

EXPRESSWAY INFRASTRUCTURE DEVELOPMENT OUTLOOK IN INDIA

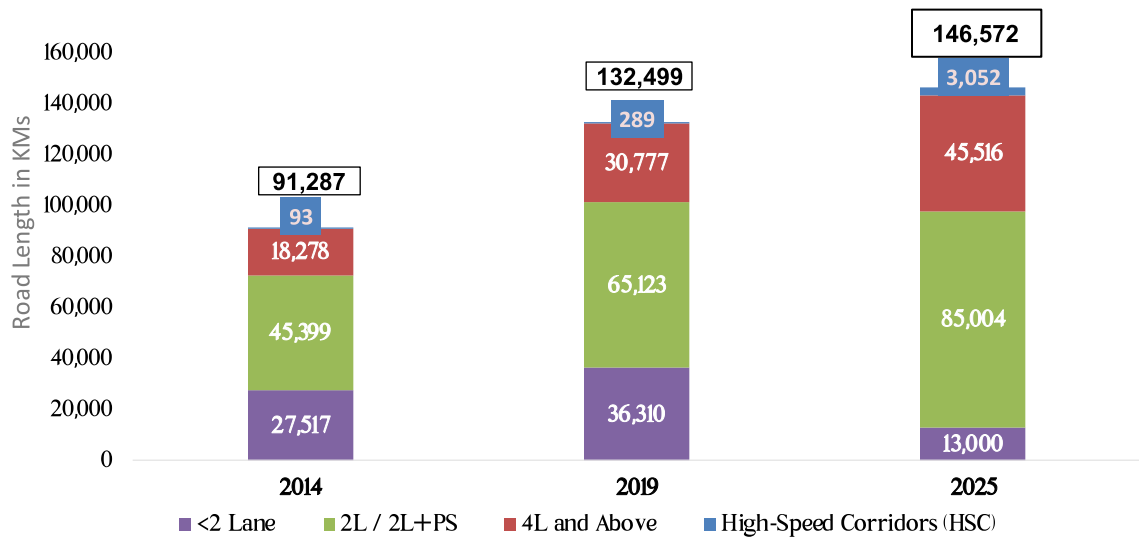
India's vision of becoming a Viksit Bharat by 2047 has positioned transport infrastructure as a cornerstone of its long-term economic growth strategy. As industrial manufacturing, logistics, and domestic consumption continue to expand across the country, India is becoming increasingly dependent on expressways to enable high-speed, access-controlled movement of people and goods across its diverse regions.

Unlike conventional highways, expressways eliminate all kinds of traffic disruptions owing to their controlled access and grade-separated interchanges with dedicated carriageways. Expressways ensure fast movement of vehicles, better road safety, and lower operational cost of transportation. This is why expressways are now being considered not just as modes of transport but also as economic corridors for industrial growth and logistics.

India's road infrastructure has witnessed significant expansion over the past decade, driven by sustained government investments and policy initiatives. According to the Ministry of Road Transport and Highways (MoRTH), the National Highway (NH) network expanded from 91,287 km in 2014 to over 1.46 lakh

km as of March 2026, making it one of the largest highway networks in the world. Alongside this expansion, the pace of highway development also accelerated considerably, with the average National Highway construction rate increasing from approximately 11.6 km per day in FY14 to nearly 34 km per day in 2025.

National Highway Network (in KMs)



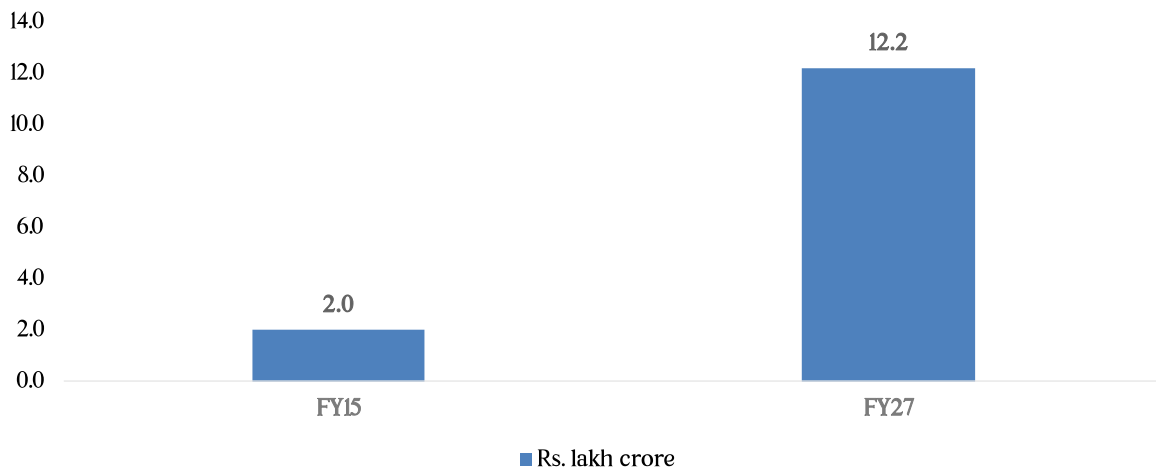
Source: Union Budget 2026-27

National Highway Network (in Kms)

