth of concrete and one-fourth of clay brick making it extremely lightweight and easy to use. AAC blocks have numerous tiny non-connecting air bubbles which make them excellent insulators. In addition, AAC is a natural non-toxic material that uses pulverized fuel ash that is a by-product of thermal power plants, making it extremely eco-friendly. If we do a quick comparison between “green” bricks and red bricks you will see that Green scores over Red on most parameters.

**How does it look and weigh?**

AAC blocks are grey, lightweight masonry blocks that are uniform in size while clay bricks are smaller than red blocks that are less uniform in size. Both are used for construction purposes but red bricks have been around for longer.

**What goes into it?**

AAC blocks are made out of a combination of pulverized fuel ash, cement, lime, gypsum and an aeration agent. On the other hand, red bricks are made from a mixture of clay, sand, lime, iron oxide and Magnesia. The quality of AAC blocks is uniform while the quality of red bricks is dependent on the quality of the topsoil used.

**What can it be used for?**

AAC blocks are used to build both load-bearing and non-load-bearing internal, partition and panel walls, inner part of cavity walls or as backing to brick masonry. It can also be used for external load-bearing walls and panel walls in steel or reinforced concrete frame structures.

Red bricks, being strong, hard and durable, are used as a construction material in creating buildings, arches, cornices ,pavements etc.
WHERE DO GREEN BRICKS SCORE OVER RED?

AAC blocks are better than red bricks in multiple ways. They are easy to handle and ordinary tools can be used for cutting them. These blocks are available in large sizes which means fewer joints, less cement and faster construction. The lightweight of the AAC blocks reduced the dead load of the building which makes it highly earthquake-resistant. AAC blocks are made from inorganic material which makes them termite resistant, unlike red bricks. The use of AAC blocks helps to reduce the overall consumption of steel and concrete in the structure, reduce the dead load and add to the carpet area. They are easier to transport to higher floors and reduce the overall project construction time due to their larger size.

AAC blocks have another advantage over red bricks. They have a very high thermal insulation index which ensures that the ambient temperature is maintained for a longer period of time making the structure cooler in summers and warmer in winters. Research shows that AAC blocks can reduce the load on the air conditioning unit by 25% and can cut down electricity consumption on HVAC by 25-30%.

AAC blocks are roughly nine times the size of a normal red brick resulting in the reduction of 75% joints, saving mortar costs and causing minimal wastage. They need less curing leading to less water consumption which is great for the environment. In recent time, price of red bricks have shot up by 100% and thus AAC Blocks are now better priced compared to red bricks. Also the government also wants to put restriction on red bricks as it uses upper crust of soil and pollutes the environment. Hence govt has applied GST at 12% on bricks from 1st January 2022 whereas AAC Blocks fall under 5% GST.

The lower dry density of the AAC blocks puts less load on the foundation and reduces the weight of the walls by 65%. The weight of AAC blocks is one fourth of concrete blocks & one third of red bricks. AAC blocks are extremely fire resistant and can resist fire up to 8 hours compared to red bricks which can resist only for 2 hours.

AAC blocks, being lightweight and porous have excellent acoustics properties. A 200mm thick wall can reduce 40-45 decibels of sound. AAC blocks can be used as interior partition walls as it provides a high sound reduction for privacy.

AAC blocks are made from a non-toxic material that does no harm to the environment. Usage of pulverized fuel ash helps to utilise this industrial waste generated by thermal plants. The wastage during the manufacturing process can be recycled for further use making AAC blocks the perfect green brick.

Bigbloc Construction, a company listed on National Stock Exchange, has two plants with a total capacity of 5.5 lacs cbm with plants at Umargaon near Vapi & Kapadvanj near Ahmedabad. The locational advantage helps it to cater to both Gujarat and Maharashtra markets. The company caters to large construction companies like Lodha, HDIL, L&T, Shapoorji Palloji, Runwal, PSP Projects, B G Shirke and many other reputed builders and developers.

AAC blocks need to be adopted by builders because of their eco-friendly features that can make a sustainable impact on the environment. It is a pocket-friendly alternative that reduces construction costs on one hand while reducing the carbon footprint on the other. It is high time that we moved to green bricks from red ones in our quest for eco-friendly solutions to help save the planet.

AAC blocks can reduce the load on the air conditioning unit by 25% and can cut down electricity consumption on HVAC by 25-30%
Todays majority of the world’s population live in cities and towns. With the rapid urbanization it is estimated that in the next 10-15 years there will be a further surge in urban residents while rural population will diminish rapidly. To ensure the rural population receive uninterrupted and continuous share of electricity for the process of urbanization these upgrades need to be sustainable in the long run. Therefore, the right index of urbanization can be recognized by sustainable development.

Infrastructure should be considered as one of the shaping forces for urban and regional development. In developed areas, underground framework may offer one of the few acceptable ways to encourage and support more sustainable growth. A well-maintained, resilient, and adequately performing underground infrastructure is essential to future sustainability of cities. Much, however, can be done to improve the sustainability aspects of underground facilities themselves.

Electrical cabling is the nerve of any electrical network and is one such critical, yet unfocused aspect for the process of modernization. They are also the most vulnerable to failures. While most failures can be attributed to improper selection of cables, suitable selection is not only a key for reliability of power supply and safety of devices as well as human beings but also avoids loss of assets and saves costly business hours. Understanding the importance coupled with demand of rapid transformation, developed countries have increasingly shifting effort towards underground cabling as a method of power transformation. Some countries which have exclusive medium voltage cable distribution grids like Singapore, Netherlands have a very reliable underground public power supply.

Apart from the obvious aesthetic advantages of improved appearance and ecological maintenance of property, underground cable transmission systems have many advantages over overhead lines. Below are some points to consider while planning to opt for underground cabling:

• The initial cost of underground cabling is high. Underground cables costs approximately three times more as compared to that of overhead lines. However, since underground...
cables are covered by insulation layers they are not exposed to damage or the environment. Ensuring the chances of developing faults are low and require less maintenance in the long run. Underground systems generally have longer life expectancy.

- Underground cables are less susceptible to environmental hazards and severe weather conditions such as heavy rain, thunderstorms, lightning, extreme wind and more. Service is uninterrupted by these factors when the cables are buried below the ground. A practical example can be seen with Mumbai consumers here enjoy virtually uninterrupted power through heavy rains, thunderstorms and high winds.

