
UNIT 4 PHYSICAL INFRASTRUCTURE: POLICY ISSUES

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4.0 OBJECTIVES

After reading this unit, you will be able to:

- state the nature of infrastructure sector;
- distinguish between infrastructure sector and other directly productive activities;

- explain the significance of infrastructure sector in the growth process of the Indian economy;
- discuss how does rapid growth of an economy facilitate the growth of infrastructure sector in an economy;
- describe the functioning of the core part of the infrastructure sector in India;
- Identify the policy issues arising out of the growth process in the Indian economy; and
- make suggestions for a proper infrastructure policy in the Indian economy.

4.1 INTRODUCTION

Infrastructure comprises such activities as (i) transport, (ii) communications, (iii) energy, (iv) intermediate goods output, (v) increasing productivity of natural resources, such as irrigation, drainage, afforestation, etc., (vi) science and technology, (vii) information system, (viii) finance and banking, (ix) piped water supply, sanitation and sewerage, solid waste collection and disposal, and piped gas, and (x) human resource development. (The first three comprise what is known as ‘hard core’ of infrastructure.) Infrastructure works on a number of determinants of economic development.

- a) On the demand side, it opens up possibilities of investment by making available a number of inputs and services, opening up the size of market as well as increasing the supply of elasticity and efficiency of factors of production.
- b) On the supply side, the development of infrastructure particularly that of financial institutions helps in mobilising potential saving and channelising them into productive investment.

In short, infrastructure creates the conditions on which the superstructure of economic activities is built up.

Per se, transport and communication and energy constitute the most important part of economic infrastructure. The different modes of transport that command greater speed point to how the world is experienced when organised on the fast-changing time-space-speed vectors. Distances are measured on the basis of speed and not in spatial terms. Consumption of energy is the single most important parameter that helps distinguish between a developed and a developing economy.

In this unit we will focus on the core of the infrastructure sector; its significance in the present stage of development, present position and different policy issues arising out of that.

4.2 MEANING AND SIGNIFICANCE OF INFRASTRUCTURE

Infrastructure covers those supporting services that help the growth of directly productive activities like agriculture and industry. These services have a wide range from the provision of health services and education facilities to the supply of such needs as power, irrigation, transport, telecommunications, etc. There is also a need to distinguish between physical infrastructure and infrastructure services. Most infrastructure services are non-tradable. For these reasons, the stock of infrastructure services may not be readily augmented through imports as in the case of other goods and services.

4.2.1 Social and Physical Infrastructure

An economy's infrastructure is more conveniently divided in two parts, viz., social infrastructure and physical infrastructure.

Social infrastructure, on the other hand, is directly concerned with the needs of such services that meet the basic needs of a society like health services, drinking water, sewerage, sanitation, electricity, education facilities, etc.

Physical infrastructure, on the other hand, is directly concerned with the needs of such production sectors as agriculture, industry, trade, etc. In physical infrastructure, we include such services as power, irrigation, transport, telecommunications, etc.

4.2.2 Nature of Infrastructure

The infrastructure sector has certain peculiarities that help us to distinguish this sector from other sectors of the economy. Among these, the more important distinguishing features can be identified as follows:

- i) **Public Goods:** Most of the physical infrastructure services have some elements of public good in them. These services are available to the public; the consumers may be charged for these services or the same may be supplied free. But even when they are supplied against a price, it is not always possible to exclude those consumers who chose not to pay for them.
- ii) **Externalities:** The social benefit of the infrastructure services far exceeds the cost involved in their generation. This, in turn, creates problems in pricing of these services. It makes it difficult to price them in order to recover the cost fully.
- iii) **Monopolies:** Due to the inherent nature of infrastructure services, it is difficult for more than one supplier to exist in one location. It thus creates the possibility for monopolies and their regulation.
- iv) **Public Sector Domination:** The existence of externalities particularly in the field of social welfare has resulted in a dominant position by public sector in production and supply of infrastructure services.
- v) **Lumpy Investment:** Infrastructure prospects, more generally, require lump-sum investment, i.e., any expenditure on a part of the project is not useful until the whole project is ready for operations. A half-way road or a rail line are of no use. Similarly, investment in energy is useful only when the whole system of generation, distribution and its reach to the ultimate consumer is ready.
- vi) **Indivisibilities:** Lump-sum investment, in turn, is the result of indivisibilities, a characteristic feature of most infrastructure projects. One can not divide and sub-divide such projects in small parts and activate them. These are indivisible.

4.2.3 Infrastructure and Economic Growth

Infrastructure has a two-way relationship with economic growth. One, infrastructure promotes economic growth, and two, economic growth brings about changes in infrastructure.

Infrastructure Promotes Growth

- i) Output of infrastructure sector such as power, water transport, etc. are used as inputs for production in the directly productive sectors (manufacturing, agricultures, etc.). Therefore, insufficient availability of the former may result in sub-optimal utilisation of assets in the latter.

- ii) Infrastructure developments such as transport not only expand the size of markets but also improve productivity significantly.
- iii) Infrastructure provides key to modern technology in practically all sectors.
- iv) A close association has been observed between infrastructure spending on the one hand and GDP growth on the other. Studies have indicated that 1 per cent growth in the infrastructure stock is associated with 1 per cent growth in per capita GDP.
- v) Empirical research has estimated that more generally around 6.5 per cent of the total value added is contributed by infrastructure services in low income countries. This proportion increases to 9 per cent in middle income countries and 11 per cent in high income countries. (Nothing is sacrosanct about these figures. These may change from country to country.)

Besides promoting growth, infrastructure is a strong antidote to slowdown, better than tax cuts and other forms of government spending. According to a recent study by the IMF, infrastructure spending yields the best results, though it has the ‘longest implementation lags’; tax cuts are obviously faster but, the IMF says, the results will be modest especially if these are not targetted at “credit-constrained consumers”. The upper bound for the impact of infrastructure spending is 1.8 — that is, a rupee spent on infrastructure will lead to a Rs. 1.8 impact on the economy. The upper bound for tax cuts is a third of this, at 0.6 — the argument here being that, consumers who are facing uncertain job prospects, will not spend the money they save through the tax cuts. Other forms of government spending like social security, transfers to local governments and assistance to small enterprises are likely to be more beneficial than tax cuts.

Given the above type of linkage, infrastructural development is important not only for economic growth, globalisation and technological innovation in manufacturing but also for poverty reduction.