The government’s infrastructure strategy has progressed from expansion of traditional road infrastructure to adoption and development of multimodal transport systems. Projects such as Special Accelerated Road Development Programme for the North

Eastern Region (SARDP-NE), Bharatmala Pariyojana, PM GatiShakti National Master Plan (PMGS-NMP) and the National Infrastructure Pipeline (NIP) facilitating the integrated development of roads, highways and other infrastructure across the country. The expressways seek to decrease logistics costs, ensure proper last-mile connectivity and help in

Public Capital Expenditure (Rs. lakh crore)



Source: Union Budget 2026-27



making manufacturing competitive by connecting industrial clusters to both domestic and international markets through port connectivity.

Investment in infrastructure remains one of the most important policy priorities in the Union Budget FY27. Public capital expenditure by the Government of India has risen from Rs. 2 lakh crore (US\$ 32.71 billion) in FY15 to Rs. 12.20 lakh crore (US\$ 129.26 billion) in FY27, demonstrating its continued commitment to economic development through infrastructure investments. Ministry of Road Transport and Highways has been provided Rs. 3.10 lakh crore (US\$ 32.85 billion) in the Union Budget 2026-27. On the other hand, National Highways Authority of India has been allocated Rs. 1.87 lakh crore (US\$ 19.81 billion) in FY27 to accelerate the development of national highways and expressway corridors across the country.

In addition to making transportation more efficient, expressways are changing the economic geography of India by promoting industrial parks, logistics facilities, warehousing clusters, smart cities, and investment corridors around

them. Increased connectivity will lead to decreased travel times, reduced logistics costs and investments in manufacturing, e-commerce, tourism, and real estate sector. In coming years, integration of Intelligent Transportation Systems (ITS), digital toll collection systems, EV charging facilities, and other green mobility solutions would help convert expressways into smart transport corridors to support India's dream of being a competitive manufacturing and logistics hub.

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EVOLUTION OF EXPRESSWAY DEVELOPMENT IN INDIA

The expressway development in India has come a long way from few high-speed roads to an integrated infrastructure ecosystem to promote and support industrial development and logistics efficiency. Despite having one of the biggest road networks in the world, the idea of expressways became prevalent in India only in the past two decades. Today, expressway development in India is driven by national infrastructure programmes, technology advancement, and integrated transport planning to make India globally competitive.

Foundation of Modern Highway Development (1998–2010)

The foundation of modern expressway developments in India was laid down via the National Highways Development Project (NHDP) implemented in 1998. The National Highways Authority of India (NHAI), being the implementing agency, has played a key role in advancing integrated transport corridor development across the country, moving beyond conventional highway construction. Key features of the National Highways Development Project (NHDP)

include the Golden Quadrilateral (GQ), connecting four metropolises such as Delhi, Mumbai, Chennai, and Kolkata and the North-South and East-West (NS-EW) Corridors.

The Golden Quadrilateral is 5,846 km in length whereas North-South and East-West Corridors have lengths totalling approximately 7,300 km. They were mainly 4 and 6-lane national highways but not expressways, which brought about reduced traveling time and promoted freight movement and showed the economic benefits of infrastructure development.

Emergence of Access-Controlled Expressways (2011–2016)

In the next wave of expressway development in India, the first generation of access-controlled expressways was developed in India. Among the first ones, the Yamuna Expressway was developed in 2012 and became the first 6-lane (expandable to 8) access-controlled expressway in India that links Greater Noida and Agra over a length of 165 km. The project demonstrated the significance of expressways in reducing the traveling time and encouraging industrial, residential and tourism developments.



The commissioning of the Agra Lucknow Expressway in Uttar Pradesh in 2016 marked a significant step in the expansion of India's access-controlled expressway network. Spanning approximately 302 km, the expressway has enhanced connectivity between the western and central regions of Uttar Pradesh, facilitating faster movement of passengers and freight. Developed at an investment of Rs. 11,526.73 crore (US\$ 1.76 billion), excluding land acquisition costs, the project has improved regional connectivity and supported economic and industrial development across the state. Construction began from January to March 2015 and was expected to be finished in 36 months. However, the project was finished much ahead of schedule in about 22-24 months and was inaugurated on November 21, 2016. Such projects were a clear sign of growing awareness regarding the use of expressways as tools to boost economic activity as investments were made in logistics parks, manufacturing industries and urban infrastructure.

Integrated Corridor Development under Bharatmala (2017–2023)

The next significant change came when

Bharatmala Pariyojana scheme was initiated in 2017. Whereas earlier schemes of highway developments emphasized on increasing road connectivity, the Bharatmala project adopted corridor development concept and thus concentrated on economic corridors, freight efficiency, coastal connectivity, border roads, and expressway development.

