







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 (Figure 11.2). 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 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).

### Energy scenario during the Twelfth Five Year Plan and beyond

11.8 The Twelfth Plan has projected a total domestic energy production of 669.6 million tons of oil equivalent (MTOE) in 2016-17 and 844 MTOE in 2021-2. 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 in 2016-17 and 375.6 MTOE in 2021-2. Import dependence in case of crude oil and coal is projected to be about 78 per cent and 22.4 per cent respectively by 2016-17. Coal and lignite will continue to dominate the energy scenario and by 2021-2 the share of these two fuel products will be about 66.8 per cent in total commercial energy produced and about 56.9 per cent in total commercial energy supply by 2021-2. The share of crude oil in production and consumption is expected to be 6.7 per cent and 23 per cent respectively. Energy exploration and exploitation, capacity additions, clean energy alternatives, conservation, and energy sector reforms will, therefore, be critical for energy security. Box 11.1 gives a picture of energy pricing in India.

## POWER

### Generation

11.9 Electricity generation by power utilities during 2012-13 was targeted to go up by 6.05 per cent to

#### Box 11.1 : Energy Pricing

The government appreciates the economic role of rational energy pricing. Rational energy prices provide the right signals to both the producers and consumers and lead to a demand-supply match, providing incentives for reducing consumption on the one hand and stimulating production on the other. Aligning domestic energy prices with the global prices, especially when large imports are involved, may be ideal option as misalignment could pose both micro- and macroeconomic problems. At microeconomic level, underpricing of energy to the consumer not only reduces the incentive for being energy-efficient, it also creates fiscal imbalances. Leverages and inappropriate use may be the other implications. Underpricing to the producer reduces both his incentive and ability to invest in the sector and increases reliance on imports.

Over the years, India's energy prices have become misaligned and are now much lower than global prices for many products. The extent of misalignment is substantial, leading to large untargeted subsidies.

The government has taken several initiatives for rationalizing the energy prices in different sectors. The Integrated Energy Policy has outlined the broad contours of the pricing system for coal. The pricing of coal is done now on gross calorific value (GCV) basis with effect from 31 January 2012, replacing the earlier system of pricing on the basis of useful heat value (UHV) which takes into account the heat trapped in ash content also, besides the heat value of carbon content. The revision in the GCV is likely to increase the prices of domestic coal to some extent, but this is a desirable adjustment because domestic thermal coal, adjusted for quality differences, continues to be underpriced.

In case of petroleum products pricing, the government dismantled the Administered Pricing Mechanism in 2002. This decision, however, was not fully implemented and domestic pass through of global price increases remained low for petrol, diesel, kerosene, and LPG. On 25 June 2010, the government announced that the price of petrol was fully deregulated and the oil companies were free to fix it periodically. However, diesel price deregulation was deferred. In January 2013, the government announced the new roadmap providing for a gradual price increase for reducing diesel under-recoveries. Admissibility of subsidized number of liquefied petroleum gas (LPG) cylinders and prices of LPG have also recently been revised.

Pricing of gas is presently done under the New Exploration Licensing Policy (NELP). The government provides the operator freedom to sell the gas produced from the NELP blocks at a market-determined price, subject to the approval of pricing formula. The government is reviewing pricing under the price sharing contract (PSC) to clarify the extent to which producers will have the freedom to market the gas.

**Table 11.2 : Power Generation by Utilities (Billion KWh)**

Category	20011-12	April-December		Growth (per cent)
		2011-12	2012-13	
Power Generation	876.887	580.664	683.753	4.55
Hydroelectric#	130.510	100.178	92.543	(-)13.9
Thermal	708.806	454.404	561.879	8.55
Nuclear	32.286	21.183	24.653	3.54
Bhutan import	5.285	4.898	4.677	(-)7.49

Source : Ministry of Power;

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

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 (Table 11.2).

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 (Table 11.3).

11.11 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 (Table 11.4). 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

**Table 11.3 : Thermal power generation during April-December 2012**

Components	Generation (Billion KWh)	Growth (%)	PLF (in per cent)	
			Apr.- Dec. 2011	Apr.- Dec. 2012
Coal	488.92	13.90	72.23	69.49
Lignite	23.40	19.81	67.05	73.47
Gas Turbine	53.87	-25.49	62.01	43.62
Diesel	1.69	-6.44	-	-
Thermal Total	561.80	8.6	71.94	69.63

Source : Ministry of Power.

**Table 11.4 : PLF of Thermal Power Stations**

Category	2011-12	2011-12	(per cent)	
			2011-12 (Apr.- Dec.)	2012-13 (Apr.- Dec.)
i) State sector	66.75	68.00	66.50	65.01
ii) Central sector	85.12	82.12	80.16	78.80
iii) Private sector (Utilities)	76.70	76.19	78.10	79.03
<b>REGIONS</b>				
i) Northern region	78.75	77.48	77.19	69.67
ii) Western region	75.26	72.04	71.19	69.00
iii) Southern region	80.04	82.19	79.39	80.77
iv) Eastern region	66.21	63.51	61.37	61.99
v) North-eastern region	0	0	0	0
<b>All India</b>	<b>75.08</b>	<b>73.32</b>	<b>71.94</b>	<b>69.63</b>

Source : Ministry of Power.

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).

### Capacity Addition

11.12 The Eleventh Five Year Plan initially envisaged a capacity addition of 78,000 MW, of which 19.9 per cent capacity was hydro, 75.8 per cent thermal, and the rest nuclear. At the time of the Mid Term Appraisal (MTA) of the Eleventh Plan, the target was revised to 62,374 MW with the thermal, hydro, and nuclear segments contributing 50,757 MW, 8,237 MW, and 3,380 MW respectively. A capacity addition of 54,964 MW has been achieved during the Eleventh Plan. The capacity addition during the Twelfth Plan period is estimated at 88,537 MW comprising 26,182 MW in the central sector, 15,530

**Table 11.5 : Sector-wise and Fuel –wise capacity addition during April-December 2012 (MW)**

Sector	Thermal		Hydro		Nuclear		Total		Per cent to target
	Target	Actual	Target	Actual	Target	Actual	Target	Actual	
Central	4023.3	2660	645	264	2000	0	6668.3	2924	43.8
State	3951	1350	87	15	0	0	4038	1365	33.8
Private	7180	5495	70	70	0	0	7250	5565	76.8
<b>All India</b>	<b>15154.3</b>	<b>9505</b>	<b>802</b>	<b>349</b>	<b>2000</b>	<b>0</b>	<b>17956.3</b>	<b>9854</b>	<b>54.87</b>

Source : Ministry of Power.

MW in the state sector, and 46,825 MW in the private sector respectively. The capacity addition target for the year 2012-13 was set at 17,956 MW. As against it, a capacity of 9,854 MW has been added till 31 December 2012 (Table 11.5).

### Development of Hydro Power

11.13 As per a re-assessment study carried out by the Central Electricity Authority (CEA), the

**Table 11.6 : Exploitation of Hydroelectric Potential**

	No of projects/ schemes	Capacity (MW)
Under operation	180	39324
Under construction	51	13619
Approved by CEA	57	29443
Approved by CEA and yet to be taken up for construction	32	19259
Survey & investigation	97	20436
<b>Total</b>	<b>377</b>	<b>103019</b>

Source : Ministry of Power

identified hydroelectric potential of the country (having installed capacity above 25 MW) is 1,45,320 MW. As of now, 434 hydropower projects/schemes (Table 11.6) are at different stages of operation/ approval/investigation.

### Ultra Mega Power Project Initiatives

11.14 The Ministry of Power launched an initiative for development of coal-based super critical Ultra Mega Power Projects (UMPP) of about 4000 MW capacity each. Four UMPPs, viz. 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. Three

units of Mundra UMPP each of 800 MW have been commissioned in March, July, and October 2012. The fourth and fifth units are expected to achieve commercial operation in May and September 2013. 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).

### Transmission, Trading, Access, and Exchange

#### National Grid

11.15 An integrated power transmission grid helps to even out supply-demand mis-matches. The existing inter-regional transmission capacity of 27,750 MW connects the northern, western, eastern, and north-eastern regions in a synchronous mode operating at the same frequency and the southern region asynchronously operating in the same mode. This has enabled inter-regional energy exchanges of about 48,896 million units (MUs) during April-December 2012, thus contributing to better utilization of generation capacity and improvement in power supply position. Synchronous inter-connection of the southern region with other regions is expected to be established by Q1 of 2014.

