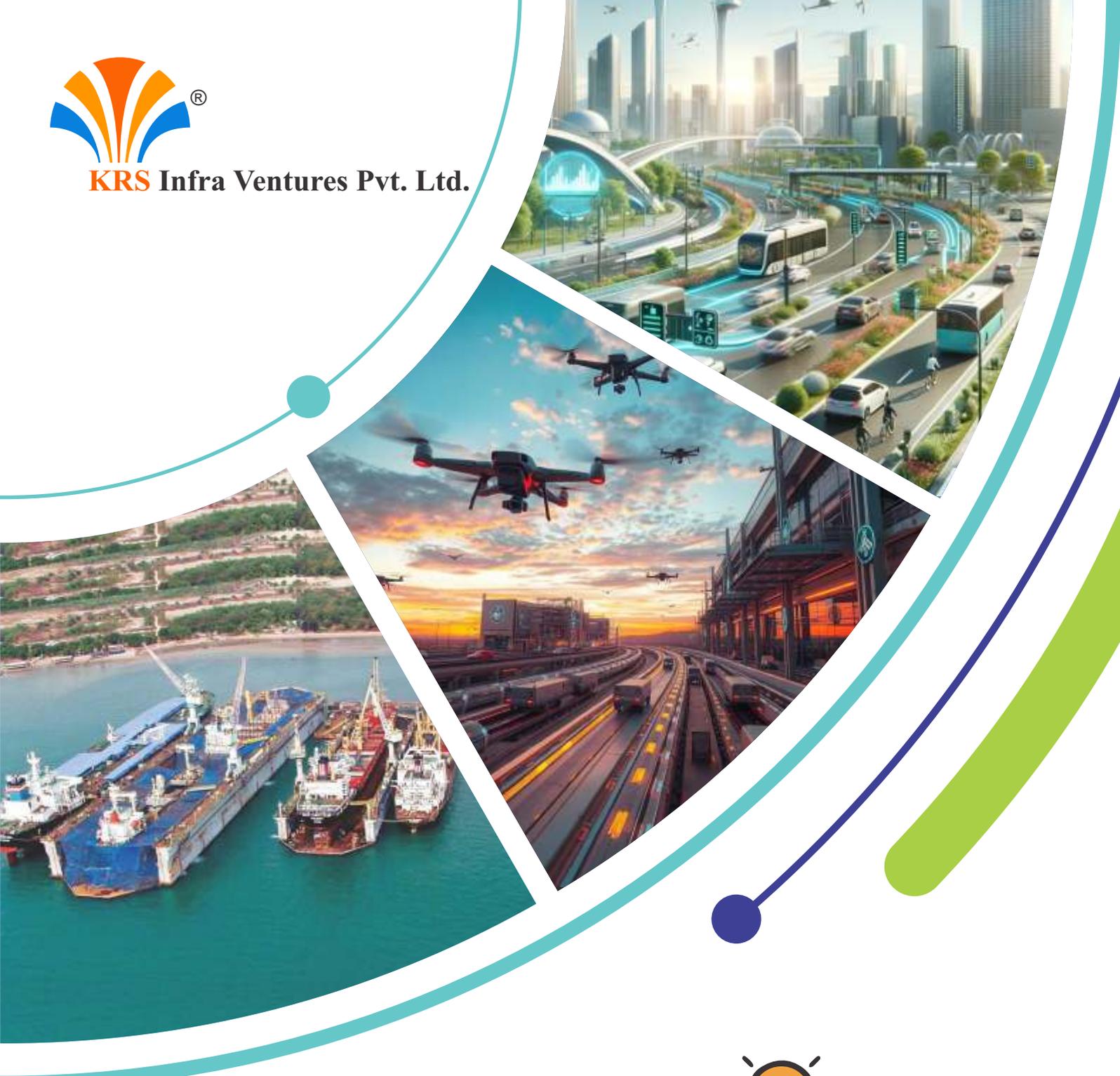




**KRS** Infra Ventures Pvt. Ltd.



**India  
Infrastructure  
2030 Plan**



**Knowledge  
Paper**  
OCT-DEC., 2025

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# From the **Director** Desk



Dear Friends,

India's infrastructure plan for 2030 aims for transformative growth across transport, energy and urban sectors, backed by estimated investments exceeding US \$2.2 trillion (INR 180 lakh crore) by 2030 to support projected economic expansion. If we analyze sector wise:

**Transport and Urban Development**—By 2030, transport is expected to attract over 60% of total infrastructure investment, with focus on highway expansion, railway modernization, metro development, port upgrades, and new logistics hubs.

**Investment and Financing**—The National Infrastructure Pipeline (NIP) set an estimate that more than US \$2.2 trillion will be needed by 2030 to achieve a GDP target of US \$7 trillion. Public-Private Partnerships (PPP) and innovative financing models, including third-party capital, are crucial for driving infrastructure investment, especially under Government fiscal constraints.

**Strategic Priorities**—Enhance transport logistics, targeting reduced costs and improved International ranking in logistics performance. Pursuing energy efficiency, renewable integration, and support Mission Net Zero Carbon Emission for railways by 2030.

The scale of India's infrastructure plan for 2030 is unprecedented, demanding innovative financing, policy support, and robust implementation frameworks to ensure timely delivery and equitable growth.

We will see Major Growth with such robust expansions in coming year, we suggest all of you to take advantage of Business Opportunities in India aggressive Plan.

Regards,



**Keshav Gandhi**  
Executive Director  
KRS Infra Ventures Private Limited

## Vision 2030 for Indian Infrastructure

India's infrastructure vision for 2030 targets holistic development across transport, urban, power, social, and digital sectors, with a projected investment range of US\$2.2–US \$4.5 trillion, much of which depends on increased private sector involvement and financing through Public-Private Partnerships (PPP). The funding and strategic plans are anchored by the National Infrastructure Pipeline, sector-specific Government programs, and multilateral institutions' contributions.



- **Logistics:** 35 Multi-Modal Logistics Parks operational by 2030, improved port and inland waterways infrastructure.
- **Aviation:** Airports to expand to 220, with investments in regional connectivity under UDAN scheme.

### Power and Energy

- **Renewables:** Goal of 50% installed power capacity from renewables by 2030; solar, wind, and green technologies supported by National Solar Mission.
- **Grid and Distribution:** Grid modernization and expansion, with substantial investment in distribution infrastructure.



### Sector-wise Infrastructure Plans

#### Transport (Roads, Railways, Logistics, Aviation)

- **Roads:** Expansion to 185,000 km national highways by 2030, including expressways and access-controlled greenfield corridors (e.g., Bharatmala Pariyojana, Delhi-Mumbai Expressway).
- **Railways:** Dedicated Freight Corridors, metro extensions in Tier-1/2 cities, and modernization of stations and rolling stock.

### Rural Infrastructure



- Roads, irrigation, drinking water supply, and digital connectivity are priorities, with half of new internet users by 2025 expected from rural India.
- Rural connectivity is enhanced through programs like PM Gram Sadak Yojana and rural electrification initiatives.

### Investment & Budget Allocation

- Projected investment required through 2030: US \$2.2–US \$4.5 trillion, with ~US \$155.5B allocated in FY 2024–25 alone.
- Government budgets have risen to INR 10.0–11.0 lakh crore (US \$1.13 trillion – US \$1.27 Trillion) per annum, focusing on transport, housing, and basic services.
- National Infrastructure Pipeline (NIP) targets INR 111.0 lakh crore (US \$1.7 Trillion) over 2020–2025 with plans to scale further.

### Key Funding Channels

- Central & State Government budgets.
- Multilateral funding (ADB, World Bank).
- Public-Private Partnerships (e.g. metro, highways, airports, urban development).

Sector	Key Initiatives	2030 Infrastructure Vision	Funding Source
Roads & Highways	Bharatmala, Expressways, Rural Roads	185,000 km highways, greenfield projects	Govt, PPP, Multilaterals
Railways	Metro, Freight corridors, Modernization	Urban mass transit, upgraded freight lines	Govt, ADB, PPP
Urban Infrastructure	Smart Cities, Housing, Urban Transport	Most cities upgraded, 40% urban population	Govt, ADB, UCF, PPP
Power & Renewables	National Solar Mission, grid modernization	50% renewables, energy access for all	Govt, Private, Multilaterals
Rural Infrastructure	Roads, Irrigation, Digital India	Full rural connectivity, broadband rollout	Govt, PPP
Digital & Social Infra	Digital India, Health, Education, Skilling	Universal broadband, tech-driven services	Govt, Private, Multilaterals



- Urban Challenge Fund and specialized sectoral funds for innovation.

- Private sector and institutional capital, especially for energy, logistics, technology, and social infrastructure.

### Summary Table: Sector-wise Plan & Funding (up to 2030)

India's 2030 infrastructure roadmap is a blend of ambitious sectoral targets and robust funding channels to drive growth, inclusion, and sustainability. ●

## Port & Shipping – Maritime India Vision 2030

The modernization of Indian ports through 2030 is guided primarily by the Maritime India Vision 2030 (MIV 2030), which sets ambitious targets for infrastructure enhancement, technological adoption, regulatory reforms, and capacity expansion across major and non-major ports.

