

Chapter 11

Energy, Infrastructure and Communications

As the growth of the economy in general and the manufacturing sector in particular is largely dependent on creation of suitable infrastructure, the policy focus in India has been on infrastructure investment. Such investment has increased manifold over time with increased private-sector participation in the country. The Twelfth Five Year Plan has also laid special emphasis on infrastructure development as quality infrastructure is important not only for sustaining high growth but also ensuring that the growth is inclusive. Large infrastructure investment during the last decade or so has helped India emerge as one of the fastest growing economies in the world. However, over the past few years, need has been felt to kick-start stalled infrastructure projects by stepping up infrastructure investment, improving the productivity and quality of infrastructure spending, removing procedural bottlenecks, and improving governance. In the current perspective, the real challenge is not only to identify a core set of projects that are crucial for accelerating overall economic growth but also to ensure channelization of investment for such viable infrastructure projects and expedite their implementation by addressing issues like delays in regulatory approvals, land acquisition and rehabilitation in fast-track mode.

OVERVIEW OF PERFORMANCE

11.2 Availability of quality infrastructure is key for the growth of industry and services. From the infrastructure development perspective, while important issues like delays in regulatory approvals, problems in land acquisition and rehabilitation, and environmental clearances need immediate attention, time overruns in the implementation of projects continue to be one of the main reasons for underachievement in many of the infrastructure sectors. According to the Ministry of Statistics and Programme Implementation (MOSPI) Flash Report for February 2014, of 239 central-sector infrastructure projects costing ₹ 1000 crore and above, 99 are delayed with respect to the latest schedule and 11 have reported additional delays with respect to the date of completion reported in the previous month. The additional delays in respect to projects relating to the petroleum, power, steel, and coal sectors are in the range of 1 to 26 months. The total original cost of implementation of these 239 projects was about ₹ 7,39,882 crore and their anticipated completion cost is likely to be ₹ 8,97,684 crore, implying an overall cost overrun of ₹ 1,57,802 crore (21.3 per cent of the original cost). The expenditure incurred on these projects till February 2014 was ₹ 4,10,684 crore, which is 45.7 per cent of the total anticipated cost.

Time overruns in the implementation of projects continue to be one of the main reasons for underachievement in many of the infrastructure sectors.

11.3 Major sector-wise performance of core industries and infrastructure services during 2013-14 shows a mixed trend. While the growth in production of power and fertilizers was comparatively higher than in 2012-13, coal, steel, cement, and refinery production posted comparatively lower growth. Crude oil and natural gas production declined during 2013-14. Among infrastructure services, growth in freight traffic by railways and cargo handled by major ports and the civil aviation sector (except import cargo) has been comparatively higher during 2013-14. In the road sector the National Highways Authority of India (NHAI) posted negative growth of 33 per cent during 2013-14 as compared to the 26.5 per cent growth during 2012-13.

ENERGY

11.4 According to the Twelfth Plan projections, total domestic energy production will reach 669.6 million tonne of oil equivalent (MTOE) 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. Even though the domestic production of energy is projected to increase, import dependence will continue to be high, particularly for crude oil where nearly 78 per cent of the demand will have to be met from imports by the end of the Twelfth Plan. Import dependence for coal is also projected to increase from 18.8 per cent in 2011-12 to 22.4 per cent by the end of the Twelfth Plan. It is further estimated that import dependence for coal, liquefied natural gas (LNG), and crude oil taken together in the terminal year of the Twelfth Plan is likely to remain at the Eleventh Plan level of 36 per cent.

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Reserves and Potential for Energy Generation

11.5 The potential for energy generation depends upon the country's natural resource endowments and the technology to harness them. India has both non-renewable reserves (coal, lignite, petroleum, and natural gas) and renewable energy sources (hydro, wind, solar, biomass, and cogeneration bagasse). As on 31 March 2012 India's estimated coal reserves were about 294 billion tonnes, lignite 42 billion tonnes, crude oil 760 million tonnes, and natural gas 1330 billion cubic metres (BCM). The total potential for renewable power generation as in March 2012 was 89,774 MW. The estimated reserves of non-renewable and potential from renewable energy resources change with the research and development (R&D) of new reserves and the pace of their exploration.

Energy Production and Consumption

11.6 In last four decades, i.e. from 1970-71 to 2011-12, the compound annual growth rate (CAGR) of production of the primary sources of conventional energy, namely coal, lignite, crude petroleum, natural gas, and electricity (hydro and nuclear) generation, was 4.9 per cent, 6.2 per cent, 4.2 per cent, 8.7 per cent, and 4.3 per cent respectively. In the same period, consumption of coal, lignite, crude oil in terms of refinery throughput, natural gas (off-take), and electricity (thermal, hydro, and nuclear) increased at a CAGR of 4.9 per cent, 6.2 per cent, 6.0 per cent, 10.7 per cent, and 7.1 per cent respectively.

Per capita energy consumption grew at a CAGR of 4.1 per cent during this period. The consumption pattern of energy by primary sources expressed in terms of peta joules shows that electricity generation accounted for about 57.6 per cent of the total consumption of all primary sources of energy during 2011-12, followed by coal and lignite (20 per cent) and crude petroleum (18.8 per cent).

POWER

Generation

11.7 Electricity generation by power utilities during 2013-14 was targeted to go up by 6.9 per cent to 975 billion units. The growth in power generation during 2013-14 (April-March) was 6.0 per cent, as compared to 4.0 per cent during April 2012 to March 2013 (Table 11.1).

Category	April-March			Growth (per cent) (2012-13 to 2013-14)
	2011-12	2012-13	2013-14	
Power generation	876.89	912.06	967.15	6.04
Hydroelectric#	130.51	113.72	134.85	18.58
Thermal	708.81	760.68	792.48	4.18
Nuclear	32.29	32.87	34.27	4.14
Bhutan import	5.29	4.80	5.60	16.75

Source: Ministry of Power.

Note: #Includes generation from hydro stations above 25 MW.

11.8 In the thermal category, growth in generation from coal, lignite, and gas-based stations was of the order of 8.3 per cent, -0.3 per cent, and -33.4 per cent respectively. The overall plant load factor (PLF), a measure of efficiency of thermal power stations, during April 2013 to March 2014 declined to 65.55 per cent as compared to a PLF of 70.13 per cent achieved during April 2012 to March 2013.

11.9 The sector-wise and region-wise break-ups of the PLF of thermal power stations from 2010-11 to 2013-14 show change over time as well as region. The PLF of state-sector utilities remained lower than that of private-sector and central-sector utilities. The energy deficit declined from 8.5 per cent in the terminal year of the Eleventh Plan (2011-12) to 4.2 per cent during 2013-14 and peak deficit from 10.6 per cent to 4.5 per cent.

Capacity Addition

11.10 The capacity-addition target for the Twelfth Plan period is estimated at 88,537 MW, comprising 26,182 MW in the central sector, 15,530 MW in the state sector, and 46,825 MW in the private sector respectively. The capacity-addition target for the year 2012-13 was 17,956.3 MW, against which a record capacity addition of 20,622.8 MW (20,121.8 MW thermal and 501 MW hydro) was achieved—the highest-ever annual capacity addition. The capacity-addition target for the year 2013-14 was 18,432.3 MW against which a capacity addition of 17,825.1 MW has been achieved.

Ultra Mega Power Project Initiatives

11.11 The Ministry of Power launched an initiative for development of coal-based supercritical Ultra Mega Power Projects (UMPP) of

Table 11.1 : Power Generation by Utilities
(Billion KWh)

about 4000 MW capacity each. Four UMPPs, namely Sasan in Madhya Pradesh, Mundra in Gujarat, Krishnapatnam in Andhra Pradesh, and Talaiya in Jharkhand, have already been transferred to the identified developers and are at different stages of implementation. The Mundra UMPP (5x800 MW) is fully commissioned and is generating electricity. Three units of the Sasan UMPP (3x660 MW) have been commissioned so far. The remaining units of Sasan and other awarded UMPPs are expected to come up in the Twelfth Plan (except the last unit of the Talaiya UMPP, which is likely to come up in the Thirteenth Plan).