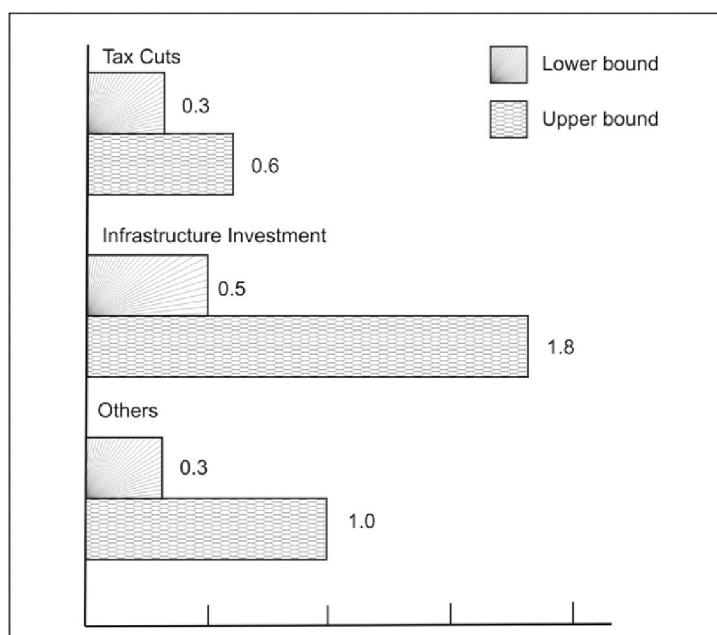


Figure 4.1: Fiscal multipliers or the impact of various policies in stimulating GDP growth.

Note: Others include additional spending on safety net transfers to state and local governments, assistance to small and medium enterprises, and support for housing markets.

Growth and Infrastructure: Growth, in turn, makes demands for infrastructure. This can be illustrated with the help of the relationship between GDP growth and demand for infrastructure, as below:

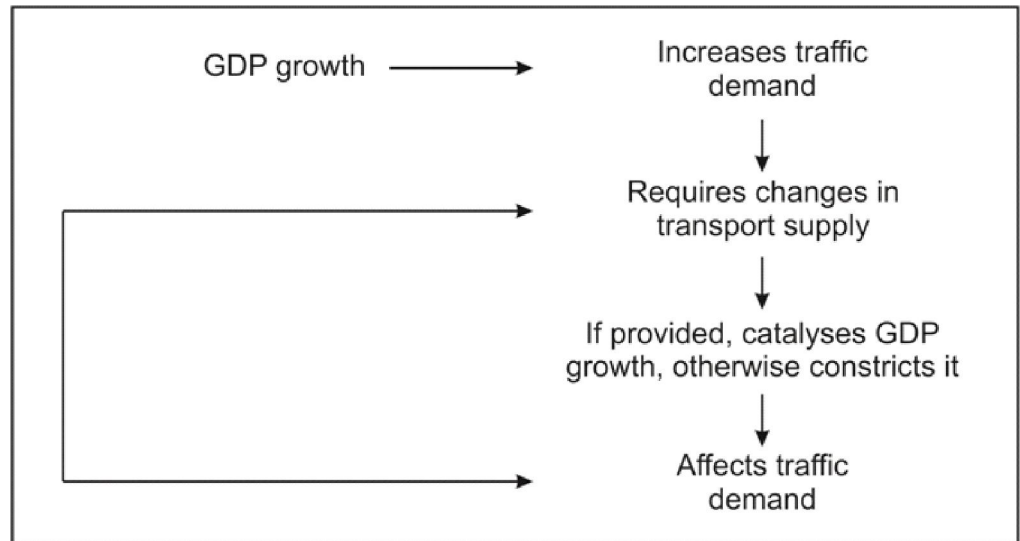


Figure 4.2

As a result, with increase in income levels, the composition of infrastructure changes.

- a) In low income countries, basic infrastructure such as water, irrigation are most important.
- b) In middle income economies, demand for transport grows fast.
- c) In high income economies, power and telecommunication occupy more importance.

Due to such linkages between infrastructure and the rest of the economy, efficiency, competitiveness and growth of the economy hinges upon the state of development of the infrastructure sector.

Studies indicate that with a 20 per cent sustained increase in public investment in infrastructure, the government can accelerate real growth by 1.8 percentage points in the medium to long run, six to ten years after the policy change. This will be accompanied by a 0.2 percentage decline in the rate of inflation. The increase in income will lead to a 0.7 percentage point annual reduction in poverty in rural India. This shows the potential for achieving the much-debated 10 per cent aggregate real GDP growth in the Indian economy. (These quantified relations are only illustrative in nature; the actual results will vary from country to country.)

Check Your Progress 1

- 1) What do you mean by infrastructure? How does infrastructure activities differ from other directly productive activities?

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- 2) Distinguish between social infrastructure and physical infrastructure.

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3) Highlight the important features of the infrastructure sector.

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4) What role is played by the infrastructure sector in the growth process of an economy?

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5) How does economic growth contribute to the growth of infrastructure sector?

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4.3 PRIVATISATION AND COMMERCIALISATION OF INFRASTRUCTURE

The heavy-industry-led-growth strategy embodied in our earlier plans contemplated an active role for the state in all spheres of economic activity. The accompanying policy framework was to be in sync with the adopted growth strategy. The different arms of economic policy sought to provide “commanding heights” of the economy to the public sector. This was true of monetary policy, fiscal policy, commercial policy as also about industrial policy. Investment in infrastructure became the exclusive preserve of the public sector. The public sector, although it recorded phenomenal growth, could not live up to the opportunities and expectations offered by the changing technology and evolving new international environment. With the onset of the 1980s, it was becoming increasingly clear that there was no alternative but to commercialise the infrastructure sector and open it to private enterprise and capital.

Private participation in infrastructure development depends upon its capability to commercialise the infrastructure services.

4.3.1 Need for Privatisation and Commercialisation

The different factors that call for immediate privatisation and commercialisation of infrastructure can be identified as follows:

Massive Investment Needs: Infrastructure development requires massive investments and it is not possible for the state to meet all the investment needs.

Managerial Constraints in the Public Sector: While the infrastructure business is becoming more complex, public sector has not been able to meet the managerial challenges and as a result, the supply could not grow at the desired pace. The

fiscal stringency has also created a demand for accountability for public spending. Therefore, a demand has arisen for commercialisation and greater privatisation of infrastructure sector in order to inject greater efficiency.

Changes in Technology: The possibility of marginal pricing and exclusion provides greater scope for commercialisation. Technological changes have made it possible to unbundle the infrastructure service thereby introducing the elements of competition. The use of new technology enables the charging of the marginal user.

Globalisation: The availability, quality, cost and reliability of infrastructure services are key factors in attracting foreign investment. Globalisation has been aided significantly by advances in transport, telecommunication and storage technology. Such advances in infrastructure enable better management of logistics by combination of purchasing, production and marketing function. Besides facilitating suppliers to respond to the consumer demands promptly, a significant cost saving is achieved in investment and working capital.