### Key Initiatives and Investments:

- Maritime India Vision 2030 outlines more than 150 initiatives with an estimated investment of INR 3.0 to 3.5 lakh crore (US

\$36 billion – US \$42.5 billion) to create world-class port infrastructure and increase competitiveness.

- Focus areas include brownfield augmentation, development of mega ports, creation of transshipment hubs, and extensive infrastructure modernization.
- Government programs such as Sagar Mala and the National Maritime Development Program complement MIV 2030, targeting over US \$82 billion in total investments.





### Capacity Expansion and Mega Ports:

- Three mega ports (each >300 million tons per annum capacity) are planned by 2030, notably including the Chennai-Kamarajar-Cuddalore cluster on the eastern coast, set to become a 300+ MTPA mega port by 2047.
- Container traffic at major ports is growing rapidly, with capacity addition of 500–550 MTPA per year projected between FY2023–FY2028.

### Technological and Operational Modernization

- Integration of cutting-edge technologies like AI and IoT to improve efficiency, monitoring, and port logistics under the Sagar Mala Innovation and Startup Policy.
- Strong push to reduce average vessel turnaround and container dwell times to world-class standards (from 25 hours to sub-20 hours and from 55 to sub-40 hours, respectively).
- Mechanization and digitalization aim to enable cost-effective, seamless EXIM trade and improve ease of doing business.

### Multimodal Connectivity and Inland Waterways

- Multi-modal connectivity projects (including dedicated freight corridors, improved rail/road links, and waterways grid) are being developed for nationwide logistics integration and to decongest ports.
- Inland water transport is a focus, with modal share of cargo moved by water set to increase and a Riverine Development Fund to finance vessel and infrastructure upgrades.

### Policy, Regulation, and Private Sector Participation

- Revised Major Port Authorities Act to empower ports with greater autonomy and give clarity for private investments.
- A new regulatory body under the Indian Ports Act will ensure transparency, dispute resolution, and coordination across major and non-major ports.

### Sustainability and Human Capital

- Targets include over 60% renewable energy use at major ports and leadership in green shipping and ship recycling by 2030.





The top 3 projects under Maritime India Vision 2030 for port modernization are:

### **1. Chennai-Kamarajar-Cuddalore Mega Port Cluster**

This cluster is developed as a mega port on the eastern coast, with a targeted cargo handling capacity of over 300 million tons per annum by 2047. It aims to establish world-class connectivity, deep-draft berths, and significant port infrastructure upgrades, positioning Tamil Nadu as a key maritime hub in Asia.

### **2. Modernization of Major Ports (Chennai, Ennore/Kamarajar, and VO Chidambaranar)**

Major modernization and capacity enhancement projects are being implemented at Chennai, Ennore (Kamarajar), and Tuticorin (VO Chidambaranar) ports. These include terminal upgrades, mechanization, digital solutions for efficiency, and new cargo handling facilities to create globally competitive ports.

### **3. Waterways Connectivity and Multimodal Transport Grid**

The Waterways Connectivity Transport Grid is set to enhance links between Indian ports and neighboring countries (Bangladesh, Nepal,

Bhutan, and Myanmar) along with last-mile multimodal infrastructure, including dedicated freight corridors, improved road and rail linkages, and decongestion initiatives. This project directly supports port modernization through swift, seamless export-import operations and integrated logistics.

These projects together serve as the cornerstone of India's efforts to transform its port sector into a global leader in efficiency, capacity, and connectivity under Maritime India Vision 2030.

Maritime India Vision 2030 envisions Chennai-Kamarajar-Cuddalore cluster to become Mega Port in the eastern coast by 2047. This cluster is targeted to achieve a cargo handling capacity of over 300 million tons per annum by the year 2047.

Under the Port Modernization pillar of Sagar Mala Program, a total of 234 projects at cost of INR 2,91,279 Cr. (US \$ 33.03 billion) have been undertaken for implementation and out of 234 projects, 104 projects worth INR 32,654 Cr. (US \$3.70 billion) have been completed and 55 projects worth INR 74,725 Cr. (US \$8.48 billion) are under implementation.





The key initiative of Government includes Port Modernization of Chennai, Ennore (Kamarajar), and Tuticorin (VO Chidambaranar) ports, and investment in infrastructure connectivity such as rail and road linkages. Further, strategic location, deep-draft ports, and policy support aim to position Tamil Nadu as a key maritime hub in Asia.

### Indian Port – Zero Emission Target

India will use zero emission port technology is to drastically reduce or eliminate greenhouse gas emissions and air pollutants from port operations and ships, supporting the country's legal commitment to achieve net zero emissions by 2050. This transition is seen as essential for improving air quality, meeting climate targets, supporting clean energy goals, and creating new green economic opportunities.

Reduce Emissions will Shift port and vessel energy sources from fossil fuels to electricity, hydrogen, ammonia, or battery propulsion generated from renewables, to eliminate operational emissions in ports and at berth. To Improve Air Quality, Ports will cut harmful pollutants like NO<sub>x</sub>, SO<sub>x</sub>, and particulates—

benefiting local communities and complying with environmental laws.

Indian Port will support Green Growth to act as hubs for clean energy, supporting broader decarbonization across shipping, logistics, and industrial sectors. Key Benefits to reduce the emission will Lower greenhouse gas and air pollutant emissions from vessels, cranes, vehicles, and terminal operations. Health and environmental gains for coastal communities due to better air quality.

100% Renewable Power At ports operations—including cranes, vessels at berth (through shore power/cold ironing), cargo handling equipment, vehicles, and buildings—must use electricity exclusively from renewable sources such as solar, wind, or green hydrogen. In addition, Ports must Electrified and Zero-Emission Equipment in full-scale replacement of diesel-powered machinery (cranes, trucks, forklifts, etc.) with battery-electric, hydrogen fuel cell, or other zero-emission alternatives, along with charging/refueling infrastructure.

**Green Buildings and Warehousing:** Efficient buildings featuring solar panels, energy-efficient lighting, rainwater harvesting, and





other sustainable systems to minimize carbon footprint.

**Comprehensive Monitoring Systems:** Real-time tracking of energy usage, emissions, and fuel consumption across vessels and port equipment to verify zero-emission status and compliance with regulations.

### **Dredging in Indian Port & Shipping sector till 2030**

India's dredging industry is undergoing rapid expansion and modernization, driven by large infrastructure projects, port maintenance, and Government initiatives through 2030.

- Capital dredging demand in India is expected to reach 200-250 million cubic meters (mcm) annually, with a market value of INR 100.0-120.0 billion (US\$ 1.14-1.36 billion) per year between 2024 and 2030.
- Maintenance dredging will likely see requirements of 100-150 mcm per year, with an estimated value of INR 50.0-70.0 billion (US \$567.0-794.0 million) annually.
- The combined Indian dredging market was around 157 mcm in 2024 and is set to grow steadily, propelled by port-led development and inland waterway

programs such as Sagar Mala and the Maritime India Vision (MIV) 2030.

### **Enhance modal share of coastal shipping & Inland Water Transport**

The coastal shipping and inland waterways sector in India are still in its nascent stage compared to other countries and other modes of transport. Despite the fact that water transportation is cost-effective, sustainable and environment friendly mode of movement, India is not able to fully utilize its 7,500 km coastline and over 14,000 km of navigable inland waterways. There are 46 initiatives identified of which the key initiatives for enhancing modal share of coastal shipping and inland water transport include creation of port based agglomeration centers, creation of coastal berths near coast based production/demand centers, Road/ Rail/ IWT connectivity/ expansion projects, reduction in port dues and terminal charges, fiscal incentives such as allowing input tax credit on bunker fuel and spares purchased from various states, reduction of GST for multimodal transportation etc., operationalize 50 waterways by 2047, introduction of low draft vessel design with a possible tug-barge combination etc.





### Upcoming/New Coastal Ports for Domestic Transport

#### Major Announced Projects

- **Vadhavan Port, Maharashtra:** Scheduled to be operational by 2030, Vadhavan port will be a mega deep-draft port 140 km from Mumbai and 34 km from the Delhi-Mumbai Freight Corridor. It will play a major role in both International and domestic coastal shipping, picking up containers and cargo traffic beyond the capacities of Mumbai and JNPA.
- **Paradip Expansion, Odisha:** Paradip port is being expanded, with a focus on handling increased volumes of domestic and coastal cargo, including coal, POL (petroleum, oil, lubricants), and containers. The development of deep-draft berths and improved multimodal links are central parts of the plan.
- **Tajpur Port, West Bengal:** Planned as a new deep-sea port, Tajpur will facilitate robust coastal cargo movement between the east coast and other parts of India. It is positioned to serve both domestic and regional traffic.

