Infrastructure Development in India: Where are We Moving

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Abstract:
There is positive linkage between infrastructure development and infrastructure development. The full potentials of economic development cannot be unleashed without development of adequate infrastructure, both physical and social. According to many commentators, India could unleash its full potentials, provided it improves the infrastructure facilities, which are at present not sufficient to meet the growing demand of the economy. In this context present paper intend the present the status report of India in global map. Paper also covers the performance of major infrastructure sector over a period of time.

Keywords: *infrastructure, global competitiveness index, five year plan*

1. Introduction

The Oxford dictionary of economics defines infrastructure as the capital equipments used to produce publicly available services including transportation and communication and gas, electricity and water supplies. Theses provides an essential background for other economic activities in modern economies, the fact that they are not available or reliable is characteristics of less developed countries, and handicaps their development. Infrastructure services are generally either provided or regulated by the state[1]. World Bank in its "World Development Report 1994" pointed out that productivity growth is higher in countries with an adequate and efficient supply of infrastructure services. Provision of infrastructure services to meet the demands of business, households and other users is one of the major challenges of economic development.

India is the fourth largest economy in the world. However, one factor which is a drag on its development is the lack of world class infrastructure. In fact, estimates suggest that the lack of proper infrastructure pulls down India's GDP growth by 1-2 per cent every year. (Geethanjali Nataraj). Physical infrastructure has a direct impact on the growth and overall development of an economy. But, the fast growth of the Indian economy in recent years has placed increasing stress on physical infrastructure, such as electricity, railways, roads, ports, airports, irrigation, urban and rural water supply, and sanitation, all of which already suffer from a substantial deficit. In fact, analysts suggest that infrastructure bottlenecks prune gross domestic product (GDP) by at least 2 percent annually (Infrastructure 2013).

According to many commentators, India could unleash its full potentials, provided it improves the infrastructure facilities, which are at present not sufficient to meet the growing demand of the economy. Failing to improve the country's infrastructure will slow down India's growth process. Therefore, Indian government's first priority is rising to the challenge of maintaining and managing high growth through investment in infrastructure sector, among others (De, P. (2008).

[1] Oxford Dictionary of Economics

Planning Commission of India has projected an investment of US$1 trillion for the infrastructure during 12th Five Year Plan (2012-2017). Government of India too has played a positive and significant role in the development of infrastructure allowing 100 percent foreign direct investment under automatic route for port development projects.

Infrastructure problems were not the central focus of policy when the reforms began in mid-1991……. Besides, infrastructure was not a significant constraint on short-term economic performance at die start of the reform programme because there was slack in the system with considerable scope for expanding supplies of infrastructure services in the short run through better utilization of existing capacity (Montek S. Ahluwalia).

After more than six decade of planning process and more than two decade of reform process, it is essential to take the stock of the situation of infrastructure development in India. It is necessary to check the growth rate in various fields of infrastructure development. Covering all infrastructure sectors will be beyond the scope of the paper. Paper primary attempts to cover major infrastructure sector viz. railways, roads, and electricity. Major focus is to take the stock of present situation and compare the growth over a period of pre and post reform period to test the impact of reform in growth of infrastructure development in India.

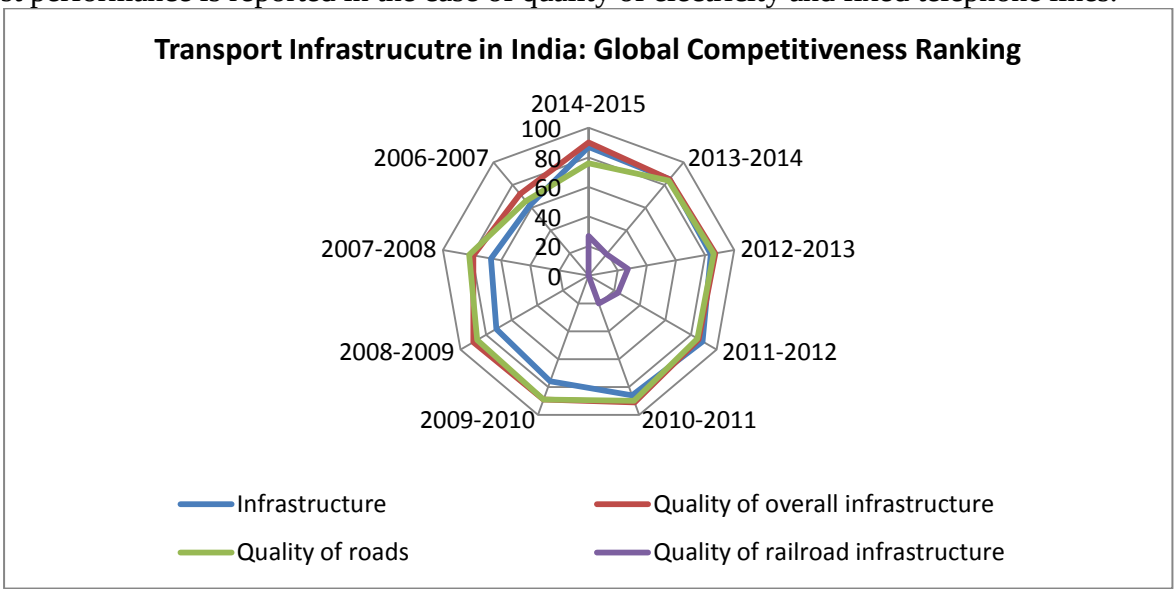
2. Infrastructure in India: Global Context