- In case of the failure or damage in underground cables, it is hard to discover and fix the wire breaks. Rectifying the problem could be a time-consuming exercise. This could be overcome if necessary, precautions and systematic planning is considered prior to the installation of underground cabling.

- The underground power cables are designed to reduce the power losses so there is very less voltage drop. They have decreased the EMFs (Electric and Magnetic Fields) and therefore removes the potential health issues.

- Once underground the underground cable system is setup, it is very hard to steal, and also very hard to sabotage or make illegal connections.

- Underground cabling setup requires a narrow surrounding area as compared to the overhead line. They are suitable for congested urban areas where overhead lines may be difficult or impossible to install. They have minimal visual pollution and aesthetically pose no danger to low flying aircrafts or wildlife and trees can grow unhampered. They also prevent accidents and the hazard of people being exposed to high-voltage power, or from poles becoming hazardous to vehicles, or from fallen poles and live wires.

- Land being a valuable and scarce resource, particularly in urban areas. Underground cable systems do not restrict the construction of buildings and other structures over and around them.

Burying power cables has become a critical aspects of distribution business in India after the recent cyclones that have battered the electric infrastructure of different parts of the country. Massive power infrastructure in the state of Odisha, including two lakh electrical poles, 84,000 kilometers of low tension wires, 11,000 distribution transformers and four 132 KV grids were damaged in the rare summer cyclone that plunged more than 25 lakh families into darkness.

To overcome disruptions in power distribution and withstand any kind of weather conditions, over the last few years, states such as Tamil Nadu, Maharashtra, Odisha and Karnataka have started planning, executing the replacement of high-tension lines with underground cables in a phased manner.

Underground cables are suited for places where it is difficult to use overhead lines due to obstructions and dangers presented by the overhead lines. They offer an affordable and justifiable solution for critical parts and in some cases the entire length, of overhead high voltage power lines. While underground cables are more expensive to install than overhead lines, however, the maintenance cost of underground system is very low and also free from interruption of natural catastrophes. Both overhead and underground has its advantages as well as disadvantages. However, the overall advantages of underground cables outweigh their disadvantages.
With the UAE celebrating its 50th National Day, the Maharashtra Week at the India Pavilion in EXPO2020 Dubai concluded with a huge success as the state received investments of Rs 15,260 crore (around USD 2 billion) and signed over 25 MoUs with global firms.

In addition to the investment MoUs signed by Industries Department, other departments such as MMRDA, Skills, Tourism and Women & Child Development Department also signed co-operation MoUs with global counterparts.

The state industries delegation headed by Subhash Desai, Hon. Minister of Industries, Baldev Singh, ACS (Industries), Dr. Harshdeep Kamble, Development Commissioner (Industries) and Dr. P. Anbalagan, CEO, MIDC, successfully signed 25 MoUs in key thrust sectors like auto & auto components, logistics, EV, textiles, data center, pharma, biofuels, and energy.

Renowned companies from 6 countries i.e., Japan, Singapore, Sweden, Korea, Germany, and Italy have agreed to invest in Maharashtra. Another MoU was done by the state with an Africa-India Economic Foundation for bilateral trade and co-operation. There were around 6 more MoUs signed by the Tourism Department, MMRDA, Skills Department, and Women & Child Development Department during the state participation.

Almost 1 lakh people visited the India Pavilion during the week, where the state showcased its trillion-dollar economic vision and business attractiveness along with the rich cultural heritage. Maharashtra’s two-week participation period kicked off on the 19 of November 2021, during which more than 15 departments of the state exhibit their achievement and vision for the state. The state not only represented the prowess of its core sectors, such as industry, logistics, tourism, culture but also explained the various initiatives taken for the upliftment of farmers, women, children, and labor.

To commemorate the 50th UAE National Day and celebrate the strong bond between the two countries, many cultural shows were presented by the Maharashtra artists, including a zestful performance by the dhol-tasha band that bedazzled the audiences at the India Pavilion.

Aslam Sheikh, Maharashtra Fisheries and Textiles Minister, in his closing remarks, congratulated the UAE on its 50th national day and said, "The UAE government has created history by setting up this expo for the countries of the world. It’s a privilege to represent Maharashtra at such a great platform." While addressing the Indian diaspora at the closing ceremony he said, "We are proud of each Indian who has contributed to the growth of the two nations. The state of Maharashtra appreciates the dedication and hard work that you all have put in strengthening the global position of both India and the UAE."

During the week, the various departments also held knowledge-sharing leadership roundtables, fireside chats and one-to-one meetings with their respective global counterparts and corporates to highlight the myriad of opportunities that the state has to offer.

The week observed the presence of eminent dignitaries, including, Nawab Malik, Minister of Skill Development, Employment and Entrepreneurship, Amit V. Deshmukh, Minister for Medical Education & Cultural Affairs, Aslam Shaikh, Minister of Textiles, Fisheries and Ports, Aditi Tatkar, Minister of State for Tourism, Industries, Anoop Kumar, Principal Secretary (PS), Cooperation & Marketing, Saurabh Vijay, Secretary Culture, Deependra Kushwaha, Commissioner MSSDS, Kailash Pagare, MD, MFSCDC, Venugopal Reddy, Principal Secretary, Forest, Eknath Gawle, Principal Secretary, Agriculture, Shradhha Joshi, MD, MAVIM, among many others.
After an average performance in Q2 2021, Hyderabad emerged as one of the resilient cities in terms of demand supply dynamics.
**MANTRA PROPERTIES ENTERS INTO COMMERCIAL REAL ESTATE**

Pune-based Mantra Properties, had launched their flagship commercial project Mantra Business Centre, marking its foray into the commercial real estate segment.

The new project is located between the IT hubs of Kharadi and Hadapsar on one side and the upscale Koregaon Park on the other. The key highlight of the project being it offers minimal travel time for working professionals.

The new launch features a 1-acre premium sector within an 8-acre land parcel. It will consist of two residential towers and one commercial tower with integrated retail that will offer office space.

The project makes it simple to get to the IT hubs of Kharadi, Magarpatta, Kalyaninagar, and Viman Nagar; among others. The projects are close to a number of well-known hospitals. In general, the project is in a good location for those looking to upgrade.