New Dynamism in World Capital Market: Since 1990s the capital markets, domestic as well as global, have witnessed a significant re-emergence. During this period there has been a nearly four-fold increase in gross private capital flows to the developing countries. Private flows are now around three times the official development assistance. Thus, the private sector now has access to the kind of resources needed for infrastructural development.

4.3.2 Prerequisites for Private Investment

Entry of private capital in infrastructure sector is not merely a matter of simple policy initiatives. A few other important and critical areas would have to be identified and a suitable environment created.

Commercialisation of Infrastructure: Infrastructure services should not be treated as public goods. In this regard, the possibility of commercialisation will depend on the ability to segregate payers and prevention of any incidence of 'free riding'. Thus the excludability is a key factor in commercialisation.

Pricing Policy: The role of private sector is not restricted to that of provider of funds. It has to play the role of efficient and accountable operator of the facility. The issue of pricing of infrastructure services becomes critical here. In this sphere the long track record of uneconomic pricing and prevalence of subsidies will be major obstacles.

Demand Orientation of Services: The existing procedure of financing infrastructure facilities is based on plan allocation and is mainly supply-oriented. Insufficient stress on the existing infrastructure and the anticipated demand has resulted in deviations in different countries and consequently a large part of such investments are not providing sufficient returns. Privatisation will necessitate a demand-oriented approach.

The challenge for policy is to find appropriate market signals which indicate the future trend of infrastructure demand and to coordinate the supply of such facilities in such a manner that investment in infrastructure provides appropriate returns.

Allocation of Risk: Allocation of risk is of key importance in commercialisation of infrastructure. The risk should be appropriately demarcated and allocated to different stake-holders. This is important for two reasons:

- i) There is a tendency among the private shareholders to shift the risk to the government.
- ii) There is also a tendency among the shareholders to shift the risk on each other.

Direct Participation by the Government: While the existence of elements of monopoly in infrastructure will necessitate regulation by the government, constraints in financing and user charging will render the direct participation by the government necessary. Therefore, a transparent framework for promotion of synergistic firmness of public-private partnership in infrastructure is required.

A Suitable Regulatory Framework: Most of the infrastructure projects are right candidates for developing as a 'natural monopoly'. These cost per unit scale of output. But these units cannot be allowed, in the interest of public welfare, to eschew competition. A healthy guided competition is required for sound growth. This presupposes the existence of an effective regulatory system.

4.4 INFRASTRUCTURE DEVELOPMENT IN INDIA

Development of infrastructure has always been given highest priority in our growth programmes. As reviewed below in the unit, there has been phenomenal growth in different aspects of infrastructure.

In the rest of this unit, we will review the state of development in three core infrastructure sectors, viz., transport, communication and energy.

4.5 TRANSPORT DEVELOPMENT IN INDIA

Three important development features of the transport sector in India can be noted as follows:

- 1) A rail dominant economy in the 1950s has become a decidedly road dominant economy presently. Road transport now accounts for over 60 per cent of inter-city freight traffic (tonne-km) and over 80 per cent of inter-city passenger traffic (pass-km).
- 2) During the same period, Indian Railways shifted from being a freight dominant operation to a passenger dominant operation.
- 3) The main links of the parallel and competing road and rail networks have become saturated under the current technological and operational regime.

What India needs at present is holistic planning for its transport infrastructure that should minimise energy use and emissions while maximising competitiveness of domestic industry.

4.6 GROWTH OF RAILWAYS IN INDIA

The growth of the Indian Railways, since the maiden journey of April 16, 1853 covering a distance of 34 km only, has been meteoric¹. About 155 years old now, the Indian railway system is the second largest in Asia after China and the fourth largest in the world, after the USA, Russia and China. Under a single management,

¹ More recent research has brought out that the first locomotive ran on the two-and-a-half mile track of Roorkee to PeeranKaliyar on December 22, 1851. See *The Statesman*, August 10, 2002.

the Railway Board, and organised in 16 zones, it is also the biggest public undertaking and the principal mode of transport in the country. Indian railways developed as a multi-gauge system with several agencies taking up construction and operations of the railways network in the earlier years. It is no exaggeration to say that the railways are the glue which has held India together.

4.6.1 Modernisation of Railways

- The railway system is being increasingly electrified; about 28 per cent of the total track has been electrified. (About 500 route km are being electrified every year.) Electrification of the railways leads to faster, safer, economical and pollution free operations. Besides, electric locomotives have higher haulage capacity with less maintenance cost compared to the diesel locomotives.
- Improvement in the standards of track for higher speeds on trunk routes and important main lines is being brought about with the help of track recording cars, which are now being produced by the railways themselves. The improvement in the standard of track has enabled a few important trains to run at high speeds of 130 km per hour.
- The Corporate Safety Plan of Indian Railways, 2003, lists out various works and programmes to be undertaken to achieve its various goals.
- Indian Railways launched in 1992 the 'unigauge project'. Under the unigauge project, the railways intend to convert the whole of the meter gauge track into broad gauge.
- The railways have set up a special purpose vehicle called the Dedicated Freight Corridor Corporation of India (DFCCIL). The Corporation would develop exclusive routes for goods trains along the four major stretches: Delhi-Howrah, Delhi-Mumbai, Mumbai-Chennai and Chennai-Howrah.
- India has given 'green signal' to the Asia-Europe rail project, running through India, Pakistan and Iran. This will be the first rail corridor in the Asian subcontinent and will open cheaper and quicker means of conducting international trade business.
- Following the recommendations made by A.F. Fergusson Report Indian Railways are currently engaged in a massive restructuring exercise. This will enable the organisation to customise its services to the needs of the final consumers.

Rail Share of Traffic: With the need for energy conservation, a new dimension has now been added to the transport problem. The railways happen to be an energy-efficient mode of transport. It is a mode that consumes much less energy per tonne-km. than any other mode of land transport. (Railways are six times more energy-efficient than road transport, four times cost-effective in construction costs for comparable levels of traffic and being the only mode of transport which is able to use almost any form of primary energy.)

The railways account for 38 per cent of national freight output (90 per cent in 1950) and 16 per cent of passenger output (80 per cent in 1950). The average lead² of traffic on the railways is 720 kms and on the road 350 kms. But nearly 30 million tonnes of freight traffic is carried by road transport on an average lead of 700 kms. Certain commodities in small lots and of high value move long distances generally by road.

² Lead = Average distance each passenger or tonne of goods is transported.

