UNIT 3: INFRASTRUCTURE IN THE INDIAN ECONOMY

UNIT STRUCTURE

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3.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- acquire an in depth knowledge about the latest development of

infrastructure in the field like energy and power and transport and communication

- discuss development of urban infrastructure in India along with the government schemes for development is also added to it
- acquire knowledge of the concepts like Industrial corridors and smart cities mission
- describe the recent infrastructural development in the Indian economy.

3.2 INTRODUCTION

The development of an economy depends on mainly its social overhead capitals (SOCs) which we call as infrastructure. We also know that Infrastructure, be it social or economic, offers foundations for the smooth functioning of the economy and thereby increasing the pace of economic development. In India the main catalyst for the development is nothing but the Infrastructure sector. Realizing the great role of this sector as an agent to speed up India'sall round development, government initiating various policies for boosting up infrastructure in the country. Though, this sector is one of the largest receivers of Foreign Direct Investment inflows in India, at present the infrastructural sector of India is not much satisfactory to compete globally. For instance, in 2023, India ranked 38th out of 139 countries in World Bank's Logistics Performance Index (LPI) 2023. So the demand for good and world class infrastructure in India is very high. However the remarkable achievement has been made in the last four years in terms of growth of transport and communication and energy sector. The total national highways length increased from 92,851 kms in 2013-2014 to 122,434 kms in 2017- 2018 which has further increased to 145,240 km in 2022-23. Energy deficit in 2021-22 stands at 0.7 per cent, which has declined from 4.2 per cent in 2013-14. India's rank improved to 10 in 2022-23 from 137 in 2014 on World Bank's Ease of doing business. Similarly, number of airports has increased to 487 in 2023 from 102 in 2018.

The infrastructure of an economy plays a critical role in accelerating

its development and laying the groundwork for its potential for future growth. To reach India 2047's goal of a $40 trillion economy and be categorised as a developed economy, infrastructure development is essential. The focus now shifts from physical infrastructure to digital and social infrastructure in the immediate aftermath of COVID-19 and the digitalization of the world.

India's economic growth is anticipated to be boosted by the significant expenditures made in current infrastructure projects. Industrial growth is accelerated by rising demands for labour, goods, and capital investments in infrastructure. According to research from the Reserve Bank of India and the National Institute of Public Finance and Policy, the GDP increases by 2.5 to 3.5 rupees for every rupee spent on infrastructure. Trade gains from improved logistics and connectivity, and the general public benefits from improved vital infrastructure and an overall rise in per capita income. Thus, India can actually achieve its goal of being a developed country by 2047.

The recent Union Budget 2023-24 presents vision for Amrit kaal-blue print for an empowered and inclusive economy. Three pronged focus driven by four transformative opportunities constitute foundation of Amrit kaal.

- Capital investment outlay increased by 33 percent to Rs. 10 lakh crore
- Effective capital expenditure at 4.5 percent of GDP.
- Atmanirbhar clean plant program with outlay of Rs. 2200 crore to be launched to boost availability of quality planting material for high value horticultural crops.
- 157 new nursing colleges to be established.
- Outlay for PM Awas Yojana enhanced by 66 percent to over Rs. 79,000 crore.
- Highest ever capital outlay of Rs. 2.40 lakh crore provided for railways.
- Urban infrastructure development fund (UIDF) to be established through use of priority sector lending shortfall.
- 500 new 'waste to wealth' plants under Gobardhan scheme to be established at total investment of Rs 10,000 crore.
- 10,000 bio-input resource centres to be set-up, creating national-level distributed micro-fertilizer and pesticide manufacturing network.



LET US KNOW

What is Infrastructure?

Infrastructure refers to the basic physical systems that provide support to the structure of the economy. Infrastructure includes transportation facilities, telecommunications networks, and water supplies. Large scale infrastructure is generally provided by the government or publicly regulated monopolies. Private firms or through local collective action often smaller infrastructure can be generated.