#### Open access

11.16 Competition in the electricity sector has been augmented through open access, allowing a buyer to choose the supplier and a seller to choose the buyer. Open access at inter-state level is now fully functional. The facilitative framework created through the Central Electricity Regulatory Commission [CERC] (Open Access in Inter-State Transmission) Regulations 2008 has provided regulatory certainty for the sellers and buyers through market access and also the security of payment against default by buyers. During 2011-12,

24,111 inter-state short-term open access transactions (including bilateral and collective) were approved for sale of 66,987 MU. During 2012-13 (up to November 2012), sale of 48,008 MU has been approved through 21,185 inter-state bilateral and collective short-term open access transactions. The CERC also notified the regulations concerning grant of connectivity, long-term access, and medium-term open access in inter-state transmission in 2009 and regulations for approvals for execution of the inter-state transmission scheme in 2010 to ensure development of an efficient, reliable, coordinated, and economical inter-state electricity transmission system based on the long-term access sought by generation developers.

### Trading of Electricity

11.17 Trading in electricity is enabled through electricity traders and power exchanges. It optimizes generation resources by facilitating trade and flow of electricity across the country. It has helped in sale of surplus power by distributing utilities and captive power plants on one hand and purchase of power by deficit utilities on the other hand to meet sudden increases in demand. The short-term markets also provide generators with an alternative to sell power other than through long-term power purchase agreements (PPAs). The CERC has granted 61 inter-state trading licences, 45 of which were in existence as on 30 November 2012. There is a cap on trading margins to be charged by traders under the regulations. For short-term contracts with the per unit price of electricity being less than ₹ 3 (Rupees Three), the trading margin is 4 (four) paise per unit and for per unit price of electricity higher than ₹ 3, the trading margin is capped at 7 (seven) paise per unit.

### Aggregate Technical and Commercial losses and Restructured APDRP

11.18 The focus of the Restructured Accelerated Power Development Reforms Programme (R-APDRP) is on actual, demonstrable performance in terms of reduction in aggregate technical and commercial (AT&C) losses. Projects under the scheme are taken up in two parts in urban areas and cities with population of more than 30,000 (10,000 in case of special category states). Part-A of the scheme includes projects for establishment of baseline data and information technology (IT) application for energy accounting/auditing and IT-

based consumer service centres. Part-B of the scheme includes regular distribution-strengthening projects. So far (as on 30.11.2012) under Part-A(IT), projects worth ₹ 5,196 crore covering all the eligible towns (1,402) in 29 states/union territories(UTs), and under Supervisory Control and Data Acquisition, and projects worth ₹ 1,442 crore covering 63 towns in 15 states have been covered. Under Part-B, 1,132 projects worth ₹ 25,684 crore in 20 states have been sanctioned. Cumulatively an amount of ₹ 6,304 crore (as on 30.11.2012) has been disbursed under the R-APDRP for implementation of sanctioned projects. A proposal for continuing the R-APDRP during the Twelfth Plan for completing the ongoing works is under consideration in the Ministry of Power.

### Rural Electrification

11.19 The Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) was launched in April 2005 with the objective of providing all rural households access to electricity through the creation of an appropriate rural electricity infrastructure. Below poverty line (BPL) households are provided connections free of cost. The Government of India provides 90 per cent capital subsidy for projects under the scheme. The scheme was initially approved with a capital subsidy of ₹ 5,000 crore for the last two years of the Tenth Plan period ending March 2007. During the Eleventh Plan, 341 projects covering 46,141 un-electrified census villages, 2,37,981 partially electrified census villages, and free connections to 152.11 lakh BPL households were sanctioned. The revised cost of these projects is ₹ 20,906 crore. During 2011-12, an additional 72 projects covering 1,909 un-electrified census villages, 53,505 partially electrified census villages, and free connections to 45.59 lakh BPL households were sanctioned with a revised cost of ₹ 8,103 crore. As on 30 November 2012, electrification works in 1,06,116 un-electrified villages and intensive electrification in 2,73,328 partially electrified villages have been completed and free electricity connections to 202.60 lakh BPL households have been released. Capital subsidy of ₹ 26,664 crore has so far been utilized under the scheme.

## PETROLEUM

11.20 In order to meet the burgeoning demand for petroleum products in the country, the government has taken several measures to enhance exploration

and exploitation of petroleum resources including natural gas and coal bed methane (CBM), apart from improved distribution, marketing, and pricing of petroleum products. During financial year 2011-12, crude oil production was 38.09 million metric tonnes (MMT), with the share of national oil companies at 72.4 per cent. The projected crude oil production in 2012-13 is 42.31 MMT which is about 11.1 per cent higher than that in 2011-12. The increase in production is expected mainly on account of higher crude oil production from Barmer Fields, Rajasthan. Crude oil production by Cairn Energy India Pvt. Ltd. in Rajasthan started with effect from 29 August 2009 and reached 5.77 MMT during April-November 2012 against 4.26 MMT during the same period of 2011-12. Overall crude oil production during April-November 2012-13 at 25.39 MMT, however, shows a negative growth of 0.54 per cent over the same period of the previous year.

11.21 The average natural gas production in the year 2011-12 was 130 million metric standard cubic metre per day (MMSCMD) which was about 9 per cent lower than the previous year mainly due to lower production from the KG D6 deep-water block. The projected natural gas production in 2012-13 is about 117.8 MMSCMD, which is about 9 per cent lower than production in the previous year. Natural Gas production during April- November 2012-13 was 28.05 billion cubic metre (BCM) as compared to 32.28 BCM during the same period of the previous year.

### Exploration of Domestic Oil and Gas

11.22 The NELP was adopted in 1999. India has an estimated sedimentary area of 3.14 million sq. km, comprising 26 sedimentary basins. Prior to adoption of the NELP, only 11 per cent of Indian sedimentary basins were under exploration. Since the operationalization of the NELP in 1999, the government has awarded an area of 47.3 per cent of Indian sedimentary basin for exploration. So far, 117 oil and gas discoveries have been made in 39 NELP blocks. As on April 2012, about 737 MMT of oil equivalent hydrocarbon reserves have been added under the NELP. The investment made by Indian and foreign companies until April 2012 was of the order of US\$ 20.2 billion, of which US \$12.1 billion was on hydrocarbon exploration and US\$ 8.1 billion on development of discoveries. With a view to further accelerating the pace of exploration, in the ninth round of the NELP (NELP-IX), 34 exploration blocks

were offered. These include 8 deep-water blocks, 7 shallow-water blocks, 11 on-land blocks, and 8 Type-S on-land blocks. Nineteen production-sharing contracts have already been signed with the awardees. A total of 254 production-sharing contracts have been signed under the NELP so far.

### Domestic Exploration of other Gaseous Fuel CBM

11.23 India has the fourth largest proven coal reserves in the world and holds significant prospects for exploration and exploitation of 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. Out 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 resources in the country are about 92 trillion cubic feet (TCF), out of which only 8.92 TCF has so far been established. Commercial production of CBM in India has now become a reality with current production of about 0.28 MMSCMD.

### Shale Gas

11.24 Shale Gas can emerge as an important new source of energy in the country. 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 on-land, and Cauvery. The Director General 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), 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. A draft Shale Oil /Gas Policy was placed in the public domain by the government for inviting comments. The views/comments received from various stakeholders/agencies are under examination.



## Equity Oil and Gas from abroad

11.25 In view of an unfavourable demand-supply ratio of hydrocarbons in the country, acquiring equity oil and gas assets overseas is an important strategy for enhancing energy security. The government is encouraging national oil companies to aggressively pursue equity oil and gas opportunities overseas. ONGC Videsh Limited (OVL) has produced about 8.753MMT of oil and equivalent gas during the year 2011-12 from its assets abroad in Sudan, Vietnam, Venezuela, Russia, Syria, Brazil, South Sudan, and Colombia. The estimated crude oil and natural gas production in 2012-13 is about 6.865 MMT. The reasons for lower overseas production are geopolitical problems in South Sudan and Syria. Oil public-sector units (PSU), viz. OVL, India 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.

## Refining Capacity

11.26 The total refining capacity in the country increased from 187.4 MMT (as on 1.4.2011) to 215.1 MMT (as on 1.1.2013) and is projected to reach 218.4 MMT by the end of 2012-13 and 239.6 MMT in 2013-14 with capacity augmentation of existing refineries and commissioning of the Paradip Refinery. Refinery production (crude throughput) during 2011-12 was 211.4 MMT (including the Jamnagar Refinery under special economic zone [SEZ] by Reliance Industry Ltd.) showing an increase of 2.6 per cent compared to a production of 206.15 MMT in 2010-11. During the current financial year (April-November 2012-13), refinery production (crude throughput) is 141.45 MMT. The country is not only self-sufficient in refining capacity for its domestic consumption but also substantially exports petroleum products. During 2011-12, the country exported 60.84 MMT of petroleum products worth ₹ 2,66,486 crore.