Globally, rail freight has grown faster than the GDP of a country — freight transport capacity should grow 1.5 times faster than GDP and passenger capacity, 1.8 times. In India, the corresponding figures are less than one.

4.6.2 Policy Issues

The ongoing economic reforms seek to remove government from much of the state-owned industrial sector and to give private enterprise more freedom to run their own affairs. The railways are most effective by these initiatives. Rail reform is well advanced in other reforming economies and the experience indicates that this is a difficult area of adjustment for politicians, rail labour and management.

Privatisation of Railways

Total privatisation of the railways, as at present, is not possible because of a number of practical problems.

- 1) Because of the technical indivisibilities of their assets, investment in railways are huge and chunky, requiring resources usually beyond the reach of private investors. If Indian Railways were to be privatised as a single entity, it is difficult to visualise how private investors can afford to commit resources on such a large scale to purchase assets which cannot be easily disposed of if the demand for rail traffic declines.
- 2) Operations of Indian Railways are probably more vertically integrated than those of many other railways in the world. There is a need to ensure technical and operational efficiency more than those of many other railways in the world. There is a need to ensure technical and operational compatibility between line-haul assets and rolling stock equipment, so that there is no mismatch in the facilities developed. Privatisation may lead to under-investment and thus resultant mismatch.
- 3) Coordination of the timetabling process is a difficult task in every railway system but considering the size of Indian Railways system but considering the size of Indian Railways' network, it would be impossible in practical terms to replicate this process through market mechanism.
- 4) With investments being large and lumpy and the cost of entry and exit being high, the basic infrastructure will have to be financed by the state.

In view of the above practical problems, it is advisable to pursue partial privatisation, as recently recommended by Rakesh Mohan Committee (2001). The committee had observed in its report that if “ IR is to survive as an ongoing transportation organisation it has to modernise and expand its capacity to serve the emerging needs of a growing economy.....New investment will have to be financed on a commercial basis. This is the challenge facing the Indian Railways.”

New Policy on Private Investment in Railways, 2010

The railways ministry has launched a major initiative to encourage private investments in infrastructure projects. A detailed policy has been drafted in this regard. The policy deals with constructing railways tracks, developing private freight terminals, automobile and ancillary hubs and private operation or special freight trains on the network.

Features

The principal features of the policy are as follows:

- 1) To increase rail share in freight traffic, the ministry has evolved a policy to build road connectivity projects spanning over 20 km with private sector participation. The minimum rate of return for such projects has been determined at 14 per cent. One of the models being considered is the 'cost-sharing freight rebate scheme', under which the private players will share the cost of developing the new line and get a discount of 10-12 per cent on incremental traffic transported on the network. Besides, new lines can also be constructed under 'full contribution apportioned earning mode', SPV model, and private line model.

In the full contribution model, the private entity in the project will finance the building of the rail link, and in return, receive apportioned earnings for 25 years.

- 2) To increase the modal share of railways in automobile transportation, the ministry had announced the setting up of 10 auto hubs at Santragachi, Shalimar, Patna and Hosur, among other places. The proposed policy says railways will make surplus land available to private players on license for a period of three years, to be extended every year thereafter. The private party, in turn, will be responsible for setting up facilities on the land. Private players can recover costs by charging automobile customers for the services at the hub. However, the hub has to be built and made operational within a year of handing over of the land otherwise the license will be made null. The hubs will not only serve house aggregation facilities and serve as distribution points to immediate catchment areas.

The railways expect to earn around Rs. 1,000 crore per annum from the automobile hubs. At present, less than two per cent of automobiles manufactured in the country are transported through the railways. The railways hopes to increase such traffic to 15 per cent by 2015-16.

- 3) For freight traffic, the railways plan to provide integrated logistics solutions by engaging private players in developing and operating freight terminals. The operators can use the terminals for 20 years. The licence can be extended by another 10 years. The terminal management company (TMC) will have to pay freight charges to the railways but can charge for value-added services from customers. The TMC can handle the bookings and delivery for all commodities except outbound coal, coke and iron ore.
- 4) The draft policy also has a 'special freight train operation' scheme that would allow private operators to invest in wagons and use the railway network for a period of 20 years. They can charge consumers for the services they offer.

4.7 GROWTH OF ROADS IN INDIA

The state of road communications in a country, the extent to which they reach into the interior and the rural areas, the number and types of vehicles that move on them and the goods they carry and the conditions in which roads are maintained are as good an indicator as any of the level of development and the quality of administrative and technical organisation sustained by it.

India's road network is one of the world's largest. The road length of India has increased from about 4 lakh kilometers in 1950-51 to about 34.00 lakh kms presently, or at an annual average rate of 4.49 per cent, that is, by more than 400 per cent.

The growth of the road network has outstripped all other channels of transport³. In 1960, the network of paved roads was 4.50 times as long as all the railway tracks combined. Presently, there are more than 10 km of roads for every km of rail track. One outcome has been the increasing transformation of the transport sector in the country from being rail-led to road-dominated.

Of the total road length, about 1201 lakh kilometers are surfaced roads, National highways from about 66,590 kms, state highways about 1.32 lakh kms, and rural roads about 26.50 lakh kms. Most of the National highways and State highways are surfaced roads whereas only about 13.5 per cent of the total rural roads are surfaced. The rural road network connects 64 per cent of the villages, i.e., about 36 per cent of the villagers in the country are still without any road connection and as much as 55.8 per cent without any all weather road. Some states have widerly poor accessibility, e.g., Madhya Pradesh (24 per cent villages connected by all weather roads), Rajasthan (21 per cent), Orissa (15 per cent), etc. On the other hand, almost all the villages have been connected with all-weather roads in some states like Kerala, Punjab and Haryana.

4.7.1 Privatisation of Roads

The economic reforms programme has brought to fore the need for greater participation by private capital and enterprise in the construction and maintenance of roads. The fact that roads need be given highest priority in interest of general economic development coupled with the fact that the government lacks necessary and adequate financial resources, makes private participation in road activity an attractive proposition. Privatisation of roads envisages permitting the entrepreneur to finance the construction of a road project, build the road to required standards, maintain and operate the facility, collect fees from the entrepreneur and allow the entrepreneur to retain with him for a definite period (concession period) in accordance with the agreed terms and conditions. At the end of the concession period, the facilities stand transferred to the government. This is popularly known as the BOT (Build, Operate and Transfer) concept. In this way, the road facilities are provided – on a user pays basis – years earlier than otherwise would be possible if followed successfully in several countries, although there have been cases of failure also. The Government hopes to build 10,000 km. of new expressways over the next 20 years through the BOT route. More recently, the Government has also mooted a new proposal of bankrolling road upgradation: shadow tolls.⁴

However, two issues are critical in any consideration of the private sector participation in a big way in road construction. One is of course raising of adequate resources to finance road construction. The second is to ensure a fair return on such investments so that the process of private sector investment is a continuous one and not a one-shot operation.