3.3 ENERGY AND POWER INFRASTRUCTURE

Energy infrastructure deals with production consumption and import of energy including electricity. Energy and power infrastructure include production and distribution of Coal, Oil and Natural Gas, LPG, Biomass and Charcoal, Biogas etc including solar energy and electricity. The energy policy of India is largely defined by the country's expanding energy deficit and thereby aimed on developing alternative source of energy, particularly solar energy, tidal, wind and nuclear energy. India ranks 81 in overall energy self-sufficiency in 2014 and energy sufficiency in India are 66 per cent. India ranks second after China in renewables production with 208.7 Million Tons in 2016.In India,during 2018, the total investmentin energy sector was 4.1 percent of total global investment (US$ 75 billion of US$ 1.85 trillion global investment). The primary energy consumption like consumption of coal, oil etc. in India grew by 7.9 percent in 2018 and is the third biggest after China and USA with 5.8 percent global share. So to meet the huge demand India has to import different types of primary energy. In 2018, India's net imports are nearly 205.3 million tons of crude oil and its products, 26.3 million tons of LNG (Liquefied Natural Gas) and 141.7 Million Tons of coal, which is equal to the 373.3 Million tons of primary energy or 46.13 percent of total primary energy consumption. It is seen that India is largely dependent on fossil fuel imports to meet its energy demands. It is expected that by 2030, India's energy imports is expected to exceed 53 percent of the country's total energy consumption.

Table 3.1 shows the primary energy consumption in India in the calendar year 2018. From the table it is seen that the highest consumption is of Coal followed by crude oil. The lowest consumption is of nuclear energy.

Table 3.1 : Primary energy consumption in India in recent years

Year	Coal #	Lignite	Crude Oil** MMT	Natural Gas (Billion Cubic Metres)	Electricity (GWh)
	(Million Tones)				
1	2	3	4	5	6
2012-13	713.39	46.31	219.21	57.37	8,24,300.99
2013-14	739.34	43.90	222.50	52.37	8,74,208.57
2014-15	822.13	46.95	223.24	51.30	9,48,521.67
2015-16	836.73	42.21	232.86	52.52	10,01,190.68
2016-17	837.22	43.16	245.36	55.70	10,61,182.64
2017-18	898.49	46.32	251.93	59.17	11,23,426.86
2018-19	968.36	45.81	257.20	60.80	12,09,971.63
2019-20	955.92	42.27	254.39	64.14	10,48,085.82
2020-21	906.33	38.49	221.77	60.82	12,30,207.98
2021-22 (P)	1,028.12	49.07	241.70	63.91	12,96,300.00
Growth rate of 2021-22 over 2020-21 (%)	13.44	27.49	8.99	5.08	5.37
CAGR 2012-13 to 2021-22 (P) (%)	4.14	0.65	1.09	1.21	5.16

(P): Provisional
GWh = Giga Watt hour = 10^6 × Kilo Watt hour
** Crude Oil in terms of refinery crude throughput.
# Does not include Lignite
Source: 1. *Office of Coal Controller, Ministry of Coal*
2. *Ministry of Petroleum & Natural Gas.*
3. *Central Electricity Authority.*

Source: Energy Statistics India, 2023

As per the latest energy statistics, the energy consumption per person in India is 24,453 Mega Joules. Due to rapid development projects the demand for energy in India has increased manifolds. Therefore the energy market is growing very rapidly in recent years. By 2035 Indian market is expected to become the second-largest in global energy demand and will consume 18 percent of the rise in global energy consumption. Now India's growing energy demands and limited stock of nonrenewable energy like domestic oil and gas reserves compels the country to harness the nontraditional or alternative sources of renewable energy whose supplies are unlimited. So importance of renewable energy like nuclear energy, solar energy, wind energy or tidal energy has increased.

The various sources of energy are discussed as follows:

3.3.1 Coal

India is the fifth largest coal producer in 2022-23 with 361409 million tonnes (10 percent of global share). Out of total energy genrated in India, approximately 73 percent comes from coal (2022-23). According to Greenpeace, an International NGO, the largest coal belt in India is at Jharia of Jharkhand having 19.4 billion tons of cooing coal. Before coal mining Jharia had forests inhabited by tribes. In 1971 the coal mines were nationalized and Bharat Cooking Coal Limited (BCCL) took over Jharia coal mines.India accounts for the world's greatest concentration of coal seam fires. So areas surrounding coal fields usually suffers from pollution of air, water and land.In India coal are mainly found in Eastern and South central India. Jharkhand has the highest deposit of coal.

Table 3.2 shows the coal reserve in different states of India.