## Pipeline Network and City Gas Distribution

11.27 There has been substantial increase in the pipelines network in the country with 32 product pipelines with a length of 11,274 km and capacity of 70.688 MMT at present. There are also 16 crude pipelines spreading over 8,558 km with capacity of 106.45 MMT. In addition, there are LPG pipelines of 2,313 km with 3.94 MMT capacity and gas pipelines of 13,428 km with 355MMSCMD capacity. The gas

pipeline infrastructure is being augmented with about 14,889 km of pipeline network with additional capacity to transport 264 MMSCMD of gas by 2015-16. In addition, around 4,300 km of pipeline network has been authorized by the Petroleum and Natural Gas Regulatory Board (PNGRB) which will further add capacity to transport 184 MMSCMD of gas.

11.28 With increased availability of gas in the country, the city gas distribution (CGD) network has been enlarged to cover various cities supplying gas for domestic consumers, public transport, and commercial/ industrial entities. At present, there are a total of 588 compressed natural gas (CNG) stations across the country. Vision- 2015 envisages providing piped natural gas (PNG) to more than 200 cities across the country. The current consumption of gas in the CGD network is around 14 MMSCMD, of which 6.63 MMSCMD is from regasified liquefied natural gas (RLNG). At present, there are a number of entities operating in 43 geographical areas (GAs). The PNGRB has recently invited bids for authorization of CGD in these cities. The CGD sector comprises CNG and PNG customers. The PNGRB has envisaged a rollout plan of CGD network development through competitive bidding in more than 300 possible GAs on the basis of expressions of interest (EOI) submitted to the Board.

## Rajiv Gandhi Gramin LPG Vitaran Yojna

11.29 The 'Vision-2015' adopted for the LPG sector inter alia focuses on raising the LPG population coverage in rural areas and areas where LPG coverage is low. The Rajiv Gandhi Gramin LPG Vitaran Yojana (RGGLVY) for small-size LPG distribution agencies has been launched in 2009. Under this scheme 75 per cent population is to be covered by 2015 by releasing 5.5 crore new LPG connections. To ensure that growth of LPG usage is evenly spread, public-sector oil marketing companies (OMCs) are assessing/identifying locations in a phased manner under the RGGLVY. OMCs have undertaken to set up 5,261 LPG distributors in 29 states. Out of this 1,591 LPG distributors had already been commissioned as on November 1, 2012. Selection for the rest of the locations is in progress as per policy.

## Direct Transfer of Cash- LPG Scheme

11.30 In order to check leakages, adulteration, and inefficiency resulting from the current system of delivery of subsidized products, the Government of

India set up a task force for evolving a suitable mechanism for direct transfer of subsidies to individuals/families, who are entitled to subsidized kerosene, LPG, and fertilizers. A pilot project was launched at Mysore. So far details of 35,000 customers have been collected. Of these, nearly 18,000 have authenticated Aadhaar numbers. As on 25 November 2012, OMCs had completed more than 35,000 successful biometric-authenticated deliveries. Modalities on subsidy payment as token amount (₹ 10) have been finalized with sponsor bank and participating banks using the Aadhaar Payment Bridge. It has now been decided to close the Mysore Pilot Project as Mysore is one of the 51 districts selected for roll-out under the wider direct benefit transfer scheme.

## COAL

11.31 The production of coal was estimated at 540 MT in 2011-12. The production of raw coal during April-December 2012 was estimated to be 384.1 MT (including coking grade coal of 35.3 MT) compared to 359.6 MT (including 33.2 MT of coking grade coal) during the corresponding period of the previous year. Domestic production however was inadequate and had to be supplemented with imports of 102.85 MT in 2012-13 (up to December 2012). Coal is largely sold through a notified price. At the same time, under the e-auction system (which enables price discovery through a market-based process), Coal India Ltd. (CIL) and Singareni Collieries Company Limited (SCCL) sold 57.27 MT and 2.91 MT of coal (spot and forward) respectively in 2011-12. During April-December 2012, CIL sold 33.84 MT of coal through e-auction at an average price which was 48.65 per cent above the notified price. Average e-auction price was nearly 80 per cent higher than the notified price for SCCL for its 2.61 MT of coal sales through e-auction.

11.32 During the Twelfth Plan period, the demand for coal is projected to reach 980 MT, whereas domestic production is expected to touch 795 MT in the terminal year (2016-17). Even though the demand gap will need to be met through imports, domestic coal production will also need to grow at an average rate of 8 per cent compared to about 4.6 per cent in the Eleventh Five Year Plan. It is envisaged that even as public-sector companies, particularly the CIL will continue to play a major role in achieving the domestic coal-production targets, investment by the private sector including

investment in new coal blocks for captive end users will be necessary.

11.33 In order to achieve the necessary impetus, the focus is on addressing both the short-run constraints on mining and evacuation of coal as also on long-term measures for enhancing production capacity. As an immediate measure, the government has issued specific guidelines for granting environment clearance for one-time production capacity expansion of up to 25 per cent in existing mines. In order to attract greater investment in coal mining, the pace of exploration and drilling will need to be scaled up. Apart from emphasis on coal production, efforts are also under way to increase the capacity for coal washing, CBD, underground coal gasification, and clean coal technologies. The positive aspect of the large investment requirements in the coal sector is the spin-off effects that it would have on associated sectors such as equipment manufacturing, supply, maintenance, project design, and execution.

## TRANSPORT SECTORS

### Railways

11.34 The Twelfth Five Year Plan (2012-2017) has envisaged an integrated approach for the transport sector as a whole. The vision for transport is to be guided by a modal mix that will lead to an efficient, sustainable, economical, safe, reliable, environment-friendly, and regionally balanced transport system. In line with the objectives of the Plan, Indian Railways aims at developing a strategy to build up the rail network to be part of an effective multi-modal transport system.

### *Freight Performance of the Indian Railways*

11.35 Freight loading by Indian Railways during the fiscal 2011-12 increased to 969.1 MMT against 921.7 MMT in 2010-11, registering an increase of 5.1 per cent. The freight traffic target for the year 2012-13 was fixed at 1,025 MMT (Budget Estimates [BE]). During April-November 2012, Indian Railways carried 647.1 MMT of revenue-earning freight traffic (an increase of 4.7 per cent) compared to 618.05 MMT carried during the corresponding period of the previous year. The moderate growth in freight traffic may be attributed not only to the overall slowdown in the economy but also to other factors like a ban on iron ore exports from Karnataka and reduced imports of fertilizers.

### *Rationalization of Railway Freight and Passenger Fare*

11.36 While Indian Railways' input costs increased by 10.6 per cent per annum between 2004-5 and 2010-11, passenger fares remained unchanged or were even reduced in lower classes thereby constraining internal resource generation, essential for replacement /renewal of assets, operation and maintenance activities, and critical safety and passenger amenity works. Further, cross-subsidy through the freight business was no longer viable due to fast evolving competition from other modes of transport. Keeping these factors in mind, an increase in passenger fares was announced on 9 January 2013, effective from the midnight of 21-22 January 2013. While second class ordinary (suburban) fares were raised by 2 paise per km, second class ordinary (non-suburban) fares were increased by 3 paise per km and second class (mail/express) fares by 4 paise per km. For the sleeper class the increase was 6 paise per km; For AC chair car, AC 3-tier, and AC first class, fares were hiked by 10 paise per km, while for first class and AC 2-tier, the increase was 3 paise and 6 paise per km respectively. A rationalized freight tariff structure was also brought into effect from 6 March 2012.

### *Upgradation of Passenger Amenities*

11.37 The Adarsh stations scheme was introduced in 2009. Adarsh stations are provided with basic facilities such as drinking water, functioning toilets, catering services, waiting rooms and dormitories especially for lady passengers, and better signage. A total of 976 stations have been identified for development as Adarsh stations, of which 616 have so far been developed. The Computerised Unreserved Ticketing System (UTS) was made available at 5,560 locations with 10,172 counters by end-November 2012. About 250 additional automatic ticket-vending machines (ATVMs) were commissioned during 2012-13 taking the total tally of installed ATVMs to 808. The Freight Operation Information System (FOIS) gives an account of all demands, number of loads/rakes/trains and their pipelines, freight locos, and stock at aggregate level. The Rake Management System (RMS) module of FOIS has been implemented at 246 locations and it covers all major yards/lobbies and control offices at various divisions and zones of Indian Railways. Box 11.2 discusses the Dedicated Freight Corridor Project initiative of Indian Railways.