Speaking at the launch Rohit Gupta, CEO, Mantra properties said, “We are entering the commercial real estate with the launch of Mantra Business Centre. We’ve seen how India’s corporate sector has had to adapt to a work-from-home culture in the last year. Despite the significant challenges posed by the Covid-19 pandemic, businesses have expressed a strong desire to return to traditional office spaces. As covid regulations become less onerous, people are returning to their offices and migrating to different cities.”

Commenting on the deal, Kamal Tanaja, Managing Director, TDI InfraCorp, said, “We are proud to be associated with Godrej Properties to deliver this uber-luxury project and we look forward to this association.”

**RUNWAL GROUP LAUNCHES NEW PHASE ‘PRIME AVENUE’**

Runwal Group, has launched a new phase ‘Prime Avenue’ at their project Runwal Gardens, Dombivli.

After the successful record sales witnessed for the other phases West Avenue, North Avenue, South Avenue and East Avenue; the Group is all set to launch its new residential phase within the 115 acres township.

Prime Avenue is as of now under development and will have around 1500+ units of 1 BHK configurations, going from 322 sq ft to 347 sq ft with a starting price of 34.5 lakh onwards.

Residences at Runwal Gardens will have multiple configurations of 1, 2 and 3 bed homes.

The township is set keeping all fundamental and lifestyle needs within a 5-minute walking distance. The township which is located right on Kalyan-Shil road will have large green open spaces with a central park of approx. 11 acres of land and 14 gardens within the vicinity.

**TRUE HABITAT RAISES RS 30 CRORE FROM CSL FINANCE**

NCR based real estate firm, Foresight RealTech Private Limited now known as “True Habitat” is launching an affordable housing project under their brand “Bodh” and has raised Rs 30 crore from CSL Finance.

True Habitat is developing affordable housing in Gurgaon under the Bodh Brand. The funds were utilized to acquire a part of over 4.16 acres of prime land in sector 79 of Gurugram, while the balance was funded by the developer.

This project by True Habitat is an affordable group housing project with 650-700 apartments and 45,692 sqft of commercial space. The construction approvals for this project are under process and is slated to be launched by January 2022 under the Haryana Affordable Housing Policy.

Savills India are the advisors to True Habitat on planning a capital raise strategy including this project funding.

**GPL, TDI GROUP TO DEVELOP LUXURY RESIDENTIAL PROJ IN DELHI**

Godrej Properties has entered into a joint venture with TDI group to develop an ultra-luxury residential project in Connaught Place, one of the most premium location within the Central Business District of New Delhi.

The project is estimated to have a developable potential of approximately 125,000 sqft saleable area comprising primarily of residential apartments of various configurations.

Mohit Malhotra, MD and CEO, Godrej Properties, said, “As we continue to strengthen our presence in Delhi, we are happy to add this project in one of downtown Delhi’s most desirable locations. This will be our third project in Delhi and further expands our presence across India’s leading cities.”

Commenting on the deal, Kamal Tanaja, Managing Director, TDI InfraCorp, said, “We are proud to be associated with Godrej Properties to deliver this uber-luxury project and we look forward to this association.”

**MARRIOTT INTERNATIONAL SIGNS AGREEMENT WITH PRESTIGE GROUP**

Marriott International has signed an agreement with Prestige Group and DB Realty to introduce the new Delhi Marriott Marquis and The St. Regis Aerocity, New Delhi. Slated to open in 2025, the agreement is expected to add 779 rooms to the Marriott International portfolio.

“We are delighted to expand our collaboration with the Prestige Group to bring these two prominent brands to the national capital. This enables us to provide more choices and experiences in key markets to serve an ever growing and discerning customer base. India continues to be a priority market for us.

“We believe our strong distribution, deep relationships and the strength of our travel program - Marriott Bonvoy makes us a leading partner for growth” said Rajeev Menon- President Asia Pacific (excluding Greater China), Marriott International.
State housing development authority MHADA in association with Chadha Developers & Promoters, have announced their first-of-kind public private partnership project – “Chadha Residency” at Karav village, Vangani West, Near Badlapur. Under this partnership between CDP & MHADA, the proposal is to develop 66 towers of 7-storey buildings comprising 4,114 flats of 1 BHK under the PMAY.

As per the proposal, a total of 133 towers and 8228 flats are planned in this project across 80 acres land. Out of these 50% flats are reserved for PMAY Scheme for EWS category. A commercial shopping complex & a school are also a part of this project.

“Chadha Residency” aims to provide 8228 flats of 1 BHK each with all the necessary amenities. The complex will also comprise a state-of-the-art commercial project.

“Recognizing the need for modern living spaces that are conducive to the needs of today’s technologically-savvy professionals, the company brings all the amenities including fully furnished and managed rooms, Wi-Fi, laundry, F&B (meals), community events and access to common areas like lounge, gym, cafeteria etc, all under one roof at the most affordable prices,” the company said.

Commenting on the development, Anuranjan Mohnot, co-founder and Managing Director of Lumos said, “Post second wave of Covid, real estate is emerging as one of the most preferred investment avenues and we are happy to have some prominent industry experts and investors on board to help us in institutionalising real estate investment and management processes. We are now actively looking at residential-focused last-mile funding and structured equity deals for our prospective fund.”

Commenting on the development Abhijeet Pai Co-founder of Gruhas and Puzzulona said, “Alternate investment in real estate will be a big opportunity in India given the requirement of capital in the realty sector. Alternate investment platforms along with fintech can provide better opportunities to new edged investors for adjusted yield products.”

HOUSR CO LIVING LAUNCHES PROPERTIES IN PUNE

Housr, India’s fastest growing co-living brand, has launched a new property in Pune as a part of its strategy to expand its presence in the western market.

The company unveiled its new property in the upmarket Wakad area of the city. The company aims to expand to 6-8 more properties in the city by 2022.

In addition to these boutique properties to its portfolio, at present, Housr has 20+ properties across NCR, Pune and Hyderabad and is aiming to aggressively launch more across existing and new cities like Bangalore, Chennai and Ahmedabad.

The rentals range from Rs 1,2000-17000 for twin sharing and Rs 23000-30000 for single occupancy. With these additions, the coliving major will offer more than 800 beds in multiple formats in the city.

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Hyderabad RE: On Growth Track

Real estate sector has been on a bumpy ride since the last few years. While some markets are still limping back, some have already surpassed the pre-Covid levels. Construction Times takes a peek in to the real estate scenario in Hyderabad.