Table 3.2: Coal reserve in India by states (2022-23)

States	Coal Reseves (In million tonnes)	States	Coal Reserves (In million tonnes)
Jharkhand	86660	Uttar Pradesh	1062
Odisha	88105	Arunachal Pradesh	90
Chhattisgarh	74192	Meghalaya	576
West Bengal	33871	Assam	522
Telangana	23034	Nagaland	478
Andhra Pradesh	4142	Sikkim	101
Bihar	4437	All India	361409

Source: Energy Statistics India, 2023.

In fact, India continues to rely significantly on coal as its main energy source. About 72.92 percent of all energy produced in FY:2021-22(P) was produced using coal, followed by electricity (from Hydro, Nuclear and other Renewable energy sources) (8.24 percent) and natural gas (8.16 percent).

3.3.2 Oil and Natural Gas

India's estimated crude oil reserves as of April 2022 were 651.77 million tonnes. According to the geographic distribution of crude oil, the Western Offshore has the largest reserves (33 percent) followed

by Assam (23 percent).

Natural gas reserves were expected to be 1138.67 billion cubic metres as of April 1, 2022. Western offshore has the largest natural gas reserves (29.6 percent), followed by eastern offshore (23.6 percent). According to the the Report *'Energy Statistics India, 2023'*, Crude oil and natural gas is the second and third largest producer of electricity in India just after coal. They contributed 10.34 per cent and 8.7 per cent of total electricity generated in India respectively. As on 31 March 2018, India had estimated crude oil reserves of 594.49 million tons (MT) and natural gas reserves of 1339.57 billion cubic meters (BCM). In 2017 , India was the third top crude oil consumer globally. About 4.8 percent of global consumption was done in India which is equivalent to 221 Mt. In the same year the net crude oil (including crude oil products) importswas188 Mt which puts India in third rank among Oil importer countries. India has a huge demand for oil and imports 82 percent of its oil needs. But by 2022 India aims to reduce her oil import by 67 per cent and for this focus would be on local exploration, extensive use of renewable and alternative source of energy. Oil and natural gas are mostly found in Assam, Gujarat and East and Western offshore of the country. Assam has a reserve of 159.96 MT of crude oil and 158.57 BCM of natural gas which is the highest among the states in India. However the largest reserve of oil and natural gas is found in Western offshore

Liquefied petroleum gas:Nearly 10.52 million tons liquefied petroleum gas (LPG) was consumed during April to September 2018 (six months) in domestic sector mainly for cooking. The number of domestic connections are 247 million (one connection for five people) with a circulation of more than 368 million LPG cylinders. India is second largest consumer of LPG globally.Most of the LPG requirement is imported. Piped city gas supply in India is not yet developed on major scale.

3.3.3 Biomass and Charcoal

Biomass is a renewable energy source and its use for energy generation in carbon neutral fuel. It is carbon neutral because it would also release greenhouse gases like methane and carbon dioxide when it is left to degenerate without using as energy source. India produces about 450-500 million tonnes of biomass per year. 32 percent of all primary energy used in the country is from biomass. Plants like Jatropha curcas, Neem, Mahua and other wild plants are identified as the potential sources for biodiesel production in India. Presently, only 20 percent of households in India use biomass and charcoal for cooking purpose. In addition biomass is also used marginally in commercial cooking, electricity generation, process industries, etc. The total biomass use in India is nearly 177 Million tons in the year 2013. Nearly 750 million tons of nonedible (by cattle) biomass is available annually in India which can be put to use for higher value addition.

3.3.4 Wind, Nuclear and Solar Energy

India's position in world's wind power market is fourth largest. The Government is about to add 100,000 MW of solar power capacity by 2020.

India has also planned to increase the contribution of nuclear power from 4.2 percent to 9 percent to overall electricity generation capacity within 25 years. The country has five nuclear reactors under construction (third highest in the world) and plans to construct 18 additional nuclear reactors (second highest in the world) by 2025.

Solar energy is also a renewable source of energy which can be harnessed very effectively. The energy of sun is limitless and can be converted to electricity using appropriate technology. The cost of solar energy in India is lower than any other type of power generation in India. Also the cost of solar thermal power project plan in India is cheaper than fossil fuel plants. Very shortly, solar

electricity price is going to become the benchmark price for deciding the other fuel prices based on their ultimate use and advantages.