### *New Initiatives by Indian Railways*

- Kisan Vision Project: To encourage setting up of cold storage and temperature-controlled perishable cargo centres through PPP mode,

## **Box 11. 2 : Dedicated Freight Corridor Project**

The Eastern and Western Dedicated Freight Corridors (DFC) are a mega rail transport project being undertaken to increase transportation capacity, reduce unit costs of transportation, and improve service quality. The Eastern DFC (1839 route kilometres [RKM]) extends from Dankuni near Kolkata to Ludhiana in Punjab, while the Western DFC (1499 RKM) extends from the Jawahar Lal Nehru Port (JNPT) in Mumbai to Dadri /Rewari near Delhi. A special purpose vehicle, the Dedicated Freight Corridor Corporation of India Limited has been set up to implement the project. Out of 10,703 ha of land to be acquired for the project, 7,768 ha (73 per cent) has already been awarded under the Railway Amendment Act (RAA) 2008. The Eastern and Western DFC projects are being funded through a mix of bilateral/multilateral loans, gross budgetary support (GBS), and PPP. The Western DFC is being funded by the Japan International Cooperation Agency (JICA) up to 77 per cent of the total cost. Funding has been tied up and award of civil contract of 900 km is in process. The remaining portion of the project construction cost will be borne by the Ministry of Railways as equity funding. The Ludhiana to Mughalsarai section (1183 km) of the Eastern DFC is being funded by the World Bank up to 66 per cent of the project cost. Funding for the first sector, viz. Khurja-Kanpur (343 km), has been tied up and award of civil contract is under way. Funding tie up with the World Bank for the remaining sectors is also in process. The Mughalsarai-Sonnagar sector (122 km) will be funded by Indian Railways' own resources. Civil construction work of this sector is in progress. The Dankuni-Sonnagar section (534 km) of the Eastern DFC will be implemented through PPP mode.

Apart from the Eastern and Western DFCs, a feasibility study has also been undertaken on four future freight corridors, viz. East-West Corridor (Kolkata-Mumbai), North-South Corridor (Delhi-Chennai), East Coast Corridor (Kharagpur-Vijayawada) and Southern Corridor (Goa-Chennai). A pre-feasibility study of the Chennai-Bangalore Freight Corridor is also being proposed. After commissioning of the Eastern and Western DFCs, it is planned to upgrade the speed of passenger trains to 160-200 kmph on the existing routes. A feasibility study for upgradation of speed of passenger trains to 160-200 kmph on the existing Delhi-Mumbai route has been undertaken with co-operation from the Government of Japan in 2012-13.

logistics based PSUs including the Container Corporation of India Limited, Central Warehousing Corporation, and Central Rail-side Warehouse Company Limited have been asked to provide infrastructure at six Indian Railways locations under a pilot project--the Kisan Vision Project. Of the six locations, so far Singur (West Bengal) and Nasik (Ojhar in Maharashtra) are in operation, while New Jalpaiguri (West Bengal), Dankuni (West Bengal), and New Azadpur (Adarsh Nagar, Delhi) are under process and will shortly be completed. Macheda (West Bengal) being not a remunerative project, was not found to be a potential location for setting up a perishable cargo shed.

- High-speed passenger trains: Indian Railways is adopting a multi-pronged strategy to provide safer, faster, cleaner, and more comfortable passenger trains. Seven corridors have been identified for conducting pre-feasibility studies for running high-speed trains (popularly referred to as bullet trains) at speeds above 350 kmph. These corridors will be set up through PPP route. Initially, the Mumbai-Ahmedabad corridor has been taken up for which the pre-feasibility study has been completed. Work is in progress in respect of the remaining corridors. A study is also being done on the Delhi-Mumbai route for raising the speed of passenger trains from 160 kmph to 200 kmph, i.e. for running semi-high speed trains.
- Induction of LHB Coaches: Linke Holfmann Busch (LHB) coaches are being inducted in train services including existing and certain important Rajdhani and mail/express trains. Till December 2012, LHB coaches had been inducted in about 14 Rajdhani, 12 Shatabdi, and 11 AC Duronto services. LHB coaches have higher carrying capacity, better riding comfort, higher-speed potential, longer life, upgraded amenities, provision of control discharge toilet system, lower maintenance requirement, enhanced safety features, and aesthetic interiors. A rail coach factory at Palakkad has been sanctioned in PPP mode for production of such coaches.
- Introduction of bio-toilets: With a commitment to providing hygienic environment to its passengers and staff, Indian Railways along with the Defence Research and Development Organization (DRDO) has developed

environment-friendly bio-toilets for its passenger coaches. Eight trains are running with 436 bio-toilets. A complete switch-over to bio-toilets in new coaches has been planned by 2016-17 and Indian Railways has targeted elimination of direct discharge passenger coach toilet systems by the end of the Thirteenth Five Year Plan (2021-22).

## Roads

11.38 National Highway Development Projects: As of now about 24 per cent of the total length of National Highways (NHs) is single lane/intermediate lane, about 51 per cent is two-lane standard, and the balance 25 per cent is four-lane standard or more. In 2012-13, the achievement under various phases of the National Highways Development Project (NHDP) up to December 2012 has been about 1,605 km and projects have been awarded for a total length of about 878 km (Table 11.7).

### Financing of NHDP

11.39 A part of the fuel cess imposed on petrol and diesel is allocated to the National Highways Authority of India (NHAI) for funding the NHDP. The NHAI leverages the cess resources 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, tax-free bonds, and short-term overdraft facility. The 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\$ 149.78 million from the ADB for the Manor Expressway Project (Table 11.8). Initiatives taken by the NHAI for speeding up the roads programme are summarized in Box 11.3.

### Development of Roads in Left Wing Extremism-affected areas

11.40 The government on 26 February 2009 approved the Road Requirement Plan (RRP) for upgrading of 1,126 km NHs and 4351 km state roads (total 5,477 km) to two-lane at a cost of ₹ 7,300 crore in 34 districts affected by left-wing extremism (LWE) in Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha,

**Table 11.7 : NHDP Projects as on December 2012**

Sl. No.	NHDP components	Total Length (km)	Completed 4/6 Lane (km)	Under implementation		Balance for Award of Civil Work (km)
				Length (km)	No. of Contracts	
1	GQ	5846	5846	0	8	-
2	NS-EW	7142	6053	722	59	367
3	Port Connectivity	380	368	12	3	0
4	Other NHs	1390	964	406	4	20
5	SARDP-NE	388	49	63	2	276
6	NHDP Phase III	12109	4602	5734	90	1773
7	NHDP Phase IV	20000	62	4300	31	15638
8	NHDP Phase V	6500	1276	2804	28	2420
9	NHDP Phase VI	1000	-	-	-	1000
10	NHDP Phase VII	700	19	22	2	659
11	NH 34	5.5	-	5.5	1	-
<b>Total</b>		<b>55460.5</b>	<b>19239</b>	<b>14068.5</b>	<b>228</b>	<b>22153</b>

Source : Ministry of Road Transport and Highways (MoRT&H).

Notes : GQ—Golden Quadrilateral connecting Delhi, Mumbai, Chennai, and Kolkata; NS-EW—North-South and East-West corridor; SARDP-NE—Special Accelerated Road Development Programme in the North-Eastern Region.

**Table 11.8 : Financial Structure of NHAI (₹ crore)**

Year	Cess Fund	External assistance		Ploughing back of funds deposited by NHAI in CFI	Borrowings 54-EC Bonds	Budgetary Support
		Grant	Loan			
2005-06	3269.70	2350.00	600.00		1289.00	802.00
2006-07	6407.45	1582.50	395.50		1500.00	570.67
2007-08	6541.06	1776.00	444.00		305.18	559.00
2008-09	6972.47	1515.00	378.80		1630.74	159.00
2009-10	7404.70	272.00	68.00		1153.63	200.00
2010-11	8440.94	320.00	80.00	1623.00	2160.10	843.00
2011-12	6187.00	-	-	2692.89	12511.52 <sup>#</sup>	1212.21
2012-13*	6003.00			1777.00	1868.85	550.00

Source : MoRT&H.