Changes in Mega Power Policy

11.12 In February 2014 the Government of India approved changes in mega power policy for provisional mega power certified projects. For availing the benefit of a mega certificate, the developers of provisional mega projects must tie up at least 65 per cent of installed capacity/net capacity through competitive bidding and up to 35 per cent of installed capacity/net capacity under regulated tariff as per specific host state policy, as the case may be and approved by the respective regulators under long-term power purchase agreements (PPA) with Discoms/state-designated agency. This dispensation would be one time and limited to the 15 projects (19,000 MW) that are located in the states having mandatory host state power to tie up policy of PPAs under regulated tariff. Further the maximum time period has been extended to 60 months from 36 months from completion of the date of import of provisional mega projects (25 projects of 32,000 MW) for the purpose of furnishing the final mega certificates to the tax authorities. Some of the recent initiatives to augment power generation in the country are provided in Box 11.1.

PETROLEUM

11.13 In order to meet the ever-growing demand for petroleum products, the government has consistently endeavoured to enhance exploration and exploitation of petroleum resources, along with developing a concrete and structured distribution and marketing system. Despite this, crude oil production for 2013-14 remained stagnant at around 37.8 million metric tonnes (MMT) as against 37.9 MMT in 2012-13, showing a marginal decrease of about 0.20 per cent. The bulk of crude oil production is from ageing fields, with the exception of the Krishna Godavari (KG) deep-water and Rajasthan blocks. Production of crude oil was also affected by environmental issues, bandhs/blockades, lower base potential, and delay in production from wells in some states. The average natural gas production for 2013-14 was about 35.4 BCM as against 40.7 BCM for 2012-13, showing a decline of about 13 per cent.

Exploration of Domestic Oil and Gas

11.14 India has an estimated sedimentary area of 3.14 million sq. km, comprising 26 sedimentary basins. A total of 254 production-sharing contracts (PSCs) have so far been signed under nine rounds of New Exploration Licensing Policy (NELP) bidding, of which 148 blocks are currently operational and the remaining 106 have been relinquished by the contractors. An area of 1.5 million sq. km

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Box 11.1 : Recent Initiatives for Augmenting Power Generation in India

Automatic approval for foreign direct investment

- Automatic approval (Reserve Bank of India [RBI] route) for 100 per cent foreign equity is permitted in generation, transmission and distribution, and trading in the power sector without any upper ceiling on the quantum of investment. The government on 22.08.2013 notified its revised position on foreign direct investment (FDI) cap for power exchanges registered under Central Electricity Regulatory Commission (CERC) Regulations 2010 as 49 per cent (26 per cent FDI+23 per cent foreign institutional investment [FII]) through automatic route.
- **Signing of fuel supply agreements** The Cabinet Committee on Economic Affairs (CCEA) in a meeting held on 21 June 2013 issued a directive to the Ministry of Coal/Coal India Limited to sign fuel supply agreements (FSAs) for a total capacity of 78,000 MW, including tapering linkage, which are likely to be commissioned by March 2015. With concerted efforts made in this regard, FSAs have been signed for 160 units totalling capacity around 74,000 MW.

Allocation of new coal blocks to the NTPC

- The National Thermal Power Corporation (NTPC) has been allocated four coal blocks (Banai, Bhalumuda, Chandrabila, and Kudanali-Laburi) in August 2013 for power projects of 8460 MW.

Pass-through mechanism

- Pass-through mechanism for the concluded PPAs has been approved by the CCEA (14,000 MW-Case I and Case II post 2009 plants) in June 2013.
- The CERC/State Electricity Regulatory Commissions (SERC) have been advised to consider the request of individual power producers in this regard as per due process on a case-by-case basis in public interest. The appropriate commission has been requested to take immediate steps for the implementation of this decision of the government.

Incorporation of PPA condition for coal block allocation

- The Ministry of Coal has issued letters to independent power producers (IPP) and state governments for incorporating the PPA condition at the time of executing mining lease with IPPs for coal block allocation so that the benefits of low cost coal can be passed on to the consumers.

Independent Coal Regulatory Bill

- The Independent Coal Regulatory Bill has been approved by the Cabinet on 27 June 2013. The Ministry of Coal introduced the Bill in Parliament in December 2013. An executive order for setting of coal regulation has been issued by the Ministry of Coal.

Third-party sampling and quality control mechanism

- The Ministry of Coal/ Coal India Limited agreed to third-party sampling at loading points to address the issue of coal quality in October 2013. A Coal India Limited (CIL)-appointed agency for third-party sampling has been operational w.e.f. 1.10.2013.

has so far been awarded under the NELP, which works out to almost 48 per cent of the total sedimentary area in the country. Current average oil production from the NELP blocks is about 6938 barrels per day and gas production 14.13 million cubic metres (MCMs) per day. Activities related to the tenth round of NELP bidding (NELP-X) have been initiated. A total of 86 blocks (30 deep water, 23 shallow water and 33 on land) have been tentatively proposed. Inter-ministerial clearances are under way.

Domestic Exploration of Other Gaseous Fuel

Coal Bed Methane

11.15 India has the fourth largest proven coal reserves in the world and holds significant prospects for exploration and exploitation of coal bed methane (CBM). Under the CBM policy, 33 exploration blocks have been awarded in Andhra Pradesh, Assam, Chhattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, and West Bengal. Of the total available coal-bearing area of 26,000 sq. km for CBM exploration in the country, exploration has been initiated in about 17,000 sq. km. The estimated

CBM reserves in the country are about 92 trillion cubic feet (TCF), of which only 9.9 TCF has so far been established. Commercial production of CBM in India has now become a reality with current production at about 0.45 million metric standard cubic metre per day (MMSCMD).

Shale Gas

11.16 Shale gas can emerge as an important new source of energy. India has several shale formations which seem to hold shale gas. The shale gas formations are spread over several sedimentary basins such as Cambay, Gondwana, Krishna-Godawari onland, and Cauvery. The Director General of Hydrocarbons (DGH) has initiated steps to identify prospective areas for shale gas exploration. A multi-organizational team (MOT) of the DGH, Oil and Natural Gas Corporation (ONGC), Oil India Limited (OIL), and Gas Authority of India Limited (GAIL) has been formed by the government to examine the existing data set and suggest a methodology for shale gas development in India. Further, a memorandum of agreement (MoU) between the Department of State, USA, and Ministry of Petroleum and Natural Gas has been signed for assessment of shale gas resources in India, imparting training to Indian geo-scientists and engineers, and assistance in the formulation of regulatory frameworks. Under the MOU signed with the USA, the US Geological Survey (USGS) has estimated the technically recoverable shale gas resource for three basins as 6.1 TCF. Further studies by the USGS are in progress.

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Equity Oil and Gas from Abroad

11.17 In view of the unfavourable hydrocarbon demand-and-supply balance in the country, acquiring equity oil and gas assets overseas is important for enhancing energy security. The government is encouraging national oil companies to aggressively pursue equity oil and gas opportunities overseas. Oil and Natural Gas Corporation Videsh Limited (OVL) has produced about 8.357 MMT of oil and equivalent gas during 2013-14 from its assets in Sudan, Vietnam, Venezuela, Russia, Syria, Brazil, South Sudan, and Colombia. The estimated oil and equivalent gas production target for 2014-15 is about 8.155 MMT. The reasons for lower overseas production are geopolitical problems in south Sudan and Syria. Oil public-sector units (PSU), namely OVL, Indian Oil Corporation (IOC), OIL, Bharat Petroleum Corporation Limited (BPCL), Hindustan Petroleum Corporation Limited (HPCL), and GAIL have acquired exploration and production (E&P) assets in more than 20 countries.

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Refining Capacity

11.18 The Indian refining industry has done exceedingly well in establishing itself as a major player globally. India is emerging as a refinery hub and refining capacity exceeds demand. The last decade has seen tremendous growth in the sector. The country's refining capacity has increased from a modest 62 million metric tonne per annum (MMTPA) in 1998 to 215.07 MMTPA as on 1 April 2014, and comprises 22 refineries, with 17 under the public sector, 3 under the private sector, and 2 in joint venture (JV). By the end of the Twelfth Five Year Plan, refinery capacity is expected to reach

307.37 MMTPA. Refinery crude throughput (crude oil processed) for 2013-14 was about 222.70 MMT as against 219.21 MMT for 2012-13, showing a marginal increase of about 1.59 per cent. During 2013-14, a total of 68.4 MMT of petroleum products, valued at ₹ 3,71,143 crore, was exported against 63.4 MMT, valued at ₹ 3,20,090 crore, during 2012-13. Exports of petroleum products during 2013-14 were higher by 7.9 per cent and 16.0 per cent in terms of quantity and value respectively, as compared to the previous year.