### Coastal Port System Strengthening

- **Capacity at Major Ports:** By 2030, major ports' collective capacity is set to rise from 1.65 billion tons (2025) to 2.5 billion tons, with a special focus on improving domestic (coastal) cargo shares through dedicated berths and streamlined links.
- **Integrated Coastal Hubs:** Investments are being made at multiple smaller and non-major ports to build dedicated coastal terminals, including facilities for roll-on/roll-off (Ro-Ro) and passenger/cargo ferries, targeting states like Gujarat, Kerala, Andhra Pradesh, and Tamil Nadu.

### Inland-Coastal Linkages

- **Intermodal Terminals:** India is expanding intermodal terminals that connect inland waterways with coastal ports for seamless cargo movement, supporting aggregation and redistribution for coastal shipping routes.
- **Dedicated Domestic Berths:** Many ports are designating new berths for exclusive domestic coastal trade, reducing congestion and improving turnaround for Indian cargo.





### Policy and Capacity Drivers

- Sagar Mala Program and Maritime India Vision 2030 are driving over 150 port and coastal shipping initiatives, including the modernization and expansion of both major and non-major ports to promote cost-efficient, environmentally sustainable domestic maritime transport.
- Enhanced multimodal connectivity (road, rail, waterways) is central to these plans, with improved last-mile infrastructure and digitalization for fast, integrated supply chains.

navigating channels to accommodate larger vessels, maintaining port entrances for smooth cargo operations, or reclaiming land for urban expansion. As of 2024, the dredging market in India is about 157 cubic meters (mcm), with maintenance dredging being 110 mcm and capital dredging being 47 mcm. Worldwide, ship sizes are increasing to achieve economies of scale. As India strides towards becoming a global powerhouse in maritime sector it will require deepening and widening of navigational channel to attract deep draft vessels and movement in cargo through



### The Role and Future of Dredging in Maritime Infrastructure Development

Dredging is a process of excavating sediments from the bottom of water bodies to deepen

inland waterways. Government has undertaken several concerted efforts and has issued the 'Dredging Guidelines of Major Ports, 2021' to ensure implementation of dredging projects with optimum utilization of the resources and re-use of dredged material for sustainable development of ports in the country. The Maritime India Vision, 2030 (MIV) also envisages developing Major Ports as transshipment hubs wherever possible and increasing their capacity by way of deepening their channels and near berths



**Greenfield Developments:** New ports and expansions such as the Chennai-Kamarajar-Cuddalore mega port and VadHAVAN port will require large-scale capital dredging.

### Private participation in key ports by 2030:

- The Government has identified 50 public-private partnerships (PPP) projects worth over INR 60,000 crore (US \$6.8 billion), significantly surpassing the original targets of the National Monetization Pipeline.
- The Government also aims to raise the share of private participation in major ports to 85% by 2030.
- Among upcoming projects, the greenfield port at **VadHAVAN** in Maharashtra will be India's largest by capacity, with an investment of INR 76,000 crore (US \$8.62 billion). It will be developed in phases, to be completed in 2029 and 2037.
- The **Nicobar** port project, with a cost of INR 48,000 crore (US \$5.44 billion), is expected to be completed over the next decade.

### Upcoming Policy & incentives by Government of India

Indian Parliament has ushered in a new era for India's maritime sector by passing five historic

legislations, for Bharat's maritime journey," highlighting that these reforms will strengthen India's Blue Economy, enhance trade efficiency, and align Indian shipping with global standards. By these initiatives will unlock the full potential of India's 7,500 km-long coastline, strengthen port-led development under the **Sagar Mala vision**, and boost trade and investment opportunities and with these reforms, Bharat is charting a modern course for its Blue Economy.

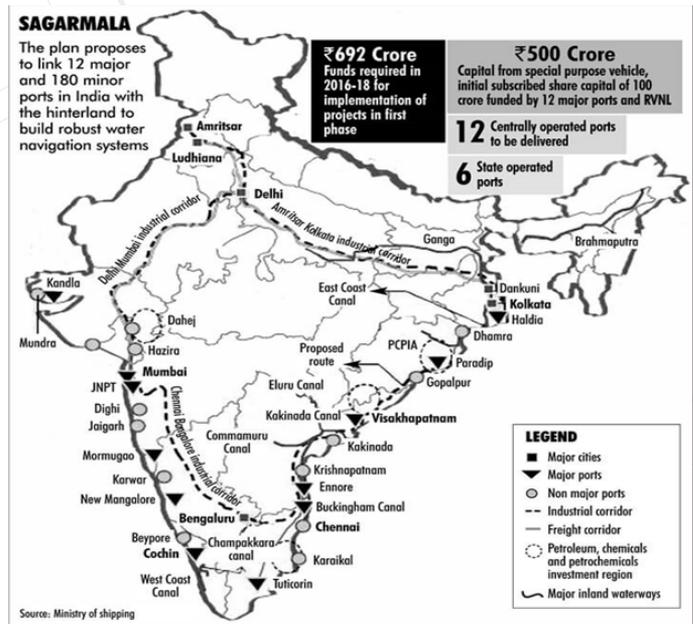
These initiatives are - The Five Landmark Maritime Bills:

- **Bills of Lading Bill, 2025:** This bill simplifies legal documentation in shipping, reducing disputes and improving the ease of doing business. By cutting down red tape, it paves the way for smoother maritime trade operations.
- **Carriage of Goods by Sea Bill, 2025:** Replacing the 1925 Act, this legislation adopts the Hague-Visby Rules, bringing India in line with International practices. It is designed to minimize litigation and strengthen maritime trade ties, particularly supporting agreements such as the India-UK CETA.



- Coastal Shipping Bill, 2025:** Focused on reviving coastal shipping's share in domestic logistics, this bill creates a dedicated legal framework. By aiming to increase coastal shipping's 6% modal share, the measure is expected to save nearly INR 10,000 crore (US \$1.34 billion) annually in logistics costs, reduce congestion, and lower carbon emissions.
- Merchant Shipping Bill, 2025:** This replaces the Merchant Shipping Act, 1958, and introduces updated provisions for seafarer welfare, ship safety, marine environmental protection, and faster wreck removal and salvage operations, ensuring greater efficiency and safety across India's maritime sector.
- Indian Ports Bill, 2025:** One of the most transformative bills, it replaces the century-old Indian Ports Act, 1908. It establishes a Maritime State Development Council for coordinated planning, strengthens the role of state maritime boards in managing minor ports, and brings in new mechanisms for dispute resolution. The bill also incorporates ecological safeguards and promotes digital integration for transparent and sustainable port operations.

The passing of these five landmark bills not only strengthens India's position in global shipping but also ensures that maritime operations are sustainable, efficient, and inclusive. By prioritizing digitalization, environmental safeguards, and International standards, the reforms will enhance trade competitiveness while supporting India's long-term economic growth.



### Tax reforms in maritime sector

Considering the capital-intensive nature of the sector, the Union Budget earlier this year announced several financial and taxation reforms. These include a Maritime Development Fund with a corpus of INR 25,000, (US \$ 289.0) the new Ship Building Financial Assistance Policy, capability and capacity development, Extension of Tonnage Tax scheme to Inland Vessels, extension of basic customs duty exemption on input material for ship building and ship breaking, conferring infrastructure status to large ships, facilitation of ship-building clusters has been transformative announcements.

These are very soon going to get formal approval laying out a comprehensive ecosystem for setting up a robust and vibrant shipping sector in India. ●

## Indian Railways – Modernization & Expansion

Indian Railways is the fourth largest railway network in the world by size, a lifeline of the nation with a total track length of 121,407 km or 75,439 miles, and its route spans 67,368 km. Indian Railways carries an average of 8.26 billion passengers annually and transports 1.16 billion tons of freight. Its revenue is estimated to be 1.874 trillion (US \$26.0 billion), of which 1.175 trillion (US \$16.0 billion) comes from freight and 501.25 billion (US \$7.0 billion) from passenger fares.

To develop Indian Railways into a world-class system that can maintain the pace of growth while supporting economic development, the Ministry of Railways has planned for the year 2030.

### National Rail Plan (NRP) 2030 Vision

Indian Railways have prepared a National Rail Plan (NRP) for India – 2030. The Plan is to create a 'future ready' Railway system by 2030. The NRP is aimed to formulate strategies based on both operational capacities and commercial policy initiatives to increase modal share of the Railways in freight to 45%. The objective of the Plan is to create capacity ahead of demand, which in turn would also



cater to future growth in demand right up to 2050 and also increase the modal share of Railways to 45% in freight traffic and to continue to sustain it. To achieve this objective all possible financial models including Public Private Partnership (PPP) are being considered.

- The NRP aims to add around 40,000 km of new tracks by 2030, including dedicated freight corridors, high-speed rail lines, and expanded suburban and mainline networks.
- Dedicated Freight Corridors totaling 3,300 km by 2030 will segregate freight traffic from passenger routes, improving efficiency and reducing logistics costs.
- The plan targets 100% electrification of the rail network with a budget of INR 2.73 lakh crore (US \$309.4 billion), to achieve a greener and more sustainable railway system aligned with India's net-zero emissions goals.



### Major Track Expansion Projects

- The Union Cabinet has approved four major multitracking projects covering 1,247 km across Maharashtra, Odisha, and



Chhattisgarh, involving 3rd, 4th, 5th, and 6th lines on key routes, at a cost of around INR 18,658 crore (US \$2.12 billion), targeted for completion by 2030-31. These improve capacity and reduce congestion on heavily used lines.