At a time when the economic activities are resuming, the sluggish real estate sector in India is also making a remarkable recovery from the shackles of the pandemic. The recovery, which began in the Q4 of 2020 catalyzed by stable repo rates, stamp duty waivers and low interest rates, was temporarily halted in Q2, 2021 when the second wave of Covid-19 hit. However, the trends in Q3, 2021 reveal that top realty markets that were derailed from the recovery path seem to be getting back on track.

"The real estate sector recorded a smart recovery despite the pandemic exigencies in 2021 with segments like residential outperforming others. The disruption caused by the pandemic is slowly settling and the real estate market is expected to gain back its rhythm in the next two to three quarters, albeit, the threats of the new variant is adequately contained with minimum disruption in the early part of the new year. Should we be able to continue at this pace, the real estate sector will see adequate recovery to match or indeed cross the pre-pandemic levels," Shishir Baijal, Chairman and Managing Director at Knight Frank India said.

Of the top seven metros, Hyderabad, known as the City of Pearls, witnessed a significant development in the real estate market.

Attributed to robust government policies and participation of private entities, the road connectivity and infrastructural development in Hyderabad has reached a new pinnacle. The residential segment has grown manifolds in the western fringe of the city with the completion of metro lines and the new proposed extensions off outer ring road set to enhance connectivity, a recent report by proptech firm Square Yards revealed.

Given such amenities, Hyderabad stood second in terms of adding new residential projects to its kitty, with west Hyderabad accounting for about 60% of the total projects launched in the city. Contrary to the previous quarter, where majority of the share (about 90%) was concentrated in the western precinct, in Q3, 2021 North Hyderabad also contributed 35% to the new launches in the city. This clearly delineates north and west Hyderabad to be the emerging hubs for both residential as well as commercial development.
Despite the positives, the builders in Hyderabad are sitting on an unsold inventory of 58,535 units as of September 30, according to data released by Anarock Property Consultants.

The inventory on June 30 was 50,580 units. While nearly 8,000 units were added to the market between July to September, the real estate sector managed to sell only 6,735 units in this period, leading to an oversupply in the market.

“Hyderabad turned out to be the only city in India with the highest increase in the available inventory with nearly 58,535 units available for sale. Furthermore, a sharp rise in the new supply over the past few quarters has increased the city’s available inventory by 113 per cent compared to the same period in the previous year,” said Prashant Thakur, Director, Anarock Property Consultants.

The demand has been largely inclined towards budget homes. The report by Square Yards revealed that more than a quarter of the inventory accounted for mid-segment properties priced at Rs 30-60 Lakhs. These were largely concentrated in localities such as Maheshwaram, Narepally, Patancheru among others.

“As per search trends, nearly 60% property seekers looked for properties in the Rs 30-60 lakh and Rs 60- 100 lakh budget ranges. There seemed to be a dissonance when it came to luxury properties. While more than 20% prospective home buyers searched for properties priced at Rs 1-3 crore, the inventory in the market did not seem to be aligned,” it said.

According to a report by CBRE, property prices have grown at a CAGR of about 2-7% across the mid segment since 2010, with Hyderabad, Bangalore and Pune recording growth at the higher end of the range. Simultaneously, over the past decade, income levels too have increased.

The Affordable Rental Housing Complex (ARHC) scheme and passage of the Model Tenancy Act, 2021 (MTA) are the first few steps towards formalizing this segment, demand for which is expected to grow exponentially over the next few years, noted Anshuman Magazine, Chairman, India & South-East Asia, Middle East & Africa, CBRE.

“The Model Tenancy Act will be a game-changer for the Indian rental housing segment. The Act is expected to encourage private participation and help monetize the vacant rental stock by infusing trust in landlord-tenant relationship, in addition to providing a speedy dispute adjudication mechanism. We further expect the Act to have far-reaching implications towards formalizing the housing market in India,” Magazine said.

Hyderabad also witnessed two mega land deals for residential development for a total of 78 acres worth Rs 1,050 crore in 2021 so far. The two separate deals over 78 acres of land are meant for large scale residential development projects and have taken place in Narsingi (ORR) and Shamshabad.

According to Santhosh Kumar, Vice Chairman, Anarock Group, “Nearly 28 separate land deals for over 1,205 acres took place between Q3 2020 and November 2021 for residential development in the top seven cities of India including Hyderabad.”

As far as the commercial real estate is concerned, Hyderabad emerged as market leader in terms of office sector demand in Q3.

“After an average performance in Q2 2021, Hyderabad emerged as one of the resilient cities in terms of demand supply dynamics. For the first time, Hyderabad had the maximum share in leasing volume at 2.5 million sq ft surpassing Bengaluru, as occupiers focussed on large block deals and even leasing entire buildings. BFSI and Flexible workplace sectors had the maximum share in leasing volume accounting for 66% of the total demand in Hyderabad. Rai Durg saw the maximum leasing traction accounting for 53% of the demand, while Hitec City contributed 40%. On a YTD basis, Bengaluru continues to be the market leader,” said Ramesh Nair, Chief Executive Officer, India & Managing Director, Market Development Asia, Colliers.

Given the current market dynamics, the real estate sector in Hyderabad is poised for a rebound.
Coronavirus pandemic has had a significant impact on our lives and even impacted our workplaces. The design trends over the last three to four years have revolved around having a work environment that was more agile. The focus was to have more open workplaces, end user-specific areas. The central idea was to promote stress-free culture. The design language was more purposeful and there was thoughtful consideration of the arrangement of desks, the easy availability of work-enabling tech, inviting lighting, proper flow of foot traffic and conducive meeting spaces. There was also an emphasis on making sure how the room smells as research shows that it influences how its inhabitants think, act, create and collaborate. The idea behind it was to design a workplace that should reduce stress but increase natural interactions among co-workers, fostering better collaboration and business results.

However, as soon as the pandemic started, organisations were forced to go back to the drawing boards and to re-imagine the workplace in order to cater to the new normal.

**IN RESPONSE TO THE FIRST WAVE**

As soon as the cases started to decline, the immediate priority for organisations was to bring people back to work as quickly and safely as possible. At that time, people were wary of the personal and economic toll the pandemic had taken on their lives. So most people were keen to get back and earn their livelihood and provide for their families. However, it was left to businesses to build an environment that was conducive to working and also to instil trust amongst their employees.