Under Phase I of the Bharatmala Pariyojana, approximately 34,800 km of National Highway corridors were developed, comprising economic corridors, feeder routes, border roads, coastal roads, and greenfield expressways. The objective of the programme focused on optimising freight movement and connectivity by connecting manufacturing centers, ports, logistics parks, and centers of consumption through capacity building in the transportation sector.

During this period, the Government of India undertook several landmark greenfield expressway projects, marking significant milestones in the expansion of the country's expressway network. Some of them are Delhi-Mumbai Expressway, Bengaluru-Chennai Expressway, Delhi-





Amritsar-Katra Expressway, and Raipur-Visakhapatnam Expressway. These projects indicated a shift towards access control corridors for freight transport and regional development.

Multimodal Infrastructure Planning and Smart Expressways (2021–Present)

The launch of PM GatiShakti National Master Plan in October 2021 is a step taken in a new direction towards the expressway development in India. As per this scheme, the process of infrastructural planning will take place in a multi-modal form through the application of a Geographic Information System (GIS) platform.

Unlike previous transportation projects, which have been planned separately, the concept of PM GatiShakti ensures that the expressways are interconnected with industrial corridors, DFC, port facilities, air terminals, and multimodal logistics parks. This integrated planning will lead to lower logistics cost and project delays. Simultaneously, development of expressways has been accompanied by incorporation of smart infrastructure through systems such as Intelligent Transportation Systems (ITS), digital surveillance systems, electronic toll collection using FASTag system, automatic traffic monitoring, and charging infrastructure for electric vehicles. These systems have turned the expressways into smart digital transport corridors.

India's long-term strategy for infrastructure development gets supplemented through schemes like National Infrastructure Pipeline (NIP) and National Logistics Policy (NLP) aimed at developing multimodal connectivity and efficient logistics systems for making India a global manufacturing and export hub under Viksit Bharat 2047 vision.

Evolution At A Glance

Phase	Major Development	Strategic Outcome
1998–2010	National Highways Development Project (NHDP), Golden Quadrilateral, NS-EW Corridor	Foundation for modern highway infrastructure
2011–2016	Yamuna Expressway, Agra–Lucknow Expressway	Emergence of access-controlled expressways
2017–2023	Bharatmala Pariyojana, Greenfield Expressways	Corridor-based freight and industrial connectivity
2021–Present	PM GatiShakti, National Logistics Policy, Smart Expressways	Integrated multimodal infrastructure and digital transport ecosystem



INDIA'S EXPRESSWAY ECOSYSTEM AND POLICY FRAMEWORK

Development of India's expressways has developed into a well-integrated institutional, financial and policy framework which includes many government organizations, financial arrangements and digital planning tools. Unlike previous highway schemes which focused mainly on road construction, the current system combines transportation infrastructure development with industrial development, logistics optimisation and regional planning which helps speed up implementation and improves connectivity between manufacturing centers, ports, airports and markets.

Government Institutions Behind the Development of India's Expressways

The Ministry of Road Transport and Highways (MoRTH) serve as the apex policy-making body for the formulation of India's road development policies, setting technical standards and developing highway and expressways projects. MoRTH is responsible for the management of initiatives such as Bharatmala Pariyojana and the expansion of India's National Highway network.

Implementation of highway and expressway projects is mainly undertaken by the National Highways Authority of India (NHAI). The body develops, maintains, and operates National Highways and Greenfield expressways. NHAI was established as per the National Highways Authority of India Act, 1988 and has now become the largest highway executing organization of India. NHAI has expedited the delivery of infrastructure through Engineering, Procurement and Construction (EPC) projects, Hybrid Annuity Model (HAM) projects and Build, Operate and Transfer

(BOT) projects.

National Highways & Infrastructure Development Corporation Limited (NHIDCL) is yet another government body which looks after the development of expressways and highways in India. The NHIDCL works on the infrastructure projects in the hilly, border areas, and North-Eastern parts of India. Furthermore, there are some states which have expressways development authorities of their own. Examples of these states are Uttar Pradesh (UPEIDA) and Maharashtra (MSRDC).

Integrated Infrastructure Planning Through PM GatiShakti

A major step taken in the infrastructure planning of India is the launch of the PM GatiShakti National Master Plan in October 2021. While the conventional method of infrastructure development involved implementation of projects independently by each ministry, PM GatiShakti involves the plan and coordination of infrastructure development across 16 ministries through a GIS based digital platform. The platform allows planners to coordinate infrastructure investments in road, rail, port, air transport, logistics parks, industrial corridors and more.



In terms of expressway projects, the integration means that the new infrastructure corridors will be carefully coordinated to ensure that they are integrated with freight terminals, industrial clusters, DFCs, multimodal logistics parks, ports and other facilities. The coordination helps avoid duplicate infrastructure investments and minimize disputes during land acquisition and improve efficiency of the cargo flows. PM GatiShakti is a data-driven project implementation tool that allows planners to analyze utility networks, environmental concerns and socio-economic factors before project implementation.