NON-CONVENTIONAL ENERGY

Ethanol-blended Petrol

11.19 The government started the Ethanol Blended Petrol (EBP) Programme in 2003. In 2006 it was extended to the entire country, except the north-eastern states, Jammu and Kashmir, Andaman and Nicobar Islands, and Lakshadweep. To boost the EBP Programme, the government decided on 22 November 2012 that 5 per cent mandatory ethanol blending with petrol should be implemented across the country. Procurement price of ethanol was henceforth to be decided between oil marketing companies (OMCs) and suppliers of ethanol. The OMCs are implementing the Programme in the notified 20 states and 4 union territories (UT) as per the availability of ethanol.

New and Renewable Energy

11.20 The Planning Commission has indicated that the Twelfth Plan envisages development of renewable and non-conventional energy sources to the tune of 5 MTOE by oil PSUs. Accordingly, oil PSUs have taken various initiatives for renewable energy by way of solar and wind energy projects and for non-conventional energy by way of CBM, basin-centred gas (BCG), and underground coal gasification (UGC) projects during 2010-11 to 2013-14. MOUs for setting up of special purpose vehicles (SPVs) on renewable energy installations and off-grid applications have accordingly been signed between the Ministry of Petroleum and Natural Gas (MOPNG) and Ministry of New and Renewable Energy (MNRE) on 25 February 2014.

COAL

11.21 The gap between demand and supply has consistently been increasing. At the end of the Eleventh Five Year Plan, the gap was about 100 MT and it has now increased to 145 to 150 MT. The report of the Working Group of Coal and Lignite for the Twelfth Five Year Plan projected the coal demand in India to grow at a CAGR of 7.1 per cent till 2016-17 and reach 980.5 MT annually under realistic demand. With a projected growth rate of 7.0 per cent, demand is expected to reach 1373 MT by 2021-22. The overall long-term demand for coal is closely linked to the performance of the end-use sectors. In India, the main end-use sectors of coal are thermal power generation (60 per cent), iron and steel (7 per cent), and cement (5 per cent), apart from irregular demand from the unorganized small-scale sector comprising primarily the brick and ceramics industry. Sharp deceleration in the production of natural gas in the past two-three years has further increased the energy sector's dependence on coal.

The overall long - term demand for coal is closely linked to the performance of the main end-use sectors, i.e. thermal power, iron and steel, and cement.

11.22 The performance of the coal sector in the first two years of the Twelfth Plan has been subdued with domestic production at 556 MT in 2012-13 and 566 MT in 2013-14. Overall domestic demand for coal during these two years was in the range of 715-720 MT. Demand was mainly driven by the power generation sector, whereas demand in the iron and steel and cement sectors had moderate growth rates. To fill the gap between domestic demand and supply, the country imported about 146 MT of coal at a cost of ₹ 92,538 crore during 2012-13 and about 169 MT at a cost of ₹ 95,175 crore during 2013-14 (provisional). The cost of imports would have been much higher had there not been a slide in coal prices in the international markets in the last two years. With the stagnant domestic coal production, coal imports are likely to surge in the remaining three years of the Twelfth Plan. In terms of value, coal remains the third highest imported item after petroleum, oil, and lubricants (POL) and gold and its rising trend will keep putting pressure on India's current account balance. Table 11.2 gives figures for production, supply, and import of coal.

Year	All India coal		CIL		Import		Total import
	Production	Off-take/supply	Production	Off-take/supply	Coking	Non-coking	
2008-09	492.76	489.17	403.73	400.72	21.08	37.92	59.00
2009-10	532.04	513.80	431.26	415.22	24.69	48.57	73.26
2010-11	532.70	523.47	431.32	423.78	19.48	49.43	68.92
2011-12	539.95	535.30	435.84	432.62	31.80	71.05	102.85
2012-13	556.40	569.76	452.21	464.77	35.56	110.22	145.78
2013-14*	565.64	571.04	462.53	471.50	—	—	168.50

Source: Ministry of Coal.

Notes: *Provisional;

RAILWAYS

11.23 The demands of a growing economy require Indian Railways (IR) to expand its freight network, increase its ability to carry higher freight per wagon, and the efficiency of the rail system for faster delivery, and improve the reach and quality of its passenger services. In order to meet these challenges, and also keeping in view the overall thrust of the Twelfth Five Year Plan (2012-17), the policies of IR currently focus on creation of additional capacity, modernization of the existing network, improvement in asset utilization and productivity, and modernization of rolling stock and maintenance practices to bring about overall improvement in the quality of railway services, while augmenting profitability and internal resource generation. The broad objective of IR is to develop a strategy to be a part of an effective multi-modal transport system and to ensure an environment-friendly and economically efficient transport movement.

Freight Performance of IR

11.24 Freight loading (excluding loading by Konkan Railways) by IR during 2012-13 was placed at 1008.09 million tonnes, as against 969.05 million tonnes in 2011-12, registering an increase of 4.03 per cent, with incremental loading of 39.04 million tonnes

Sharp deceleration in the production of natural gas in the past two-three years has further increased the energy sector's dependence on coal.

With stagnant domestic coal production, coal imports are likely to surge in the remaining three years of the Twelfth Plan.

Table 11.2 : Production, Off-take, and Import of Coal from 2008-09 to 2013-14 (million tonne)

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over 2011-12 levels. During 2013-14, IR carried 1050.18 million tonne of revenue-earning freight traffic, as against a revised target of 1052 million tonnes. The freight carried shows an increase of 42.09 million tonnes over the freight traffic of 2012-13, translating into an increase of 4.18 per cent. Box 11.2 provides details of progress made on the Eastern and Western Dedicated Freight Corridors.

High Speed Trains

11.25 The Ministry of Railways, in consultation with state governments, has selected seven corridors for carrying out pre-feasibility studies for introduction of high speed passenger trains. High speed train projects are highly capital intensive in nature, requiring high passenger volumes and high tariff to justify investment. A business development study for the Mumbai-Ahmedabad high speed corridor has been undertaken by French Railways. The study is likely to be completed in 2014. A joint feasibility study for the Mumbai-Ahmedabad high speed corridor, co-financed by IR and JICA was also initiated in December 2013 and is likely to be completed in about 18 months. Box 11.3 provides other initiatives taken by IR in 2013-14.

ROADS

11.26 India has one of the largest road networks in the world, spread over 48.65 lakh km. It comprises national highways, expressways, state highways, major district roads, other district roads, and village roads with following length distribution (Table 11.3).

National Highway Development Project

11.27 The National Highways (NHs) with a total length of 92,851 km, serve as the arterial network of the country. The development of NHs is the responsibility of the Government of India, which has been mandated to upgrade and strengthen a total of 54,478 km of NHs, through various phases of the National Highways Development Project (NHDP). A total length of 21,787 km has been completed till March 2014 under various phases of the NHDP. The National Highways Authority of India (NHAI) awarded 5083 km and 6491 km of road in 2010-11 and 2011-12 respectively for development. However, the pace of awarding, which slowed down due to various reasons in 2012-13 continued even during 2013-14. While in 2012-13, a total of 1116 km was awarded, 17 projects for a length of 1436 km with a total project cost of ₹ 7256 crore have been awarded in 2013-14. Also a length of 1172 km of NHs was awarded under NHDP-IV in the Ministry in 2013-14. In spite of several constraints due to the economic downturn, the NHAI constructed 2844 km length in 2012-13, its highest-ever annual achievement. During 2013-14 a total of 1901 km of road construction was completed. Box 11.4 outlines some of the initiatives taken by the government to expedite NHDP projects.

Financing of the NHDP

11.28 A part of the fuelcess imposed on petrol and diesel is allocated to the NHAI for funding the NHDP. The NHAI leverages this to borrow additional funds from the debt market. Till date, such borrowings have been limited to funds raised through 54 EC (capital gains tax exemption) bonds and tax-free bonds. The

Box 11.2 : Dedicated Freight Corridor Project: Progress So Far

The Eastern and Western Dedicated Freight Corridors (DFC) are a mega rail transport project being undertaken by the Ministry of Railways to increase transportation capacity, reduce unit costs of transportation, and improve service quality. Of the 1839 km of the Eastern DFC, which extends from Dankuni near Kolkata to Ludhiana in Punjab, the World Bank is funding 1183 km from Ludhiana to Mughalsarai, in three phases. The loan agreement and civil construction contracts for Phase-1, namely the Khurja-Kanpur section, are already in position and work is in progress. For implementing Phase-2, namely the Kanpur-Mughalsarai section, a loan of US \$1100 million has been sanctioned. For the last phase, i.e. the Ludhiana-Khurja-Dadri section, advance procurement action has been initiated. For the 1499 km Western DFC, which extends from Jawaharlal Nehru Port in Mumbai to Dadri near Delhi, complete funding from the Japan International Cooperation Agency (JICA) has been tied up, and construction is in progress on the 625 km Rewari-Iqbalgarh section and for 54 major and important bridges between Vaitarana and Bharuch. Construction contracts for over 600 km are at an advanced stage of award. Approximately 96 per cent of the land required for the project, excluding the Sonnagar-Dankuni section to be implemented under public-private partnership (PPP), has been acquired, and land compensation award of ₹ 6110 crore, has been declared as per provisions of the Railway Amendment Act 2008.