3.3.5 Electricity

About 80 percent of the Indian population had access to electricity. By 2013, India became the world's third largest producer of electricity with 4.8 percent global share, surpassing Japan and Russia.India ranks 7th globally in hydropower generation during the year 2015.

India has 111 gigawatts (GW) (32 percent) installed capacity of renewable energy and set a target of 175 GW by 2022. This would include 100 GW capacity from solar energy sources, 60 GW from wind power, 10 GW from bio power, and 5 GW from small hydropower. India is one of the world leaders in renewable energy investments and installations. In 2018 the central government set up a US$350-million fund to finance solar projects.

3.4 TRANSPORT SYSTEM

We know that the transport system in India includes Rail transport, Road transport, Air transport, water transport and portal connectivity. India has one of the largest road networks in the world, largest railway system in Asia and second largest in the world.

3.4.1 Rail Transport

Indian Railway is the national railway network which is operated by Ministry of Railway. The first rail railway line in India was operated for public in 1853, between Bombay (Now Mumbai) to Thane over distance of 34 km and it was nationalized in 1950.Indian Railway is the 3rd largest rail network in the world after US and China. It is a multi-gauge, multi-traction system covering Broad Gauge (1676 mm), Meter Gauge (1000 mm), Narrow Gauge (762/610 mm) with. route length of 67,368-kilometre (41,861 mi) and total track length of 121,407-kilometre (75,439 mi) as of March 2017.Indian Railway runs

more than 20,000 passenger trains daily, on both long-distance and suburban routes, from 7,349 stations across India. The fastest trains in Indian railways are Rajdhani Expresss, Shatabdi Express and Gatiman Express. Indian railways has also introducedthe semi-high speedVande Bharat Express (also called asTrain-18), between Delhi-Varanasi and Lucknow-Delhi with a maximum track speed of 180 km/h. Train 18 is so far the fastest train in India. The Vivek Express - from Dibrugarh to Kanyakumari - travels 4,273 km, making it the longest-run in terms of total time & distance. The Konkan Railways passes through 3 states of India - Goa, Maharashtra and Karnataka. It runs along the Indian west coast parallel to Arabian Sea and Western Ghats. It is an extremely beautiful and scenic route running from Maharashtra till Karnataka (112mph). The railways recognised by UNESCO are Darjeeling, Himalayan Railways, Nilgiri Mountain Railways, Chhatrapati Shivaji Terminus, and Kalka-Shimla Railways. Indian Railway runs more than 9,200 freight trains daily. Indian Railway has 17 zones. The production units are Chitranjan Locomotive works at Chitranjan, Diesel Locomotive works at Varanasi, Diesel Loco modernization works at Patiala, Integral coach Factory at Chennai, Rail coach Factory at Kapurthala, Rail wheel factory at Bengaluru. Indian Railway becomes the world's eighth-largest employer, it had 1.308 million employees as of March 2017. In 2018, IR carried 8.26 billion passengers and transported 1.16 billion tons of freight. In the fiscal year 2017-18, IR is projected to have revenue of ?1.874 trillion (US$27 billion), consisting of ?1.175 trillion (US$17 billion) in freight revenue and ?501.25 billion (US$7.3 billion) in passenger revenue.



LET US KNOW

The Dedicated Freight Corridor Corporation of India Limited (DFCCIL) is a corporation run by the Ministry of Railways (India) to undertake planning & development, mobilization of financial resources and construction, maintenance and operation of the different dedicated freight corridors.

It is both enabler and beneficiary of other key Government of India schemes, such as Industrial corridor, Make in India, Start-up India, Stand-up India, Sagarmala, Bharatmala, UDAN-RCS, Digital India, BharatNet and UMANG.

Recently NITI Aayog has been planning to make a holistic development in 150 trains and 50 railway station which a strong potential to draw private investment. The cost of development of railway stations in metro cities in India is pegged at about Rs 10,000 crores, while that in tier-2 cities could be between Rs 3,000 crores and Rs 4,000 crores.