Rakesh Mohan Committee Recommendations

The Expert Group has recommended:

- i) four-laning of some of the existing highways be taken up through the public toll-road method;

³ The elasticity of demand for roads with respect to GDP growth is estimated to be 1.5 for freight traffic and 2.0 for passenger traffic.

⁴ In this system a private entrepreneur builds (or maintains) a road and the Government pays him a shadow toll. This is either a fixed amount every year for a certain period, or an annual amount calculated on the basis of the number of vehicles that use the road.

- ii) super-national highways by-passes and spot improvements be done through the private sector or in collaboration with it;
- iii) setting up of a Highway Development Fund as an extra-budgetary funding source through levying a cess on diesel, petrol, commercial vehicles, automobiles and auto components.⁵

Government Response: The Government has responded with the following policy initiatives:

- a) The National Highways Act has been amended to allow for private participation.
- b) Tolling has been permitted on selected improved sections of the national highway network.
- c) The road sector has been declared an industry to facilitate commercial borrowings by the private sector.
- d) The government has decided to provide financial support to private developers. One of the mechanisms identified envisages the NHAI having equity stakes in private sector projects.
- e) Tax holidays for the first five years and tax concessions for the subsequent five years have been declared for all road sector projects.
- f) Financial institutions have been given incentives to provide funds to the road sector.
- g) Liberalisation of the norms of foreign investment in the road sector has resulted in the granting of automatic approval for foreign equity participation up to 100 per cent in the construction and maintenance of roads and bridges subject to a limit of Rs. 1,500 crore and up to 51 per cent in services of support of land transport such as operation of highway bridges, toll roads and vehicular tunnels.

Many parts of NHDP have been commissioned, and the focus needs to now shift from construction to “corridor management”, i.e., the process of managing the highway so as to deliver maximal throughput in terms of velocity and number of vehicles, while minimising the cost to the economy of accidents. Road safety is an important area of focus, particularly given India’s lack of experience with high velocity roads.

4.8 GROWTH OF SHIPPING

To India, with a coastline stretching over 5,700 kms, and with almost the whole of its foreign trade passing across the seas, a flourishing shipping industry becomes a vital factor in economic growth. The objective of shipping development is the earning and saving of foreign exchange, building up of a transport infrastructure which will promote exports of Indian goods and lower the delivered cost of imports and create and stimulate a marine environment which will enable India, in the course of time, to exploit the vast potential of its rich resources beneath its seas.

⁵ Such funds, as suggested by the noted transport economist Gabriel Ruth, typically work as follows: any firm that builds a highway should get money from the road fund in accordance with the traffic carried by his road. Traffic is measured through ‘shadow-tolling’; there is no need for toll-booths every few miles. If the road carries traffic it earns money; if not too bad for whoever built it.

Shipping in India has made very encouraging progress during the course of planning. Presently, India has the largest merchant shipping fleet among the developing countries, and ranks sixteenth in the world in shipping tonnage.

Indian tonnage can be divided into two categories, viz; (i) overseas shipping, and (ii) coastal shipping. Out of 1,029 ships with gross registered tonnage (GRT) of 101.0 lakh for which data are available, 693 ships with a total tonnage of 100 lakh GRT were engaged in coastal shipping and 366 ships with a total tonnage of about 90 lakh GRT were engaged in overseas shipping. Almost 50 per cent of the Indian merchant fleet belongs to the government owned shipping corporation of India.

The average age of India's shipping fleet (15.2 years) is higher than the world's average (12 years)

Overall Performance: When examined historically in terms of the acquisition of total tonnage alone, Indian shipping made a substantial advance. With the 1980s, Indian shipping entered a prolonged period of almost a decade and a-half of stagnation; it could come out of it only towards the year 1996. India opened up shipping to foreign investment in the year 2004-05, allowing 100 per cent FDI through the automatic route. The aim was to provide a level playing field to domestic shipping industry against the international shipping companies and facilitate the growth of Indian tonnage. Since then, the Indian tonnage has steadily grown from 6.94 million in April 2004 to the present level. When viewed comparatively, the Indian shipping industry demonstrates grave weaknesses. The overall tonnage is marked by serious imbalances. Particularly noteworthy is the failure over some two decades after the early 1970s to acquire containerships. Connected with that failure is the declining tonnage in liner cargo and the extremely poor record in terms of share in high-value cargo.

Breath-taking developments are taking place in world shipping. The Indian shipping industry enjoys several advantages such as highly skilled and competent managerial and shipboard personnel, excellent balance sheet profits, both in the public and private sector, and a very congenial investment climate.

The Indian shipping industry should come up with a blue-print for development. Government should not take a routine view of the development problems of the shipping industry; it should go all out to provide succour to the industry in form of procedure for sale and purchase of ships, increase of Indian Lines' share in carriage of general cargo and acquisition of cellular container vessels for carriage of general cargo, etc.

4.9 GROWTH OF AIR TRANSPORT

Compared to road and rail transport, civil air transport is a new comer to the Indian scene. Its potential was first demonstrated in 1911, when an aircraft carried mail from Allahabad to Naini, across the Ganga river, covering a distance of about 10 kilometers in nearly as many minutes. However, the airlines remained a minor part of the country's transportation system till the Second World War.

4.9.1 Progress

In 1953, air transport was nationalised in India; two corporations were set up to operate transport services — the Indian Airlines was to operate internal services and Air-India was to operate international services. The two companies were

merged into the National Aviation Co. of India Ltd. (NACIL). With effect from November 2010, the merged company has been renamed as Air India Ltd.

A new chapter in the history of India's air transport opened on March 1, 1994, when the Air Corporation Act, 1953, was repealed; it ended the monopoly of state-owned airlines. Further, there are no restrictions on pricing by the private airlines and air-cargo operators. Likewise, most restrictions on types and imports of aircraft and operating routes were relaxed in 1994. 100 per cent FDI in greenfield airports through automatic route is also permitted. Airport infrastructure is being upgraded across the country with surging private participation.

If the present growth trend can be sustained, civil aviation will become the vehicle for take off for the Indian economy in the coming decade. It is around this time that the Indian economy is expected to acquire a size comparable to the Chinese economy. This has reassured entrepreneurs about healthy prospects for growth of civil aviation in India. Therefore, it is not surprising that a number of new airlines are proposing to enter the market while existing airlines are going for significant fleet expansion/renewal.