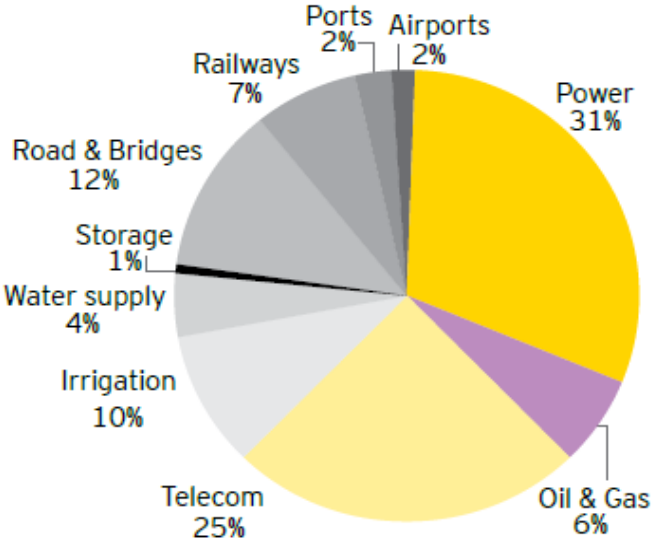
Before we proceed with the taking stock of infrastructure in India, it is advisable check the status of infrastructure in India in global context. Where do we stand in global context when it comes to infrastructure?

As reported by World Economic Forum extensive and efficient infrastructure is critical for ensuring the effective functioning of the economy, as it is an important factor in determining the location of economic activity and the kinds of activities or sectors that can develop within a country. Well-developed infrastructure reduces the effect of distance between regions, integrating the national market and connecting it at low cost to markets in other countries and regions. In addition, the quality and extensiveness of infrastructure networks significantly impact economic growth and reduce income inequalities and poverty in a variety of ways. A well-developed transport and communications infrastructure network is a prerequisite for the access of less-developed communities to core economic activities and service. Infrastructure has been recognized as second pillar with 25 percent weight in Global Competitiveness Index which speaks of it importance. Within infrastructure 50 percent weight is given to transport infrastructure and 50 percent weight to electricity and telephony infrastructure. Various parameter included in transport infrastructure include quality of overall infrastructure, quality of roads, quality of railroad infrastructure, quality of port infrastructure, quality of air transport infrastructure, and available airline seat kilometers. Similarly electricity and telephony infrastructure include quality of electricity supply, mobile telephone subscriptions, and fixed telephone lines.

Infrastructure In India: Global Competitiveness Index Ranking										
Year	Infrastructure	Transport Infrastructure						Electricity and Telephony Infrastructure		
		Quality of overall infrastructure	Quality of roads	Quality of railroad infrastructure	Quality of port infrastructure	Quality of air transport infrastructure	Available airline seat	Quality of electricity	Mobile telephone	Fixed telephone lines
2014-2015	87	90	76	27	76	71	12	103	121	118
2013-2014	85	85	84	19	70	61	13	111	123	118
2012-2013	84	87	86	27	80	68	13	110	116	118
2011-2012	89	86	85	23	82	67	12	112	117	113
2010-2011	86	91	90	20	83	71	12	110	118	110
2009-2010	76	89	89	-	90	65	10	106	116	103
2008-2009	72	90	87	-	93	66	10	108	115	107
2007-2008	67	79	82	-	80	61	10	106	114	102
2006-2007	62	72	66	-	69	51	12	94	106	97

It can be seen from the table that India's rank in terms of infrastructure has not improved over a period of time. India was ranked 62 as per Global Competitiveness Index report 2006-07 which declined to 87 during Global Competitiveness Index Report 2014-15. The performance of India in various parameter of infrastructure is also presented in table above and charts below. It can be seen that India's rank has deteriorated in almost all the parameters of infrastructure. Further among various parameters poorest performance is reported in the case of quality of electricity and fixed telephone lines.