3.4.2 Road Transport

Roads help in connecting far-fetch villages, interior countryside and hill areas which are not connected with railways. It is complimentary to railways. It acts as arteries for goods and passenger arriving at the railway station and often provides last mile connectivity. India has the one of largest road network across the world. India's road network is the third largest in the world spanning over a total of 5.5 million km. This road network transports 64.5 per cent of all goods in the country and 90 per cent of India's total passenger traffic uses road network. Nagpur plan of 1943 classified the roads into four categories- National Highway, Highway, State Highway, District roads and Village roads. National Highways comes under jurisdiction of National Highway Authority of India (NHAI). NH 44 covers the North-South Corridor of NHDP and it is officially listed as running over 3,745 km (2,327 miles) from Srinagar to Kanyakumari is considered as the longest highway.National Highway 47A has length of 6 km that links the Junction with NH 47 at Kundanoor to the Town of Willington Island in Cochin isconsidered as the shortest highway.



LET US KNOW

- Best Expressway in India: The Ahmedabad Vadodara Expressway is known as one of the best Expressway in India and also referred as the National Expressway1.
- Longest Elevated Freeway: Chennai Port Maduravoyal Elevated Expressway will be the longest Elevated Expressway in India
- Golden Quadrilateral (GQ) stretch which connects the four metro cities of India (Delhi, Mumbai, Kolkata and Chennai)
- National Highways are specified by Yellow and White colour milestones. State Highways are specified by Green and White colour milestones. City roads are specified by black and white colour milestones.

3.4.3 Air Transport

The Air transport is the fastest and the costlier mode of transport. It was started in 1911 in India between Allahabad and NainitalIn 1995, International Airport Authority of India and National Airports Authority were merged to form Airports Authority of India. The authority manages the Civil Aviation Training College at Allahabad and National Institute of Aviation Management and Research at Delhi. Aviation in India, broadly divided into military and civil aviation, is the fastest-growing aviation market in the world. Prior to 2016, India had 75 operational airports, built over a century. In the year-and-a-half since, that number has increased to 100. The credit for boosting in connectivity goes to UDAN, a government scheme launched in October 2016, that has linked 25 smaller cities and towns by air. Pawan Hans Helicopter Limited has providing helicopter support services to the petroleum sector like ONGC, ODL etc. and also provides services to certain state Governments, PSU and in the North-Eastern States.

3.4.4 Water Transport

Water transport in India is one of the cheapest modes of transportation. Cost of water transportation per kilometer is 50 paise only as compared to Rs 1 in railway and Rs 1.5 in roadways. India has an extensive network of inland waterways in the form of rivers, canals, backwaters and creeks. The total navigable length is 14,500 km (9,000 mi), out of which about 5,200 km (3,200 mi) of river and 4,000 km (2,500 mi) of canal can be used by mechanized crafts. About 44 million tonnes (49,000,000 short tons) of cargo are moved annually through these waterways using mechanized vessels and country boats. Freight transport by waterways is highly under-utilized in India compared to other large countries and geographic areas such as the United States, China and the European Union. The total cargo moved (in tonne kilometres) by inland waterways was 0.1 percent of the total inland traffic in India, compared to the 21 percent figure for the United States. There are six national water ways set-up by Inland water ways Authority of India in 1986. There are 13 major ports and 187 minor ports in India.



LET US KNOW

Six National Water Ways:

NW1- Allahabad along Ganga River,

NW2- Sadiya-Dhubri along Brahmaputra River,

NW3- Kottapuram-Kollam,

NW4- Bhadrachalam to Rajahmundri and Wazirabad to Vijaywada along Godavri and Krishna River,

NW5- Mangalgarhi to Paradeep and Talcher to Dharmara along Mahanadi and Brahmnai River,

NW6- Lakhipur to Bhanga along the Barak River.



CHECK YOUR PROGRESS

Q 1: Name the four metro cities that are connected by the Golden Quadrilateral.

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Q 2: Which national waterway covers the Dhubri- Sadiya stretch of the Brahmaputra?

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Q 3: Which train in India cloaks the highest speed?

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3.5 COMMUNICATION SYSTEM

We all know that the communication system of any country includes postal and telegraph services, telecommunication systems, television and broadcasting, and also information services, etc. The following are the different types of communication system in India.