Bharatmala Pariyojana and National Infrastructure Pipeline

India's government has taken up a corridor-based approach to infrastructure development through Bharatmala Pariyojana, with the intention of achieving optimal freight movements rather than building more highways. Approved by the Government of India, the Bharatmala Pariyojana programme aims to develop approximately 34,800 km of National Highway corridors, including economic corridors, inter-corridors, feeder routes, border roads, coastal roads, and greenfield expressways, with a planned investment of Rs. 5.35 lakh crore (US\$ 83.01 billion). The programme is designed to strengthen nationwide

connectivity, improve freight movement, and enhance logistics efficiency across the country.

Complementing the Bharatmala Pariyojana programme, the Government of India introduced the National Infrastructure Pipeline (NIP), a long-term investment programme covering key sectors such as transport, energy, urban infrastructure, and digital infrastructure. The NIP aims to integrate expressway development with industrial infrastructure and logistics networks to improve connectivity, attract private investment, and enhance India's competitiveness in global value chains. Overall, both programs help the government to achieve its target of reducing logistics cost as a percentage of GDP while improving manufacturing in the country through programs like Make in India.

Financing Models Supporting Expressway Expansion

India's expressway program is built on a diverse financing model involving budgetary provisions, institutional borrowings, private sector participation, and asset monetization. In Union Budget 2026-27, the Indian government set aside Rs. 3.10 lakh crore (US\$ 32.83 billion) for the Ministry of Road Transport and Highways, with infrastructure being one of the key drivers of economic growth in the country. Out of this provision, Rs. 1.87 lakh crore (US\$ 19.81 billion) has been set aside for NHAI for developing and maintaining the National Highways and expressways.

In order to attract private investment, the Indian government has resorted to different kinds of financing models including EPC model, HAM, BOT, and other models. Furthermore, National Monetisation Pipeline allows for monetization of operating highway



assets through mechanisms such as Toll-Operate-Transfer (TOT) model and Infrastructure Investment Trusts (InvITs), hence allowing investment in new projects.

ROLE OF EXPRESSWAYS IN ECONOMIC TRANSFORMATION AND REGIONAL DEVELOPMENT

The growing network of India's expressways has become a catalyst for economic transformation by increasing connectivity, lowering logistics costs and creating new possibilities for industry and regional development. Besides the facilitation of transportation, access-controlled expressways are transforming economic geography by connecting production facilities with domestic markets, ports, airports and logistics nodes. This assumes greater significance as India seeks to strengthen its manufacturing capabilities, enhance supply chain efficiency, and position itself as a global production and export hub under the Viksit Bharat 2047 vision

Improving Logistics Efficiency and Lowering Logistics Costs

Logistics efficiency is becoming an important driver of competitiveness of industries. For many years, the logistics costs in India were relatively higher compared with those in other developed manufacturing economies owing to fragmented transport infrastructure,

congestion and long travel times. To address this problem, the Indian government launched the National Logistics Policy (NLP) in 2022 with the goal of improving multimodal connectivity and increasing the logistics efficiency through the comprehensive approach to infrastructure development. The development of access-controlled expressways is among the key factors that can help the government to accomplish these goals. By allowing fast movement of freight vehicles without any delays at intersections, expressways help to lower travel times, the amount of fuel used and operating costs. They also improve delivery reliability, allowing industries to optimise inventory management and adopt just-in-time manufacturing practices.

The integration of expressways with Dedicated Freight Corridors (DFCs), multimodal logistics parks, ports, and industrial corridors within the framework of PM GatiShakti is expected to further improve the country's logistics system. These investments are expected to improve freight mobility across manufacturing clusters while supporting India's ambition of reducing logistics costs as a percentage of GDP over the long term.

Strengthening Industrial Corridors and Industrial Competitiveness

The role of expressways as the physical



backbone of India's strategy of developing industrial corridors is becoming increasingly prominent. By providing seamless connectivity between manufacturing facilities, logistics parks, ports, and domestic markets, expressways improve logistics efficiency, facilitate the movement of goods, strengthen supply chains, and enhance the attractiveness of industrial corridors for both domestic and foreign investment. Several Greenfield

completed, the expressway is expected to reduce travel time, enhance logistics efficiency, and stimulate industrial development, investment, and employment along its corridor.

Similar to that, Bengaluru-Chennai expressway will strengthen one of the leading regions in terms of automobile, electronics, and aerospace manufacturing in India because it will enhance connection between industrial clusters in Karnataka, Andhra Pradesh, and Tamil Nadu.

Promoting Regional Development and Urbanisation

Industrial activity has been concentrated in large metropolitan centers in India. The development of expressways promotes decentralized industrial growth by providing better connectivity to Tier II and Tier III cities. This way companies encourage establishment of their businesses beyond metropolitan centers.

Better access to main expressways has promoted the emergence of logistics parks, warehousing, commerce, and residential zones along major expressway corridors. States like Uttar Pradesh, Maharashtra, Gujarat, and Haryana have recorded increased investment in industrial parks and integrated townships located at the vicinity of expressway interchanges.