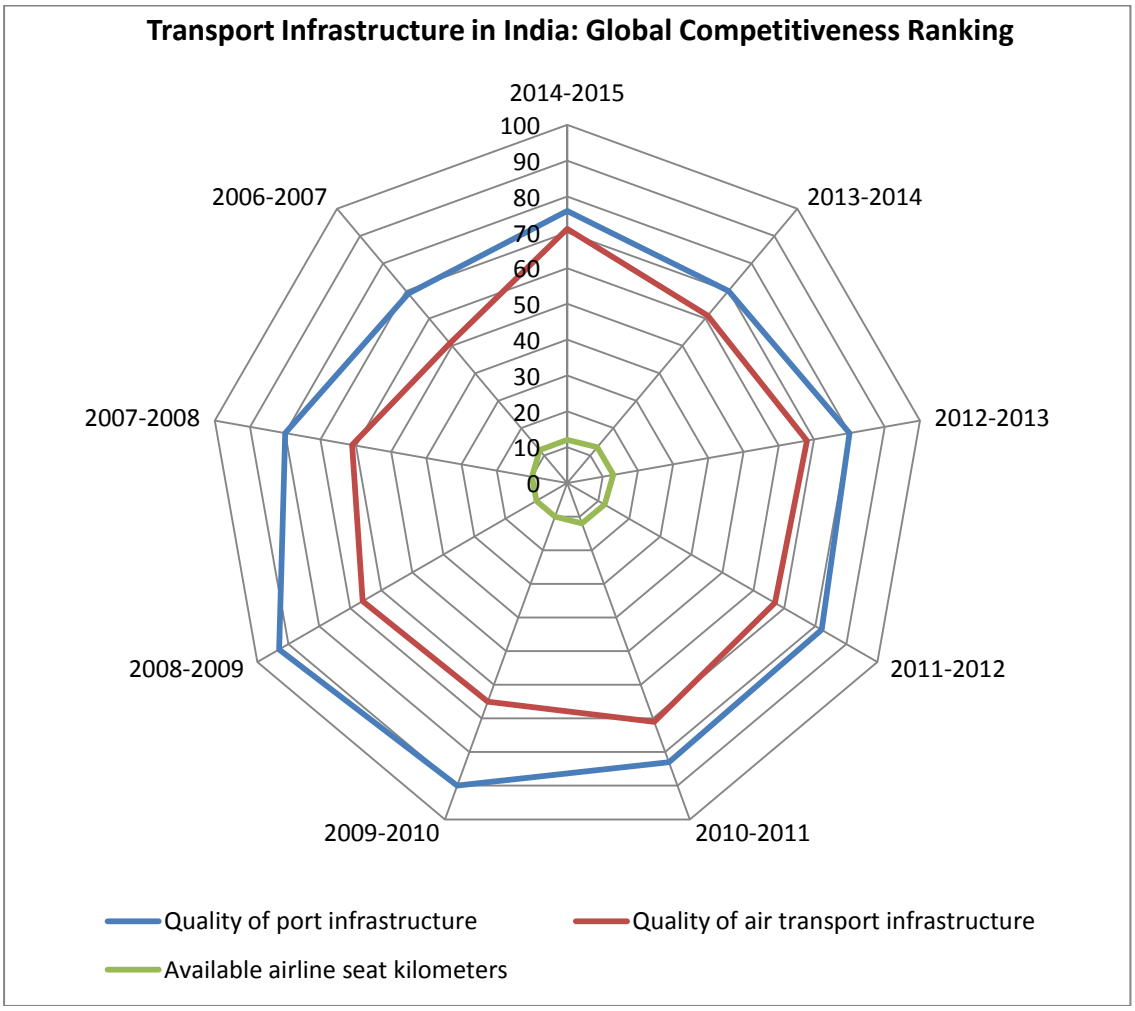


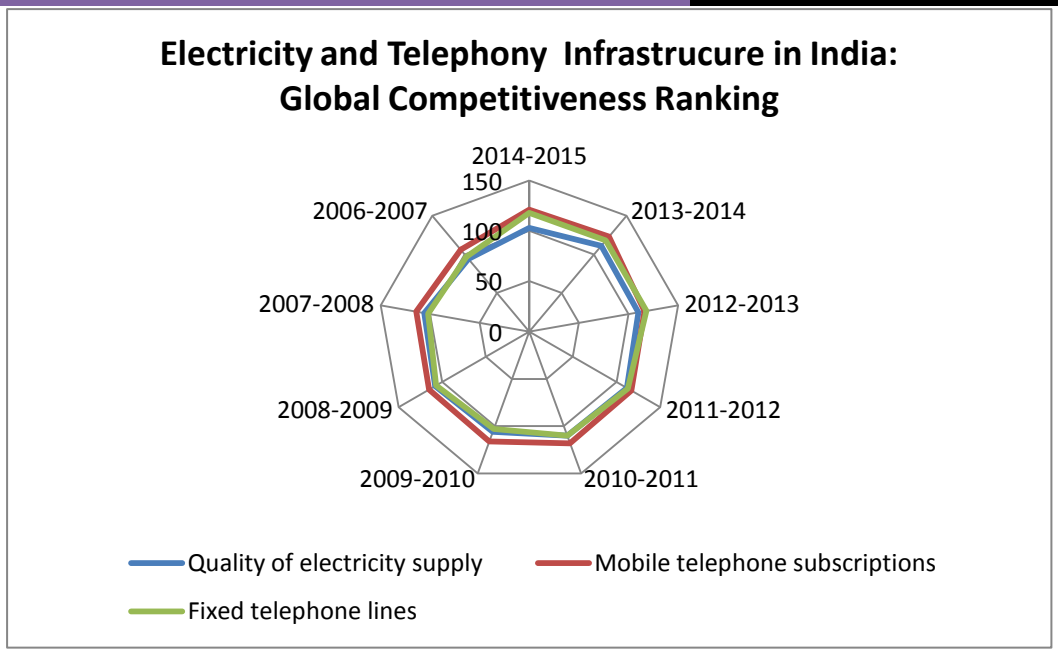


Source: Twelfth Five Year Plan approach paper and Planning Commission

Infrastructure in India and 12th Five Year Plan

Infrastructure has been on the top of the agenda for government of India. It has been realized that infrastructure development is key to economic development. Macroeconomics issues related production, unemployment, urbanization, income in-equality, poverty, industrialization, agriculture development etc.





can easily be tacked with the development of infrastructure. Infrastructure has been given special emphasis in planning process. Efficient and widespread infrastructure is an essential component for country's economic growth. In recent years India is consistently increasing infrastructure spending. Indian government is also offering various incentives such as liberlisation of FDI norms; tax holidays to mobilize resources from domestic as well as foreign sources. Currently India's infrastructure spending is 8% of GDP which is required to augment further to sustain economic growth.