Notes : <sup>#</sup>including tax-free bonds of ₹ 10,000 crore;

\* up to December 2012; CFI—Construction Federation of India.

and Uttar Pradesh for inclusive growth of these areas. The Ministry of Road Transport & Highways (MoRT&H) entrusted with the responsibility of developing these roads, has set up a LWE division under the Chief Engineer for sanctioning and implementing the above programme through respective PWDs. Detailed estimates for 5,419 km length have been sanctioned at an estimated cost of ₹ 7,699 crore and works on 5,049 km

length costing ₹ 6,853 crore have been awarded. Development of 1,960 km length had been completed up to December 2012 with a cumulative expenditure of ₹ 2,494 crore incurred so far. The development of roads under the programme is scheduled to be completed by March 2015. RRP-II covering a length of 5,624 km at an estimated cost of ₹ 9,400 crore is under consideration of the government.

**Box 11.3 : Initiatives taken by the Government to expedite projects under NHDP**

- The NHAI Board has approved formation of a High Level Expert Settlement Advisory Committee for one-time settlement of old cases pending in courts. The claims shall be resolved as one-time settlement and strategy would vary based on commonality of issues across contracts or could be based on optimum settlement with firms or groups with significant stakes collectively through appraisal of merits, risks, and settlement through stages of negotiations.
- As a new initiative for promoting highway development, the mode of engineering procurement and construction (EPC) contracts is being brought in. Projects that are not viable under BOT (toll) mode, such as those in far-flung areas, would have to be undertaken under EPC mode. To overcome the economic slowdown in this sector, the MoRT&H has finalized a proposal for awarding projects under new modified turnkey EPC mode under 100 per cent government funding in cases where there are no takers under BOT (toll) mode. This mode of delivery will also take care of cost and time overruns.
- In order to remove the bottlenecks and ensure seamless movement of traffic and collection of toll as per the notified rates, the government had decided to introduce passive radio frequency identification (RFID) based on electronic toll collection.
- In order to relax the condition of mandatory environment clearance (EC) for areas less than 5 hectare, the Ministry of Environment and Forests (MoEF) has been requested not to insist on EC for the earth/soil because all highway projects commence only after obtaining necessary environment clearance for the project whereby the conditions stipulated by the MoEF for borrow areas are adhered to by the concessionaires.
- The NHAI has recently taken up award of select highway projects to private-sector players under an operate, maintain, and transfer (OMT) concession. Till recently the tasks of toll collection and highway maintenance were entrusted to tolling agents/ operators and subcontractors, respectively.
- State governments have been requested to constitute high-level committees under their Chief Secretaries (as Nodal Officers) with the NHAI's Regional Officer as Member-Secretary, for monitoring pre-construction activities for NHAI projects. Most states have constituted the committees.

In order to speed up the implementation of projects mandated to the NHAI by the government and for ensuring better and closer liaison with the state governments for expediting the pre-construction activities of the projects, it was decided to establish 17 Regional Offices headed by Chief General Managers CGMs at various locations in the country. Substantial financial powers have been delegated to Regional Officers for facilitating speedy processing/ approvals for acquisition of land.

### Prime Minister's Reconstruction Plan for J&K

11.41 The Hon'ble Prime Minister announced a Reconstruction Plan (PMRP) for Jammu and Kashmir during his visit to the state on 17 and 18 November 2004. Construction of Mughal Road, widening of Domel-Katra road (NH-1C), double-laning of Batote-Kishtwar-Sinthanpass-Anantnag Road (NH-1B), upgrading of Srinagar-Uri Road (NH-1A), construction of Khanabal--Pahalgam Road, construction of Narbal-Aangmarg Road and double-laning of Srinagar-Kargil-Leh Road (NH-1D) are the seven works under this project amounting to ₹ 3,300 crore. An expenditure of around ₹ 2,708 crore has already been incurred. Besides, ₹ 178.6 crore has been allocated to the State of J&K for work being executed on NHs through the BRO. Under the Central Road Fund (CRF) another ₹ 113.58 crore has been allocated for work on state and other district roads (ODR).

### Civil Aviation

#### *Air Passenger and Cargo Traffic*

11.42 Domestic passenger traffic handled at Indian airports reached 106 million during January to November 2012. This is marginally lower than the domestic passenger traffic throughput of 108 million for the same period during 2011. International passenger traffic handled at Indian airports was placed at 37.8 million during January-November 2012 as against 36.20 million during the corresponding period of the previous year. International cargo throughput at Indian airports during January-November 2012 was 1.30 MMT as compared to 1.37 MMT during the previous year. Domestic cargo throughput during January-November 2012 stood at 0.73 MMT, almost the same as in the corresponding period of the previous year.

### Air India

11.43 The Government of India approved a Turn Around Plan (TAP) and a Financial Restructuring Plan (FRP) for improving the operational and financial performance of Air India (AI) in April 2012. The company has taken several initiatives towards cost cutting and revenue enhancement during the year 2011-12, covering route rationalization, phasing out and grounding of old fleet, freezing of employment in non-operational areas, leveraging assets of the company to increase MRO (maintenance, repair, and overhaul) revenue and revenue from the company's real estate properties. The TAP also included operationalization of subsidiary companies in ground handling and MRO and transfer of manpower and equipment so that these could be treated as independent profit centres. An Oversight Committee in the Ministry of Civil Aviation has been constituted to closely monitor the performance of AI vis-à-vis milestones set in the TAP. For the first half of the year, performance has been in line with the target set in the TAP. AI has registered an all-round enhanced performance such as on-time performance at 85 per cent, passenger load factor at 70.9 per cent, and yield at ₹ 4.31 per revenue passenger kilometre. It is expected that the company will achieve positive EBIDTA (earnings before income, taxes, depreciation and Amortization) in the results for the Financial Year 2012-13.

### Airport Infrastructure

11.44 The Airports Authority of India (AAI) is a major airport operator managing 125 airports across the country and 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. The Twelfth Five Year Plan (2012-17) envisages an investment of ₹ 65,000 crore at Indian airports, of which a contribution of about ₹ 50,000 crore is expected from the private sector. The AAI has completed expansion and upgradation of two metro airports at Kolkata and Chennai at the cost of ₹ 2,325 crore and ₹ 2,015 crore respectively. In addition, restructuring and modernization of Delhi and Mumbai airports has also been undertaken at a cost of about ₹ 25,000 crore with state-of-the-art facilities. Expansion of Bangalore International Airport Ltd. (BIAL) has been undertaken at an estimated cost of ₹ 1,479 crore.

11.45 Development of 35 selected non-metro airports has been undertaken by the AAI which have been identified based on regional connectivity, development of regional hubs, places of major tourist attraction, and potential for development as business hubs. Projects at 28 airports have been completed.

### Ports

11.46 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

**Table 11.9 : Traffic Handled at Indian Ports (Thousand Tonnes)**

Major/Non-Major Ports	Traffic Handled				Growth over previous year/period			
	2010-11	2011-12	April-September 2011-12	April-September 2012-13	2010-11	2011-12	April-September 2011-12	April-September 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

Source : Indian Ports Association

Note : Figures within parenthesis indicate percent share in total cargo traffic for Major and Non Major ports respectively. (P) : Provisional

(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).

11.47 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.

## TELECOMMUNICATION

11.48 The telecom sector has been one of the fastest growing sectors in recent years. It is now the second largest telephone network in the world, after only China. A series of reform measures by the government, wireless technology, and active participation by the private sector played an important role in the exponential growth of the telecom sector in the country. Tele-density, which shows the number of telephones per 100 persons, was 76.75 per cent at the end of October 2012. With the growth of mobile telephony due to easy access and affordability, the number of landline telephones has declined from 32.17 million as on end March 2012 to 30.95 million as on 31 October 2012. Wireless telephones now account for 96.7 per cent of all telephones. The share of the private sector, in terms of number of subscribers, has increased from 86.3 per cent to 86.6 per cent during the period from April to June 2012 and is currently placed at 86.1 per cent (end- October 2012) (Table 11.10). Broad features of the National Telecom Policy-2012 (NTP-2012) are summarized in Box 11.4.