For instance, Ganga expressway connecting western and eastern Uttar Pradesh through 594 kilometers is going to enhance connectivity within 12 districts while promoting industrial development, agricultural market connectivity, and investment opportunities. In addition, the Mumbai-Nagpur expressway (Samruddhi Mahamarg) has enhanced connectivity within commercial capital and interior



expressways have been designed considering major industrial corridors like the Delhi-Mumbai Industrial Corridor (DMIC), the Chennai-Bengaluru Industrial Corridor (CBIC) and the Amritsar-Kolkata Industrial Corridor (AKIC). The connection with these corridors enables manufacturers to cut down transportation expenses, become more accessible for markets and expand their capacities.

The Delhi-Mumbai Expressway is India's flagship greenfield expressway project, spanning approximately 1,386 km with an estimated investment of Rs. 1 lakh crore (US\$ 11.32 billion). Designed to connect six states, namely Delhi, Haryana, Rajasthan, Madhya Pradesh, Gujarat, and Maharashtra, it is expected to significantly improve connectivity between key economic hubs. Since the inauguration of its first operational section in February 2023, additional stretches have been opened in Gujarat, accelerating project progress. Once



districts of Maharashtra which will facilitate logistics, agro-processing, and tourism. Such investments in the infrastructure contribute to balanced regional development by creation of economic centers, generation of employment opportunities, and reduction of development gap between urban and rural areas.

Encouraging Private Investment and Real Estate Development

Transportation connectivity is becoming the key factor in driving private investments. Expressways increase accessibility of lands and reduce risks connected with transportation that encourages investment in industrial parks, logistics parks, manufacturing plants, and commercial real estate development. As reported by Invest India, the main factor in determining industrial location is infrastructure connectivity, especially for export-oriented manufacturing industry. Now more industrial developers are setting up integrated logistics parks and warehousing facilities near expressway corridors owing to faster transportation and proximity to major markets. Rapid development of organized warehousing and Grade A logistics parks along expressway corridors is also fuelling the development of rapidly growing e-commerce sector in India.

EMERGING EXPRESSWAY CORRIDORS DRIVING INDIA'S INFRASTRUCTURE GROWTH

Several greenfield expressways have been constructed in order to improve the movement of goods and services, minimize travel time, and provide investment prospects in manufacturing industries, warehousing facilities, agriculture industry, and tourism industry. In general, these expressways form the backbone of the various

multimodal infrastructure development plans such as PM GatiShakti, Bharatmala Pariyojana, and National Infrastructure Pipeline (NIP). Several greenfield expressways have been planned and started in these projects as explained below.

Delhi-Mumbai Expressway: India's Longest Greenfield Expressway

This greenfield expressway project is among the largest greenfield expressway projects in India and forms a revolutionary infrastructure project for India. Delhi-Mumbai Expressway is 1,386 kilometers long and forms a fully controlled eight-lane expressway connecting Delhi to Mumbai via Haryana, Rajasthan, Madhya Pradesh, Gujarat, and Maharashtra states. It is estimated that this expressway will reduce the travel time from 24 hours to 12 hours and will also reduce the travel distance by 130 kilometers. Since it is strategically linked to the Delhi-Mumbai Industrial Corridor (DMIC), it provides linkage to the industrial nodes, logistics facilities, ports, and manufacturing facilities.

The Delhi-Mumbai Expressway has achieved approximately 75-80% physical completion, with the remaining sections expected to be completed within



the next two years. The expressway, which has been developed at a total cost of investment of Rs. 1.10 lakh crore (US\$ 11.65 billion), is expected to help significantly in improving freight transport, reducing journey time, and improving industrial and logistics connectivity in six states. The expressway features wildlife passages, rain water harvesting systems, solar lighting, and Intelligent Transportation Systems (ITS), thus indicating the importance of sustainable and technological infrastructure in the country

Ganga Expressway: Strengthening Uttar Pradesh's Industrial Connectivity

The Ganga Expressway is one of the longest expressways in India developed by any Indian state and is expected to become an important growth corridor of Uttar Pradesh in the coming years. Spanning almost 594 km long, the expressway which has six lanes (which can be expanded to eight lanes) connects Meerut, which is located in western Uttar Pradesh, to Prayagraj in eastern parts of the state and spans over 12 districts of the state.

The expressway is expected to improve connectivity between the state's agricultural, industrial, and commercial centres, while facilitating the development of logistics parks, industrial estates, and warehousing infrastructure along the corridor.

Connecting the manufacturing base of western Uttar Pradesh to eastern parts of the state, the expressway is expected to help in promoting balanced regional development and improving the market reach of MSMEs and agricultural producers. The Ganga Expressway will complement the already existing expressways in the state like Yamuna, Agra-Lucknow, Purvanchal, and

Bundelkhand Expressways.