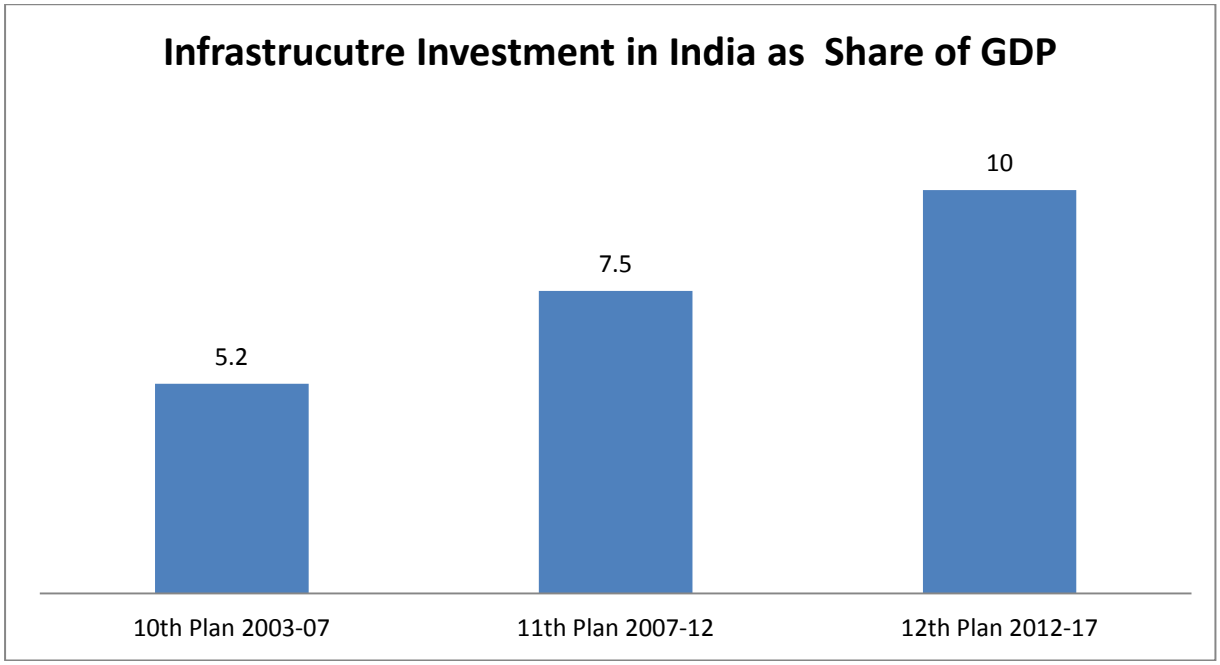
The Twelfth Plan must continue the thrust on accelerating the pace of investment in infrastructure, as this is critical for sustaining and accelerating growth. Public investment in infrastructure will have to bear a large part of the infrastructure needs in backward and remote areas to improve connectivity and expand the much needed public services. Since resource constraints will continue to limit public investment in infrastructure in other areas, PPP-based development needs to be encouraged wherever feasible. It is necessary to review the factors which may be constraining private investment, and take steps to rectify them. PPP, with appropriate regulation and concern for equity, should also be encouraged in the social sectors, such as health and education (Planning Commission, GOI). Indian infrastructure sector is going through a significant transformation. Investment in infrastructure is envisaged to be doubled to US$1 trillion during the Twelfth Five Year Plan and about half of this is targeted to be achieved through private sector investment. The share of infrastructure investment in GDP is planned to be increased to more than 10% by the end of the Twelfth Plan. The proposed share of each sector within infrastructure is presented in figure below.

Government of India is planning to increase investment in infrastructure to support the growth momentum. Infrastructure investment as a share of India's GDP has increased from 5.2 percent during 10^{th} plan period to projected level of 10 during 12^{th} five year plan period. Among various sectors 12^{th} five year plan target power sector (31 percent) telecom (25 percent) and roads (12 percent) and irrigation (10 percent).[2]

The Government, on its part, has set the huge target of doubling investment in infrastructure from INR 20.5 trillion to INR 40.9 trillion during the Twelfth Plan period[3]. This investment, if it materializes, can propel India's economic growth to a higher trajectory. While the overall investment in the

[2] Infrastructure 2013: Global Priorities and Global Insights, Urban Land Institute and Ernst Young
[3] India Infrastructure Summit 2012, FICCI

infrastructure sector over the last five years has met the target, it has been lopsided, with the major share invested in the Telecom and the Oil & Gas sectors. Other critical infrastructure segments, including roads, railways and ports, have witnessed a shortfall in actual investments. The gap in terms of physical achievement of infrastructure projects is more perceptible than that in investment gap continues to be a major concern. Moreover, physical achievements have not matched the aggressive investment targets set in previous Five Year Plans. Projects are delayed due to multiple factors, leading to time and cost overruns. Their track record can be gauged from the fact that only a quarter of the total number of infrastructure projects has been commissioned on their scheduled dates in India. Bridging this growing backlog and additional requirements will put a strain on resources.



3. Performance of Major Infrastructure Sector

The performance of major infrastructure sector in India is given in table below;

Sector	Growth In %				
	FY08	FY09	FY10	FY11	FY12 (April-Dec.)
Power	6.3	2.5	6.8	5.7	9.3
Railway revenue-earning freight traffic	9.0	4.9	6.6	3.8	4.7
Cargo handled at major ports	12.0	2.2	5.7	1.6	0.4
Civil Aviation					
Export cargo handled	7.5	3.4	10.4	13.4	-1.1
Import cargo handled	19.7	-5.7	7.9	20.6	1.4
Passengers handled at international terminals	11.9	3.8	5.7	11.5	7.2
Passengers handled at domestic terminals	20.6	-12.1	14.5	16.1	17.5
Telecommunication					
Cell Phone Connections	38.3	80.9	47.3	18.0	-51.0
Roads: Up gradation of Highways *					
NHAI	164.6	30.9	21.4	-33.3	8.9
NH(O) & BRDB	12.5	17.3	4.0	-6.8	-36.5

** Includes Widening to four lanes & two lanes and Strengthening of existing weak pavement only.*
Notes: NH (O) stands for National Highways Organization and BRDB for the Border Roads Development Board (BRDB).
Source : Ministry of Statistics and Programme Implementation (MOSPI)

3.1 Railways

Indian Railways is the fourth largest railway network in the world in terms of route kilometers. As on 31 March 2011, it has a total route length of 64,460 km of which 1,034 km is electrified. The total track length is 1,13,994 km of which 1,02,680 km is broad gauge, 8,561 km is meter gauge and 2,753 km is narrow gauge[4]. In spite of such s huge network of lines, considering the requirements of the economy and size of the country, the expansion of the railway network has been inadequate. Indian Railways has not been able to cover major areas in many states and has very little presence in the North-East States and the Himalayan region. The network needs extensive modernization, increase of speeds, improvement in safety and modernization of rolling stock to meet the needs of a rapidly growing economy.