Presently, the growth in Indian air traffic is the second fastest in the world, next only to China. The airports have grown on all the three major parameters, viz., (i) passenger numbers, (ii) aircraft movements, and (iii) cargo carriage.

Air transport primarily caters to passenger traffic, and here also its share of the total passenger traffic in the country is only one per cent (only 6.67 per cent of India's middle class travels by air, compared to 35 per cent in China). It has a distinct advantage over surface transport due to its superiority in speed and/or substantial saving in time over long distances. Foreign investors are also taking a closer look at aviation in India. Not surprisingly, air transport industry is already being rated as one of the fastest growing industries of India.

The changing economic climate, that poses several challenges, has forced many in the aviation industry to look at consolidation and rationalisation. The unsustainable players will be weeded out, while those with strong business fundamentals will survive. In the long run, this can only benefit the industry, making it leaner and even more competitive.

4.9.2 Policy Issues

The aviation sector has remained a captive industry in India, managed and operated by bureaucracy. Most of the problems in which the aviation sector finds itself, are due to over-protection, interference at various levels, absence of cohesive and long-range planning, frequent changes at decision-making level and inducting in this hi-tech field people unaware of the complexity of the business.

It is here that the process of deregulation of the aviation sector need be speeded up. Deregulation should address to the manifold obstacles being faced by the aviation sector:

- i) The extent of foreign ownership in a private airline is restricted and requires official clearance;
- ii) All the private airline operators must operate on a specific number of non-trunk routes.

Check Your Progress 2

1) What do you understand by commercialisation of infrastructure?

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2) Highlight the prerequisites for private investment in the infrastructure sector in India.

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3) Bring out the three important developmental features of the transport sector in India.

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4.10 TELECOMMUNICATIONS

Few areas of India's economy have enjoyed a sharp pace of structural change as that in the telecom sector. The rapid pace was the outcome of the New Telecom Policy, 1999. It brought in vigorous competition among firms and technologies. The drastic pace of structural change highlights the possibilities in other segments of infrastructure for eliciting massive investment by the private sector, and for benefitting the consumers through competition between old and new technologies.

The major features of the telecom sector can be identified as follows:

- i) The structure and composition of telecom growth have undergone a substantial change in terms of mobile versus fixed phones and public versus private participation.
- ii) In 1999, both mobile phones and private sector separately accounted for 5 per cent of total number of phones. Presently, mobile phones account for a little over 92 per cent of total phones and the private sector accounts for 78 per cent of total phones. From basic telephony to Value Added Services (VAS), several remarkable changes have happened that have resulted in not only expanding the base of mobile users but also providing more user-friendly services to consumers. Mobile phone has surpassed their primary role of voice communications and have become more of an infotainment device for mobile users.
- iii) Although India has a 750 million strong telephone network, including mobile phones, the tele-density (number of phones per hundred population) at about 60 is much less than over 120 in U.K., USA, and Australia.
- iv) While tele-density lags behind the world, present trends suggest that catching up is presently underway. For this, massive investments, including FDI, are planned.

- v) There is a big rural-urban divide. Tele-density is only 26 in rural areas, against 120 in urban areas. Since rural phones do not generate enough revenue to justify their installation, the government started a Universal Service Obligation (USO) Fund several years ago — the idea was to collect a cess of sorts from telecom firms and use this money to subsidise the rollout of phones in rural India. Initially, the money was meant to subsidise only fixed-land-line phones, but when it was later pointed out that it would be more cost-effective to subsidise mobile phones, the USO Fund’s charter was amended to allow this.
- vi) India also lags behind the world to a considerable extent in the field of broadband telecom.

Internet penetration in India continues to be abysmal even in comparison with similar countries. The coming launch of third-generation (3G) telephony services will hopefully make us a more digital nation, and promote the sort of empowerment and economic push that came in the wake of the mobile telephony revolution in the first decade of this century.

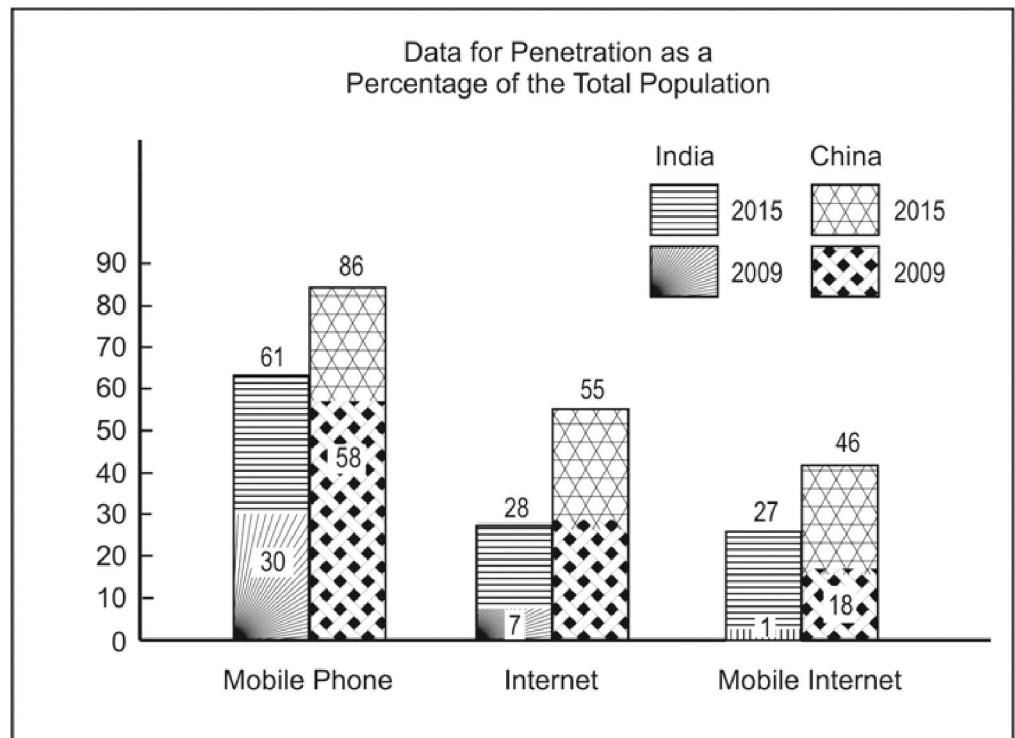


Figure 4.3: India: Mobile-Internet Country.

Source: McKinsay Quarterly.

The Broadband Policy announced on October 14, 2004 aims to target 20 million broadband subscribers and 40 million Internet subscribers. The prime consideration guiding the policy includes affordability and reliability of broadband services, incentives for creation of additional infrastructure, employment opportunities, induction of latest technologies, national security and bringing in a competitive environment to reduce regulatory interventions.