11.49 Since the announcement of the Broadband Policy in 2004, several measures have been taken to promote broadband penetration in the country. As a result, there were 22.86 million internet subscribers including 13.79 million broadband subscribers at the end of March 2012. Broadband subscribers increased to 14.81 million by the end

**Table 11.10 : Telephone Connections & Tele-density**

	At the end of March (in million)			As on 31st Oct. 12
	2010	2011	2012	
Total telephones	621.28	846.33	951.35	935.18
Landline telephones	36.96	34.73	32.17	30.95
Wireless telephones	584.32	811.60	919.17	904.23
Rural telephones	200.77	282.29	330.83	344.49
Urban telephones	420.51	564.04	620.52	590.68
Telephones of Private Sector ( % share)	515.41	720.32	821.08	805.21
	<b>(82.96%)</b>	<b>(85.11%)</b>	<b>(86.31%)</b>	<b>(86.10%)</b>
Telephones of Public Sector( % share)	105.87	126.01	130.27	129.97
	<b>(17.04%)</b>	<b>(14.89%)</b>	<b>(13.69%)</b>	<b>(13.90%)</b>
Rural tele-density in%	24.31	33.83	39.26	40.66
Urban tele-density in %	119.45	156.93	169.17	159.15
Overall tele-density in %	<b>52.74</b>	<b>70.89</b>	<b>78.66</b>	<b>76.75</b>

Source : Department of Telecom (DOT).



**Box 11.4 : NTP-2012**

The Government approved National Telecom Policy (NTP) 2012, which addresses the vision, strategic direction, and the various medium- and long-term issues related to the telecom sector, on 31 May 2012. NTP-2012 is aimed at maximizing public good by making affordable, reliable, and secure telecommunication and broadband services available across the country. The objectives of NTP-2012 include the following:

- Provide secure, affordable, and high-quality telecommunication services to all citizens.
- Strive to create One Nation-One Licence across services and service areas.
- Achieve One Nation-Full Mobile Number Portability and work towards One Nation-Free Roaming.
- Increase rural tele-density from the current level of around 39 to 70 by the year 2017 and 100 by the year 2020.
- Recognize telecom, including broadband connectivity, as a basic necessity like education and health and work towards 'Right to Broadband'.
- Provide affordable and reliable broadband-on-demand by the year 2015 and to achieve 175 million broadband connections by the year 2017 and 600 million by the year 2020 at minimum 2 Mbps download speed and make available higher speeds of at least 100 Mbps on demand.
- Provide high-speed and high-quality broadband access to all village panchayats through a combination of technologies by the year 2014 and progressively to all villages and habitations by 2020.
- Recognize telecom as an infrastructure sector to realize the true potential of information communication technology (ICT) for development
- Address right-of-way (RoW) issues in setting up of telecom infrastructure.
- Mandate an ecosystem for ensuring setting up of a common platform for interconnection of various networks for providing non-exclusive and non-discriminatory access.
- Strive for enhanced and continued adoption of green policy in telecom and incentivize use of renewable resources for sustainability
- Achieve substantial transition to the new Internet Protocol (IPv 6) in the country in a phased and time-bound manner by 2020 and encourage an ecosystem for provision of a significantly large bouquet of services on the IP platform.

of October 2012. Special efforts are being made to increase the penetration of broadband, especially in rural and remote areas. The government has approved a project at a cost of ₹ 20,000 crore for creating a National Optical Fiber Network (NOFN) which will provide broadband connectivity to 2.5 lakh gram panchayats for various applications like e-health, e-education, and e-governance. The project is being funded under the Universal Service Obligation Fund (USOF).

**USOF**

11.50 With the objective of promoting rural telephony, the government formed a Universal Service Obligation Fund (USOF). Under the Shared Mobile Infrastructure Scheme of USOF 7,310 towers were set up by the end of November 2012 and 15,971 base transceiver stations commissioned by service providers at these towers for provisioning of mobile services. Under another scheme for village public telephones (VPTs), at the end of November 2012 a total of 5,81,572 (97.97 per cent) villages had been covered. VPTs are likely to be provided in the remaining inhabited revenue villages by March 2013 through the ongoing USOF scheme for provision of

VPTs in newly identified uncovered villages as per Census 2001.

11.51 For providing broadband connectivity to rural and remote areas, the USOF signed an agreement with Bharat Sanchar Nigam Limited on 20 January, 2009 under the Rural Wireline Broadband Scheme to provide wire-line broadband connectivity (with a speed of at least 512 kbps, always on) to rural and remote areas by leveraging the existing rural exchanges infrastructure and copper wire-line network. As on 31 August 2012, a total of 3,91,245 broadband connections had been provided and 10,076 kiosks set up in rural and remote areas.

**URBAN INFRASTRUCTURE****Urban Infrastructure and Governance**

11.52 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) to encourage cities to initiate steps for bringing improvements in a phased manner in their civic service levels. The government has extended the tenure of the Mission

for two years, i.e. from 1 April 2012 to 31 March 2014. The components under the sub-mission Urban Infrastructure and Governance (UIG) include 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 for the Mission period is ₹ 31,500 crore. A sum of ₹ 6,340 crore (BE) has been provided for the year 2012-13. The JNNURM has also emphasized the implementation of three key mandatory pro-poor reforms to enhance the capacity of urban local bodies (ULBs):

- Internal earmarking within local body budgets for basic services to the urban poor.
- Earmarking of at least 20-25 per cent of developed land in all housing projects (both public and private agencies) for the economically weaker sections (EWS)/ low income groups (LIG) category.
- Implementation of a seven-point charter for provisioning of seven basic entitlements/ services.

11.53 All the selected 65 cities under the UIG component of the JNNURM have prepared comprehensive city development plans (CDPs), charting their long-term vision and goals in urban governance and development. These plans include investment plans, with a focus on provision of city-wide urban services such as water supply, sanitation, drainage, and provision of basic services to the urban poor. During the Mission period, highest priority has been accorded to water supply, sanitation, and storm-water drainage sectors that directly benefit the urban poor. As on December 2012, more than 91 per cent of the seven-year additional central assistance (ACA) allocation of ₹ 31,500 crore had been committed.

11.54 A total of 551 projects (as on 31 December 2012) have been sanctioned at an approved cost of ₹ 61,772.9 crore for the listed 65 mission cities across 31 states/ union territories (UTs). The ACA committed for these projects including assistance for the buses sanctioned under the second stimulus package is ₹ 30,689.7 crore. As on 31 December 2012, a sum of ₹ 20,145.2 crore had been released as ACA. During April-December 2012 ₹ 1326.7 crore was released as ACA for the projects sanctioned under the JNNURM. Out of these 551 projects

approved under the UIG, 165 are reported to have been completed.

11.55 The JNNURM has also undertaken an exercise for assessment of finances and creditworthiness of the Mission ULBs through a process of credit rating. This is intended to trigger the process of leveraging debt for JNNURM projects and provide a platform for the ULBs and financial institutions to engage on issues related to project financing. Presently 65 ULBs in the Mission cities have been assigned final ratings that have been made public. As a follow up, surveillance rating has been initiated to affirm the rating and assess improvements undertaken. So far, 62 ULBs have undergone surveillance rating.

### Urban Infrastructure Development Scheme for Small and Medium Towns

11.56 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 ULBs need to sign memorandums of agreement committing to the implementation of the reforms. From its inception in December 2005 till December 2012, 807 projects across 672 towns and cities at a cost of ₹14,021 crore had been sanctioned under the UIDSSMT. Committed ACA for the approved projects is ₹ 11,358.3 crore, against which ₹ 9465.2 crore had been released till 31 December 2012. 305 projects are reported to have been completed.

### Urban Transport

11.57 Urban transport is one of the key elements of urban infrastructure. In order to provide better transport, proposals for bus rapid transit system (BRTS) were approved for Ahmedabad, Bhopal, Indore, Jaipur, Pune-Pimpri-Chinchwad, Rajkot, Surat, Vijayawada, Vishakhapatnam, and Kolkata under the JNNURM, covering a total length of 467.4 km at an estimated cost of ₹ 5,211.6 crore with admissible central financial assistance of ₹ 2,373.4 crore. In addition, BRTS is also planned in Naya Raipur and Hubli-Dharwar with loan from the World Bank. Purchase of 15,260 buses at a total cost of ₹ 4,724 crore has been approved under the scheme, with admissible ACA amounting to

₹ 2,092.1 crore. Till November 2012, more than 12,620 modern intelligent transport system (ITS)-enabled low-floor and semi-low-floor buses have been delivered to the states/cities.