What this meant for the organisations was to retrofit the workplace with what they had, using
the health guidelines available at that time. As per the guidelines, workplaces could have only up to 50 percent of the workforce.

In order to keep the employees safe, the design ideas that the organisation adopted were sensible as well as practical. Sensible strategies included practising physical distancing, like moving desks apart and removing chairs, adding barriers, enhancing cleaning and safety measures, in addition to supporting those who are working from home.

**TECH-ENABLED WORKSPACES**

Technology has always been at the forefront of any future of work conversation and in this post-pandemic world, it has taken centre stage. Many organisations have started to use technology to make sure that their workplaces are safe and adhering to all the norms that have been set in place.

Some of the measures introduced include pre-entry wellness checks, no-touch entry into the building, social distancing sensors to ensure adequate distance at all times and autonomous cleaning solutions. As organisations toy with hybrid models of working, various online tools are also being used to map and schedule work timetables and the flow of employees. It is also a great way to make sure that only the essential employees travel to the office while the rest can continue to work from home.

Another essential element for every workplace is to maintain hygiene at every touchpoint. So, every appliance, every entry/exit and every workstation needs to be cleaned and sanitized at a regular interval. There are structured routes being mapped in some workplaces to map the movement of people. What this essentially means is that rather than taking any particular way to the workstation or zigzagging across the office, people will have to follow a particular circular route.

Under this, employees will enter from one way and exit from another to avoid any overlaps.

Companies are also adopting new layouts in the space to help physical distancing feel more comfortable such as adding new elements to workstations, like glass or higher screens. New bleach-cleanable fabrics are being introduced that are easier to clean and maintain. Smart materials and nature-focused office design are being adopted to boost air quality and circulation.

**WAY FORWARD**

As organisations reinvent the workplace, science-based solutions will integrate with emerging technology to deliver employee safety and an even higher level of employee well-being. This will result in planning paradigms driven by density and costs shifting. Organisations will become more adaptable and fluid instead of fixed. Employees will have a whole new appreciation for being together and will want to feel a renewed sense of community. Virtual and physical experiences will bring people together in new ways to create a sense of belonging.

Moving forward, many organisations are likely to reconsider their corporate real estate footprint. This may involve downsizing or redistributing space to satellite offices. The past year and a half has already proved that a completely remote workforce seems unlikely, given the intangible benefits of social connection, collaboration, and innovation that in-person working provides. Nonetheless, it will be crucial to create optimal conditions for employees to work remotely as well as in the office.

Furthermore, to stay ahead of the curve, companies will need to consider key investments across wellness, remote collaboration tools, mobile cyber security, accessible HR tools, and workforce training programs for professional development and upskilling.
BROKER AGGREGATION CAN TRANSFORM INDIAN REAL ESTATE

Residential real estate fundamentally has three stakeholders – home buyers, developers, and brokers which drive key business transactions in the segment. The Indian realty space has been gradually picking up post the Covid-19 pandemic in terms of new launches, consolidation, increased property registrations, etc., however various operational factors still plague the segment widely.

From a homebuyer’s perspective, it is the most challenging to identify a suitable home that meets all their requirement criteria. Even if a buyer finds a home, he does not have enough knowledge to understand the accurate pricing of the property or has the right source of information that he can blindly rely upon. Further, documentation and closing processes towards purchasing a home are far from being hassle-free. The broker community also faces multiple roadblocks while operating their businesses, for instance, lack of technological bandwidth, limited knowledge about real estate in different regions, constant follow-ups for brokerage, etc. The consistent growth of the Indian real estate segment will be far-fetched unless robust and flawless networking and engagement is facilitated between the stakeholders.

Broker aggregation, to a large extent, can help ease the challenges cited here. This aggregation can be made a reality by leveraging technology at its best. A central platform that can manage the entire business operations of a broker will immensely revolutionize the real estate ecosystem in the country. With technological advancement, all the certified brokers can be on a single platform and create a community within. Such a community will ensure a drop in the rate of deal loss due to borderless access of markets and collaboration with home-grown brokers across India. The real estate brokers are usually very well networked and have a strong understanding of various projects and buyers in a particular area. However, in order for this broker to expand his/her reach and serve customers in another region that is not familiar, it will be important for him/her to know brokers in that region and engage with them. This will open avenues for the brokers to mutually benefit from this engagement and to serve their customers without any time wastage thereby helping the brokers and the customers alike. This unique cohesiveness between the brokers will also open up a plethora of property options for the homebuyers as they are assured of being served exactly as per their requirement.

Technology can also work wonders to help brokers know about the payment done by the customers and the brokerage due from the developers. It can streamline the process of brokerage collection, where the broker will be aware of the status of the deal and doesn’t have to worry about delays or loss in payment. The time contributed in follow-ups can be utilized efficiently in building a healthy pipeline.

To sum it up, it is high time that brands and consultancies realize how technology can transform the realty space and bring about a change in the way all the stakeholders’ function. Real estate is expected to contribute 13% to the country’s GDP by 2025 and it will be a magnanimous success if there is a platform that conveniently streamlines the transaction, aggregation, and engagement between the key stakeholders.
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LIGHT+LED EXPO
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Indian construction industry has undergone a rapid transformation in the last few years. The infrastructure sector, especially the real estate industry, has witnessed the use of newer construction materials and construction techniques to keep pace with rapid development. This transformation has been necessitated due to the rise in demand for affordable homes aided by several reforms announced by the governments both at the Central and state levels to give a boost to the ailing real estate sector.

Construction techniques, especially scaffolding and formwork, have witnessed a significant change in the last few years due to the adoption of various western world techniques of construction to ensure speedy completion of projects.

**DEMAND FOR FORMWORK**

Formwork is an essential component in the construction industry as it plays a critical role in creating concrete structures. Formwork is a temporary or permanent structure or form into which concrete is poured, which later hardens taking the desired shape. This technique of construction has been used since a very long time as it helps in creating structures of desired shapes and sizes.

Formwork is typically a temporary structure which is removed after use and can also be reused. For concrete formwork, timber and steel are most commonly used. Now, with technology taking the centre stage, building plans and designs of big structures are created using software, which has not only improved the pace, effectiveness and safety of construction and also substantially lowered the costs.
Nowadays, since the construction materials used are far more robust and long-lasting as compared to the older materials, it becomes even more pertinent to have strong formwork to build safer and more practical structures in a short span.