Mumbai-Nagpur Expressway (Samruddhi Mahamarg)

Hindu Hrudaysamrat Balasaheb Thackeray Maharashtra Samruddhi Mahamarg is one of the major Greenfield corridors spanning 701 km from Mumbai to Nagpur, with a cost of development of Rs. 55,000 crore (US\$ 7.00 billion). Built by the Maharashtra State Road Development Corporation (MSRDC), the expressway traverses through 10 districts of the state, connecting the commercial, industrial, and agrarian parts of the state.



It is expected to cut down the journey time between Mumbai and Nagpur from about sixteen hours to eight hours, thus helping in fast freight transport in the state. Apart from acting as a means of transport, the expressway has been developed as an integrated corridor for developing logistics parks, agro processing industries, tourism places, and industrial townships. Besides that, MSRDC has also proposed the development of numerous integrated townships and economic activity centers along the expressway.

Bengaluru-Chennai Expressway: Accelerating High-Technology Manufacturing

The Bengaluru-Chennai Expressway marks the first expressway in India built as part of the Bharatmala Pariyojana, which has been carefully designed to



fortify one of India's leading manufacturing regions. Stretching to a total length of 262 km, the access-controlled highway passes through Karnataka, Andhra Pradesh, and Tamil Nadu states, connecting the technology and aerospace hub of Bengaluru with the automobile, electronics, and port industry of Chennai. The current progress of the project as of June 2026 is 98%, and its scheduled completion date is set for August 2026.

This expressway serves as the backbone of the Chennai-Bengaluru Industrial Corridor (CBIC) and will facilitate improved connectivity for businesses working in the automobile, electric vehicle, electronics, aerospace, and precision engineering sectors.

Delhi-Amritsar-Katra Expressway: Enhancing Northern India's Connectivity

The Delhi-Amritsar-Katra Expressway project is one of those Greenfield infrastructure projects that will cover a distance of around 669 kilometers from Delhi to Amritsar and Katra through Haryana and Punjab states and then linking up to Jammu & Kashmir. It is estimated that once the expressway starts operations, it will cut down travel time from Delhi to Katra by 50 percent of the current 12-hour duration.

Besides facilitating faster transport of passengers, the expressway will help connect the industrial zones, agriculture markets, and places having tourism to the various areas like Shri Mata Vaishno Devi Shrine and Golden Temple.

Raipur-Visakhapatnam Expressway: Connecting Central India to the East Coast

The Raipur-Visakhapatnam Expressway is an upcoming 464-km-long Greenfield Corridor which aims to provide



connectivity between mineral resource rich areas in Chhattisgarh and the Visakhapatnam Port of Andhra Pradesh. The expressway will be constructed within the framework of the Bharatmala Pariyojana Project and is expected to help improve freight logistics and support the development of industries along its route.

The corridor is expected to improve export logistics by enhancing connectivity to one of India's major east coast ports. It is also expected to strengthen connectivity across tribal and interior regions, facilitating industrial development, investment, and balanced regional economic growth in central and eastern India.

Strategic Importance of Emerging Expressway Corridors

Taken together, all of them represent a paradigm shift in the strategy behind India's infrastructure development, from focusing merely on building roads for connecting different regions to constructing economic corridors that will aid industrial development and logistic efficiencies. The connection of manufacturing zones with ports, airports, Dedicated Freight Corridors, and logistics parks is expected to provide greater supply chain security, more investments and lower costs for transportation. These corridor developments are in perfect synergy with programs such as PM GatiShakti, Bharatmala Pariyojana, National Logistics Policy, and National Industrial Corridor Development Program and have resulted in the development of a perfect multimodal transport system.



Table: Major Expressway Corridors in India

Expressway	Length	Key States	Strategic Importance
Delhi–Mumbai Expressway	1,386 km	Delhi, Haryana, Rajasthan, Madhya Pradesh, Gujarat, Maharashtra	Industrial corridor, freight mobility, export connectivity
Ganga Expressway	594 km	Uttar Pradesh	Regional industrial development, agriculture, logistics
Mumbai–Nagpur (Samruddhi Mahamarg)	701 km	Maharashtra	Industrial growth, agro-processing, tourism
Bengaluru–Chennai Expressway	262 km	Karnataka, Andhra Pradesh, Tamil Nadu	Electronics, automobiles, aerospace manufacturing
Delhi–Amritsar–Katra Expressway	669 km	Delhi, Haryana, Punjab, Jammu & Kashmir	Tourism, agriculture, regional connectivity
Raipur–Visakhapatnam Expressway	464 km	Chhattisgarh, Andhra Pradesh	Mining, steel, port-led exports

SECTORAL IMPACT OF EXPRESSWAY DEVELOPMENT

The construction of expressways in India has transformed the economy because of the provision of integrated transport network that will ensure better connectivity, logistics efficiencies and operational efficiency in various sectors. The access-controlled expressways not only provide quick mobility but also impact industrial location, strengthen domestic supply chains and facilitate market access of enterprises. With the launch of India's multi modal infrastructure projects like 'PM GatiShakti', 'Bharatmala Pariyojana' and 'National Logistics Policy', the advantages of expressway construction would be realized in the manufacturing, logistics, agriculture, tourism, real estate and eCommerce sectors.