3.5.1 Postal Service

India has the largest postal network in the world. The postal system in India was started in 1854. At that time Department of Posts has been created with on an around 700 post offices. Currently, there are more than 1.5 lakh post offices across the country. In recent years, the Government has given more importance on the tribal, hilly, and rural areas and thereby accelerating the reach of country's postal network. Now India's postal network has the few advanced features like saving banks, satellite money order, a hybrid mail service with electronic devices and metro channel service in metro cities etc.

3.5.2 Telecommunication

In 1851, telecommunication services were introduced in India and the first telegraph message was sent between Kolkata (erstwhile Calcutta) and Diamond Harbor. However telegraph service has been closed permanently in 2013. In 1881-82, telephone services were launched and in due course, telecommunications services have

undergone phenomenal growth and change. In the post liberalization period the telephone service has shown a robust growth. The National Telecommunications Policy of 1994, divided the country into 20 circles for basic telephones and 18 circles for mobile-related services. The Mahanagar Telephone Nigam Limited (MTNL) and the Bharat Sanchar Nigam Limited (BSNL) are the two public sector telecom company in India.

3.5.3 Radio and Television

Radio services in India started in twentieth century only. Radio broadcasting started in 1927 and commercial broadcasting started in 1967. Television, on the other hand, started regularly from 1965. In 1976, it was separated from the All India Radio (AIR) and Doordarshan was formed. Currently, the television industry is a huge industry providing revenue and creating employment opportunities.

3.5.4 Internet

Internet has created a revolutionary change in the communication sector of the country. The first publicly available internet service in India was provided by Videsh Sanchar Nigam Limited (VSNL) on 15 August 1995.In 2018, India had a population of 130 crore people (1.3 billion) out of which internet user is 56 crore which accounts 41 percent of countries total population. With internet and smart phones the countries total e commerce business has shown a growth of 51 per cent.

3.6 URBAN INFRASTRUCTURE IN INDIA

India's urban area has been growing rapidly. Nearly 31 percent of India's current population lives in urban areas which contribute to 63 percent of India's GDP (Census 2011). India's urban growth is largely concentrated in large cities with a population of 10,00,000 or more, the number of cities with a population exceeding 1 million has increased from 35 in 2001 to 53 in 2011, accounting for 43 percent of India's urban population, and is expected

to be 87 by 2030. With increasing urbanization, urban areas are expected to incorporate 40 percent of India's population and contribute to 75 percent of India's GDP by 2030.

Government of India has launched various urban development schemes in the recent years with an aim to improve quality of life and attract investment in urban areas and thereby promoting and boosting growth. One of these scheme is smart city mission which is discussed below.

Various incentives have also been offered for building up and invest in urban infrastructure. Promoting affordable housing through different rebate and discount and National Investment and Infrastructural Funds are important among them.

3.7 SMART CITIES MISSION

Government of India announced smart cities mission with an aim to develop 100 cities by providing core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'smart' solutions. Actually it is an urban renewal mission. The focus is on sustainable and inclusive development and the idea is to look at compact areas, create a replicable model which will be an example for other aspiring cities. The major aspects of smart city mission are manifolds. A smart city must have adequate water supply, assured electricity supply, proper sanitation, including solid waste management ,efficient urban mobility and public transport affordable housing, especially for the poor, robust IT connectivity and digitalization, good governance, especially e-Governance and citizen participation, sustainable environment safety and security of citizens, particularly women, children and the elderly, and Health and education. The central Government proposes to give financial support to the Mission to the extent of USD 7.77 billion in the next five years (FY2015-16 to FY2019-20). In the first year, Government proposes to give USD 30.77 million to each selected Smart City to create a higher initial corpus, followed by USD 15.38 million every year for the next three years. The smart city mission comprises of city improvement, city renewal and city expansion.Smart Cities will feature

urban development and expansion of housing opportunities under different schemes like Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Pradhan Mantri Awas Yojana and Swachh Bharat Mission.



ACTIVITY 3.1

Collect and study the main objectives of Atal Amrut, Pradhan Mantri Awas Yojna and Swachh Bharat Mission.