- Eight (8) new railway line projects have been approved to expand the network by approximately 900 km across seven states, including Odisha, Maharashtra, Andhra Pradesh, Jharkhand, Bihar, Telangana, and West Bengal. These projects will construct about 64 new stations, benefiting around 40 million people and enhancing connectivity in aspirational districts.
- Indian Government approves doubling of Tirupati-Pakala-Katpadi single railway line Section (104 km) in Andhra Pradesh and Tamil Nadu with total cost of INR 1332 crore (US \$151.0 Million).
- Indian Railways has allocated funds worth INR 37.77 billion (US \$428.43 million) for sub-urban rail projects in Maharashtra. Of the total, INR 1.0 billion (US \$11.56 million) is for the Mumbai Urban Transport Project (MUTP) Phase II, INR 8.0 billion (US \$97.0 million) for MUTP Phase III, and INR 8.77 billion (US \$99.43 million) for MUTP Phase III A.

### Objective of NRP 2030

- A strategy should be devised that further enhances operational and commercial capacity, so that the railway's contribution to freight transport increases to 45%.
- "Reduce the transit time for freight, and to achieve this, increase the average speed of freight trains to 50 km/h."
- Under the National Rail Plan, it includes 100% electrification, laying multi-tracks on congested routes, increasing the speed to 160 km/h on the Delhi-Howrah and Delhi-Mumbai routes, upgrading the speed to 130 km/h on all Golden Quadrilateral and Golden Diagonal routes, and eliminating all level crossings on these GQ/GD routes.
- Identify new Dedicated Freight Corridors.
- 5 Identify new High Speed Rail Corridors.
- Assess the requirement of rolling stock for passenger travel and wagons for freight transport.
- Assess the requirement of locomotives to achieve 100% electrification (green energy) and to increase freight capacity.
- Assess the total investment based on the breakup of intervals.
- Private sector participation in the operation and ownership of rolling stock, development of freight and passenger terminals, and the development and operation of track infrastructure.

### Investment

Under the visionary National Rail Plan (NRP) 2030, the Indian Government has allocated a monumental INR 40 lakh crore (approximately US \$500 billion) to modernize, electrify and streamline this national treasure. This ambitious initiative will redefine the way people travel, freight moves, and the entire rail infrastructure operates across the country.

### Summary Table of Some Key Approved Track Projects till 2030

Project	Type	Region (States)	Length (km)	Cost (INR in crore)	Completion Target
<b>Sambalpur—Jarapda</b>	3rd & 4th line	Odisha	Included in 1,247 km total	Part of INR 18,658 crore package	By 2030-31
<b>Jharsuguda—Sason</b>	3rd & 4th line	Odisha	Included in 1,247 km total	Part of INR 18,658 crore package	By 2030-31
<b>Kharsia—Naya Raipur—Parmalkasa</b>	5th & 6th line	Chhattisgarh	Included in 1,247 km total	Part of INR 18,658 crore package	By 2030-31
<b>Gondia—Balharshah</b>	Doubling	Maharashtra	Included in 1,247 km total	Part of INR 18,658 crore package	By 2030-31
<b>Eight new lines</b>	New line projects	Odisha, Maharashtra, Andhra Pradesh, Jharkhand, Bihar, Telangana, West Bengal	Approx. 900 km	INR 24,657 crore	Ongoing, by 2030
<b>Dedicated Freight Corridors</b>	Freight corridors	Across multiple states	3,300 km	Large-scale ongoing	By 2030

#### Amrit Bharat Station Scheme

The scheme aims to upgrade stations in a planned way, focusing on improving station infrastructure and making facilities better for

passengers. These facilities include improving accessibility, installation of lifts/escalators as needed, cleanliness of waiting halls and restroom, provision of free Wi-Fi, promotion of



local products through initiatives like 'One Station One Product', launch of executive lounges, establishment spaces for business meetings, landscaping and other necessary amenities personalized to the requirements of each station.

### Indian Railways: Prioritizing Safety on the Tracks

The Government of India has initiated several key rail safety measures to be applied by 2030 as part of its vision for a safe, efficient, and future-ready railway system. India's rail safety efforts blend cutting-edge technology like Kavach, AI monitoring, and IoT sensors with traditional infrastructure upgrades and human resource development to dramatically improve safety outcomes by 2030.

The main initiatives include:

#### Key Rail Safety Initiatives by 2030

- **Kavach Train Collision Avoidance System:** An indigenous automatic train protection system that prevents collisions by applying brakes automatically if the driver fails to respond. It is planned to be deployed across approximately 34,000 to 44,000 km of track

by 2030, covering major routes such as Delhi-Mumbai and Delhi-Howrah.

- **Rashtriya Rail Sanraksha Kosh (RRSK):** A dedicated safety fund with a corpus of INR One (1.0) lakh crore (US \$134.6 billion) (over five years since 2017) to finance critical safety improvements like track renewal, signaling upgrades, bridge strengthening, and staff training.
- **Modern Yard Safety Systems:** Implementation of AI-based cameras, IoT sensors, and smart inspection technologies in railway yards and depots to enhance operational safety.
- **Fog Pilot Assistance System (GPS-based):** GPS-enabled devices installed in fog-affected zones to help drivers gauge distances to signals and crossings for safe navigation in low visibility conditions.
- **Automatic Fire Alarm and Fire Safety Systems:** Installation of smoke detectors, automatic fire extinguishers, and fire suppression systems especially in LHB coaches and pantry cars.
- **Vigilance Control Devices (VCD):** Ensuring alertness of loco pilots by monitoring pilot





fatigue and distraction using AI-based cameras and sensors in locomotives.

- **Real-Time Train Tracking and Monitoring:** Satellite-based tracking technologies developed in collaboration with ISRO enable real-time train position monitoring, helping improve response times to incidents.
- **Enhanced Safety Training and Staffing:** Recruitment to fill safety-critical vacancies and advanced training modules to reduce human error and improve adherence to safety protocols.
- **Use of AI and Predictive Maintenance:** Leveraging AI for predictive maintenance by analyzing data from track sensors and rolling stock to prevent accidents before they occur.

### Alternative fueling technologies by Indian Railways

Indian Railways plans to meet its 10-gigawatt traction requirement by 2030 using a mix of nuclear, solar, hydropower, wind, and thermal sources. With 95% of trains running on electricity by 2025-26, carbon emissions are expected to reduce significantly. The initiative

brings environmental benefits and significant cost savings in diesel expenditure.

Indian railway has set a target to achieve Net Zero Carbon Emission by 2030. Lowering energy consumption by adopting energy-efficient measures would be one of the key measures to achieve this ambitious target.

Indian Railways is actively projecting the use of alternative fueling technologies by 2030 to reduce dependency on diesel and achieve net-zero carbon emissions. Key alternative fuel initiatives include:

### Hydrogen Fuel Cell Trains

- Pilot projects are underway to convert Diesel Electric Multiple Units (DEMUs) into hydrogen fuel-cell-powered trains, starting with a trial on the Jind-Sonipat section of Northern Railway.
- These trains use hydrogen fuel cells to generate electricity onboard, producing zero emissions.
- Hydrogen fuel is planned to be produced locally using electrolysis powered by renewable energy, with refueling infrastructure being developed alongside.





### Renewable Energy for Traction

- Indian Railways aims for 100% electrification of broad-gauge routes, with traction power increasingly sourced from renewables like solar, wind, hydropower, and nuclear energy.
- By 2030, the traction power requirement is expected to be around 10,000 MW, with a substantial portion met through captive and contracted renewable power plants.
- The focus on renewable traction reduces reliance on fossil-fuel-based diesel engines.

### Biofuels and Alternative Diesel Blends

- Trials with biodiesel blends in diesel locomotives are ongoing to reduce emissions.
- Some diesel locomotives are being modified for Compressed Natural Gas (CNG) usage, which is cleaner than conventional diesel.

### Energy Efficiency Technologies

- Regenerative braking systems convert kinetic energy during braking into electrical

energy, which is fed back into the grid or reused on the train.

- Energy-efficient systems and appliances are being adopted across rail operations.

### Vision 2030 Goals

- The vision reflects a transition toward cleaner, greener railway operations using alternative fuels like hydrogen and renewable electricity alongside modernized, energy-efficient infrastructure.
- This transition supports Indian Railways' commitment to become a net-zero carbon emitter by 2030.
- Indian Railways' alternative fueling plans for 2030 focus largely on hydrogen fuel cell trains, increased renewable energy use for electrification, and cleaner fuel trials like biodiesel and CNG to phase out traditional diesel engines and promote sustainable rail transport.

### Upcoming Railway Projects

The Indian Government approved Four projects of Ministry of Railways. These projects got approved as on 27/08/2025. These projects include:



Total cost of the Project- INR 12,328 crore (US \$ 1.4 billion)

### Details of Projects in pipeline:

- The multi-tracking projects will benefit approximately 3,108 villages and a population of about 47.34 lakh across these states.
- They will create about 251 lakh human-days of direct employment during construction.
- The projects aim to reduce congestion, improve efficiency in rail transport, support growth in tourism, facilitate freight



movement, and contribute to environmental sustainability by lowering CO<sub>2</sub> emissions.