National Highways/ Expressway	92,851 km
State Highways	1,42,687 km
Other Roads	46,29,462 km

Source: Ministry of Road, Transport; and Highways.

Note: *Status as in May 2014.

Table 11.3 : Road Networks in India

Box 11.3 : New Initiatives by Indian Railways during 2013-14

- **Linking Kashmir Valley with the Jammu region:** The Pir Panjal tunnel, the longest tunnel in India, was opened successfully, establishing a railway link between Kashmir valley and the Jammu region, in June 2013.
- **IR enters the one billion tonne select club:** By achieving an originating freight loading of 1008.09 million tonnes (i.e. one billion plus) in 2012-13, IR entered the one billion tonne select club, joining the Chinese, Russian, and United States railways. Under the freight-loading strategy adopted by IR, special focus has been given to enhancing evacuation of coal from CIL sources.
- **High Speed Rail Corporation of India Limited set up:** The High Speed Rail Corporation of India (HSRC) has been launched as a subsidiary of Rail Vikas Nigam Limited. The HSRC has been set up to develop the high speed rail corridors in India in order to run passenger trains at speeds up to 350 km per hour. It will undertake project activities such as preparation of project-related studies and preparation of technical standards for the Mumbai-Ahmedabad corridor and any other corridor decided by the government. It will provide support to the government in finalizing the financial and implementation models.
- **Facilitating the visually impaired:** As a part of its social commitment to make IR more passenger-friendly for differently abled passengers, IR has decided to provide Braille stickers in coaches to facilitate visually impaired passengers. It is planned to use stickers with metallic base, with printed characters embedded on to the base. The Integral Coach Factory, a production unit of IR, has developed the specification for integrated Braille signages in coaches, in consultation with various blind associations, and inputs received from the Research Design and Standards Organisation (RDSO).
- **Safety for women:** In order to enhance the safety and security of women under the Nirbhaya Fund Scheme set up by the Ministry of Finance, the Ministry of Railways has proposed a pilot scheme for setting up an alert system in trains in select zones. The work was awarded to the Centre for Railway Information Systems (CRIS) in October 2013, with a completion period of 13 months, for conducting pilot projects in Central and Western Railways.
- **World's First Ever 5500 HP Locomotive as a Pilot Project:** IR has produced the world's first prototype 5500 HP diesel locomotive (WDG5), developed by Diesel Locomotive Works, Varanasi, a production unit of IR. The locomotive will be able to achieve 100 kmph speed on level track, with higher axle load. The 5500 HP WDG5 is primarily aimed at improving the throughput with higher balancing speeds, and is already running as a pilot project in North Central Railways.
- **Green Initiatives:** (i) The Ministry of Railways and Rail India Technical and Economic Service (RITES) Limited have formed the Railway Energy Management Company (REMC), a JV with a shareholding pattern of 49 and 51 per cent respectively, for undertaking IR projects related to harnessing green energy like solar and windmill power plants, power-trading activities, transmission lines and power evacuation planning, energy conservation initiatives, efficient coordination in power generation through captive power plant, and energy audits. The REMC will also facilitate faster execution of renewable energy and energy conservation works, with the aim of generating green power and reducing the energy bill of IR. The REMC has become functional and is working on setting up windmill and solar power plants, with about 40 per cent subsidy from the MNRE. To begin with, 200 railway stations, rooftops of 26 buildings, and 2000 level crossing gates will be covered.

government has also taken loans for financing projects under the NHDP from the World Bank (US\$ 1965 million), Asian Development Bank (ADB) (US\$ 1605 million), and Japan Bank for International Cooperation (32,060 million yen) which are passed on to the NHAI partly in the form of grants and partly as loan. The NHAI has also taken a direct loan of US\$ 149.73 million from the ADB for the Manor Expressway Project.

Development of Roads in Left Wing Extremism-affected Areas

11.29 The government on 26 February 2009 approved the Road Requirement Plan (RRP) for upgrading of 1202 km of NHs and 4363 km of state roads (total 5565 km) to two-lane at a cost of ₹ 7300 crore in 34 left wing extremism (LWE)-affected districts in Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, and Uttar Pradesh for inclusive growth of these areas. Under the RRP, development of 2929 km length had been completed till 2013-14 with cumulative expenditure of ₹ 3878 crore. The development of roads under the programme is scheduled to be completed by March 2015.

Prime Minister's Reconstruction Plan for J&K

11.30 The Prime Minister announced a Reconstruction Plan for Jammu and Kashmir during his visit to the state in November 2004. Construction of the Mughal Road, widening of the Domel-Katra road (NH-1C), double-laning of the Botote-Kishtawar-Sinthanpass-Anantnag Road (NH-1B), upgrading of the Srinagar-Uri Road (NH-1A), construction of the Khanabal-Pahalgam Road, construction of the Narbal-Aangmarg Road, and double-laning of the Srinagar-Kargil-Leh Road (NH-1D) are the seven works under this project amounting to ₹ 3300 crore. An expenditure of around ₹ 2,996 crore has already been incurred as on March 2014.

CIVIL AVIATION

Air Passenger and Cargo Traffic

11.31 Domestic passenger traffic handled at Indian airports reached 122.43 million during April to March 2013-14. This is an increase of 5.2 per cent over the domestic passenger traffic throughput of 116.37 million for the same period during 2012-13. International passenger traffic handled at Indian airports was placed at 46.62 million during 2013-14 as against 43.03 million during the corresponding period of the previous year, thereby recording a growth rate of 8.34 per cent. International cargo throughput at Indian airports during 2013-14 was 1.44 MMT as compared to 1.41 MMT during the previous year. During the reference period, domestic cargo throughput stood at 0.84 MMT as against 0.78 MMT, thereby recording an increase of 7.7 per cent.

Airport Infrastructure

11.32 The Airports Authority of India (AAI) is a major airport operator managing 125 airports across the country including 26 civil enclaves at defence airports and is also entrusted with the sovereign function of providing air traffic services in India. To enhance airport infrastructure in India, modernization of existing airport infrastructure in metro and non-metro cities and construction of greenfield airports were contemplated.

11.33 Modernization of Kolkata Airport has been taken up whereby construction of a terminal building with a 20 million passenger capacity has been commissioned and completed. In order to increase airside capacity, the secondary runway has been extended by 431 m. Under modernization of Chennai Airport, new domestic and international terminal buildings with an annual capacity of 10 million and 4 million passengers respectively were commissioned and constructed. To augment airside capacity, extension of the secondary runway by 1032 m has also been undertaken. Modernization of Delhi and Mumbai Airports has been undertaken by JV companies and state-of-the-art facilities have been provided. Development of 35 non-metro airports which have been identified based on regional connectivity, development of regional hubs, etc., has been undertaken by the AAI. Out of 35 airports, work has been completed at 33. Development work for Vadodra and Khajuraho Airports is in progress.

Box 11.4 : Initiatives Taken by the Government to Expedite Projects under the NHDP

Project Preparation

- The NHAI has decided not to award projects till all pre-construction approvals are in place to avoid post-bid delays and litigations.

Streamlining of Land acquisition

- The process of land acquisition (LA) and collection of data on this acquisition has been streamlined by standardizing formats and collecting periodic data for effective monitoring of the LA process.
- Guidelines have been issued for streamlining the LA process, including those for continuation of the process in case of projects that are foreclosed, thereby removing any ambiguity and ensuring timely execution of pre-construction activities.

Streamlining of Environment Clearances

- The NHAI has taken several proactive measures and ensured that for existing and future projects the process of obtaining environment and forest clearances has been relaxed significantly.

Dispute Resolution

- Mechanisms for speedy resolution of long pending disputes in engineering procurement and construction (EPC) and built operate and transfer (BOT) projects have been established.
- Several contractors and concessionaires have opted for the same and successfully settled claims with the NHAI.