Twelfth five year plan has major objective of more inclusive and sustainable growth which requires Indian Railways to meet the expanding requirements of the economy through much faster expansion of the freight network along with its ability to carry larger freight per wagon, improve efficiency of the Rail system to deliver it faster and expand the network. There will also be need to improve the share of the Railways in the overall national freight market. With increasing incomes, passenger traffic will increase but plan for expansion must factor in the fact that demand will be for better quality services for which passengers will be willing to pay.

3.1.1 Indian Railways in Global Context

The comparison of India with some of other major countries in terms of yield per kilometer is presented in table above. It is clearly evident that Indian passenger tariffs are one-fourth of China and are one-ninth of Russia. They are nearly one-twentieth of Japan. Even in Purchase Price Parity terms, the tariffs bear no comparison. In terms of freight rates, however, the Indian freight rates are the highest whereas those of China, Russia and the USA are 58 per cent, 75 per cent and 51 per cent of the Indian rates adjusted for PPP. Even in nominal terms, Chinese freight rates are only around 72 per cent of the Indian fright rates. The low passenger fares, which have not been revised for several years, have led to huge losses in passenger traffic operations estimated at `22,000 crore in 2011–12. Unless the trend is arrested by rationally linking passenger fare to input costs, the Railways will be out priced in the freight market and would find it unsustainable to run the Railway operations.

Passenger Service Yields in some Major Economies

Country	Passenger Service Yield US Cents/ Passenger-KM at nominal prices	Passenger Service Yield US Cents/Passenger-KM adjusted for PPP (India=1)
India	0.6	1.0
China	2.4	2.7
Russia	5.2	6.7
Japan	19.0	9.4
Germany	12.6	6.2

Source: World Bank (2012): Railways International Overview: Issues for India.

Government of India is constantly attempting to modernize Railways and to convert it from loss making to profit making units contributing to nation building. Numerous reports have been presented related to the rail sector. The Indian Railways Expert Committee Report (2001) recommended significant organizational changes including corporatization of the Indian Railways and a new investment programme to achieve high traffic and revenue growth along with improvement in safety performance. Indian Railway's Vision 2020 (2009) is an aspirational plan which charts out a growth of 10 per cent for the Railways over the next 10 years by developing a sharper commercial focus with strong social commitment. Recently in February 2012, two more reports have been submitted. The Expert Group on modernization of Indian Railways (Pitroda Committee) has unequivocally stated that Indian Railways are in urgent need of modernization and generational change to ensure safety,

[4] 12th Five Year Plan, GOI

improve productivity, take advantage of advances in technology and respond to ever increasing demand in order to meet the inclusive growth aspirations of the country. The High Level Safety Review Committee (Kakodkar Committee) was also presented in February 2012. All these reports have recommended organizational reforms in the Railways. Operations of Indian Railways since 1950-51 are presented in table below.

Operations of Indian Railways 1950-51 to 2010-11

	1950-51	1960-61	1970-71	1980-81	1990-91	2000-01	2006-07	2007-08	2008-09	2009-10	2010-11[Pb]
1	2	3	4	5	6	7	8	9	10	11	12
1. Route Kilometres (000's)											
Electrified	0.4	0.8	3.7	5.4	10.0	14.9	17.8	18.3	18.6	18.9	19.6
Total	53.6	56.2	59.8	61.2	62.4	63.0	63.3	63.3	64.0	64.0	64.4
2. Originating traffic (million tonnes)											
Revenue Earning	73.2	119.8	167.9	195.9	318.4	473.5	727.8[a]	793.9[a]	833.4[a]	887.8[a]	921.7[a]
Total Traffic	93.0	156.2	196.5	220.0	341.4	504.2	744.6[a]	804.1[a]	836.6[a]	892.2[a]	926.4[a]
3. Goods carried (billion tonne km.)											
Revenue Earning	37.6	72.3	110.7	147.7	235.8	312.4	481.0[a]	521.4[a]	551.4[a]	600.6[a]	625.7[a]
Total Traffic	44.1	87.7	127.4	158.5	242.7	315.5	483.4[a]	523.2[a]	552.0[a]	601.3[a]	626.5[a]
4. Earnings from goods carried (₹ crore)	139.3	280.5	600.7	1550.9	8247.0	23045.4	41073.2[a]	46425.5[a]	51749.3[a]	56937.3[a]	60687.1[a]
5. Average Lead: all goods traffic (km)	470.0	561.0	648.0	720.0	711.0	626.0	649.0	651.0	660.0	674.0	676.0
6. Average rate/ tonne km. (paise)	3.2	3.9	5.4	10.5	35.0	73.8	85.4	89.0	93.8	94.8	97.0
7. Passengers Originating (million)[b]	1284.0	1594.0	2431.0	3613.0	3858.0	4833.0	6219.0	6524.0	6920.4	7245.8	7651.1
8. Passengers kilometers (billion)	66.5	77.7	118.1	208.6	295.6	457.0	695.0	770.0	838.0	903.5	978.5
9. Passengers Earnings (₹ crore)	98.2	131.6	295.5	827.5	3144.7	10515.1[c]	17224.6[c]	19844.2[c]	21931.32[c]	23488.2[c]	25792.6[c]
10. Average lead: passenger traffic (km)	51.8	48.7	48.6	57.7	76.6	94.6	111.7	118.0	121.1	124.7	127.9
11. Average rate per passenger-kilometre (paise)	1.5	1.7	2.5	4.0	10.6	22.9	24.7	25.7	26.1	25.9	26.3