4.11 ENERGY RESOURCES IN INDIA

The need for energy in a developing economy can hardly be over-emphasised. It is basic input required to sustain economic growth and to provide basic amenities of life to the entire population of a country. It is energy which is the dividing line

between a subsistence economy and a highly developed economy. In the affluent United States, an average American consumes nearly 40 times as much energy as an Indian does in our country. (Annual consumption of commercial energy in kilograms of oil equivalent per capita in India is estimated at 513 as against 7,943 in the USA). Empirically, it has been established that “inadequate supplies of energy can inhibit development and that assurance of an adequate supply and mix of energy inputs can be a great stimulus to development.”

India with installed capacity of 147.0 mn.kw, is the fifth largest producer of electricity in the world, behind USA, China and Russia. Energy in India is produced from different sources; these can be classified into two groups:

- i) Commercial sources — like thermal power, hydel power, power from oil, gas, nuclear, etc.
- ii) Non-commercial sources — like firewood, dung-cakes, etc.

Of the two sets of sources, commercial sources occupy a more prominent position. Thermal power accounts for about 81 per cent, hydro power for about 13 per cent, and nuclear for about 3 per cent. The bulk of the commercial energy is consumed in the industrial sector followed by the transport and household sectors whereas a large part of the energy requirement in the rural and domestic sectors is met from non-commercial sources. It is expected that the relative share of non-commercial energy will fall still further over the next decade. By that time, energy requirements of the economy would also multiply by two to six times depending upon the rate of growth of the economy. Even if India achieves only an annual average rate of growth of 5 per cent, the per capita consumption of energy would multiply by about 2.5 times. It, therefore, becomes crucial to identify the sources of commercial energy.

4.11.1 Energy Problem in India

By ‘energy problem’ we mean the problem of providing fuels or energy in its various forms at reasonable cost to those who need them wherever they are. At present, India faces an energy shortage of 10.1 per cent and a peak load shortage of 13.3 per cent. Given the estimated elasticity coefficient at 0.95, an annual 9 per cent growth in GDP would translate into 7.6 per cent annual growth in electricity. In order to meet that demand, our power generation capacity would have to increase more than six times by the year 2032.

That the overall energy scene is none-too-happy is evident from the reduced level of self-sufficiency in oil, the yawning gap between power demand and supply, the declining share of hydel power in total power generation, the increasing dependence on coal imports and the insignificant commercialisation of non-traditional sources of energy.

4.11.2 Energy Policy

For a healthy development of the power sector, the following objectives have to be met:

- 1) Minimise investment costs to enable better utilisation of available financial resources;
- 2) Minimise net outflow of resources, especially foreign exchange;

- 3) Minimise costs of energy production to bring about economies in power supply and keep power tariff at affordable levels without having to resort to heavy and unsustainable subsidisation;
- 4) Maximise security of power supply and insulate from external and international events and catastrophe.

In pursuance of these objectives, the various measures taken by the State can be divided in two parts, viz., (a) energy pricing measures, and (b) non-pricing measures.

Pricing Measures: Policies adopted in India have generally aimed at the following:

- i) Meeting the maximum energy needs of low income consumers;
- ii) Encouraging the shift from oil products to domestically produced fuels;
- iii) Providing pricing subsidies to sectors such as agriculture and specific industries where energy prices for consumers were held down in order to provide enough margin between output price and the costs of inputs;
- iv) Prices should be left to be determined by administrative order. This should also promote rational use and conservation of energy.

The overall trend is towards greater efficiency in pricing and recent pricing decisions have certainly passed on the burden of increased import prices fully and, by and large, equitably to all categories of producers.

Non-price Measures: Non-price measures instituted immediately after the first oil price shock relied largely on allocation measures.

- i) The government concentrated immediately on substitution of heavy fuel oil (furnace oil) by coal whenever this was technically feasible.
- ii) Efforts have also been made towards regulation and management of energy demand, as also to improve the efficiency of energy use in different sectors of the economy.
- iii) On the supply side, efforts have been intensified for larger production of both crude oil and refined products, as also of alternative sources of energy, both conventional and non-conventional.
- iv) The other important steps have been:
 - Improving the existing utilisation of assets.
 - Reducing the transmission losses.
 - Add power generation through private sector.
 - Low voltage equipment sales are largely to industrial sector and public utilities in India. Growth of low voltage equipment industry is related to: (a) level of investment in the power sector and availability of electricity in India, and (b) level of investments and growth in the industrial sector in India.
- v) In 2002, the Accelerated Power Development and Reform Programme was launched. It has since become the focal point of reforms in the distribution segments.

- vi) Power Grid Corporation is implementing the National Power Grid Project; the project is estimated to cost Rs. 80,000 crores and is scheduled to be completed by 2012. Under this project, all the existing power grids will be joined to form a national grid; this will be accessible from any point in the country. It will shift excess power to power-deficit States.
- vii) In early-2004, India Power Fund (IPF) was launched with the aim to:
 - facilitate expeditious financial closure of power projects.
 - accelerate investment in power sector.
 - promote competition in line with Electricity Act, 2003.

An integrated energy policy should focus on relative prices of fuels based on calorific value, conversion efficiency, storage, transportation and pollution potential. Rationalisation of tax and duty structure and promoting energy efficiency in the entire energy value chain are also needed to be addressed.

4.11.3 Energy and Private Investment

The aim of recent economic reforms is to attract private investment, both domestic and foreign, in the field of energy.

- 1) Under the liberalised environment.
 - i) The private sector units can set up coal/ lignite or gas-based thermal, hydel, wind, solar energy project of any size.
 - ii) The private sector can set up units either as licensees distributing power in a licensed area from own generation or purchased power or as generating companies, generating power for supply to the grid.
 - iii) New licences can be issued by the State Governments to interested private companies through competitive bidding.
 - iv) Captive power plants set up by private enterprises will be permitted to sell or supply surplus power to SEBs.
 - v) Projects with an investment of less than Rs. 25 crore exempted from normally mandatory CEA clearance.
 - vi) 100 per cent FDI through automatic route has been allowed in gas pipelines.
 - vii) Ten ultra mega power projects (UMPPs) are being launched. Each UMPP will have a capacity of 4,000 MW. The UMPPs are a special initiative of the government to bridge the demand-supply gap with private participation through tariff-based competitive bidding.
- 2) A package of incentives is offered to investors as follows:
 - i) All private companies entering the electricity sector hereafter will be allowed to maintain a debt-equity ratio of 4 : 1. They will be permitted to raise up a minimum of 20 per cent of the total outlay through public issues. Promoter's contribution should be at least 11 per cent of the total outlay. Not more than 40 per cent of the total outlay can come from the Indian public sector financial institutions.