Contractors in the construction sector are adopting advanced solutions to make infrastructural projects cost-effective, while boosting the speed of construction and flexibility as well as the surface quality of construction property. At present, builders and contractors are facing high competition, which is creating demand for economic formwork solutions for ensuring greater speed of operations, timely completion of construction projects, enhanced safety of workers, and improved quality of work. To keep pace with the construction activities and to reduce overall costs, there is a high demand for reusable materials.

According to a report by The Insight Partners, the proliferation of the construction industry, supported by favorable government initiatives and growing inclination toward green buildings, is a key factor impacting the infrastructural projects, thus driving the formwork system market growth.

The agency stated that timber and plywood products are adopted to a greater extent than other materials as they are available at lower prices and can be used for multiple applications. “Moreover, with advent of sophisticated technologies such as tunnel formwork, fiberglass shuttering, and wireless temperature monitoring formwork system in formwork industry is projected to generate ample of growth prospects for formwork,” it said.

“Dynamically changing trends over the last couple of years have resulted in a surge for skyscrapers. Most of these sky-high buildings in India are residential. For formwork in tall buildings developers opt for Mivan Shuttering, MS Shuttering or Aluminium shuttering.

Various measures are taken by developers to reduce accidents, injuries and deaths at the construction site. For flexible modular design, steel scaffolding systems are preferred as it is more flexible and easier to adapt. Aluminium scaffolding is not used for skyscrapers as these cannot reach over 30 feet,” said Vinit Dungarwal, Director, AMs Project Consultants.

**FORMWORK MATERIALS**

Over the years, newer materials are being used in formwork. Some of the prominently used formwork materials are

1. Timber
2. Plywood
3. Steel
4. Aluminum
5. Plastics
6. Magnesium
7. Fabric

The wood formwork is a commonly used formwork compared to other materials such as steel, aluminum, plastic, and fabric, according to the report. The wooden formwork has been a conventional choice in the construction sector. The plywood and timber shuttering are available at lower prices and are easily accessible. Factors such as the easier process of production of wooden shuttering, involving low labor costs, boosts their procurement of reusable form work material, therefore these systems are appropriate for small scale project.

Climbing formwork, beam formworks, flexible formwork, staircase shuttering, slab formwork, concrete road construction, and supporting metallic shuttering are among the applications of wooden formwork in concrete. SVA Formwork Solution, PASCHAL, METSÄ Group, TECON Formwork, and G.B.M. Building Equipments S.r.l. are a few of the wooden formwork system providers catering to different requirements of construction sector.

**DEMAND FOR SCAFFOLDING**

Scaffolding is characterized as the erection, alteration or dismantling of a temporary structure, specially erected to support a platform. Scaffolds are widely used for working at heights, and it involves the risk for a scaffolder (person working on a scaffold) to fall from an incomplete scaffold during the erection and dismantling of a scaffold.

Scaffolding is a form of prefabricated construction that entails large structures or components of construction built off-site, generally at factories to be erected later on-site on a concrete foundation. Increasing FDI in construction in the Asia Pacific region and supportive government regulations and policies are driving the scaffolding market. The scaffolding market is constrained by factors such as fluctuating raw material prices and slower economic growth, which impede market growth.

Rapidly expanding industrialisation and rapid urbanisation, has lead the growth of the scaffolding industry worldwide. The demand for scaffolding is being supported by improvements in residential infrastructure as well as new building activities. According to research agency Maximize Market Research, globally, the scaffolding industry is likely to be led by growing FDI in building and supporting government policies regulating labour safety. New residential properties being built in developing nations like China and India are propelling the global scaffolding market forward.
According to Aditya Kushwaha, CEO & Director, Axis Ecorp, over the years, construction technology has evolved significantly. Currently, for tall structures, most developers prefer prefab technology as it helps in saving cost, time and is not labour intensive. It also offers better durability and quality consistency.

“Another reason for opting for prefab technology is that it requires low to no maintenance. The only flip side to using prefab technology is that it is beneficial only in regards to large scale projects. There are stringent norms that have been put in place by the government to ensure the safety of the labourers on site. There are various measures undertaken to make sure that even in case of an accident, there is minimum chance of an injury,” he said.

Kushwaha further noted that despite the ever-present challenges of ballooning input costs and shrinking margins, the real estate industry has been bracing new trends that add value to the consumers.

“The concept of sustainable housing has gained prominence in the last 4-5 years. In the post-pandemic world, with people placing greater emphasis on well-being, the demand for sustainable projects has multiplied even further. There is a common misconception that sustainable projects or projects that use recyclable products are cost-effective. In reality, these costs vary from project to project. Since these projects are designed keeping in mind environmental factors, they may offer savings on the monthly utility bills,” he sums up.

**COVID IMPACT**

According to The Insight Partners, the Covid-19 pandemic has severely affected the growth of the formwork system market. Lockdowns and other restrictions, as well as halt in the construction sector, has hindered the growth of the formwork system market. However, the ease of lockdown restrictions since Q4 2020, along with the rise in emphasis on the effective restoration of the construction sector, is expected to support the speedy recovery of the market hereon.

Similarly, the Covid-19 pandemic has had a direct effect on rental construction services such as scaffolding, roofing, and interior finishing materials like acoustic panels, carpets, and fire alarm protection systems. Being heavily reliant on China for almost all materials and machinery the construction industry faced a major setback.

**WAY FORWARD**

According to Market Research Future, global scaffolding market is projected to be worth USD 84.34 billion by 2030, registering a CAGR of 6.20% during the forecast period (2022 - 2030). The market was valued at USD 48.85 billion in 2021.

On the other hand, the formwork system market is projected to reach USD 7,486.32 million by 2028 from USD 5,618.35 million in 2021, as it is expected to grow at a CAGR of 4.2% from 2021 to 2028, according to the report by The Insight Partners.

As the demand for residential real estate in India is expected to touch the pre-Covid levels, the demand for construction materials including formwork and scaffolding will see a significant rise in the coming quarters.
The lockdown imposed in 2020 to control the spread of the pandemic has created a trend with developers for creating integrated townships that offer homes with established neighborhoods. The outbreak motivated developers to capitalize on the emerging trend of having a holistic and inclusive lifestyle amidst the new way of living. Today’s home buyers know the actual benefits of living in a holistic township; especially in the post-Covid-19 pandemic scenarios and hence choosing to be in one of them considering safety and security.