Source : Ministry of Railways
[P] Provisional
[a] Excluding Konkan Railways Corporation Limited loading.
[b] Excluding Metro Kolkata.
[c] Includes Metro Railway/Kolkata's earnings

3.2 Roads

Road transport is vital to the economic development and social integration of the country. Easy accessibility, flexibility of operations, door-to-door service and reliability have earned road transport an increasingly higher share of both passenger and freight traffic vis-à-vis other transport modes. India has one of the largest road networks in the world, consisting of national highways, state highways, major district roads and rural roads that include other district roads and village roads. The national highways with a length of 76,818 km comprise only 2.0 per cent of the road network but carry 40 per cent of the road based traffic. The state highways and the major district roads together constitute the secondary system of road transportation which contributes significantly to the development of the rural economy and industrial growth of the country. The secondary system also carries about 40 per cent of the total road traffic, although it constitutes about 13 per cent of the total road length. At the tertiary level are the other district roads (and the rural roads. These, once adequately developed and maintained, hold the potential to provide rural connectivity vital for generating higher agricultural incomes and productive employment opportunities besides promoting access to economic and social services. Twelfth five year plan has also noticed that India's transport sector is grossly overstretched. The pace of economic development after the economic reforms has imposed a heavy burden on this sector[5]. The road transport sector in India has expanded manifold in more than fifty years after independence, both in terms of spread (total road length & road density) and capacity (No. of registered vehicles on road and the volume of passenger and freight traffic handled).

[5] 12th Five Year Plan

The modal growth rates have varied with road transport growing at a much higher rate compared to other competing modes like inland water, railways and air transport despite significant barriers to inter-State movement of freight and passenger by road.

Operations of Road Transports

	Unit	1950-51	1960-61	1970-71	1980-81	1990-91	2000-01	2006-07	2007-08	2008-09	2009-10
1	2	3	4	5	6	7	8	9	10	11	12
1. Length of roads	(Thousand km)										
Total #		399.9	524.5	914.9	1485.4	2331.1	3373.5	4016.4	4109.6	na	na
Surfaced		157.0	263.0	398.0	684.0	1091.0	1601.7	1944.8	2036.1	na	na
2. Length of national highways	(Thousand km)										
Total		19.8	23.8	23.8	31.7	33.7	57.7	66.6	66.8	na	na
Surfaced		na	21.0	23.3	31.5	33.4	57.7	66.6	66.8	na	na
3. Length of state highways	(Thousand km)										
Total		na	na	56.8	94.4	127.3	132.1	152.2	154.5	na	na
Surfaced		na	na	51.7	90.3	124.8	129.9	150.7	152.7	na	na
4. Number of registered vehicles	(Thousand)										
All vehicles		306.0	665.0	1865.0	5391.0	21374.0	54991.0	96707	105353	114951	na
Goods vehicles		82.0	168.0	343.0	554.0	1356.0	2948.0	5119	5601	6041	na
Buses		34.0	57.0	94.0	162.0	331.0	634.0	1350	1427	1486	na
5. Revenue from road transport	(₹ crore)										
Central		34.8	111.7	451.8	930.9	4596.0	23861.0	54580.0	56758.2	53098.0	59345.3
States		12.6	55.2	231.4	750.4	3259.6	12901.7	21770.0	24025.8	34241.0	37733.5

The information about the operations of road transportation in India is presented in table above. It is evident from the table that the total length of roads has increased from 399.9 thousand km in 1950-51 to 2331.1 thousand km in 1990-91 ad further to 4109.6 km in 2007-08. The length of national highway has increased from 19.8 thousand km in 1950-51 to 66.8 thousand km in 2007-08. In terms of total number of registered vehicles, it changed from 306 thousand in 1950-51 to 21374 thousand vehicles in 1990-91 and further to 114951 thousand vehicles in 2008-09. Central revenue from road transport has increased from 34.8 crore to 4596 crore in 1990-91 to 59345.3 crore in 2009-10. During the same period state revenue from road transport has increased from 12.6 crore to 37733.5 crore.
In recent years special efforts have been made by the central government to strengthen the National Highway and also to improve rural road connectivity. Despite this, the road network remains grossly inadequate in various respects. It is unable to handle high traffic density and high speeds at many places and has poor riding quality. It is necessary to accelerate completion of ongoing projects, including expressways besides speedy implementation of the Golden Quadrilateral (GQ) and the North-South and East-West (NS-EW) corridors and also to address the deterioration of large stretches of the NHs.

Against an outlay of `1,92,428 crore in the Eleventh Plan for the road sector, the anticipated expenditure was `1,58,077 crore (at current prices). The Twelfth Plan budgetary support for Central Sector Roads is `1,44,769 crore. In addition, the sector is expected to generate IEBR amounting to `64,834 crore and private-sector investment of `2,14,186 crore during this period. 15.122. The Twelfth Plan budgetary support for Rural Roads (PMGSY) is `1,26,491 crore.

3.3 Energy and Power

Social and economic developments of mankind to great extent depend on the availability, consumption and technology in the area of energy. Energy is critical, directly or indirectly, in the entire process of evolution, growth and survival of all living beings and it plays a vital role in the socio-economic

development and human welfare of a country[6]. Energy has come to be known as a `strategic commodity' and any uncertainty about its supply can threaten the functioning of the economy, particularly in developing economies. Achieving energy security in this strategic sense is of fundamental importance not only to India's economic growth but also for the human development objectives that aim at alleviation of poverty, unemployment and meeting the Millennium Development Goals (MDGs)[7].