- ii) For both licensees and generating companies, up to 100 per cent foreign equity participation can be permitted for projects set up by foreign private investors. With the approval of the government, import of equipment for power projects will also be permitted in cases where foreign suppliers or agency(ies) extend concessional credit.
- iii) Generating companies can sell power on the basis of a suitably structured two-part tariff.
- iv) The specific incentives for licensees include: (a) Licences for a longer duration of 30 years in the first instance and subsequent renewals of 20 years, instead of the previous 20 and 10 years respectively; (b) higher rate of return of 5 per cent in place of the previous 2 per cent above the RBI rate; (c) capitalisation of interest during construction at actual cost as against the previous 1 per cent over the RBI rate; (d) special appropriations to meet debt redemption obligation; and (e) exemption granted from the provisions of the MRTP Act.
- v) A guaranteed return of 16 per cent—foreign investors will get it in dollars.

Private sector participation is also being allowed in renovation and modernisation of hydro and thermal power projects. For this purpose, detailed guidelines were announced on October 29, 1995. These guidelines envisage three options which include (i) lease, rehabilitate, operate and transfer (LROT), (ii) sale of plant, and (iii) joint venture between SEBs and private companies.

4.11.4 Integrated Energy Policy

Towards the end of 2008, the Planning Commission approved the Integrated Energy Policy. Two critical elements of the policy are (i) that the price of all energy from all sources must be determined by markets and (ii) that sources should be taxed differentially based on their negative externalities, mainly contributions to local and global pollution.

The immediate implication of this is that subsidies on all energy sources should cease. Consumers should pay what it costs to supply energy in a competitive market situation as well as for the damage that they do to the environment as a result of their consumption. If implemented in the letter, this will immediately raise the prices of some of the petroleum products, which are currently subsidised, including, LPG and kerosene. It will also lower the price of petrol relative to diesel, since the two currently bear differential taxes. While the policy does not call for a complete end to subsidies, it does favour limiting their scope through better targeting.

Check Your Progress 3

- 1) Review the importance and present position of the energy sector in the Indian economy.

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- 2) “Overall energy scene is none-too-happy.” Comment.

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- 3) Bring out the important elements of the integrated energy policy in India.

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4.12 SUGGESTIONS TO DEVELOP INFRASTRUCTURE

India has never lacked in intent on infrastructure front, but has often messed up the implementation. A sum of \$ 1 trillion is proposed to be spent on infrastructure development during the Twelfth Five-Year Plan. This will form 9.95 per cent of the GDP.

Following suggestions can be made to accelerate the growth of infrastructure:

- 1) *Annual Infrastructure Budget*: Just as in case of railways, an annual policy, progress and accountability statement is required for other areas, as roads, ports, power and airports. These areas will begin to invite focus and attention.
- 2) *Establishment of Infrastructure Investment Promotion Board*: Along the lines of the Foreign Investment Promotion Board, this body can identify some infrastructure projects of national importance, ensure that land environmental clearances are ready, release and help mobilise funds, set a deadline, review progress every quarter and provide regular updates on implementation to the nation.
- 3) *Setting Up of Domestic Economic Zones (DEZs)*: These could be set up along the lines of the SEZs. They should enjoy all the benefits that SEZs do today.
- 4) *Independent Regulatory Authorities*: Independent regulators with authority over government bodies and private companies will greatly enhance the latter’s comfort to invest. The regulator should not only monitor the projects, but also take care of the interests of the consumer of infrastructure services.
- 5) *More PSUs to Carry out Major Infrastructure Projects*: Presently, there are few institutions that can actually convert fiscal devolution into projects on the ground. The government needs to create many more such institutions.
- 6) *Public-Private Partnership in Rural Infrastructure*: The PPP model has accelerated development in roads and highways. The model can be easily applied to rural infrastructure projects such as irrigation canals, mandies, cold storages and rural roads.

- 7) *Mass Transit System in 20 Top Cities*: City-specific mass transit system can improve productivity.
- 8) *Energise PSUs in Inland Waterways and Highways*.

4.13 LET US SUM UP

Infrastructure covers those supporting services that help the growth of directly productive activities like agriculture and industries. Most infrastructure services are non-tradable. For these reasons, the stock of infrastructure services may not be readily augmented through imports as in the case of other goods and services. Therefore, for rapid growth it is imperative, that the rate of growth of infrastructure keeps with the growth of productive activities. The Indian economy, at the present juncture, is at crossroads. Inadequate infrastructure, as it is, is already posing a challenge to policy-makers and planners. For infrastructure growth, besides resources, a proper policy framework is required to be developed. The policy may invite coordinated participation both by government agencies and private sector enterprises.

4.14 EXERCISES

- 1) “The aim of recent economic reforms is to attract private investment, both domestic and foreign, in the field of energy.” Elaborate.
- 2) Bring out the principal features of the new policy on private investment in Indian Railways.
- 3) What policy measures have been taken to promote private investment in the road sector in India?
- 4) Highlight the important features of the present state of telecommunication sector in India.

4.15 KEY WORDS

Infrastructure	: The stock of fixed capital equipment in a country, including power plants, roads, schools, etc., considered as a determinant of economic growth.
Physical Infrastructure	: It is directly concerned with the needs of such production sectors as agriculture, industry, trade, etc.
Social Infrastructure	: It is concerned with the supply of such services as meet the basic needs of a society like health services, drinking water, sewerage, sanitation, electricity, education facilities etc.
Hard Infrastructure	: It refers to the large physical networks necessary for the functioning of a modern industrial nation.
Soft Infrastructure	: It refers to all the institutions which are required to maintain the economic health, and cultural and social standards of a country.

4.16 SOME USEFUL BOOKS

Dhingra Ishwar C. (2012): *The Indian Economy, Environment and Policy*, Sultan Chand, New Delhi.

Asian Development Bank (2009): *Energy Infrastructure*.

Kaushik Basu (ed.) (2010): *The Oxford Companion to Economics in India*, New Delhi.

Nasser Munjee (ed.): *India Infrastructure Report*, Oxford, New Delhi.

4.17 ANSWERS OR HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

- 1) See Section 4.1
- 2) See Sub-section 4.2.1
- 3) See Sub-section 4.2.2
- 4) See Sub-section 4.2.3
- 5) See Sub-section 4.2.3

Check Your Progress 2

- 1) See Sub-section 4.3.1
- 2) See Sub-section 4.3.2
- 3) See Section 4.5

Check Your Progress 3

- 1) See Section 4.11
- 2) See Sub-section 4.11.1
- 3) See Sub-section 4.11.4