Exit for Equity Investors

- The NHAI has allowed complete exit to equity investors for all concessions post-completion of projects. This move is expected to unlock growth capital for utilization in future projects and infuse fresh capital into the sector.

Coordination with other ministries

- Several mechanisms have been established to ensure better coordination with other ministries, namely Railways, utilities-owning departments / ministries, etc. to ensure smooth execution of projects.

Investment by Foreign Airlines

11.34 Subsequent to Government of India's decision to permit 'foreign airlines' to invest in Indian scheduled air transport service operators, up to a limit of 49 per cent of their paid-up capital, proposals of M/s Air-Asia and Tata-Singapore Airlines for initial no objection certificates (NoC) have been approved. The validity of 'in principle' approval for import of aircraft by scheduled operators has been revised from 5 years to 10 years on account of longer delivery schedule of aircraft by manufacturers.

PORTS

Cargo Traffic at Indian Ports

11.35 During 2013-14 (April to March) major and non-major ports in India accomplished a total cargo throughput of around 980.49 million tonnes reflecting an increase of 5.0 per cent over 2012-13. This can mainly be attributed to an increase of 1.8 per cent in the cargo handled at major ports. In contrast, traffic at non-major ports grew at around 9.6 per cent during 2013-14 as compared to 9.8 per cent in 2012-13 (Table 11.4). During 2013-14, Ennore Port recorded the highest growth in traffic (52.9 per cent) followed by Paradip (20.3 per cent), Kolkata Dock System (8.7 per cent), New Mangalore Port Trust (6.3 per cent), Cochin Port (5.3 per cent), Mumbai Port (2.0 per cent), Haldia Dock Complex (1.5 per cent), and V.O.Chidambarnar (1.4 per cent). Negative traffic growth was reported by Visakhapatnam (-0.9 per cent), Jawaharlal Nehru Port Trust (JNPT) (-3.3 per cent), Chennai Port (-4.3 per cent), Kandla (-7.0 per cent), and Mormugao(-33.7 per cent).

	Traffic handled		Growth over previous year/period	
	2012-13	2013-14	2012-13	2013-14
Major ports	545790 (58.5)	555488 (56.7)	-2.6	1.8
Non-major ports	387867 (41.5)	425000 (43.3)	9.8	9.6
All ports	933657 (100)	980488 (100)	2.2	5.0

Source: Indian Ports Association

Commodity-wise Cargo Traffic at Major Ports

11.36 At a broad commodity level, during 2013-14, coal, POL, and other cargo traffic posted growth of 20.6 per cent, 0.6 per cent, and 0.5 per cent respectively. The traffic in iron ore recorded negative growth of 13.0 per cent primarily owing to a ban on mining of iron ore. Fertilizer traffic also declined during 2013-14 by 7.0 per cent over the previous year. In terms of composition of cargo traffic handled at major ports during 2013-14, the largest commodity group (by percentage share in total cargo handled) was POL (34 per cent) followed by other traffic (22 per cent), container (21 per cent), coal (19 per cent), and iron ore (4 per cent).

Table 11.4 : Traffic Handled at Indian Ports (ooo' tonnes)

Total container traffic at major ports decreased both in terms of tonne and twenty foot equivalent units (TEUs) by 4.3 per cent and 3.2 per cent respectively during April 2013 to March 2014. During this period JNPT emerged as the leading container-handling port with a 48.2 per cent share in terms of tonnage and 55.8 per cent in terms of TEUs.

TELECOMMUNICATIONS

11.37 The Indian telecom sector has registered phenomenal growth during the past few years and has become the second largest telephone network in the world, next only to China. A series of reform measures by the government, innovations in wireless technology, and active participation by the private sector played an important role in the growth of the telecom sector in the country. The details of the number of telephones, teledensity, and other key indicators of the telecommunications sector are given in Table 11.5.

	2012	2013	2014
1 Total telephones (million)	951.35	898.02	933.02
2 Rural teledensity (per cent)	39.26	41.05	44.01
3 Urban teledensity (per cent)	169.17	146.64	145.46
4 Overall teledensity (per cent)	78.66	73.32	75.23
5 Growth in total telephones (over previous year) (per cent)	12.41	-5.61	3.9

Source: Department of Telecommunications.

Spectrum Auction

11.38 The government announced the National Telecom Policy (NTP) in 2012. This is an initiative for creating a conducive policy framework for growth of the sector and for triggering an ecosystem for inclusive growth. NTP-2012 envisages adequate availability of spectrum and its allocation in a transparent manner through a market-related process. The auction of spectrum in the 800 MHz, 900 MHz, and 1800 MHz bands was conducted in March 2013. During this auction, there was one successful bidder in the 800 MHz band, who won 3.75 MHz of spectrum in each of eight service areas, namely Delhi, Kolkata, Gujarat, Karnataka, Tamil Nadu, Kerala, West Bengal, and Uttar Pradesh (West). However, no interest was expressed in bidding for spectrum in the 900 MHz and 1800 MHz bands. As a result, spectrum auction in the 900 MHz and 1800 MHz bands was conducted during February 2014. In the 1800 MHz category, 307.2 MHz out of 385.2 was sold. In the 900 MHz band, 46 MHz was put up for auction in the Delhi, Mumbai, and Kolkata service areas and all was sold out. The total amount of ₹ 61,162 crore obtained through auction of spectrum was 27.6 per cent more than the value of the spectrum on offer at reserve price.

Unified Licence

11.39 With a view to achieving the NTP-2012 objective of creating one nation-one licence across services and service areas, the Department of Telecom has finalized guidelines on unified licence.

A series of reform measures by the government, innovations in wireless technology, and active participation by the private sector played an important role in the growth of the telecom sector in the country.

Table 11.5: Telephone Connections and Teledensity (at end March)

NTP-2012 envisages adequate availability of spectrum and its allocation in a transparent manner through a market-related process.

As per these guidelines, the allocation of spectrum is delinked from the licence and has to be obtained separately as per prescribed procedure, i.e. bidding process. Only one unified licence is required for all telecom services in the entire country. Authorization for various services (like access services, National Long Distance services, international long distance services, internet service provider [ISP] services) will be required separately. A single authorization for the unified licence (all services) category will cover all telecom services except ISP (B) and ISP(C) services. The tenure of such authorization will run concurrently with the unified licence. Besides the entry fee for various telecom services has been reduced substantially.

Mobile Communication Services in LWE-affected Areas

11.40 In June 2013 the government approved a proposal to instal mobile towers at 2199 identified locations in nine LWE-affected states (Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Maharashtra, Madhya Pradesh, Odisha, Uttar Pradesh, and West Bengal) at a cost of ₹ 3046 crore. The work has been awarded to Bharat Sanchar Nigam Limited (BSNL) and funding for the project will be met out of the Universal Service Obligation Fund (USOF) for five years.

Rural Wireline Broadband Scheme

11.41 For providing wireline broadband connectivity up to village level in rural and remote areas, the USOF signed an agreement with BSNL under the Rural Wireline Broadband Scheme to provide wireline broadband connectivity to rural and remote areas by leveraging the existing rural exchanges infrastructure and copper wireline network. The speed of each of the broadband connections shall be at least 512 Kbps. Under this scheme, BSNL is to provide 8,88,832 wireline broadband connections to individual users and government institutions and set up 28,672 kiosks over a period of six years, i.e. by 2015. The estimated subsidy outflow is ₹ 1500 crore. As on 31 March 2014, a total of 5,89,783 broadband connections had been provided and 14,186 kiosks set up in rural and remote the areas. The subsidy disbursed till 31 March 2014 under scheme was ₹ 329.55 crore.

URBAN INFRASTRUCTURE

Urban Infrastructure and Governance

11.42 The Jawaharlal Nehru National Urban Renewal Mission (JnNURM) was launched by the Ministry of Urban Development for a seven-year period (i.e. up to March 2012) for encouraging cities to initiate steps for bringing about improvements in their civic service levels in a phased manner. The government extended the tenure of the Mission for two years, i.e. from 1 April 2012 to 31 March 2014. Besides this, in January 2013, the government also approved a transition phase for launching of new projects under the JnNURM. The components under Urban Infrastructure and Governance (UIG), sub-mission of the JnNURM, are urban renewal, water supply (including desalination plants), sanitation, sewerage and solid waste management, urban transport, development of

heritage areas, and preservation of water bodies. Revised allocation for the UIG sub-mission for the Mission period is ₹ 31,500 crore. A sum of ₹ 5500 crore (budget estimates-BE) had been provided for the year 2013-14. As on 31 March 2014— under the first phase of the JnNURM, 538 projects at a total cost of ₹ 60,201 crore had been sanctioned under the UIG sub-mission with additional central assistance (ACA) of ₹ 27,655 crore, of which ₹ 21,119 crore was released to the 65 mission cities across 31 states/UTs.