Manufacturing: Strengthening Industrial Competitiveness

Amongst other industries, manufacturing is one of the prime sectors to benefit from expressway construction in India. The higher transportation speed allows for the quicker delivery of inputs

and outputs, thus providing better inventory management, cost savings and operational efficiency. The industrial clusters located on expressway corridors like Delhi-Mumbai Expressway and Bengaluru-Chennai Expressway would benefit from better connectivity of the industry to the ports, airports and industrial hubs formed as part of Delhi Mumbai Industrial Corridor (DMIC) and Chennai-Bengaluru Industrial Corridor (CBIC). The connectivity provided through the link between expressways and these industrial corridors would help in making India's Make in India vision a reality.

Logistics and Warehousing: Developing the Supply Chain

The development of the logistics sector is one of the main drivers of demand for expressway infrastructure in India. Improved connectivity results in faster movement of goods, lower variability of delivery, and increased supply chain reliability. The aim of National Logistics Policy (NLP) of the Government of India is to increase logistics efficiency with the help of multimodal connectivity and digital integration. The development of



expressways allows connecting Multi-Modal Logistics Park (MMLP), inland container depots, freight terminals, ports, and airports to develop a seamless freight corridor in the country. Rapid growth of warehouses developed along the main expressway corridors allows supporting e-commerce, retail, pharma, and FMCG industries. Places near Delhi-Mumbai Expressway, Mumbai-Nagpur Expressway, and Ganga Expressway become increasingly popular locations for investing in logistics parks.

Agriculture and Food Processing: Increased Connectivity for Better Market Access

Expressways are helping create efficient value chains in agriculture through reduced transport times between farms, processing centers, and consumption centers. The increase in connectivity is making it possible for farmers to transport their fresh produce more easily, resulting in lower post-harvest losses and better quality of produce.

The construction of expressways in states like Uttar Pradesh and Maharashtra has facilitated better connectivity between the agricultural zones and the food-processing clusters. Better connectivity is also serving the purposes of Pradhan Mantri Kisan SAMPAD A Yojana (PMKSY) through increased distribution of processed food items. Better road connectivity is leading to increased investment in the cold-chain logistics and food processing plants located on transport corridors.

Tourism and Hospitality: Enhancing Destination Accessibility

The expressway network is improving connectivity of various destinations that include religious destinations, cultural destinations, and leisure destinations, helping in developing the domestic

tourism sector. Reduction in time improves tourist footfall and better roads improve experience of tourists, thus, helping in tourism development in the region.

For Instance, Delhi-Amritsar-Katra Expressway will help in better connectivity to various religious destinations like the Shri Mata Vaishno Devi Shrine and the Golden Temple, whereas the Mumbai-Nagpur Expressway will improve the connectivity to various wildlife parks and other tourism destinations in Maharashtra. Connectivity also results in increased investments in hotels, restaurants, fuel stops, and other facilities, thus, increasing employment opportunities.

Real Estate & Urban Development

Expressways are reshaping urban development patterns by creating new investment corridors around major



interchanges and junctions. Increased connectivity increases the land value and promotes development of various real estate projects, which can include residential townships, industrial parks, commercial centers, etc.

Further, State governments across the country are adopting a coordinated strategy in terms of land use planning to encourage integrated urbanization with the help of expressway development. Industrial townships, logistics zones, and other commercial clusters are being developed along the Delhi-Mumbai Expressway, the Ganga Expressway, and the Samruddhi Mahamarg. This corridor-



led development approach aligns with the objectives of PM GatiShakti, which promotes integrated infrastructure and spatial planning across sectors.

E-commerce and Digital Commerce

India's rapidly expanding e-commerce ecosystem depends on efficient transportation networks to meet increasing consumer expectations for faster deliveries. Expressways improve first-mile, middle-mile and last-mile connectivity, enabling logistics providers to optimise distribution networks and reduce delivery timelines.

The e-commerce warehouses are also being set up increasingly close to the expressways to benefit from better inter-regional connectivity and low logistics cost. Improved transport infrastructure helps in cross-border commerce by connecting the production centers to the ports and airports and thereby becomes important for the digital economy and export-oriented industries of India.

FUTURE OUTLOOK: SMART, SUSTAINABLE AND DIGITAL EXPRESSWAYS

The development of expressway networks in India is likely to proceed to the next development stage that will be characterized by greater intelligence, sustainability, and digitization. While the first generation of expressways were mostly concerned about enhanced connectivity and shorter journey times,

future investments will focus on greater efficiency, sustainability, and multimodality. Further, initiatives such as the National Logistics Policy, PM GatiShakti, and National Electric Mobility Mission Plan (NEMMP), expressways can become smart transportation links that will make the country competitive and correspond to India's net-zero and digitization goals.

Intelligent Transportation Systems Driving Operational Efficiency

Intelligent Transportation Systems (ITS) will revolutionize management and operations of expressways in India. Intelligent transportation systems include application of digital technologies, such as artificial intelligence, IoT, sensors, surveillance cameras, and others for the purpose of improved traffic flow, safety enhancement and infrastructure utilization optimisation.