Energy exploration and exploitation, capacity additions, clean energy alternatives, conservation, and energy sector reforms will, therefore, be critical for energy security. Energy conservation has also emerged as one of the major issues in recent years. Conservation and efficient utilization of energy resources play a vital role in narrowing the gap between demand and supply of energy. Improving energy efficiency is one of the most desirable options for bridging the gap in the short term. During the Eleventh Five Year Plan, nearly 55,000 MW of new generation capacity was created yet there continued to be an overall energy deficit of 8.7 per cent and peak shortage of 9.0 per cent. Resources currently allocated to energy supply are not sufficient for narrowing the gap between energy needs and energy availability. Indeed, this may widen as the economy moves to a higher growth trajectory.

India's success in resolving energy bottlenecks therefore remains one of the key challenges in achieving the projected growth outcomes. Further, India's excessive reliance on imported crude oil makes it imperative to have an optimal energy mix that will allow it to achieve its long-run goal of sustainable development.

The trend in production of the primary sources of conventional energy such as coal, lignite, crude petroleum, natural gas, and electricity shows that in last four decades, i.e. from 1970-1 to 2010-11, the compound annual growth rate (CAGR) of production of coal, lignite, crude petroleum, natural gas, and electricity (hydro and nuclear) generation was 5.0 per cent, 6.1 per cent, 4.3 per cent, 9.1 per cent, and 4.0 per cent respectively (Figure 11.1). In terms of energy equivalent of all the primary energy sources in 2010-11, the share of coal and lignite, electricity (hydro and nuclear), and natural gas was 52 per cent, 28 per cent, and 11 per cent respectively.

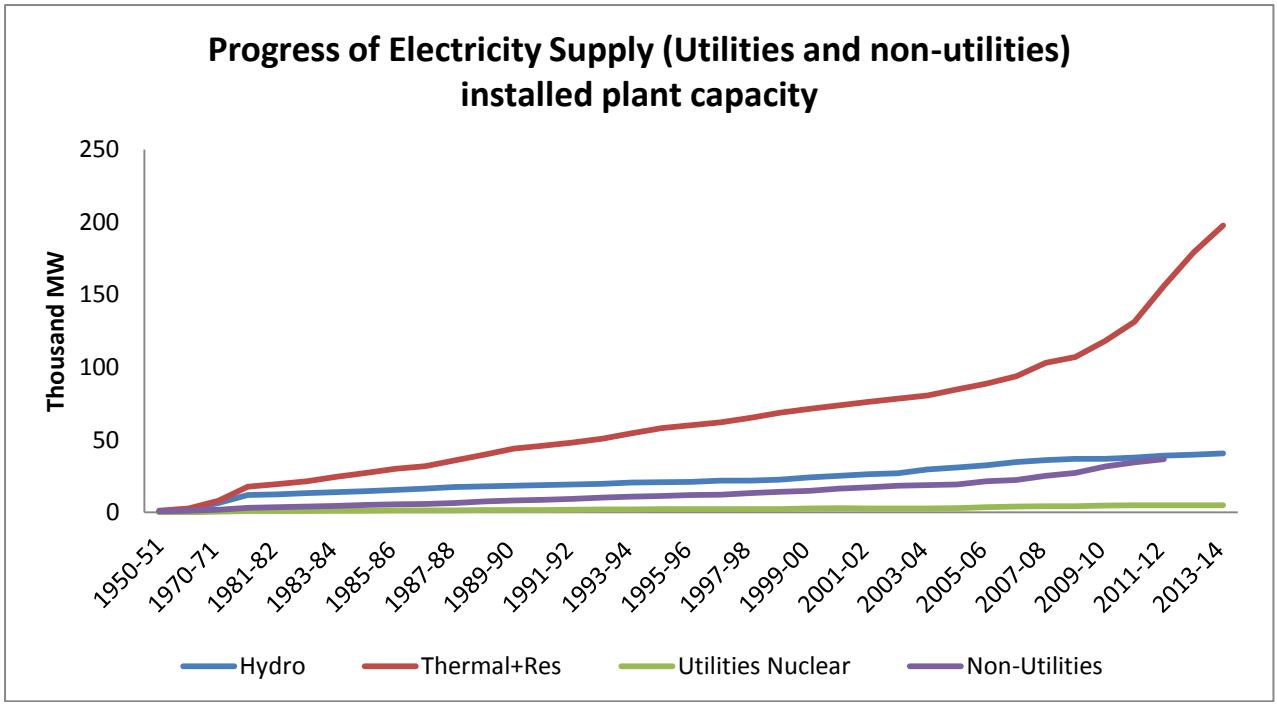
In 2011-12, India was the fourth largest consumer in the world of Crude Oil and Natural Gas, after the United States, China, and Russia. India's energy demand continued to rise inspite of slowing global economy. Petroleum demand in the transport sector is expected to grow rapidly in the coming years with rapid expansion of vehicle ownership. While India's domestic energy resource base is substantial, the country relies on imports for a considerable amount of its energy use, particularly for Crude Petroleum.

Trends in consumption of energy from conventional sources in India show that during the last four decades, i.e from 1970-1 to 2010-11, consumption of coal, lignite, crude oil in terms of refinery throughput, and electricity (thermal, hydro and nuclear) increased at a CAGR of 5.30 per cent, 6.05 per cent, 11.25 per cent, and 6.63 per cent respectively. Growth of total energy consumption from all conventional sources in terms of peta joules was 6.04 per cent during 1970-1 to 2010-11. Per capita energy consumption grew at an average annual rate of 5.30 per cent during this period. The elasticity of energy use (Kwh per rupee), defined as the amount of energy consumed for generating one unit of gross domestic production (GDP), has, however, been less than one. The consumption pattern of energy by primary sources expressed in terms of peta joules shows that electricity generation

[6] Energy Statistics 2013, CSO, Government of India
[7] Energy Statistics 2013, CSO, Government of India

accounted for about 51 per cent of the total consumption of all primary sources of energy during 2010-11, followed by coal and lignite (25 per cent) and crude petroleum (20 per cent).