With life slowly moving back to absolute normalcy, buyers are now very keen to own homes at locations that offer convenience when it comes to daily needs, being all available at just walking distance. Ease of living and having a secured lifestyle has become one of the topmost priorities of today’s customers. Township projects are strategically designed which not only offer the luxury of living but the ease of your daily errands around you. These are healthcare, education, supermarkets, recreation area, retail, business center, gardens, green spaces, play areas, amenities, etc. These townships also provide unique connectivity along with excellent physical and social infrastructure at walking distance for the residents, making their lives simple and easy.

Some of the key reasons why living in a township are the new normal:

**TOWNSHIPS ARE SELF-SUSTAINING**

Self-sustenance is one of the key benefits of living in a township, and a well-planned integrated township will include sustainable features and amenities, along with planned exigencies to truly be self-reliant. On top of everything, they also offer a socioeconomic space which is important for a community living experience for all the members of the family - from kids to the elders.

**THE IDEAL MIXTURE OF RESIDENTIAL AND COMMERCIAL**

Townships are an ideal combination of living in a well-planned residential complex with close proximity to some commercial spaces as well. It’s a miniature urban setup that is multi-functional with proximity to varsities, health facilities, and recreational choices. By having both residential and commercial complexes in close vicinity, townships enable the customers to reduce their daily travel time drastically so that residents can spend more time with their family members.

**ABSOLUTE VALUE FOR MONEY**

Industry trends show that townships are gaining popularity among families as well as working individuals when compared with renting apartments or buying independent homes. The pandemic has reaffirmed the demand for townships, as homebuyers are looking at facilities beyond just the 4 walls of their house. With multiple amenities like gyms, play areas, walking tracks, security features, etc. buying a house in a township is absolute value for money for the customers. They get everything at their doorstep without spending an extra dime on travel or leisure.

**CONCLUSION**

Today, we are seeing more industry players developing townships considering the ever-increasing demand with homebuyers at the center stage. With increasing city issues like persistent traffic, congestion and pollution, being faced by the urban dwellers these days, integrated townships bring value propositions like green and open spaces, pollution-free environment with plantations, parks along with convenience, affordability, and a relaxing mode all packed in one.

Seeing the ongoing pandemic affecting all sectors across the globe, the amalgamation of commercial spaces and residential spaces will soon become the new face of integrated townships. So have you considered a township for a living? If not, this is the time to choose to live in a township, for a serene lifestyle.

**Manju Yagnik**
Vice Chairperson
Nahar Group
During the pandemic, people have turned their gaze indoors. By this, we mean that folks have started to understand the importance of their private spaces. Your home has to be a reflection of who you are as a person, but at the same time, it also has to be a place that is considered your safe haven. The KariGhars, an uber-luxe interior design firm based in Bangalore, shed some light on the rising trend of putting a greater emphasis on your home. The lockdown has been difficult for all of us, but a direct consequence of the lockdown has been the rise in importance given to homes and the comfort level associated with it. All the projects talked about in this article have been constructed during the pandemic by The KariGhars.

Villa 32, or Prestige Lakeside Habitat, is one of the projects undertaken by the firm, which places a lot of importance on the value of having a cozy yet luxurious space for the family to spend their lockdown in. This house has been carefully built, with attention given to details from the...
dazzling ceilings to the automated kitchen and living room to the serene garden with a koi fish pond. Everything a family could ever want or hope for in an ideal home has been given in this space, where they can be the best versions of themselves. Abhishek Chadha, the Co-Founder and Principal Designer of The KariGhars, strongly believes in the power of transformative spaces. Any space that has the power to move you while making you feel welcome, is the vibe they have been able to perfectly capture through all the homes they have built. However, the pandemic did make things challenging for them, says Abhishek. But with the help of a dedicated team and tenacious suppliers, the firm was able to overcome the challenges.

The KariGhars have yet again weaved their special brand of magic on another one of their opulent projects, aptly named “The Blooming Casa.” This house has not conformed to the conventional idea of luxury as the client called for an amalgamation of contemporary and traditional home styles. Nonetheless, this house has blossomed into the brainchild of the principal designers and the client through a beautiful and masterful use of materials like marble, metal, and lighting elements. Catering to every need the resident might have, this home boasts of a serene landscape, using skillful techniques like symmetry, smart illumination, and automation. One of the best parts about this house is that it is centred on the principles of sustainability as it is built such that it can capitalize on natural light. Local artisans have been employed to decorate the house, making it very easy to carry out during a pandemic as shipping costs are slashed drastically. Again, Abhishek is of the opinion that with the help of seamless & integrated design input, the output that leads to the creation of such a house during the pandemic gets marginally easier. At the same time, Abhishek is also acutely aware of the fact that the needs and demands made by the client will reign supreme and will significantly influence how the course of the house’s construction will occur.

Adamant about delivering the epitome of luxury, The KariGhars have done a stunning job of consistently delivering on their promises of creating bespoke homes for their clients. Even the behemoth of a pandemic has not been able to stop the force that the KariGhars work with.
When you can't go for a vacation, a luxury bathroom can help you relax. Bathrooms have now become one of the most important spaces in any building. People are investing a lot in getting just the right bathroom for their needs. Amenities like a shower, bathtub, spa chambers, etc. are gaining more popularity. At the same time, due to more technological advancements, Bathrooms are also now equipped with every advanced accessory that you can think of. A jacuzzi with underwater lighting, adjustable slide jets, steam bath, heated air, etc. is all possible due to the marvelous era of technology.

Technologies in the bathroom not just make it beautiful, but also extremely comfortable and convenient for use. Ansa Interiors has always tried to stay updated with the latest trends and make sure that the bathrooms have all the new scientific advancements. The designs are made more functional by keeping in mind the needs of the clients and figuring out the ways to get the right technology for a given space.

The amount of space available in a bathroom also plays a crucial role in deciding the right accessory. Here mentioned are a few ways you can use to design a bathroom that is appropriate for someone tech-savvy.