Project Name	States Covered	Route/Track Length	Estimated Cost	Completion Timeline	Key Benefits
<b>Secunderabad (Sanathnagar) – Wadi 3rd &amp; 4th Line</b>	Karnataka, Telangana	173 km	INR 5,012 crore	5 years	Boosts southern infra, helps Aspirational District Kalaburagi
<b>Bhagalpur – Jamalpur 3rd Line</b>	Bihar	53 km	INR 1,156 crore	3 years	Improves North-East connection, enables faster transit
<b>Furkating – New Tinsukia Doubling</b>	Assam	194 km	INR 3,634 crore	4 years	Eases transport bottlenecks, aids logistics
<b>Deshalpar– Hajipir–Luna &amp; Vayor– Lakhpat New Line</b>	Kutch, Gujarat	145 km (164 track km)	INR 2,526 crore	3 years	Connects remote Kutch, boosts trade & tourism

## Indian Road & Highways – on path of Expansion

India is planning a massive expansion of its road and highway network by 2030 as part of a comprehensive infrastructure development vision. Key highlights of upcoming new roads and highways include:

### New Road & Highway Expansion by 2030

- The national highway network is expected to expand by about 30,600 km under a INR 22.0 lakh crore (US\$ 265 Billion @ Rs. 83/USD) investment plan aimed for completion by 2031-32. This includes the construction of approximately:
- 18,000 km of expressways and high-speed corridors,
- 4,000 km of national highway widening and decongestion around cities,
- Strategic, International connectivity, and port connectivity roads.
- The overall length of national highways in India is targeted to increase to over Two (2.0) lakh km by 2037 (up from 146,000 km now), with a substantial ramp-up of access-controlled highways to 50,000 km by then from 4,000 km currently.



- Under the flagship Bharatmala Pariyojana, around 65,000 km of highways are planned, including economic corridors, inter-corridor and feeder routes, border and International connectivity roads, and coastal and port connectivity roads. Till March 2024, 26,425 km have been awarded and 17,411 km constructed under this scheme.
- Upgrades for better road safety and congestion reduction include converting 25,000 km of two-lane highways to four lanes and expanding 16,000 km to six lanes, with budgets of INR 10.0 trillion (US \$113.5 billion) and INR 6.0 trillion (US \$68.1 billion) respectively, aiming to reduce road accidents by 50% by 2030.
- India's expressway network is rapidly expanding, with about 2,474 km of National High-Speed Corridors and expressways operational and many more under construction. The plan includes achieving connectivity where any part of India is accessible by high-speed expressways within 100-150 km.

**Summary Table of Road & Highway Targets:**

Metric	Target Year	Planned Expansion	Notes
National highways length	2037	Over 2,00,000 km	Up from 1,46,000 km currently
Expressways & High-Speed Corridors	2031-32	18,000 km expressways	Includes Bharat Mala corridors
Highway widening (4-lane)	By 2030	25,000 km	INR 10.0 trillion investment
Highway widening (6-lane)	By 2030	16,000 km	INR 6.0 trillion investment
Bharat Mala Pariyojana (total)	2030+	65,000 km	Includes economic corridors, etc.

**Toll system technology in Indian road & highways sector by 2030**

**ANPR-FASTag-Based Barrierless Tolling**

- Combines Automatic Number Plate Recognition (ANPR) cameras and RFID FASTag readers for toll collection without requiring vehicles to stop.
- Vehicles are automatically identified, and tolls deducted electronically with high accuracy and speed.



- Non-compliance results in e-notices and penalties, adding enforcement rigor.
- This system is already piloted on roads like Dwarka Expressway and is planned for wider adoption pending performance.

**Upcoming Technologies of Road & Highways sector in India by 2030**

India's roads and highways sector is gradually transforming to qualitative from quantitative





by introducing smart technologies and digital innovations in the building and maintenance of the projects.

India has the second-largest road network in the world, with a total length of 66.71 lakh km and roads currently handle approximately 85% of passenger traffic and over 60% of freight in the country.

**NHAI Explores New Self-Healing Road Technologies:** The National Highways Authority of India (NHAI) is exploring new technologies aimed at creating pothole-free highways. This includes innovative development towards self-healing roads, encapsulating technologies that allow the roads to repair themselves automatically under specific conditions.

**Implementation Status and Future Prospects:** Currently, the technology is not in use as the Government intends to perform a thorough cost-benefit analysis to ensure its effective implementation. Looking forward, these innovative self-healing road technologies hold significant potential to

make Indian roads more durable and sustainable, with a likelihood of becoming more common in the coming years.

### Smart Road Technologies

- **Digital Monitoring & AI-Driven Traffic Management:** Indian highways will be equipped with sensors, IoT devices, and AI-powered platforms to monitor traffic in real-time, predict congestion, optimize signal timings, and improve overall road safety.
- **Digital Twins & Advanced Analytics:** Digital replicas of infrastructure assets (digital twins) will improve design, construction, and maintenance decision-making by providing detailed real-time data throughout the project lifecycle.
- **Automated Surveying & Construction:** Use of LiDAR, drones, 3D mapping, and automated machinery enhances precision in planning and accelerates quality construction.

### Sustainable Road Materials & Green Technology





- **Recycled & Waste Materials in Roads:** Plastic waste, shredded tires, and other recycled materials will be increasingly used as alternatives to bitumen in road construction to reduce environmental impact.
- **Solar-Powered Streetlights & EV Charging:** Integration of renewable energy sources with solar-powered lighting and dedicated electric vehicle charging infrastructure along highways supports India's green mobility goals.
- **Expressway & Infrastructure Upgrades:** India planned expansion of over 10,000 km



of national highways with high-speed corridors and expressways, designed with smart tolling and emergency response systems. Dedicated EV lanes and charging corridors in expressway projects encourage the adoption of electric vehicles.

- **Safety & Efficiency Enhancements:** Deployment of smart surveillance, speed enforcement cameras, and driver assistance systems to reduce accidents. Barrierless tolling and satellite-based toll



collection technology to reduce traffic delays.

- **Large-Scale Investment & Policy Support:** The Government is channeling investments of around INR 20.0 trillion (US \$227.1 billion) towards smart and sustainable road infrastructure. Public-private partnerships (PPP) and technology-driven planning are promoting quicker, more efficient project delivery.

### Top upcoming Highway projects across states\* (on the basis of length)

Project Name	State	Cost (INR in Billion)	Length (KM)	Implementing Agency
<b>Umargam-Narayan Sarovar Coastal Highway Project</b>	Gujarat	24.00	1630.00	Government of Gujarat
<b>Mumbai-Bengaluru 14-Lane Highway Project</b>	Maharashtra, Karnataka	100.00	856.00	Ministry of Road Transport and Highways
<b>Nagpur-Goa Shaktipeeth Expressway Project</b>	Maharashtra	207.87	805.00	Maharashtra State Road Development Corporation Limited
<b>Double Lane East-West Highway Project</b>	Arunachal Pradesh	52.44	692.70	Government of Arunachal Pradesh
<b>Somnath- Dwarka Expressway Project</b>	Gujarat	571.20	680.00	Government of Gujarat
<b>Kerala Coastal Highway Project</b>	Kerala	65.00	623.00	Public Works Department, Kerala
<b>Gorakhpur- Siliguri Six- Lane Greenfield expressway Project</b>	Uttar Pradesh, Bihar, West Bengal	386.45	586.00	National Highway Authority of India
<b>Namo Shakti Expressway Project</b>	Gujarat	391.20	430.00	Government of Gujarat
<b>Jalore-Jhalawar Expressway Project</b>	Rajasthan	10300	402.00	Public Works Department
<b>Access- Controlled Anantapur-Amravati Expressway (Greenfield)</b>	Andhra Pradesh	171.11	371.03	National Highway Authority of India
<b>Ajmer- Banswara Expressway Project</b>	Rajasthan	89.34	358.00	Public Works Department, Rajasthan
<b>Jaipur-Phalodi Expressway Project</b>	Rajasthan	70.86	345.00	Public Works Department, Rajasthan
<b>Beawar-Bharatpur Expressway Project</b>	Rajasthan	83.34	342.00	Public Works Department, Rajasthan
<b>Bikaner- Kotputli Expressway Project</b>	Rajasthan	63.01	295.00	Public Works Department, Rajasthan