Electricity generation by power utilities during 2012-13 was targeted to go up by 6.05 per cent to 930 billion units. The growth in power generation during April to December, 2012 was 4.55 per cent, as compared to about 9.33 per cent during April to December, 2011. 11.10 In the thermal category, growth in generation from coal, lignite, and gas-based stations was of the order of 13.90 per cent, 19.81 per cent, and (-) 25.49 per cent respectively. The overall plant load factor (PLF), a measure of efficiency of thermal power stations, during April to December 2012 declined to 69.63 per cent as compared to the PLF of 71.94 per cent achieved during April to December 2011.



The sector-wise and region-wise break-ups of the PLF of thermal power stations from 2009-10 to 2012-13 (April to December 2012) show change over time as well as regional variation. During the current year, while the PLF for central and state-sector utilities moderated, PLF for private sector utilities witnessed improvement. The PLF of state-sector utilities remained lower than that of private- and central-sector utilities. The deficit in power supply in terms of peak availability and total energy availability declined during the Eleventh Five Year Plan. While the energy deficit decreased from 9.6 per cent in the terminal year of the Tenth Plan (2006-7) to 8.7 per cent during April to December 2012, peak deficit declined from 13.8 per cent in 2006-7 to 9.0 per cent during the current financial year (up to December 2012)

A projection in the Twelfth Plan document of the Planning Commission indicates that total domestic energy production of 669.6 million tons of oil equivalent (MTOE) will be reached by 2016-17 and 844 MTOE by 2021-22. This will meet around 71 per cent and 69 per cent of expected energy consumption, with the balance to be met from imports, projected to be about 267.8 MTOE by 2016-17 and 375.6 MTOE by 2021-22.

3.4 Ports

The national economic development of India requires a well functioning seaport system. India has 12 major seaports and 185 minor seaports along a coastline of over 7.000 km. The 12 Major Ports handle some 75% of the total Indian port traffic. Due to the foreseen national economic development in the coming decades, a strong further growth of the Indian port sector is expected. To be able to cope with

the above, the Government of India not only decided to improve the seaport and hinterland infrastructure but also the institutional and organizational structure of the port sector[8].

Indian ports are dynamic nodes in the supply chain involving complex international production and distribution network. It is main route for international trade. Ports have become integrated transport centers providing logistic platform for international trade and also stimulate trade and regional development. Indian model of port development include land-lord port and private ports which provide opportunity for the private sector either to act as port operators especially at major ports and work as port developer at minor ports.

Cargo Traffic at Indian Ports: During the first half (April-September) of 2012-13 major and non-major ports in India accomplished a total cargo throughput of 455.8 million tonnes reflecting an increase of only 1.8 per cent over the same period of 2011-12. This is mainly attributable to a decline of 3.3 per cent in the cargo handled at major ports. In contrast, non-major ports' growth increased to 10.3 per cent in the first half of 2012-13 compared to 8.2 per cent in the corresponding period of 2011-12 (Table 11.9). During first six months of 2012-13, Ennore port recorded the highest growth in traffic (22.5 per cent) followed by Mumbai (8.0 per cent), Kandla (7.5 per cent), NMPT (4.3 per cent) and Cochin Port (3.9 per cent). Negative traffic handling was reported by Mormugao (-22.9 per cent) Haldia Dock Complex (HDC) (-17.9 per cent), Vishakhapatnam (-16.0 per cent), Paradip (-8.5 per cent), Chennai Port (-7.3 per cent) and Kolkata Dock System (KDS) (-7.8 per cent)[9].

Traffic Handled at Indian Ports (Thousand Tonnes)

Major/Non-Major Ports	Traffic Handled				Growth over previous year/period			
	2010-11	2011-12	April-September		2010-11	2011-12	April-September	
			2011-12	2012-13			2011-12 (P)	2012-13
Major Ports	570086 (64.4)	560134 (61.4)	279880 (62.5)	270561 (59.4)	1.6	-1.7	3.2	-3.3
Non-Major Ports	315358 (35.6)	351545 (38.6)	167969 (37.5)	185206 (40.6)	9.1	11.5	8..2	10.3
All Ports	885444 (100)	911679 (100)	447849 (100)	455767 (100)	4.2	3.0	5.0	1.8

Commodity-wise Cargo Traffic at Major Ports : At a broad commodity level, during the first six months of 2012-13, coal, container cargo, other cargo, and petroleum oil and lubricant (POL) traffic posted growth of 3.8 per cent, 2.7 per cent, 2.4 per cent and 0.5 per cent respectively. The traffic in iron ore was affected during April-September 2012, recording a negative growth of 43.1 per cent primarily due to ban on mining of iron ore. Fertilizer and FRM traffic during April-September 2012 also declined by 5.2 per cent over the corresponding period of the previous year. In terms of the composition of cargo traffic handled at major ports during April-September 2012, the largest commodity group (in terms of percentage share in total cargo handled) was POL (34 per cent) followed by container traffic (22 per cent), other cargo (19 per cent) and coal (15 per cent). Total container traffic at major ports increased both in terms of tonnes and twenty foot equivalent units [TEUs] by 2.7 per cent and 1.3 per cent respectively during April-September 2012 and Jawahar Lal Nehru Port (JNPT) emerged as the leading container-handling port with a 48 per cent share in terms of tonnage and 55 per cent in terms of TEUs[10].

[8] Indian Port Association
[9] 12th Five Year Plan
[10] Economic Survey, Government of India

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