- Say no to foggy mirrors in the bathroom. Electric Bathroom mirrors defoggers solve the problem of foggy mirrors and makes the bathroom cleaner and much more functional. By installing this amazing technology, you will no longer come out of your shower to a foggy mirror. You will be able to look at yourself, clear as the day.
- You no longer need to go on a fancy vacation to unwind. If your bathroom is fitted with the best accessories, you can feel like you’re in the Maldives right from your beautiful bathroom. Waking up to a warm bathroom floor in cold winter is a beautiful feeling. It will not only give a positive start to your day but will also help you unwind. Technology has now made it possible for us to create a bathroom that makes life more luxurious and life relaxing. Electric floor warming is a comfort that you shouldn't miss out on.
- The shower systems are now better than ever. You can install ceiling showers to give it the feel of rain. A variety of colored lightings can also be installed to go with each of your moods. Use blue lights to calm yourself and relax, and change them as you wish to. Smart devices can be attached to regulate the water temperature, and also play music while you are having a relaxing shower.
• You can now install a bathtub, that connects to a pool. For a maximum luxury experience, this can help you relax more. Ansa Interiors has managed to create such a setting for a luxury residence wherein bathtubs run into a pool and even a private beach for that matter. Luxury living has no bounds, and when combined with the right technology, there can be nothing better.

• Big-sized acrylic bathtubs go great for people who love a bubble bath. Multiple air jets can be installed at the same time. The water pressure and temperature can be regulated by using a smart device, so you don’t have to get up from your relaxing bath, just to moderate the temperature. Using different aromas to relax can also be done with the click of a button.

• Bathrooms can now be designed to provide chromotherapy. The new Bath range allows an individual to be immersed in a warm, ultra-deep bath and, with the touch of a button. The bathing experience can be enhanced by including a full spectrum of dramatic color - from soothing to stimulating. These lights are not just limited to a bathtub. A steam shower chamber, washbasin, ceiling lights, etc. everything can be customized as per your needs.

• Saunas have proven to be one of the most relaxing experiences. You no longer need to go to a sauna place to relax. A steam shower is another technology that you can install in your bathroom to make the bathroom better. It will help your body relax and give maximum luxury experience. A great variety of towel warmers are also being installed in Bathrooms so you don’t have to wait to get the right temperature.

• Plumbing plays an important role in any luxury technology-filled bathroom. We know that it is one of the places that has the maximum presence of water, so the fittings must be done in a way that suits the technological needs, but at the same time, maintains to remain aesthetic. The wash basin pipes can be hidden with the help of a storage unit. This storage unit can be opened or closed with the help of a button, for easy access.

Alongside these technological accessories, Sapna Agarwal, the creative director at Ansa Interiors has created the best luxury and non-luxury bathrooms. The level of comfort and functionality has just been improved over time, with each new design created. Going modern does not mean losing touch with the traditional. All the designs can be modified to fit one's budget. A technology-rich bathroom is now the new necessity. Make sure you choose the best accessories to get a relaxing bathroom.
GLARE–FREE PANEL LIGHTS

Ceiling lights can enhance and complement any interior setting effectively, creating a heightened ambient mood and bequeathing your personal as well as professional space with an individualistic aura. Häfele brings to you the new Lucina’E Panel Lights from its commercial lighting range which not only augments the aesthetics of your interior space but also provides superior illumination. With their sleek build and soothing light output, you can set the ambience to your requirements in order to achieve the desired results.

The Lucina’E Panel Lights are backed by a strong value proposition and cater to varying output needs starting from 3 watts and going up to 18 watts, depending on the type of application and the interior space they need to be installed within. What is more is that these downlights come with a dimmable feature providing you the convenience of setting the right level of brightness within your interior space. Additionally, the Lucina’E Panel Lights come with the inherent benefits of LEDs such as durability, energy conservation and no emissions of harmful UV radiation.

MOVABLE WALLS

Movable glass walls offer a variety of applications in shops, hotels, cafes and restaurants and government, banking and insurance buildings. Häfele’s President series makes it easy for you to create privacy, while its transparency and open look and feel will allow the space itself to remain intact. An enormous degree of user-friendliness and an extensive range of design and finish options are among the President’s greatest USPs. Thanks to its slim construction, this functional and stable wall will take up only a remarkably small amount of space in a parked position.

From shopping-arcade to reception area: the President SLIDO Wall provides stylish aesthetics. The glass panels of this series have been developed in a way that vertical aluminium profiles are not necessary. Therefore, no matter where your wall is to be installed, you can always maintain continuity in design without the obstruction of unnecessary frames. Because Häfele develops and produces the President series completely under its own management, there is practically no limit when it comes to turning creative ideas in to practical solutions. A selection can be made, for instance, between straight and curved, as well as segmented panels. Let your imagination run free and discover, with the help of our consultants, which movable glass wall will be shown to its best advantage in your project!
ABOUT IESC
The Infrastructure Equipment Skill Council (IESC) is a ‘Not for Profit’ sustainable organization promoted by the Indian Construction Equipment Manufacturers Association (ICEMA) and supported by the Confederation of Indian Industry (CII) and funded by National Skill Development Corporation (NSDC) under the Ministry of Skill Development and Entrepreneurship, Govt of India to spearhead the skilling of workforce in the Infrastructure Equipment Sector with primary focus on training and certification of Operators and Mechanics.

The council is governed by 19-member Governing Body from various segments of the Industry along with the representative from Department of Heavy Industries, Academia and National Skill Development Corporation.

MISSION
To train over million Operators & Mechanics in ten years to have 5000+ Certified Trainers in over next decade To accredit 400 Training Organizations meeting Global Standards Pan India

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India is on its way, to fast becoming a multi-trillion economy and infrastructure building takes the center stage. From creating all-weather Connectivity with Z-Mohr Tunnel, to contributing towards Energy Security with the Kudankulam project, or manufacturing M-Sand, a sustainable alternative to river sand and covering the length and breadth of the nation with Road network from Arunachal to Gujarat and Kashmir to Kanyakumari, Terex has participated with a solution, to most Construction equipment needs.

With an eye on future, addition of Recycling and Crane systems, are going to make Terex Solutions more versatile and ready to meet all challenges!

- Powerscreen
- Terex Finlay
- Terex Minerals Processing Systems (MPS)
- Terex Washing Systems (TWS)
- Franna Pick & Carry Cranes
- Terex Recycling Systems
- Evoquip