Urban Infrastructure Development Scheme for Small and Medium Towns

11.43 The Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) is a sub-component of the JnNURM for development of infrastructure facilities in all towns and cities other than the 65 Mission cities covered under its UIG sub-mission. For obtaining assistance under the UIDSSMT, states and urban local bodies (ULB) ULBs need to sign memorandums of agreement committing to the implementation of the reforms. Revised allocation for the UIDSSMT for the Mission period was ₹ 11,400 crore. From its inception in December 2005 till March 2014 a total of 801 projects across 668 towns and cities at a cost of ₹ 13,866 crore with ACA commitment of ₹ 11,197 crore had been sanctioned. A sum of ₹ 4488 crore (BE) was provided for the year 2013-14. Out of the committed ACA of ₹ 11,197 crore, ₹ 9996 crore had been released till 31 March 2014. During April 2013 to March 2014 ₹ 2919 crore was released as ACA under the UIDSSMT.

STREAMLINING ENVIRONMENTAL CLEARANCES

Institutional Factors

11.44 There is need for better and more effective coordination amongst various central ministries/ institutions regarding integration of environmental concerns at the inception/ planning stage of a project. Any fragmentation of current policies across several government agencies with differing policy mandates may also need to be addressed. Lack of trained personnel and a comprehensive database also leads to delay in many projects. Most of the state government institutions are relatively small and suffer from inadequacy of technical staff and resources. Although the overall quality of environmental impact assessment (EIA) studies and implementation of the EIA process have improved over the years, institutional strengthening measures such as training of key professionals and staffing with proper technical persons are needed to make the EIA procedure a more effective instrument for environment protection and sustainable development. The Ministry of Environment and Forests (MoEF) has recently taken a number of initiatives for streamlining environment clearance (EC) processes (Box 11.5) so as to enhance capacity for environmental governance.

11.45 A Committee under the Director National Environmental Engineering Research Institute (NEERI) has examined further simplification of procedures including doing away with the existing categorization of projects into categories A and B; relaxing general conditions relating to distance of project from state boundaries,

There is need for better and more effective coordination amongst various central ministries / institutions regarding integration of environmental concerns at the inception/planning stage of a project.

Box 11.5 : Initiatives for Streamlining Environment Clearance

- For linear projects, the requirement of obtaining Stage-I Forest Clearance (FC) before issuing EC has been dispensed with.
- Linear projects involving forest land have been exempted from Forest Rights Act (FRA) clearance subject to certain stipulations.
- For mining projects that have already obtained EC under EIA Notification 2006, the requirement of obtaining EC at the time of mine renewal has been dispensed with.
- For mining projects involving forest land, all state governments have been requested on 1 February 2013 to obtain approval under the Forest (Conservation) Act 1980 for diversion of entire forest land in the mining lease within a period of two years. For such existing mining leases, the project proponents have been asked to obtain the necessary approval within a period of two years, failing which the mine lease area would be considered as the area containing non-forest land and the forest land for which FC is available.
- For highway expansion projects, the requirement of obtaining terms of reference (TOR) has been dispensed with. Further, the conditions for obtaining EC for national highway expansion projects have been relaxed. Now only those expansion projects will require EC where the expansion is greater than 100 km involving right of way or land acquisition greater than 40 m on existing alignments and 60 m on realignments or bypasses.
- Guidelines have been issued for categorization of category B projects into B₁ and B₂. B₂ projects do not require public hearing and preparation of EIA reports and therefore taking decisions on EC of such projects is quicker. All category B projects are decided at state level.
- For UMPPs, the EC could now be considered without linking it with the requirement of obtaining EC and Stage-I FC of linked coal mine.
- For one-time expansion in existing coal mine projects, exemption from public hearing was earlier allowed for capacity expansion up to 25 per cent. Recently it has been further relaxed. For projects with capacity of up to 8 million tons per annum, the limit has now been increased to 50 per cent or incremental production of up to 1 MTPA, whichever is more.
- Forests (Conservation) Amendment Rules 2014 have been issued stipulating timelines for processing of FC applications at each level in the central and state governments. Simplified format for submission of application for obtaining FC for prospecting activities in forest areas has been prescribed.

critically polluted areas, etc.; and guidelines to expert appraisal committees (EACs)/state-level expert appraisal committees (SEACs) for exempting from EIA and public hearing in respect of expansion projects. The Committee has since submitted its report which is under examination in the Ministry.

INFRASTRUCTURE DEVELOPMENT IN INDIA: A MACRO PERSPECTIVE

11.46 The need for infrastructure development for economic prosperity and global integration cannot be overemphasized. Lack of infrastructure not only results in reduced economic output, it also translates into additional costs in terms of time, effort, and money for accessing essential services such as health care and education. Rapid economic growth in recent years has put enormous pressure on existing infrastructure, particularly in transport, energy, and communications. Unless it is significantly improved, infrastructure will continue to be a bottleneck for growth and an obstacle to poverty reduction. In other words, the challenge is to ensure strong, sustainable, and balanced development through integration of economies with environmentally sustainable development of infrastructure. In order to ensure accelerated growth in the infrastructure sector, the government has taken several initiatives in the recent past (Box 11.6).

The challenge is to ensure strong, sustainable, and balanced development through integration of economies with environmentally sustainable development of infrastructure.

Box. 11.6 : Recent Initiatives for Development of the Infrastructure Sector in India

The following initiatives have been taken in the recent past in order to ensure accelerated growth in the infrastructure sector:

(a) **Harmonized Master List of Infrastructure Sub-sectors:** To resolve the issue of uniform definition of infrastructure, a Harmonized Master list of Infrastructure Sub-sectors has been drawn up and published in the Gazette of India dated 7 October 2013. An institutional mechanism has been set up under the chairmanship of the Secretary, Department of Economic Affairs, with representation from the Planning Commission, Department of Revenue, Reserve Bank of India (RBI), Securities and Exchange Board of India (SEBI), Insurance Regulatory and Development Authority (IRDA), Pension Fund Regulatory and Development Authority (PFRDA), and concerned ministry for updating the master list and revisiting the sub-sectors outside the master list on the basis of well-defined principles.

(b) Infrastructure Financing

(i) **The Cabinet Committee on Investment (CCI)** set up under the chairmanship of the Prime Minister on 2 January 2013 to expedite clearances and decisions on large infrastructure projects, cleared 303 projects with aggregate investment of ₹ 6,95,437 crore up to end February 2014.

(ii) **Infrastructure Debt Fund:** The government has conceptualised infrastructure debt funds (IDF) for sourcing long-term debt for infrastructure projects. Potential investors under IDFs may include off-shore institutional investors, off-shore high networth individuals (HNIs), and other institutional investors (insurance funds, pension funds, sovereign wealth funds, etc.). An IDF can be set up either as a trust or as a non-banking financial company (NBFC). The income of IDFs has been exempted from income tax. So far, two IDF-NBFCs and five IDF-mutual funds (MFs) have been operationalized.

(iii) **Tax-free Bonds:** The government has attempted to broaden the corporate bond market by according tax-free status to infrastructure bonds for addressing the specific needs of infrastructure deficit, especially in sectors such as roads, ports, airports, and power, which are essential for economic growth in any country. During financial year 2013-14, the government has allowed issue of tax-free bonds amounting to ₹ 50,000 crore, to central public sector undertakings (CPSUs), for a period of 10, 15, and 20 years.

(iv) **Municipal Borrowing:** With a view to deepening the bond markets for infrastructure finance, draft guidelines/framework has been prepared for issuance of municipal bonds in India.

(c) Public-Private Partnership Initiatives in India

The Government of India is promoting public-private partnerships (PPP) as an effective tool for bringing private-sector efficiencies in creation of economic and social infrastructure assets and for delivery of quality public services. By end March 2014 there were over 1300 projects in the infrastructure sector with a total project cost (TPC) of ₹ 6,94,040 crore. These projects are at different stages of implementation, i.e. bidding, construction, and operational.

(i) **Viability Gap Funding for PPP Projects :** Under the scheme for financial support to PPPs in infrastructure (Viability Gap Funding [VGF] Scheme), 178 projects have been granted approval with a TPC of ₹ 88,697 crore and VGF support of ₹ 16,894 crore, of which ₹ 1455 crore has been disbursed.