### Metro Rail Projects

11.58 In order to give proper legal cover to metro/mono-rail projects, the Metro Railways Amendment Act 2009 was brought into effect in September 2009, providing an umbrella 'statutory' safety cover for metro rail work in all the metro cities of India. The Act has been extended to the National Capital Region, Bengaluru, Mumbai, Chennai, Hyderabad, Kochi, and Jaipur metropolitan areas. The Bangalore Metro Rail Project of 42.3 km length is targeted for completion by December 2013. The first leg of 7 km has already been commissioned on 20 October 2011. The government had earlier approved the implementation of the East-West Metro Corridor of 14.67 km length in Kolkata by Kolkata Metro Rail Corporation Ltd. (KMRCL). The project is targeted for completion by 31 January 2015. The Chennai Metro Rail Project of 46.5 km length by Chennai Metro Rail Ltd. (CMRL) at a total estimated cost of ₹ 14,600 crore is targeted for completion by 31 March 2015. Recently the 103.5 km Phase III of Delhi Metro at a total cost of ₹ 35,242 crore has also been approved and is targeted for completion by 2016. The metro extension to Faridabad has also been sanctioned. In addition, the government has also approved the extension of Delhi Metro from Dwarka to Najafgarh (5 km), Yamuna Vihar to Shiv

Vihar (2.7 km), and Mundka to Bahadurgarh (11.50 km) as part of Delhi Metro Phase III, this year. The Kochi Metro Rail Project of 25.6 km by Kochi Metro Rail Limited (KMRL) at a completion cost of ₹ 5,181.8 crore has also been approved. In addition, metro rail projects have been taken up in Mumbai on PPP basis for Versova-Andheri-Ghatkopar (11.07 km) and Charkop to Mankhurd via Bandra (31.87 km) and in Hyderabad (71.16 km) with viability gap funding (VGF) from the Government of India. Presently the Government of Rajasthan is implementing 7 km of metro rail with funding entirely from the state government.

### Credit flow to infrastructure sector

11.59 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 provides financial assistance up to 20 per cent of the project cost both through direct lending to project companies and by refinancing banks and financial institutions. The IIFCL raises funds from both domestic and overseas markets on the strength of government guarantees. It has sanctioned loans aggregating ₹ 40,373 crore for 229 projects involving a total investment of ₹ 3,52,047 crore and disbursed ₹ 20,377 crore till 31 March 2012. The IIFCL is expected to graduate in the Twelfth Plan from the existing role of a normal lender to that of a catalyst mobilizing additional resources for financing of infrastructure. This could be achieved by the IIFCL

**Table 11.11 : Sectoral share and growth rate of credit- Infrastructure (₹ crore)**

	2010-11		2011-12				2012-13		
	2010-11	2011-12	Q1	Q2	Q3	Q4	Q1	Q2	Q3
<b>Infrastructure</b>	4640.08	5745.35	5477.70	5581.83	5832.68	6089.19	6218.46	6431.96	6799.16
Power	2317.28	3031.76	2864.55	2965.78	3080.25	3216.48	3263.97	3536.92	3745.00
Telecommunications	898.51	930.43	973.58	903.76	918.46	925.93	966.70	894.66	917.66
Roads	818.37	1048.02	976.03	1023.90	1068.86	1123.29	1142.40	1204.62	1262.44
Other Infrastructure	605.92	735.13	663.53	688.39	765.10	823.50	845.39	795.75	874.06
<b>Share</b>									
Power	49.94	52.77	52.29	53.13	52.81	52.82	52.49	54.99	55.08
Telecommunications	19.36	16.19	17.77	16.19	15.75	15.21	15.55	13.91	13.50
Roads	17.64	18.24	17.82	18.34	18.33	18.45	18.37	18.73	18.57
Other Infrastructure	13.06	12.80	12.11	12.33	13.12	13.52	13.59	12.37	12.86
<b>Growth rate</b>									
Infrastructure	44.60	23.82	35.61	22.19	20.72	18.90	13.52	15.23	16.57
Power	48.19	30.83	41.44	34.15	27.06	23.30	13.94	19.26	21.58
Telecommunications	76.57	3.55	41.01	-5.55	-4.84	-5.67	-0.71	-1.01	-0.09
Roads	33.27	28.06	29.42	29.26	28.99	25.00	17.04	17.65	18.11
Other Infrastructure	16.05	21.32	16.50	13.17	24.69	30.25	27.41	15.60	14.24

Source : RBI

providing guarantees for bonds issued by private infrastructure companies rather than expanding its direct lending operations. This would enable mobilization of insurance and pension funds, external debt, and household savings. The IIFCL would also make subordinated debt available as an additional source of finance. Further, it may also substitute its take-out financing scheme with an Infrastructure Debt Fund.

11.60 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 35.61 per cent in Q1 of 2011-12 to 13.52 per cent in Q1 of 2012-13, before marginally improving to 16.57 per cent in Q3 of the current year. Within infrastructure, power had over 50 per cent share in total credit flow to infrastructure. The rate of growth of this sector, after moderating to 13.94 per cent in Q1 of 2012-13 improved to 21.58 per cent in Q3. The telecom sector witnessed consecutive decline in the last six quarters (Table 11.11)

11.61 Continued global risks and moderated business sentiment have affected FDI inflows to key infrastructure during the current financial year. The total FDI inflows into major infrastructure sectors during April-November 2012 have dipped significantly registering a contraction of 97.8 per cent. The major decline has been in the power sector (-68 per cent), petroleum and natural gas (-89 per cent), and telecommunications (-96 per cent) (Table 11.12). Regulatory uncertainties, slower growth, and delays in acquisition of land were some of the reasons for decline in FDI inflows in the infrastructure sector in the current year.

## PPP initiatives

11.62 The government is promoting PPPs as an effective tool for bringing private-sector efficiencies in creation of economic and social infrastructure assets and delivery of quality public services. According to a World Bank Report on Private Participation in Infrastructure (PPI), India has been the top recipient of PPI activity since 2006 and has implemented 43 new projects which attracted total investment of US\$20.7 billion in 2011. India alone accounted for almost half of the investment in new PPI projects implemented in developing countries during the first semester of 2011. The Report maintained that India remained the largest market for PPI in the developing world. In the South Asian region, India attracted 98 per cent of regional investment and implemented 43 of the 44 new projects in the region. Details of PPP initiatives are provided in Box.11.5.

## CHALLENGES AND OUTLOOK

11.63 From a macroeconomic perspective, a high level of investment in the infrastructure sector is essential for the overall revival of investment climate which may finally lead to sustainable growth in an economy. However, in the current macroeconomic environment, to achieve this objective, there is need to address sector-specific issues over the medium- to long-term horizon in India.

11.64 There is an overall shortage of power in the country both in terms of energy deficit and peak shortage. At present, overall energy deficit is about 8.6 per cent and peak shortage of power is about 9.0 per cent. The Eleventh Plan added 55,000 MW

**Table 11.12 : FDI Flows to infrastructure (US\$ million)**

Sector	2009-10	2010-11	2011-12	Apr.-Nov.	
				2011	2012
Power	1,437.3	1271.77	1652.38	1436.75	456.00
Non-conventional energy	497.9	214.40	452.17	241.62	443.08
Petroleum & natural gas	272.1	556.43	2029.98	1971.97	210.73
Telecommunications	2554.0	1664.50	1997.24	1987.18	70.46
Air transport *	22.6	136.00	31.22	27.50	13.72
Sea transport	284.9	300.51	129.36	99.42	36.23
Ports	65.4	10.92	0.00	0.00	0.00
Railway-related components	34.2	70.66	42.27	35.16	17.79
<b>Total (of above)</b>	<b>5,168.40</b>	<b>4,225.19</b>	<b>6,334.62</b>	<b>5,799.60</b>	<b>1,248.01</b>

Source : Department of Industrial Policy and Promotion.

Notes : \*Air transport including air freight. Variation in data is due to reclassification of some sectors.

### Box 11.5 : PPP initiatives in India

The Government of India is promoting PPPs as an effective tool for bringing private-sector efficiencies in creation of economic and social infrastructure assets and for delivery of quality public services. India in recent years has emerged as one of the leading PPP markets in the world, because of several policy and institutional initiatives taken by the central government. By end December 2012 there were over 900 PPP projects in the infrastructure sector with total project cost (TPC) of ₹ 5,43,045 crore as compared to over 600 projects with TPC of ₹ 333,083 crore on 31 March 2010. These projects are at different stages of implementation, i.e. bidding, construction, and operational.

#### Approval of Central-sector PPP projects

Since its constitution in January 2006, the Public Private Partnership Appraisal Committee (PPPAC) has approved 307 central project proposals with TPC of ₹ 2,97,856.58 crore. These include NHs (242 proposals), ports (29 proposals), airports (2 proposals), tourism infrastructure (1 proposal), railways (1 proposal), housing (27 proposals), and sports stadia (5 proposals).