### Upcoming Projects

#### Government of India-Approved Road & Highway Projects (Recent Highlights)

Project Name	Length (km)	States Covered	Approved Investment (INR in crore)	Key Benefits
<b>High-Speed Road Corridors (8 projects, Aug 2024)</b>	936	9 States	50,655	Decongest cities, boost logistics, create ~4.4 crore jobs
<b>Agra-Gwalior Corridor (6-lane)</b>	88	Uttar Pradesh, Madhya Pradesh	4,613	Reduces Agra-Gwalior travel time by 50%
<b>Kharagpur-Moregram Access-Controlled Highway (4-lane)</b>	231	West Bengal, Odisha, Andhra Pradesh	10,247	Cuts travel for freight from 9-10 hours to 3-5 hours
<b>Tharad-Deesa-Mehsana-Ahmedabad Expressway (6-lane)</b>	214	Gujarat	10,534	Cuts distance by 20%, travel time by 60%
<b>Ayodhya Ring Road (4-lane)</b>	68	Uttar Pradesh	3,935	Relieves city congestion, improves pilgrimage/tourist access
<b>Capital Region Ring Road (Bhubaneswar Bypass)</b>	110.9	Odisha	8,307.74	Diverts heavy traffic, boosts multimodal freight efficiency
<b>Patna-Arrah-Sasaram Greenfield &amp; Brownfield Corridor</b>	120.1	Bihar	3,712.4	Enhances Bihar's connectivity
<b>JNPA Port-Chowk Access-Controlled Greenfield Highway</b>	29.2	Maharashtra	4,500.62	Fast freight linkage to major port

#### Indian Government announced recently these three projects:

The first project involves the four-laning of the 17.87 km Amazhar-Barela Road (Jabalpur Ring Road). According to the National Highways Authority of India (NHAI), the project completes the final stretch of the Jabalpur Ring Road, reduces the entry of heavy vehicles into the city, lowers accident risks, and provides better connectivity for vehicles from Amarkantak to other NHs.



The second project focuses on the construction of seven underpasses along the Rewa–Maihar– Katni section of NH-30. These underpasses, to be built at key locations including Amarpatan–Satna Link Road, Maihar City Entry, and Sleemnabad Junction, will improve safety on the existing fourlane stretch and introduce long-term safety features such as service roads and median barriers.

The third project covers the construction of six flyovers and underpasses on the Katni–Jabalpur–Lakhnadon section of NH-30/34. NHA stated that the project will enhance safety by adding underpasses, service roads, and realignments. Major works



include interventions at Barna Tiraha, Sihora Bypass Junction, Panagar Bypass, and realignment of the Ramanpur Valley to reduce accident-prone stretches. ●

## Indian Aviation – Expansion & Modernization

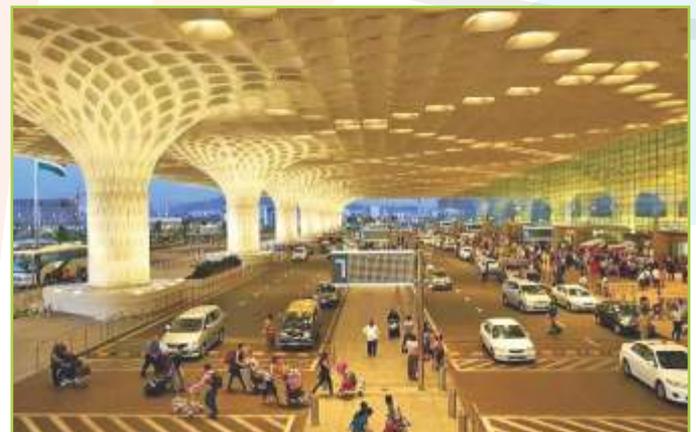
India's Aviation Sector is poised for significant growth, with Indian Government announcing that the annual number of air travelers is expected to more than double from INR 24.0 crore (US \$ 2.7 million) to nearly INR 50.0 crore (US \$5.78 million) by 2030.

India's strategic geographical location positions it as a potential major International Aviation hub, capable of serving both Eastern and Western markets.



Indian Aviation Ministry ambitious plans to construct 50 new airports within the next five years, with a strategic focus on establishing Delhi (DEL) as a major International Aviation hub. He emphasized India's commitment to expanding its Aviation ecosystem through International partnerships and technological advancements.

India has already emerged as the third-largest domestic Aviation network, attracting



significant International interest from potential investors. The plan 2030 expect Airport Ground Services expansion to the following:

- **Growth in Cargo Handling:** India aims to triple its cargo handling capacity from 3.5 million metric tons to 10 million metric tons by the end of this decade.
- **Maintenance, Repair, and Overhaul (MRO) Hub:** The country is set to become a US \$4 billion MRO hub by 2030, enhancing its role in the global Aviation supply chain.
- **Commercial Space Flights:** India is working towards integrating space travel into its civil Aviation sector, aiming to commercialize space flights in the future.
- **Inclusive Workforce:** India boasts one of the most inclusive Aviation workforces globally, with women comprising 15% of pilots, compared to the global average of 5%.

### Key Growth Projections

With such aggressive plan India is expected to become the 3rd-largest air passenger market globally (domestic and International combined) by 2030. Passenger traffic is projected to nearly double to 500.0 million passengers annually by 2030, up from around 240.0 million currently. Cargo traffic is also set to grow from 3.5 million metric tons to more than 10 million metric tons by 2030.

The Aviation market will require an investment of over US \$170 billion to finance aircraft orders (about 1,700 planes) and expand airport capacity.

### Airport Infrastructure Expansion

Indian Aviation Industry expansion plan will show the number of operational airports is set to increase to 350-400 by 2047, with about 50



new airports planned by 2030, focusing on Tier 2 and Tier 3 cities to improve regional connectivity. Airport modernization will include new terminals, greenfield airports, and enhanced maintenance, repair, and overhaul (MRO) facilities, with India targeting to become a US \$4 billion MRO hub by 2030. Implementation of digital initiatives such as Digi Yatra for seamless, paperless travel and enhanced security systems will improve passenger experience.

### Policy and Market Developments

The Government's UDAN scheme has expanded regional connectivity by subsidizing flights to underserved airports, with over 519 routes operationalized. India's policy environment supports 100% foreign direct investment (FDI) under the automatic route in scheduled domestic airlines and incentivizes domestic aircraft manufacturing under "Make in India" initiatives. Focus on sustainable Aviation with increased use of sustainable Aviation fuels (SAF) and commitment to reducing carbon footprint. The Aviation sector directly employs over 369,700 people and indirectly supports about 7.7 million jobs, contributing significantly to GDP. ●

## Indian Power & Energy Sector

India's power sector is witnessing a transition from thermal to renewable energy generation. While coal continues to play a critical role in meeting baseload demand, accounting for almost 70% of energy generation, the Government is actively advancing policy initiatives to accelerate renewable energy deployment, achieve 500 GW of renewable energy capacity by 2030 and become a net zero emission economy by 2070. In FY 2025-26 (till April), capacity addition stood at 4,582 MW. This comprises 350 MW of thermal, 200 MW of hydro and 3,332 MW of renewables. After a long gap, the Rajasthan Atomic Power Station (RAPS) was commissioned, adding 700 MW to nuclear capacity.

The cumulative electricity generation in 2024-25 stood at 1,824 BUs. Source-wise thermal generation accounted for 74.76% at 1,364 BUs and renewables 14% at 255 BUs (excluding large hydro), while large hydro stood at 148 BUs and nuclear at 57 BUs. The total energy generation grew at 4% and renewable energy generation at 12.3%.



India is rapidly developing renewables; the pace of renewable capacity and storage deployment is still insufficient to replace thermal generation assets for round-the-clock supply. TPPS remain crucial for grid stability and flexibility, balancing the fluctuating output from solar and wind sources. These plants are deeply integrated with India's existing transmission, coal supply and water infrastructure. Their continued operation is critical until alternative sources and supporting infrastructure become fully developed and reliable.

India aims to reach 600 GW of non-fossil fuel capacity by 2030, including 377 GW of solar, 148 GW of wind, 62 GW of hydro, and 20 GW of nuclear energy. This ambitious target supports reliable and affordable power supply, addressing challenges in grid management and infrastructure.

India's transmission network continues to scale new milestones, with steady growth in both line length and transformation capacity. As of May 2025, the total length of transmission lines at the 220 kV level and above stood at 494,994 ckt km, while the AC transformation



capacity was 1,354,103 MVA. During 2024-25, India added 8,830 ckt km of transmission line length and 86,433 MVA of transformation capacity. The current pace of network expansion indicates a strong alignment with the Central Electricity Authority's (CEA's) long-term vision and a special focus on integrating and supporting India's renewable energy trajectory. To meet the national target of 500 GW of non-fossil fuel-based capacity by 2030, developing the transmission network is a critical priority.

India's ambitious also extend beyond national borders. As part of the One Sun One World One grid (OSOWOG) initiatives, the country is exploring cross border electricity trade with regions in the Middle East and Southeast Asia. These developments underscore the potential of transmission infrastructure not just as domestic enabler, but as a tool for regional diplomacy and cooperation.

### Renewable Expansion and National Targets

India is targeting 500 GW of non-fossil fuel power capacity by 2030, driven primarily by significant growth in solar, wind, and hydropower installations. As of June 2025, renewables (including solar, wind, hydro, and

nuclear) account for nearly 49% of the nation's total installed power generation capacity of 476 GW. Government policies are supporting annual non-fossil fuel additions of about 50 GW, and major investments are being made in green hydrogen, energy storage, and transmission infrastructure.