(ii) **Support for Project Development of PPP Projects:** The India Infrastructure Project Development Fund (IIPDF) was launched in December 2007 to facilitate quality project development for PPP projects and ensure transparency in procurement of consultants and projects. So far 53 projects have been approved with IIPDF assistance.

(iii) **National PPP Capacity Building Programme:** The National PPP Capacity Building Programme was launched in December 2010, and has been rolled out in 16 states and two central training institutes, i.e. the Indian Maritime University and Lal Bahadur Shastri National Academy of Administration. The roll-out in the respective institutes commenced in 2011-12. So far, 160 training programmes have been conducted to train over 5000 public functionaries who deal with PPPs in their domain.

(iv) **Online toolkits for PPP projects** for five sectors are available on the Department of Economic Affairs, Ministry of Finance, website on PPPs, i.e. www.pppinindia.com. The PPP toolkit is a web-based resource that has been designed to help improve decision making for infrastructure PPPs in India and to improve the quality of infrastructure PPPs that are implemented in India.

FINANCING INFRASTRUCTURE

Recent Trends in Credit Flow to the Infrastructure Sector

11.47 The India Infrastructure Finance Company Limited (IIFCL) was set up in 2006 for providing long-term financing for infrastructure projects that typically involve long gestation periods. The IIFCL funds viable infrastructure projects through long-term debt as well as refinance to banks and financial institutions for loans approved by them. During 2013-14, the IIFCL mobilized long-term resources primarily from multilateral and bilateral

institutions like the ADB, World Bank, and KfW aggregating ₹ 1605 crore as compared to ₹ 1080 crore raised during 2012-13. During 2013-14, the IIFCL:

- i) successfully mobilized ₹ 9840.74 crore through tax-free bonds issue as against ₹ 10,000 crore allocated to the IIFCL.
- ii) signed an agreement with the ADB for another line of credit for US\$ 700 million and also executed a Finance Contract Agreement with the European Investment Bank (EIB) for a line of credit of Euro 200 million.
- iii) sanctioned two more pilot transactions for proposed bond issuance of around ₹ 1417 crore taking cumulative sanctions for four transactions amounting to around ₹ 2200 crore under its Credit Enhancement Scheme (pilot basis).
- iv) further disbursed ₹ 1058 crore under the Take-out Finance Scheme taking cumulative disbursements from 27 banks/ financial institutions to ₹ 3819 crore.
- v) was allowed to offer financial assistance to PPP projects with tenors longer than other consortium lenders and remain as sole lender, if necessary, after other lenders are paid. This will enable spreading the debt repayments over a longer period which will benefit PPP infrastructure projects with improved liquidity, better viability, and reduced restructuring risk.

Deployment of Gross Bank Credit

11.48 The latest available data on gross deployment of bank credit to major infrastructure sectors shows that the rate of growth of bank credit moderated from an average of 44.8 per cent in 2011-12 to 17.7 per cent in 2013-14 (Figure 11.1). Power had an over 50 per cent share in total credit flow to infrastructure. However, the rate of growth of credit to this sector also moderated from an average of 48.6 in 2010-11 to 25.0 per cent 2013-14. Both in terms of share in total credit to infrastructure and rate of growth, the telecom sector witnessed consecutive decline in the last three years (Table 11.6 and Figure 11.1).

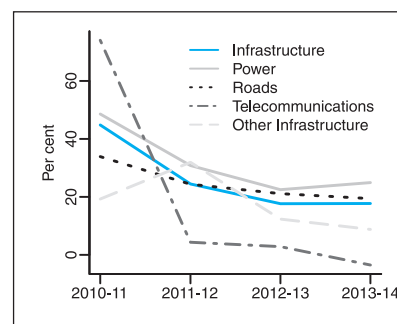


Figure 11.1 : Growth Rate (Avg. of 12 monthly y-o-y) of Credit to Infrastructure Sector

	(₹ crore)			
	2010-11	2011-12	2012-13	2013-14
Infrastructure total of which	463658	574794	676264	794991
(i) Power	231467	301327	369596	460087
(ii) Telecommunications	88432	89930	92450	89098
(iii) Roads	81556	101362	122778	146486
(iv) Other Infrastructure	62203	82175	91440	99319
Share in total infrastructure (per cent)				
(i) Power	49.92	52.42	54.65	57.87
(ii) Telecommunications	19.07	15.65	13.67	11.21
(iii) Roads	17.59	17.63	18.16	18.43
(iv) Other Infrastructure	13.42	14.30	13.52	12.49

Source: RBI, Absolute figures pertain to average of monthly outstanding.

Table 11.6: Sectoral Share of Credit: Infrastructure

Foreign Direct Investment into Major Infrastructure

11.49 The government has put in place a liberal foreign direct investment (FDI) policy, under which FDI up to 100 per cent is permitted under the automatic route in most sectors/activities. Further, the FDI policy is reviewed on an ongoing basis, with a view to making it more investor-friendly. Significant changes have been made in the FDI policy regime in recent times to ensure that India remains an increasingly attractive investment destination. As a result, total FDI inflows into major infrastructure sectors registered a growth of 22.8 per cent in 2013-14 as compared to a contraction of 60.9 per cent during 2012-13. Sectors recording positive growth included railway-related components, telecommunications, air transport (including air freight), and power (Table 11.7).

Sector	2009-10	2010-11	2011-12	2012-13	2013-14
Power	1271.79	1271.77	1652.38	535.68	1066.08
Non-conventional energy	622.52	214.40	452.17	1106.52	414.25
Petroleum & natural gas	265.53	556.43	2029.98	214.80	112.23
Telecommunications	2539.26	1664.50	1997.24	303.87	1306.95
Air transport (including air freight)	23.71	136.60	31.22	15.89	45.95
Sea transport	284.85	300.51	129.36	64.62	20.49
Ports	65.41	10.92	0.00	0.00	0.31
Railway-related components	34.43	70.66	42.27	29.85	236.93
Grand Total	10578.92	6192.73	9690.06	3793.14	4657.2

Source: DIPP, Ministry of Commerce and Industry.

Note: 1. Amount includes the inflows received through SIA/FIPB route, acquisition of existing shares, and RBI's automatic route only.
2. Variation in data due to reclassification of some sectors.

CHALLENGES AND OUTLOOK

11.50 The Twelfth Five Year Plan lays special emphasis on development of the infrastructure sector including energy as an imperative for sustaining high growth and also ensuring that the growth is inclusive. According to the Twelfth Plan projections, during the Plan period, i.e. 2012-17, an investment of US\$ 1 trillion is required in the infrastructure sector in India. About half of this is expected to come from the private sector. While large infrastructure investment during the last decade or so has placed India in the global league of fast growing economies, concerns have been raised over the past few years about stalled infrastructure projects. Stepping up infrastructure investment, improving productivity and quality of infrastructure spending, removing procedural bottlenecks, improving governance, and above all maintaining consistency in government's infrastructure policies are some issues that need to be urgently addressed in this context. Some sector-specific issues that need consideration are now discussed.

Power

11.51 The capacity-addition target for the Twelfth Plan period is estimated at 88,537 MW. Against this target, 38,583 MW capacity has been added till April 2014, which constitutes 43.6 per cent of the target envisaged in the Twelfth Plan. The individual targets achieved by the centre, states, and private sector during this period

Significant changes have been made in the FDI policy regime in recent times to ensure that India remains an increasingly attractive investment destination.

Table 11.7 : Financial Year-wise FDI Flows to Infrastructure (US\$ million)

While large infrastructure investment during the last decade or so has placed India in the global league of fast growing economies, concerns have been raised over the past few years about stalled infrastructure projects.

Power generation from additional capacity generated during the Twelfth Plan critically depends on ensuring fuel supply (coal as well as gas), improving the financial health of the state electricity boards (SEBs), and making PPAs of IPPs economically viable.

are 30.5 per cent, 47.2 per cent, and 49.7 per cent respectively. However, power generation from this additional capacity critically depends on ensuring fuel supply (coal as well as gas), improving the financial health of the state electricity boards (SEBs), and making PPAs of IPPs economically viable. All these factors also affect the capital expenditure programme in the power sector.

11.52 Private developers may not be able to finance projects if coal linkage issues are not resolved and there are delays in finalization of fuel supply agreements (FSA). While some decisions have been taken for restructuring Discoms' finances, these may need to be monitored and implemented in spirit. There is also a need to initiate sustained and meaningful SEB reforms by focusing on areas like tariff rationalization, minimizing AT & C losses, and linking incremental funding to SEBs with the reforms process undertaken by them. The power sector cannot deliver on its social commitments unless it is commercially and financially viable. To improve the financial health of the distribution utilities, measures are required for strengthening governance standards of Discoms, rationalizing the tariff structure, and optimizing procurement cost of power.