#### VGF for PPP Projects

Under the Scheme for Financial Support to PPPs in Infrastructure (Viability Gap Funding Scheme), 145 projects have been granted approval with TPC of ₹ 80,203.28 crore and VGF support of ₹ 1,56,72.68 crore and ₹ 902.96 VGF crore has been disbursed.

Thirteen new sub-sectors have been included in the list of sectors eligible for VGF support under the Scheme. These include:

- i. Capital investment in the creation of modern storage capacity including cold chains and post-harvest storage.
- ii. Education, health, and skill development.
- iii. Internal infrastructure in National Investment and Manufacturing Zones.
- iv. Oil/gas/liquefied natural gas (LNG) storage facility [includes City Gas distribution (CGD) network]; oil and gas pipelines (includes CGD network); irrigation (dams, channels, embankments, etc); telecommunication (fixed network) (includes optic fibre/ wire/ cable networks which provide broadband / internet); telecommunication towers; terminal markets; common infrastructure in agriculture markets; and soil-testing laboratories.

#### 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 consultants and projects. So far, 51 projects have been approved with IIPDF assistance of ₹ 64.51 crore of which ₹ 25.00 crore has been disbursed.

#### Capacity Building and Strengthening of State and Central Institutions

The National PPP Capacity Building Programme was launched by the Finance Minister in December 2010, and was rolled out last year in 15 States and two central training institutes, viz. the Indian Maritime University and Lal Bahadur Shastri National Academy of Administration. A comprehensive curriculum has been prepared and 11 training programmes conducted to train 154 trainers, who have trained over 1975 public functionaries, who deal with PPPs in their domain.

**Online toolkits for PPP projects** for five sectors were developed and were launched by the Finance Minister. These are available on this Department's website on PPPs, i.e. [www.pppinindia.com](http://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 the infrastructure PPPs that are implemented in India. In the past one year, 720 national and international users have availed of this one-of-a-kind web-based resource to structure better PPP projects.

#### PPP Rules and PPP Policy:

Following the recommendations of the Committee on Public Procurement, the Prime Minister's announcement regarding transparency and accountability in procurement, and preparation of the Public Procurement Bill, and to ensure that PPP projects are procured and implemented by following laid down processes and observing principles of transparency, competitive bid process, affordability, and value for money, the draft PPP Rules and PPP Policy have been prepared. These have undergone extensive consultation process at central and state government levels for finalization.

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 government needs to study the PPP experience and build some central capacity to help ministries, authorities, and states structure contracts and renegotiate troubled ones.

**Box 11.6 : Financial Restructuring of State Distribution Companies**

The government in September 2012 approved the scheme for Financial Restructuring of State Distribution Companies (Discoms). The salient features of the scheme are as follows:

- a. 50 per cent of the outstanding short-term liabilities up to 31 March 2012 to be taken over by state governments. This shall be first converted into bonds to be issued by Discoms to participating lenders, duly backed by state government guarantee.
- b. Takeover of liability by state governments from Discoms in the next two to five years by way of special securities and repayment and interest payment to be done by state governments till the date of takeover.
- c. Restructuring the balance 50 per cent short-term Loan by rescheduling loans and providing moratorium on principal.
- d. The restructuring/reschedulement of loan is to be accompanied by concrete and measurable action by the Discoms/ states to improve their operational performance.
- e. Central government will provide incentive by way of grant equal to the value of the additional energy saved by way of accelerated AT&C loss reduction beyond the loss trajectory specified under the RAPDRP and capital reimbursement support of 25 per cent of principal repayment by the state governments on the liability taken over by the state governments under the scheme.

of generation capacity which was more than twice the capacity added in the Tenth Plan. The Twelfth Plan aims to add another 88, 000 MW. Delivery of this additional capacity would critically depend on resolving fuel availability problems, especially when about half the generated capacity is expected to come from the private sector. The private developers may not be able to finance the projects if coal linkages are not resolved and there are delays in finalization of fuel supply agreements (FSAs). While some decisions have been taken for restructuring Discoms' finances (Box 11.6), these may need to be monitored and implemented in spirit.

11.65 Although India has large coal reserves, demand for coal is substantially outpacing its domestic availability, with Coal India not being able to meet its coal production targets in the Eleventh Plan. Domestic coal supplies are therefore not assured for coal-based power projects planned during the Twelfth Plan. Hence it is essential to ensure that domestic production of coal increases from 540 million tonnes in 2011-12 to the target of 795 million tonnes at the end of the Plan. This increase of 255 million tonnes assumes an increase of 64 million tonnes of captive capacity with the rest being met by Coal India Limited. However, even with this increase, there will be a need to import 185 million tonnes of coal in 2016-17 which may further add to the financing cost of power projects. More effort must be made for improving competition and efficiency in the coal sector, which may entail structural reforms. Problems like delays in obtaining environmental clearances, land acquisitions, and

rehabilitation need to be suitably addressed in fast-track mode to achieve the Twelfth Plan targets for coal production while maintaining a balance between growth needs and environmental concerns. Progress of road projects has also suffered on account of similar factors. The creation of a High-Level Cabinet Committee on Investment to quicken the pace of decision making in critical infrastructure projects by the government is expected to resolve any issues involving inter-ministerial coordination.

11.66 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 route needs to be eased so that promoters can sell equity positions after construction, passing on all benefits and responsibilities to entities that step in. Promoters can then use the equity thus released for new projects. Steps are also needed to up-scale projects in PPP mode for achieving the targets envisaged for the development of roads in the Twelfth Plan.

11.67 The process of extending transparent policies and mechanisms for allocation of scarce natural resources to private companies for commercial purposes has also been initiated. The Mines & Mineral (Development and Regulation) Bill 2011 aims at providing a simple and transparent mechanism for grant of mining lease or prospecting licence through competitive bidding in areas of known mineralization and on first-in-time basis in areas where mineralization is not known. However,

in order to meet the objective of revenue maximization in an open, transparent and competitive manner, this should be preceded by detailed geological mapping of the mineral wealth of the country. Further, any policy prescription regarding the use of natural resources must ensure that the process of selection is fair, reasonable, non-discriminatory, transparent, and aimed at promoting healthy competition and equitable treatment.

11.68 Owing to a number of external and internal factors, viability of airline operations in India has come under stress. A high operating cost environment owing to high and rising cost of aviation turbine fuel (ATF) coupled with rupee depreciation is making operations unviable for carriers in India. The Expert Report of Nathan Economic Consulting India Private Ltd. (Nathan India) which went into the question of pricing and the tax regime governing ATF concluded that ATF prices in India are significantly higher (at least 40 per cent) than in competing hubs in the region such as Singapore, Hong Kong, and Dubai. Therefore, there is need to rationalize the tax regime particularly value added tax on ATF which is in the range of 20-30 per cent in most of the states. The Ministry of Civil Aviation is of the view that ATF should be included under the declared category of goods under the relevant provision of the Central Sales Tax Act so that a uniform levy of 5 per cent is achieved. Equally important is the need for a transparent pricing regime for ATF in India. A high tax regime for aviation in general and ATF in particular will reduce the wider economic benefits available from aviation, resulting in a negative impact on economic growth and overall government revenue bases.

11.69 Development of capability in Railways is another urgent priority for the Twelfth Plan. Capacity in Railways has lagged far behind what is needed, especially given the requirement of shifting from road transport to rail in the interests of improving energy efficiency and reducing carbon footprints in development. The funding pattern of the Twelfth Plan clearly shows that the modernization of Indian Railways cannot be achieved by simply relying on GBS as about 62 per cent of the resources would have to be generated through non-GBS sources and nearly 20 per cent through private-sector investment. There is a need to draw up clear strategies to generate resources by identifying segments where Indian Railways can adopt a low-cost policy by playing on volumes and taking advantage of economies of scale and segments where it can adopt a differentiation approach by providing high quality services and command premium prices.

11.70 As mentioned in the Twelfth Plan document, a GDP growth rate of about 8 per cent requires a growth rate of about 6 per cent in total energy use from all sources. Unfortunately, the capacity of the economy to expand domestic energy supplies to meet this demand is severely limited. The country is not well-endowed with energy resources, except coal, and the existence of policy distortions makes management of demand and supply more difficult. Accordingly, the short-run action needed to remove impediments to implementation of projects in infrastructure, especially in the area of energy, includes ensuring fuel supply to power stations, financial restructuring of Discoms, and clarity in terms of the NELP. At the same time, the long-term strategy should focus on issues like coal production, petroleum price distortion, natural gas pricing, and effective management of the urbanization process.