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3.8 INDUSTRIAL CORRIDOR

An industrial corridor is a package of infrastructure provided to a specific area with an aim to stimulate industrialization. We know that investors will like to invest in an area which is well equipped with electricity, water supply, transport communication etc. An industrial corridor will provide all those basic infrastructural facilities to the investors and thereby attracting them towards the region to invest more. In this way the industrialization has boosted up and so economic development. An industrial corridor aims to create an area with a cluster of manufacturing or other industry. Such corridors are often created in areas that have existing infrastructure, such as ports, highways and railroads beforehand. These modalities are arranged such that an arterial modality, such as a highway or railroad, receives "feeder" roads or railways. Before creating these corridors a proper assessment of demand and viability should be made. Moreover transport option for goods and workers, land values and economic incentives for companies should be taken care of.

Economic Corridors of India or Industrial Corridors of India include: Delhi-Mumbai Industrial Corridor Project, Shendra-Bidkin Industrial Park, Chennai-Bangalore Industrial Corridor, Mumbai-Bangalore economic corridor, Amritsar-Delhi-Kolkata Industrial Corridor, Udhana- Palsana

Industrial Corridor, East Coast Economic Corridor, Kochi-Bangalore Industrial corridor.



LET US KNOW

India and Japan have joined hands for infrastructure development in India's north-eastern states and are also setting up an India-Japan Coordination Forum for Development of North East to undertake strategic infrastructure projects in the northeast.



CHECK YOUR PROGRESS

Q 4: Briefly discuss the recent trend of urbanization in India. (Answer in about 60 words).....

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Q 5: Mention the major focus laid down by the Smart Cities Mission in India. (Answer in about 30 words)

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Q 6: Name the economic corridors in India.

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3.9 LET US SUM UP

- The infrastructural development is very crucial for rapid economic development.
- Infrastructure includes energy and power, transport and communication etc.
- In India the recent focus in the field of energy infrastructure is towards alternative source of energy like solar, wind and nuclear energy.
- In India we have used four types of transportation like rail, road, air and water.
- Water is the cheapest mode of transportation but operating in under capacity. In the field of communication the internet users have increased substantially.
- India's urban infrastructure has developed in the recent years and expected to expand more in the coming years.
- Projects like smart cities attract investment and boost up urban infrastructural development. Industrial corridors are built up to boost industrialization and thereby economic development.



3.10 FURTHER READING

1) Datt, G and Mahajan, A. (2016). *Datt & Sundharam's Indian Economy.* New Delhi: S. Chand & Co.
2) Dhar, P.K. (2015). *Indian Economy - Its Growing Dimension.* New Delhi: Kalyani Publishers.
3) Dash, L.N. (2008). *Infrastructure Development and Indian Economy.* New Delhi: Regal Publications.



3.11 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: The four metro cities of India connected by the Golden Quadrilateral (GQ) stretch are Delhi, Mumbai, Kolkata and Chennai.

Ans to Q No 2: National Waterway 2.

Ans to Q No 3: The Bande Bharat Expressway.

Ans to Q No 4: India's urban area has been growing rapidly. Nearly 31 percent of India's current population lives in urban areas which contribute to 63 percent of India's GDP (Census 2011). The number of cities with a population exceeding 1 million has increased from 35 in 2001 to 53 in 2011, accounting for 43 percent of India's urban population, and is expected to be 87 by 2030.

Ans to Q No 5: The major focus of the Smart Cities Mission is on sustainable and inclusive development and the idea is to look at compact areas, create a replicable model which will be an example for other aspiring cities.

Ans to Q No 6: Economic Corridors of India or Industrial Corridors of India include: Delhi-Mumbai Industrial Corridor Project, Shendra-Bidkin Industrial Park, Chennai-Bangalore Industrial Corridor, Mumbai-Bangalore economic corridor, Amritsar-Delhi-Kolkata Industrial Corridor, Udhana- Palsana Industrial Corridor, East Coast Economic Corridor, Kochi-Bangalore Industrial corridor.



3.12 MODEL QUESTIONS

Short questions (Answer each question in about 150 words)

Q 1: Briefly describe the communication infrastructure in India.

Q 2: Briefly discuss Smart Cities Mission launched in India.

Long questions (Answer each question in about 300-500 words)

Q 1: Explain the energy infrastructure in India

Q 2: Explain the transport and Communication system in India

Q 3: Discuss the status alternative energy sources in India

Q 4: Explain smart city mission as a part of urban infrastructure in India.

Q 5: What do you mean by Industrial corridor? Do you think industrial corridor helps to boost up industrial growth?

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