Coal

11.53 Based on the sectoral analysis carried out by various committees and institutions in the recent past (including the report of the Working group for the Twelfth Plan on Coal and Lignite), the demand and supply projections of the coal sector, and the current status of the coal mining, the following initiatives need to be expedited on priority basis:

➤ Action points to accelerate coal production in the short term:

- ❖ **Building critical feeder routes for coal:** The implementation of key infrastructure projects for evacuation and movement of coal will be of critical importance for enabling a step up in coal production. In order to transport coal from the pithead, three critical railway lines have been identified which include Tori-Shirvpur-Kathutia (90.7 km) in North Karanpura in Jharkand, Jharsuguda-Barpalli-Sardega (53 km) in Ib valley, Odisha, and Bhudevpur-Korichapar-Dharmjaigarh (180 km) in the Mand-Raigarh coal fields in Chattisgarh. Work on these critical routes needs to be expedited.
- ❖ **Clearing pending environment and forest clearances as well as rehabilitation issues** that have stalled coal production by private captive blocks and CIL subsidiaries on priority basis.
- **Permit commercial coal mining by the private sector:** A Bill to amend the Coal Mines (Nationalization) has been pending in the Rajya Sabha since 2000 and its passage needs to be expedited to permit private-sector entry into coal mining. In view of the deceleration in the coal prices in the global market, the government needs to have a stable long-term coal-mining policy to attract private-sector mining once the Act is amended. Since mining involves huge sunk cost, the government should allow only limited number of large domestic companies with proven

Challenges in the Coal Sector:

1. Building critical feeder routes for coal.
 2. Clearing pending environment and forest clearances and rehabilitation issues.
 3. Permitting commercial coal mining by the private sector.
 4. Restructuring of CIL.
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track record to compete with CIL and also to bring in the latest technology and skills.

- **Restructure CIL:** CIL is a holding company with seven wholly owned coal-producing subsidiary companies and one mine planning and consultancy company, namely Central Mine Planning and Design Institute Limited (CMPDIL). It encompasses the whole gamut of identification of coal reserves and detailed exploration followed by design and implementation and optimizing operations for coal extraction in its mines. The T. L. Shankar Committee on Road Map for Coal Sector Reforms had recommended restructuring of CIL during the Twelfth Plan. The process needs to be pushed through swiftly.

Roads

11.54 Of late, financing of road projects has also run into difficulty as leveraged companies implementing road projects are unable to raise more debt in the absence of fresh equity. In current market conditions these firms are unable to raise new equity. Exit conditions, therefore, need to be eased in such a manner that promoters can sell equity positions after construction, passing on all benefits and responsibilities to entities that step in to take over the project. Promoters can then use the equity thus released for new projects. Further, the toll should have correlation with users' capacity to pay as well as reasonable payback for the financing entities. From the lending institutions' perspective, keeping in view of the asset-liability mismatch issue, there is a need to design new financing products so as to avoid undue burden on the developer. Going by international practice, concepts like 'traffic trigger' and 're-equilibrium discount' could be examined to see whether they can be applied to address some of the problems of the Indian road sector. A 'traffic trigger' clause in the contract implies that if a certain volume of identified traffic is reached, the concessionaire is obligated to increase roadways capacity in order to maintain a minimum level of service to users. The 're-equilibrium discount' is used to reduce tariff when performance parameters are not being met. A table of discounts is pre-defined in the contract. The discounts represent the resources that are not invested as a result of a failure to meet performance parameters.

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Telecommunications

11.55 Keeping in view the role of a robust telecom network in e-governance and delivery of public services, provisions for state-of-the-art IT facilities in urban areas and creation of a digital highway and an action plan covering areas like policy change, regulations, physical infrastructure, and tax/fiscal need to be put in place in due course of time. To start with, policy for better spectrum management through trading and sharing of spectrum needs to be looked into so as to bring down the cost of spectrum. This may also pave the way for a liberal merger and acquisition policy as has been demanded by stakeholders from time to time. With a view to lowering the entry/exit barrier, there is also a need to look into separation of telecom networking from services. Further, local manufacturing, research, and entrepreneurship needs to be promoted with government assistance. Other issues requiring attention include strengthening a

Policy for better spectrum management through trading and sharing of spectrum needs to be looked into so as to bring down the cost of spectrum.

national fibre optic network, nationwide mobile number portability and rural telephony.

PPP

11.56 As highlighted in Economic Survey 2012-13, global experience indicates that PPPs work well when they combine the efficiency and risk assessment of the private sector with the public purpose of the government sector. They work poorly when they rely on the efficiency and risk assessment of the government sector and the public purpose of the private sector. India should be careful not to undertake PPPs that do not apportion risks and responsibilities sensibly. Moreover flexibility needs to be built into arrangements so that the contract can be withdrawn and put up for rebid when the private party underperforms. The early success of PPP projects in India was mainly due to the meeting of obligations by the stakeholder(s) in a timely manner as well as implementation of projects over reasonable timelines. However with economic slowdown, lower-than-expected demand for services and a sharp rise in input costs has started resulting in failure of contracting parties to meet their obligations as stipulated in the PPP agreements. As a result, the infrastructure gap has widened over the last few years. A model that depends on private capital may be difficult to implement if the companies executing infrastructure projects are financially stressed and not in a position to raise more funds in the absence of radical restructuring. Further, the execution, operation, and maintenance capacities of implementing agencies also need to be assessed and strengthened. The role of banks and financial institutions also needs a relook from the due diligence and appraisal perspective. Last but not the least, the ability of PPPs to become an efficient means of delivering public services will also crucially depend on the intention and spirit of all contractual parties to honour their respective commitments.

Infra Financing

11.57 Long-term finance for infrastructure projects is one of the issues that need to be addressed in the context of the limitation of banks to finance such projects. Infrastructure projects, given their long pay-back period, require long-term financing in order to be sustainable and cost effective. However, banks which have been the main source of funding for such projects are unable to provide long-term funding, given their asset-liability mismatch and the ceiling on their exposure limits. To address the problem of asset-liability mismatch, banks have a tendency to lend on floating rate basis which more often than not results in escalation of project cost because of interest rate fluctuations. Further, non-availability of products for hedging foreign exchange risks, especially long tenor loans as well as high cost of such hedging could be deterrent factor(s) in meeting the financing need of the infrastructure sector in the country. Absence of a well-developed corporate bond market has put additional burden on banks to meet the funding requirements of the corporate sector. A robust and transparent issuance and trading process, uniform stamp duty across states, a well-devised credit enhancement mechanism, an integrated trading and settlement

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A robust and transparent issuance and trading process, uniform stamp duty across states, a well-devised credit enhancement mechanism, an integrated trading and settlement mechanism are some of the issues which need to be suitably addressed for the development of the corporate bond market in India.

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11.58 Recognizing the constraint of incremental financing, banks have been permitted take out financing through the IDF route. IDFs have been put in place to channelize long-term debt from other sources, including domestic and foreign investors. Through innovative means of credit enhancement, policy interventions, and tax incentives, IDFs are expected to provide long-term low-cost debt for infrastructure projects by tapping into sources of savings like insurance and pension funds that have hitherto played a comparatively limited role in financing infrastructure. By refinancing bank loans of existing projects, IDFs are also expected to take over a fairly large volume of the existing bank debt that will release an equivalent volume for fresh lending to infrastructure projects. Besides augmenting debt resources for financing infrastructure, IDFs could also refinance PPP projects after their construction is completed and operations have stabilized. It may, however, be argued that after assuming risk till the long gestation projects come on stream and start generating revenues, banks may not be willing to trade good credit-risk projects for greenfield projects with much higher risk as envisaged under IDFs.

11.59 In the current global context, post the withdrawal of the stimulus package in the USA and other advanced economies, a major challenge for emerging market economies (EMEs) including India is to better equip themselves to face tight global financial and monetary conditions. However, in the background of unconventional monetary policies being adopted by developed countries and volatile capital flows, another challenge for EMEs is to devise unconventional development financing products with active support from multilateral development banks as well as international financial institutions for meeting the funding requirements of their infrastructure sector. The objective should be to devise mechanisms that can ensure flow of funds, especially if investments from conventional sources are not adequate for meeting the requirements of the infrastructure sector.