### Key Trends Shaping Energy Future

- **Rapid Renewable Adoption:** Solar capacity has reached 110.9 GW, with India's total renewables (excluding nuclear) surpassing 226 GW by mid-2025, reflecting a pivotal transition away from fossil-fuels.
- **Declining Coal Share:** While coal remains significant, its share in electricity generation is declining as renewables surge; renewable output rose 24.4% year-over-year in the first half of 2025, while coal output fell 3%.
- **Investments and Policy Support:** Record investment levels, supportive tenders, and Government incentives are accelerating clean energy projects.

### Technological and Regional Focus

- **Battery Storage & Grid Modernization:** Large-scale battery storage and grid integration projects are stabilizing renewable supply and reducing energy waste, supporting the shift to renewables.
- **Green Hydrogen & New Technologies:** India is investing in green hydrogen and advanced energy technologies, with major conglomerates allocating substantial funding to these sectors.
- **Regional Hubs:** States like Rajasthan, Gujarat, Karnataka, and Andhra Pradesh are emerging as leaders in solar and wind

capacity addition due to favorable resources and proactive policies.

India's strategy combines economic development with sustainability, leveraging domestic manufacturing, policy reforms, and external investments to meet growing energy demand. The path forward involves continued expansion of clean energy, scaling storage and smart grids, and addressing challenges in transmission and project execution.

India is on track to become a global leader in renewable energy and is likely to meet or exceed its decarbonization goals for 2030.

### Indian Nuclear Power Generation-Private Player Entry

#### Major Proposed and Under-Development Hydro Power Projects

Project Name	Location	Type	Capacity (MW)	Status/Expected Year
Upper Siang	Arunachal Pradesh	Conventional Hydro	10,000	Announced, 2033
Sonbhadra (Greenko)	Uttar Pradesh	Conventional Hydro	3,660	Announced, 2033
Etalim	Arunachal Pradesh	Conventional Hydro	3,097	Permitting, 2026
Karjat	Chhattisgarh	Conventional Hydro	3,000	Announced, 2033
Up01 (Greenko)	To be announced	Conventional Hydro	3,000	Permitting, 2034
Dibang	Arunachal Pradesh	Multipurpose	2,880	Under Construction, 2032
Bhawali PSP	Maharashtra	Pumped Storage	1,500	Approved, 2028
Bhivpuri PSP	Maharashtra	Pumped Storage	1,000	Approved, 2028

India is opening up the private sector for nuclear energy, Government of India announced on the occasion of the 78th Independence Day. The move to allow private firms to mine, import and process uranium will end a decades-old state monopoly over the nuclear sector and bring in billions of dollars to boost the industry.

### Hydro power projects

India has a robust pipeline of upcoming hydro power projects targeting completion by 2030, including both large conventional plants and a significant wave of pumped storage projects (PSPs) to support grid stability and renewable energy integration.

## Indian Oil & Gas Sector

India's energy demand continues to rise sharply, driven by sustained economic growth, industrial activity and urbanization.

However, the country's crude oil production is witnessing a consistent decline, intensifying its reliance on imports to meet domestic requirements.

During 2024-25, India's domestic consumption of crude oil reached 239.2 million tones (mt), up from 194.3 mt during 2020-21, registering a CAGR of 4.2%. In contrast, domestic crude oil production declined to 28.7 mt in 2024-25, from 30.5 mt in 2020-21. Offshore fields accounted for 53%, while onshore fields contributed the remaining 47%. The western offshore region remains the most productive, followed by Gujarat onshore (17%), Assam onshore (16%) and Rajasthan onshore (12%).

Meanwhile, natural gas production has seen a positive trajectory. Output increased to 36,113 million metric standard cubic meters (mmscm) in 2024-25, up from 28,672 mmscm in 2020-21, reflecting a CAGR of 4.7%. Natural gas consumption, including internal use, rose



from 60,981 mmscm to 71,948 mmscm during the same period.

Despite these gains, India's dependence on imports remains substantial. Import dependence on crude oil increased to 88.2% in 2024-25 from 84.4% in 2020-21. As the world's third largest oil importer and consumer, the country spent US \$144.2 billion on net oil and gas imports in 2024-25, up from US \$113.4 billion in the previous fiscal year. This rising energy import bill reinforces the need for strategic sourcing, accelerated domestic exploration and production, and diversification of supply sources.



India's natural gas pipeline network is undergoing a phase of accelerated development, with a strong focus on expanding pipeline connectivity and improving liquefied natural gas (LNG) terminal utilization. The national gas grid is poised for significant expansion, with a total announced network length of 34,233 km. Of this, around 25,429 km is currently operational, and 10,459 km is under construction. The expansion is

aimed at enhancing last-mile connectivity, improving gas accessibility across regions and supporting the Government's ambition to increase the share of natural gas in the energy mix to 15%.

Complementing the pipeline network is the country's LNG infrastructure. Presently, India has eight operational LNG terminals with a cumulative regasification capacity of around 52.7 million metric tons per annum (mmt- pa). These terminals are strategically located at Dahej, Hazira, Kochi, Dabhol, Ennore, Mundra, Dhamra and Chhara, serving as key entry points for imported gas.

To address issues of underutilization and ensure more efficient use of existing assets, the Petroleum and Natural Gas Regulatory Board (PNGRB) recently introduced the LNG Terminal Regulations, 2025. This marks a major step towards improving India's gas infrastructure efficiency and transparency. The new regulations apply to terminals commissioned from October 1, 2027, and require mandatory registration by operators. They also mandate the public disclosure of key



charges, including regasification tariffs, truck-loading fees and boil-off gas charges.

India has made remarkable progress in expanding its gas connectivity. Liquefied petroleum gas (LPG) has reached households across the country, earning International recognition for its scale and impact. The Government's "One Nation, One Gas Grid" vision - exemplified by the ambitious Pradhan Mantri Urja Ganga Yojana (PMUGY) - has been a game changer in bringing affordable, clean energy to millions. Launched to extend gas pipelines across six eastern states, including West Bengal, this initiative aims to supply affordable piped gas to industries and households alike. It also supports the wider adoption of compressed natural gas for vehicles and gas-based technologies for industries.

### Expansion of Oil and Gas Pipeline Infrastructure

India's oil and natural gas pipeline infrastructure has evolved rapidly over the past few years, playing a pivotal role in shaping the country's energy transition journey. As a





cleaner alternative to conventional fossil fuels, natural gas has become increasingly central to India's push for sustainable and efficient energy use. Given the country's ambitious target to raise the share of natural gas in its energy mix to 15% by 2030 (from ~7% at present), a robust pipeline network and enhanced interconnectivity remain essential for bridging supply-demand gaps and enabling equitable regional access and safe transportation. Oil pipelines have also witnessed substantial progress across key segments. Digitalization and automation have been instrumental in transforming the sector.

The city gas distribution (CGD) sector has long played a central role in boosting natural gas consumption. As of May 2025, the country has recorded significant growth in CGD, with approximately 15.3 million piped natural gas (PNG) domestic connections, 45,730 PNG commercial connections and 20,697 PNG industrial connections. Minimum work program targets (MWPTS) have played a critical role in fueling progress by ensuring the timely, accountable and measurable expansion of gas pipeline infrastructure ac

country. The MWPT across all states and union territories collectively amounts to 126 million connections. Of there, about 47% equivalent to 15.26 million PNG domestic connections, have been achieved. Among these domestic connections, around 63 per cent (9.63 million) are billed connections, reflecting steady progress in consumer conversion and revenue realization.

The outlook for the sector appears promising & steadily rising demand and increasing coverage of pipeline infrastructure. Alongside one reforms to amend and optimize the tariff structure are expected to widen the consumer base unit and improve access to PNG. Despite challenges the expansion of the pipeline network has scope for growth, with the industry estimating that the CGD sector will grow at a CAGR of around 10% by 2040.

The segment is also exploring decarbonizing their operations and shifting to cleaner alternative forms of energy. In line with this, in June 2025, the PNGRB recommended that operators transition from the utilization of gas engine-driven compressors to electric motor-driven alternatives powered by renewable





energy sources. This move aligns with the country's broader climate goals. The petroleum sector is embracing advanced technologies to boost efficiency and sustainability. Enhanced oil recovery, digital tools and artificial intelligence are streamlining exploration and production, while initiatives like biorefineries and compressed biogas supplement the industry's push towards cleaner, tech-driven innovation. The Government has undertaken various policy reforms and programs to compliment the modernization of O&G pipeline infrastructure. The Ethanol Blending Program targets 20% ethanol in petrol by 2025-26 to reduce fossil fuel use and emissions. O&G pipelines remain central to India's energy architecture, critical for transporting fuels efficiently and enabling the country's transition to a more sustainable and self-reliant energy ecosystem.

### Future of the Indian oil and gas sector

The future of the Indian oil and gas sector is expected to be marked by strong growth in demand, significant infrastructure expansion, and a strategic push towards cleaner fuels

and greater self-reliance despite global volatility.