FASTag implemented by the National Highways Authority of India allows for electronic toll payment on National Highways. According to NHAI, FASTag significantly decreases waiting time in the queue, increases fuel savings and prevents from congestion. In the future, there is going to be implemented barrier-free toll payments using Automatic Number Plate Recognition (ANPR) and Global Navigation Satellite System (GNSS). Further, AI is expected to assist in analysing traffic patterns and incidents, supporting key functions such as asset



management and emergency response.

Green Expressways Supporting Sustainable Mobility

Environmental sustainability has become an essential component of infrastructure development in India. In compliance with Green Highways (Plantation, Transplantation, Beautification and Maintenance) Policy, environmental rehabilitation and conservation are incorporated in highways construction.

It is expected that in the future, renewable energy solutions will be used in the form of solar energy installations to provide illumination and improve operations efficiency and install rainwater harvesting facilities. Expansion of electric vehicle charging infrastructure along major expressways will facilitate the process of electric mobility adoption. In the long run, implementation of the National Green Hydrogen Mission is going to stimulate installation of hydrogen fuelling stations for heavy commercial vehicles in order to create a sustainable transport environment.

Strengthening Multimodal Connectivity

Development plans for the future expressways tend to become more and more consistent with the general multimodal infrastructure strategy of India. Integration of expressways with Dedicated Freight Corridors, ports, airports, inland waterways, railway terminals and Multimodal Logistics Parks (MMLP) will contribute to the creation of an efficient multimodal logistics system. This initiative is aimed to increase cargo mobility, solve logistical problems and improve logistics chain resilience due to multimodal transfers availability. The development of logistics parks at expressway junctions will also



help to develop regional logistics chains and facilitate the development of export-oriented manufacturing. The National Logistics Policy of India, which promotes the use of digital logistics platforms, standardisation of documents, and integrated logistics infrastructure planning contributes to implementation of India's strategy to enhance logistics performance and decrease logistics costs.

Technological Development of Digital Infrastructures and Data-Driven Asset Management

In coming years, the planning, management and maintenance of the expressway infrastructure in India will be increasingly relying on digital technologies. Geographic Information Systems (GIS), Building Information Modelling (BIM), drones, and remote sensing technologies are likely to become useful for planning, land acquisition, and construction monitoring.

In the upcoming period, it is expected that digital technologies will be widely used in the planning, management, and maintenance of the expressway infrastructure in India. GIS, BIM, drones, and remote sensing technologies will be useful in the planning, land acquisition, and construction monitoring of the expressways. Innovations such as digital twins are likely to be widely used in the future for the expressway infrastructure



as they will enable real-time monitoring, traffic flow simulation, predictive maintenance, and asset performance optimisation. Digital twin technology is expected to help increase efficiency and resilience of the infrastructure as well as to support informed decision-making along the asset life cycle. With the use of AI analytics, these technologies will help to improve infrastructure reliability and lower its maintenance costs in the life cycle. Government initiatives like Digital India and the PM GatiShakti National Master Plan are expected to speed up the application of digital technologies in the infrastructure of the expressways. These programs will enable the integration of traffic data, analytics, and smart infrastructure management systems that will increase traffic monitoring and asset management, thus making planning, operations, and maintenance of the national expressway network more efficient.

SUMMING UP

From being just a highway infrastructure program, India's expressway development has now become a program aimed at facilitating growth in economic activities. Over the last two decades, flagship programs like NHDP, Bharatmala Pariyojana, NIP, and the PM GatiShakti national master plan have changed how the nation develops its transport infrastructure by focusing on corridor development, multimodal approach, and infrastructure development. Thus, the expressways in India have not only become fast transport networks but also an important facilitator of industry development, logistics efficiency, investments, and

regional growth.

The construction of greenfield expressways like the Delhi-Mumbai Expressway, Ganga Expressway, Mumbai-Nagpur Expressway, and Bengaluru-Chennai Expressway shows the intention of the Government of India to build world-class transport infrastructure. These expressways have helped in strengthening the supply chain system of the nation because they link manufacturing clusters, logistics parks, ports, airports, and cities. They have socio-economic implications in terms of stimulating investments in logistics infrastructure, industrial parks, tourism, real estate development, and agricultural logistics. The enhanced connectivity enables decentralization of economic activities making the Tier II and III cities act as manufacturing centers and industrial zones. At the same time, investments in ITS, digital toll collection, EV charging infrastructure, and sustainable highway infrastructure will help in advancing the Indian expressway network to the next level.

Going forward, there are indications that the integration of transport ecosystems will pick up pace due to the policy support of PM GatiShakti, national logistics policy, NMP, and National Green Hydrogen Mission. Technologies like artificial intelligence, predictive asset management, GIS planning, and multimodal freight connectivity can be used to improve operational efficiencies. In pursuit of the Viksit Bharat 2047 vision, the expressways in India are likely to become more important in improving logistics performance and private sector investments in the nation.