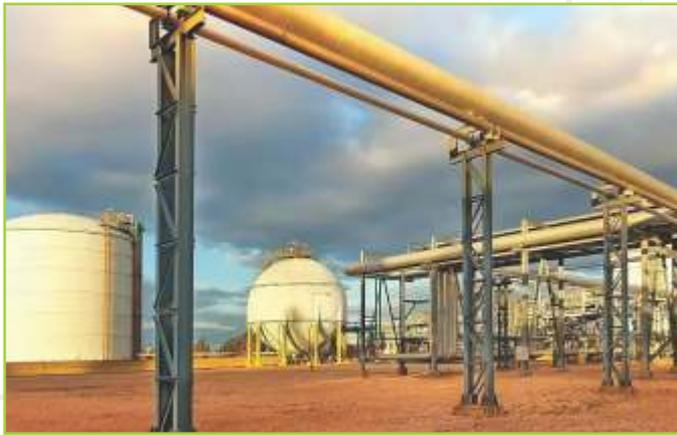
### Growth Drivers and Forecasts:

- Oil demand in India is projected to double, reaching about 11 million barrels per day by 2045, with diesel demand expected to double by 2029-30.
- Natural gas consumption is forecast to grow nearly 60% by 2030, reaching around 297 million standard cubic meters per day (mmscmd), up from 188 mmscmd in FY24.
- The industry is likely to deliver sales, EBITDA, and profit growth of 6%, 12.9%, and 13.3% respectively for FY26E, and continued expansion into FY27.

### Strategic and Policy Shifts

- The Oilfields (Regulation and Development) Amendment Bill, 2024 has modernized sector regulations, aiming to boost private investment, improve governance, and promote environmental sustainability.
- The Open Acreage Licensing Policy (OALP X) and the National Seismic Program are





accelerating upstream exploration, aiming to increase domestic production and reduce import dependency.

- Large investments are planned, with over US \$25 billion targeted toward exploration and production by 2040.

### Infrastructure and Import Trends

- A major pipeline expansion is underway, targeting 34,233 km in length, to enhance last-mile connectivity and support natural gases share increase in the energy mix.
- Despite improvements in production, import dependency is rising India's crude oil import dependence reached 88.2% in 2024-25 due to strong demand.
- LNG import infrastructure is being strengthened to meet anticipated gas demand.
- FSRU (Floating Storage and Regasification Unit) sector is expected to see robust installation activity due to rising LNG demand, tight supply of available FSRUs, and accelerated project timelines in

multiple regions. FSRU installation from 2026 onwards will accelerate, with the technology playing a critical and flexible role in the global LNG infrastructure expansion and energy transition.

### Industry Challenges and Opportunities:

- New discoveries are needed to offset declining production from legacy fields.
- Emphasis on cleaner fuels is driving natural gas growth, with policy support for compressed biogas and LNG, especially in transport and power generation.
- Integration of digital and sustainable technologies is expected to drive both efficiency and environmental compliance.

### Leading Players and Investments:

- Top companies highlighted for strong future growth include Reliance Industries Ltd. (RIL), GAIL India Ltd., Mahanagar Gas Ltd., and Gulf Oil Lubricants India Ltd.
- The sector is benefiting from both domestic and foreign investment and is actively developing mechanisms to reduce exposure to global supply shocks.





The sector is expected to show robust growth in both oil and gas consumption, underpinned by large-scale infrastructure, regulatory reform, and rising investments, but will continue to struggle with high import dependency. Cleaner energy adoption, infrastructure modernization, and renewed domestic exploration are set to define the sector's trajectory through the end of this decade.

### Indian Oil & Gas Sector Expansion by 2030

The Indian Oil & Gas sector is poised for significant expansion by 2030, driven by rising energy demand, economic growth, and Government initiatives to boost domestic production and infrastructure.

#### Key Expansion Highlights by 2030

- India aims to increase the share of natural gas in its energy mix from about 6.7% to 15%. This includes major expansion of the City Gas Distribution (CGD) network for near-complete national coverage, excluding islands.
- The country plans to nearly double refining capacity to between 450.0-500.0 million

tons by 2030 and further to 667.0 million tons by 2040.

- Oil demand is projected to soar by 1.0 million barrels per day by 2030, the highest increase among major countries, primarily fueled by transport fuels and economic growth.
- Diesel and jet fuel demand will lead the growth in oil consumption, with gasoline demand growing moderately due to increasing vehicle electrification.
- Natural gas consumption is expected to grow by nearly 60%, reaching about 297.0 million standard cubic meters per day by 2030.
- India's Strategic Petroleum Reserves (SPR) commercialization will help raise funds for storage expansion to reduce import dependence.
- Major legislative reforms like the Oilfields (Regulation and Development) Amendment Act 2025 are streamlining regulatory processes to attract foreign investment and improve upstream production.





- Investment opportunities in the sector are estimated to be around US \$67 billion, including projects in refining, exploration, pipeline infrastructure, and biofuels, which are seeing accelerated blending targets (e.g., ethanol blending from 10% to 20% ahead of schedule).

### Infrastructure & Production:

- India has 23 refineries with a combined capacity of about 256.8 million metric tons per annum, 8 LNG terminals, and over 93,000 petroleum retail outlets.
- The country has more than 10,000 km of crude oil pipelines and over 24,000 km of product pipelines.
- Domestic crude oil production is expected to decline slightly, underscoring the need for increased exploration and production investments.
- Indian Oil targets to increase its upstream integration rate from 5.3% to 10% by 2030.

### Energy Transition and Sustainability

- India is progressing rapidly toward net-zero ambitions by 2046, emphasizing cleaner

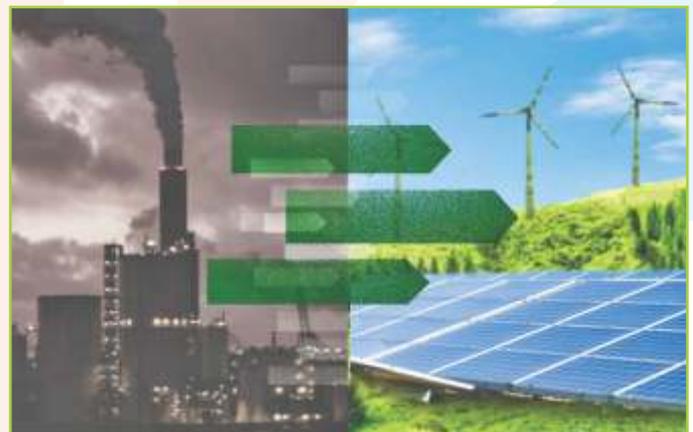
fuels, biofuels, and natural gas adoption to reduce emissions.

- Biofuels and electric vehicles are expected to significantly reduce additional oil demand growth, with the Government advancing ethanol blending mandates and promoting sustainable Aviation fuel.

This holistic expansion is positioning India as a key driver of global oil demand growth and a major hub for energy investments by 2030, with a strong focus on infrastructure, cleaner energy, and strategic reserves to enhance energy security and economic growth.

If more detailed focus on any sub-sector or specific projects is needed, further information can be gathered.

The Oil & Gas sector remains a critical pillar of India's energy ecosystem, contributing significantly to economy growth and ensuring energy security. In recent years the sector has witnessed notable progress driven by regulatory reforms, increased private sector participation and the deployment of advanced technologies. ●



## KRS MARKETING Partnership Proposal

### Marketing Requirements

Handling business opportunities in India require various steps and Marketing Partnership will help you to understand the practice and management to work in India. Considering the promotion before official participation in business, few steps like promotion, introducing own product range to manage the requirement development accept our standard products or services, advance preparation of participation in Indian Opportunities, management of local vendor team, if required for joint participation, handling tenders, offers, negotiations, contract management support etc., the list is ongoing and KRS Infra Ventures Pvt. Limited ensure that our experience being in this trade from last three decades offer you wider experience base in INDIA.

### Marketing Proposal

The KRS Group herewith introduce KRS Infra Ventures Pvt. Limited herewith offers the marketing partnership to your organization to promote you and yours associates interest in Indian Infrastructure Sector with following ways:

- ▶ Informing Business Opportunities in India for business scope of your organization.
- ▶ Promoting your organization with introducing and presenting details to various clients in Government

and Private Sector and follow-up for acquisition formalities (tendering process, finalization of business, all assistance during implementation & after sales etc.)

- ▶ Informing the current scenario of market in view of Government Policies, Procurements plans etc.
- ▶ Advising the strategies required during promotion for successful business opportunities.

The partnership terms will require discussions to finalize, which will be second step after receiving your principal approval and suggest you to work on following options for understanding:

- ▶ Marketing Partnership Joint Venture-which means "KRS Infra Ventures" will be offering all Marketing support in India and your organization handle the technical & commercial need of the projects targeted and rest terms & conditions of arrangement will decided after in principal approval of partnership.
- ▶ Exclusive Agent in INDIA-KRS will be offered exclusive Agency Agreement for 3 years minimum to develop and managing business opportunities for your organization and terms & conditions of this agreement will be discuss after principal approval of working.



## KRS Infra Ventures Private Limited

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